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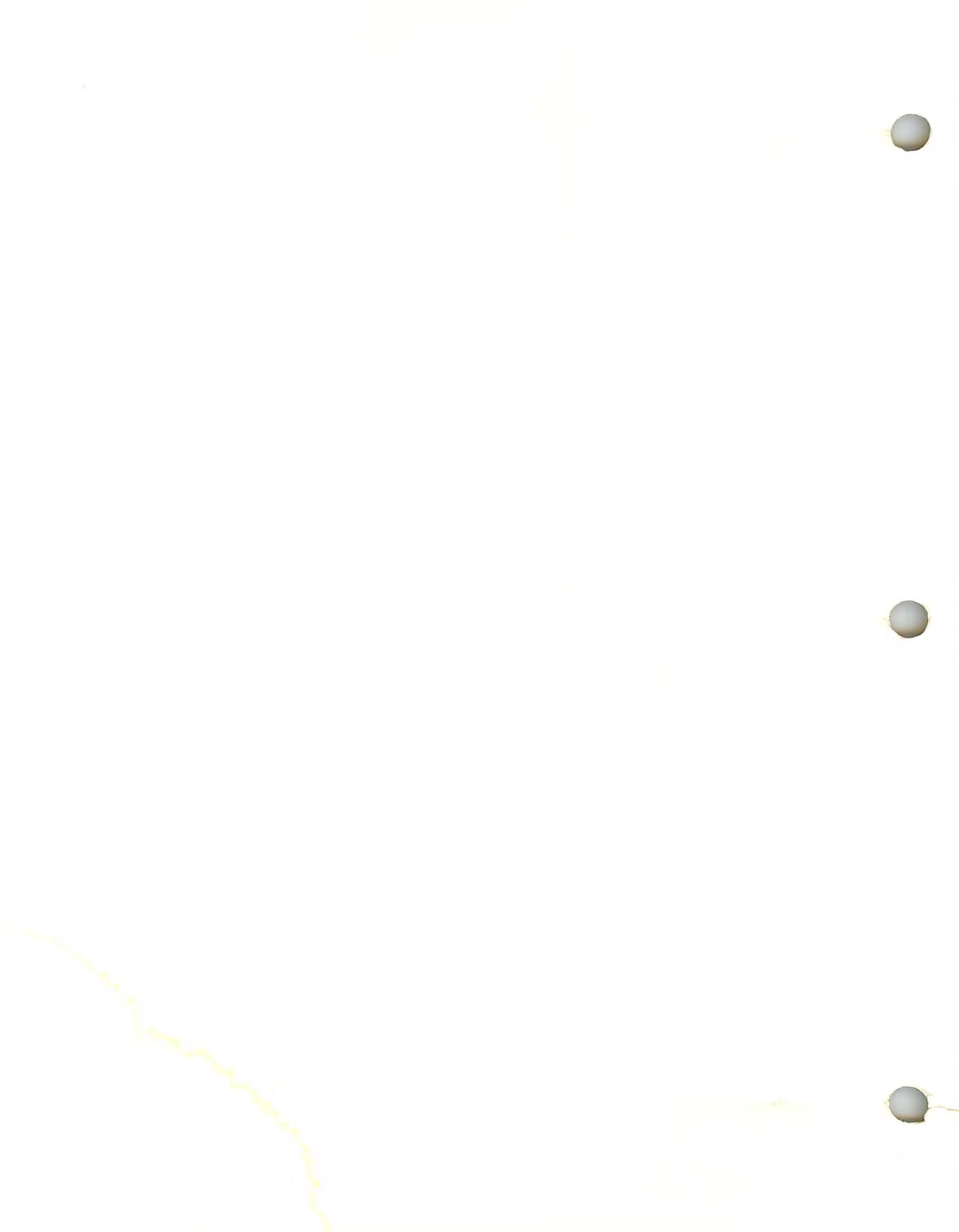
Reference Manual

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Reference Manual

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NOTICE

Rules established by the Federal Communications Commission (FCC) permit connection of the ZP-150 to a telephone line in the United States through an approved connector jack. Before connecting to the telephone line, however, ZP-150 users must give their local telephone company the following information.

- Phone number;
- The FCC Registration Number (from the label on the rear panel of the ZP-150).
- The ringer equivalency number (also from the label).
- The USOC connector jack required (RJ11C/RJ11W, RJ12C/RJ12W, or RJ13C/RJ13W).

If the phone jack is not so equipped, the telephone company can provide the proper jack. However, this equipment must not be connected to a party line or coin phone installation.

The telephone company may make changes in its technical operations and procedures, but they are required to give adequate notice if such changes might affect the compatibility or use of registered equipment.

If the ZP-150 malfunctions at any time, disconnect it immediately from the telephone line and leave it disconnected until the problem is corrected. This will prevent possible damage to the phone network, and interruption of service.

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INTRODUCTION

Congratulations on becoming the owner/operator of a powerful, truly portable computer—the Heath/Zenith Data Systems ZP-150.

This manual is written to provide tutorial and comprehensive reference information for the use of Microsoft® Works—the ROM-based integrated software system that is part of your ZP-150. Works includes:

- the System Manager (Works' operating system),
- BASIC,
- Calendar (an electronic journal/planner with built-in alarm/reminder capability),
- File (for database file creation and management),
- Plan (a subset of Microsoft Multiplan),
- Telcom (a versatile telecommunications program featuring ANSI terminal support and script-run operation),
- Word, and
- Alarm, Calc, and Dialer (special programs that you will find useful throughout Works).

C This manual includes one or two chapters for each of the programs in Works. For ZP-150 hardware information and a brief introduction to Works, refer to your *ZP-150 User's Guide*. Be sure you read your *User's Guide* before you try to use your ZP-150. It contains procedures that must be followed before you can power up and use your new computer.

MANUAL ORGANIZATION

This manual is organized so that related information is in adjacent chapters. Skim through the Contents listing and the body of the manual to get a general idea of how the chapters are organized. The first four chapters are foundation chapters; they provide information about the System Manager and features of Works that you can use throughout the system:

- Chapters 1 and 2 provide introductory and reference information for the System Manager.
- Chapter 3 provides general information about loading and using Works programs, and about exchanging information between programs by using a special area of memory called the scrap. It also describes how you can transfer files between your ZP-150 and a desktop computer system.

- Chapter 4 describes the peripherals you can use with your ZP-150, and the logical device names you must use to access them.

The special programs—Alarm, Calc, and Dialer—can be used at any time. They can be invoked whether you are working in the System Manager or a program, and will not cause you to terminate the current program or to lose any data. Chapters 5 through 7 provide instructions for using the special programs.

The remaining chapters in the manual are program-specific, with the chapters organized in alphabetical order by program name. For information about:

- BASIC, refer to Chapters 8 and 9;
- Calendar, refer to Chapters 10 and 11;
- File, refer to Chapters 12 and 13;
- Plan, refer to Chapters 14 and 15;
- Telcom, refer to Chapters 16 and 17; and
- Word, refer to Chapters 18 and 19.

For each program, the first of the two program-specific chapters is an introduction that you should read before using the program, especially if you are not familiar with its desktop-system counterpart. The introductory chapters include tutorials that will help you become familiar with program features and functions. In most cases, you will be able to use a program effectively for yourself after working through the tutorial.

The second of the two chapters for each program provides comprehensive reference information for the program. In it you will find descriptions of program function keys, descriptions of selection and scrolling keys as they are used within the program, a summary listing of program commands, a detailed reference section for each command, and descriptions of error messages that you may encounter. As you are learning to use a program, refer to the reference chapter when you have a question about something that is not covered in the tutorial. Later, as you become more familiar with the program, you will want to refer to the reference chapter to learn more about how to use the program's full capabilities. For example, you can read and work through Chapter 14 to learn the basics about Plan. Then as your knowledge increases, you can refer to Chapter 15 for information about all of the commands and functions that Plan provides.

For your convenience, a Glossary is provided at the end of this manual. In it you can find definitions for terms that are specific to Works and its programs.

An Index is also provided to make it easy for you to find specific information quickly.

As you are learning about the programs in Works, and later, as you are using the programs in Works, you may find it helpful to refer to the *Quick Reference Card* that is provided with this manual.

HOW TO USE THIS MANUAL

You may be intimidated by the volume of this *Reference Manual* as compared to the size of your ZP-150. If you are, consider that because of the power and versatility of your portable computer, describing it simply took a lot of paper! This manual is actually eight manuals in one: an operating system manual (Chapters 1-4), a guidebook for three special programs (Chapters 5-7), and six manuals for the five built-in applications and BASIC (Chapters 8-19).

As you begin, it is recommended that you *not* try to read through the entire manual at once. Instead, take a look at Chapter 1, "System Manager," first. The System Manager is the foundation for Works, just as an operating system for a desktop computer system is the foundation for all the programs that you run. The System Manager keeps track of all your files for you, enables you to execute the built-in and special programs, allocates memory for program execution, and manages all program and system functions that require the use of external devices.

Chapter 1 includes descriptions of screen display characteristics that are common to most Works programs and introduces terms and concepts that are used throughout the *Reference Manual*.

You do not have to memorize all of the functions of the System Manager before you can use a program, but gaining a general understanding of the interactive, menu-driven structure of the System Manager will be beneficial. Once you are familiar with the menu-driven structure of the System Manager, you will have no difficulty learning to use the menus, submenus, and command prompts that you will encounter in running the Works applications.

After reading Chapter 1, choose the application that is of most interest to you and proceed to the first chapter for that program—the one titled "Introduction to . . ." (You probably will want to choose a program other than BASIC, since BASIC is used much the same as you would use BASIC on a desktop system. As a new ZP-150 user, you will profit most by becoming familiar with its unique ways of executing programs.) Read the introductory chapter carefully, try the tutorials and examples, and experiment with the program until you feel comfortable using the commands and functions covered in the tutorials.

Once you have worked through the introductory chapter for the program you chose, you can work through the introductory chapter for another program, or, if you want to learn more details about the first program, you can read the reference chapter for it. Reference chapters all have titles ending with "Reference." In addition, the reference chapter for each program immediately follows that program's introductory chapter.

Read the manual in the order that best suits you. As you work, remember that the *Quick Reference Card*, Glossary, and Index can all be helpful reference tools.

About the Typefaces Used in this Manual

A variety of typefaces are used in this manual to help clarify the information that is presented. For example, in a specific procedure or example where a certain key must be pressed, the key name is printed in boldface type—like this: RETURN. In all cases, key names are printed in uppercase letters.

When a term is being defined or when a word represents a variable, italic type is used. For example:

- "A *hidden file* is a system or program file that . . .", and
- *mm/dd/yy*.

In the first example, the term "hidden file" is being explained or defined. In the second example, *mm/dd/yy* is a variable for which you must supply actual values. Also, italic letters are sometimes used for emphasis within text. (For information about variables and syntax line representations used in a particular program such as BASIC, refer to the reference chapter for that program.)

Where text or data that is actually displayed on the screen is included in the manual, it is printed in *this typeface*, whether it is embedded in text or set apart as a figure.

Finally, a note about key names: sometimes you will see hyphenated key names, as in CTRL-F10. When you see two or more key names printed this way, it means that you should press the keys simultaneously. In the case of the example here, you would press and hold the CTRL key, press F10, and then release both keys.

CHAPTER 1

SYSTEM MANAGER

OVERVIEW

Your ZP-150 is a powerful, truly portable personal computer designed for those on the go. It features Microsoft Works—a series of built-in applications, BASIC, and three special programs that meet the needs of a wide range of users, from business managers and sales representatives to independent programmers, writers, and students. The programs can be used independently or in conjunction with each other. The programs included in Works are:

- BASIC—a powerful version of BASIC that enables both experienced and inexperienced users to write and execute programs;
- Calendar—an electronic journal/planner with built-in reminder feature, for recording daily appointments (tasks) and activities;
- File—a database file creation and management program that allows you to store, retrieve, and process the information you enter;
- Plan—a subset of Multiplan that enables you to create an electronic worksheet for business and personal data analysis;
- Telcom—a telecommunications program that allows your ZP-150 to communicate with a host computer system or information service such as Dow Jones or CompuServe. Telcom also transfers files between your ZP-150 and a compatible desktop computer; and
- Word—for creating, editing, and printing documents.

The special programs that are part of Works are:

- Alarm—to notify you of appointments and tasks scheduled with the Calendar program, and to enable you to set a second reminder time for those activities for which an alarm has sounded;
- Calc—to enable you to use your ZP-150 as you would a calculator with a memory feature; and
- Dialer—to complete voice communications connections through your ZP-150 and a conventional modular telephone handset.

These special programs can be used at almost any time—during any program or when your system is idle—with loss of data or termination of the

operation in progress. You can suspend a program at any time to acknowledge an alarm, use your system's built-in calculator, or make a phone call.

NOTE: Special programs cannot be used when the amount of available system memory is low.

The part of Works that interconnects all these programs and features and that supports system functions is the System Manager. The System Manager is much like the operating system in a desktop computer system, except that it is menu-based and interactive throughout. With it you run the applications and special programs, exchange information among programs, and manage the files you create.

Other features of the ZP-150 include:

- a built-in 300-baud modem for telecommunications;
- flexible power supply requirements (power can be supplied by means of an AC adapter or 10 AA alkaline batteries);
- data protection (a Ni-Cad battery retains the contents of Random Access Memory (RAM) even when the unit is turned off); and
- an array of ports and connectors for the use of peripheral devices such as external modems, parallel and serial printers, and data cassette recorders.

The use and requirements of the System Manager are described in the remainder of this chapter and in Chapter 2, "System Manager Reference." For general information about the applications, refer to Chapter 3, "ZP-150 Applications." Detailed tutorial and reference information for BASIC and each of the applications is provided in Chapters 8 through 19. For information about using external devices (peripherals), see Chapter 4, "External Devices," and for details about Alarm, Calc, and Dialer, refer to Chapters 5, 6, and 7, respectively.

STARTING UP

Whenever you turn on your ZP-150, you start the System Manager, and (unless you turned off your system while you were running an application or automatic power-off has occurred) the System Manager screen is displayed as shown in Figure 1.1. (If automatic power-off occurred the last time you used your computer or if you turned off your system while it was running an application, then the LCD screen will appear as it did when power-off occurred.)

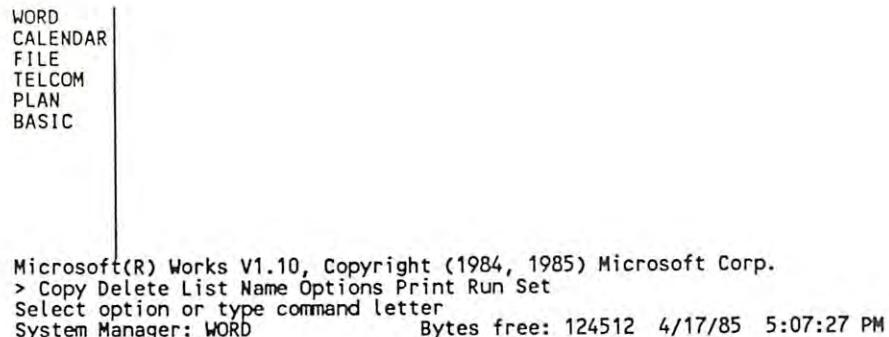


Figure 1.1. The System Manager Screen

NOTE: The very first time your ZP-150 is turned on after it is shipped from the factory or after a cold start is performed, an internal diagnostics routine is completed before the System Manager screen is displayed.

The Screen Display

The System Manager screen shares some common features with the screens produced by all the built-in programs except BASIC. These common features are the *command line*, the *message line*, and the *status line*.

THE COMMAND LINE

The *command line* displays command menus, submenus, and command prompts. Each program, including the System Manager, has its own command menu. In addition, many individual commands produce submenus and/or prompts for you to enter additional information for execution of the selected command. At any time while you are using the System Manager or an application, you select the command you want to execute from the displayed menu. As shown in Figure 1.1, the System Manager command menu selections are the COPY, DELETE, LIST, NAME, OPTIONS, PRINT, RUN, and SET commands. More information about commands is provided under Command Selection and Execution in this chapter. Detailed information about each of the System Manager commands is provided in Chapter 2, "System Manager Reference."

THE MESSAGE LINE

Directly below the command line is the *message line*. The messages displayed here give you information about what to do next or about an error condition that has occurred. (Any error message displayed on the message line remains in the display until any key is pressed.) For example, on the System Manager screen the message that is displayed when no operation is in progress is Select

option or type command letter. This message, or prompt, informs you that the System Manager is ready to accept a command you select from the menu.

NOTE: While the message line provides ongoing information for convenient use of the System Manager or an application, the copyright line that is displayed directly above the command line is also used by some functions and commands to provide information about an operation that is currently in progress. For example, when you delete a file, the name of the file that is being deleted is displayed on this line. For more information, refer to Commands in Chapter 2, "System Manager Reference."

THE STATUS LINE

The last line on the screen is the *status line*. This line displays status information relevant to the system and the program being run. When you are working in the System Manager, the status line displays the name of the program being run (System Manager:), the default or currently selected application, the amount of free memory in bytes, and the current date and time. (Notice that, as shown in Figure 1.1, Word is always the default application when your system enters the System Manager.) The contents of the status line are application- and operation-specific, and thus, vary somewhat from application to application and from command to command. However, most applications do display the name of the application and the file that you are working with at any given time.

In addition, there are a number of status line indicators that correspond to some system-wide and special functions and may be displayed at any time. These indicators are displayed on the rightmost third of the status line and are listed in Table 1.1.

THE FILES DISPLAY

Look again at Figure 1.1. The upper area of the display shown in the figure is unique to the System Manager screen. To the left of the vertical bar, the first six lines of the screen list the names of the built-in programs. The area to the right of the vertical bar is reserved to display the names of the data and work files you create. Once you have created data files, their associated file name extensions will also be displayed to the left of the vertical bar. For files that do not have a file name extension, a period (.) is displayed to the left of the vertical bar. (For more information about work and data files, file naming conventions, and about how files are displayed by the System Manager, refer to Files and File Names in this chapter.)

Table 1.1. Status Line Indicators

INDICATOR	DESCRIPTION
Ap	Append Scrap mode is in effect. The selection will be appended to the existing contents of the scrap.
Cp	Text Capture mode is in effect (Telcom program only).
Ex	Extend Selection feature is on.
Lo	Low memory. Either the amount of free system memory is low, or the file that is currently open is nearing the maximum file size of 64K bytes.
Ns	No Scrap mode is in effect. If you are deleting a selection from any application, the selection will be erased and not stored in the scrap. If you are attempting to insert data or text in Plan, no data will be transferred from the scrap. For other programs, No Scrap mode does not affect the insertion of data from the scrap.
Ot	Overtype mode is on (Word program only).
Pr	Print Text mode is on (Telcom program only).
Rv	Review Text mode is on (Telcom program only).
Unsorted	Sort capability is turned off (Calendar and File programs only).
Voice	VOICE key is on, indicating that only voice (and no data) communications can be conducted (Telcom program only).
Xoff	XOFF has been received from remote/host (Telcom program only).
⌚	Alarm (set with Calendar or Alarm program) is waiting to be acknowledged.
♫	Incoming call (displayed only if telephone line is connected to ZP-150 TEL LINE connector).

NOTE: The normal, or Blank Scrap, mode of the scrap produces no status line indicator. That is, the absence of both Ap and Ns indicates a normal scrap setting. More information about the scrap is provided later in this chapter and in Chapter 3, "ZP-150 Applications." For more information about application-specific status line indicators, refer to the introductory and reference chapter(s) for the application(s).

COMMAND SELECTION AND EXECUTION

Once you learn how to select and execute commands from the System Manager screen, you will be able to use any of the applications that also produce a command menu. The methods of command selection and execution are the same for all programs except BASIC, which functions much the same as BASIC used in a desktop computer system. (Refer to Chapters 8 and 9 for more information about BASIC.)

Selecting a Command from the Menu

Whenever the System Manager command menu is displayed, the default or currently selected command is displayed in reverse video, or highlighted. This reverse-video bar is called the *selection highlight* because you can move it around the screen to select a file, text, command, or option for command execution. (Note that, in some applications, you have a selection highlight in the data area of the screen display as well as in the command line. In others, the selection highlight will appear in only one of these two areas at any given time.) Whenever you first enter or return to the System Manager, the default command is RUN. This command is used to invoke any of the built-in applications and/or BASIC.

There are two ways to select a command from the menu for execution. You can do either one of the following:

- Press **SPACE BAR** (or **TAB**) and/or **BACK SPACE** (or **BACK TAB**) to move the selection highlight to the desired command. The **SPACE BAR** and **TAB** keys move the highlight right one command at a time. The **BACK SPACE** and **BACK TAB** keys move the highlight left one command at a time. When the desired command has been selected, press **RETURN** to begin command execution. For example, suppose that the **RUN** command is the current selection and you want to invoke the **COPY** command. To do so, you can press **SPACE BAR** twice to select the **COPY** command and then press **RETURN**.

NOTE: Enter **BACK TAB** by pressing **SHIFT-TAB**.

- Enter the first letter of the command name to begin command execution. For example, if you want to copy a file, you can simply press C to invoke the COPY command. You do not have to press RETURN when you select a command in this way.

When a command has been selected by one of the above methods, it may be executed immediately or a command submenu or command prompt(s) may be displayed, depending upon the command you invoked and the currently selected file on the System Manager screen.

Using a Command Submenu

A *command submenu* shows the full range of commands available under one primary command name. For example, the SET command (as it appears on the System Manager command menu) actually represents all of the following commands:

- SET CLOCK,
- SET PRINTER,
- SET SLEEP,
- SET TONE, and
- SET WAKE.

Whenever you invoke the SET command, the following command submenu is displayed:

SET: Clock Printer Sleep Tone Wake

As with a command menu, the default or currently selected command on a command submenu is displayed in reverse video. For the SET command, the default selection is *Clock*, for the SET CLOCK command. You make selections from a command submenu the same as you do from a command menu. That is, you can use the SPACE BAR or TAB and BACK SPACE or BACK TAB keys to select the desired command and then press RETURN, or you can enter the first letter of the command name.

Command Prompts

Command prompts are displayed on the command line (in conjunction with informational messages on the message line) whenever the system requires additional information to execute the command you invoked. A command may produce one or more command prompts. However, not all commands produce prompts. Consider the SET CLOCK command as an example for commands that do produce prompts.

Suppose the SET command submenu were displayed as shown previously and you selected the SET CLOCK command by entering C. The command and message lines of the screen would then display:

1.8

System Manager

SET CLOCK date: mm/dd/yy time: hh:mm:ss AM
Enter date

where mm/dd/yy is the date (month, day, and year) currently entered in system memory; and hh:mm:ss is the time (hour, minute, and second) currently entered in system memory, followed by either AM or PM.

In this display, date: and time: are command prompts at which you can enter a new date and time, respectively. The selection highlight is on the current date in the display to indicate that any entry you make will be associated with the date: prompt. The prompt at which the selection highlight is located is called the *currently selected* or *active prompt*. Notice that the message line display is relevant to the active prompt. In this example, it tells you to enter the date. Suppose you do not want to change the date currently being used by the system. To select the other command prompt, you would simply press TAB. The selection highlight would move to the data entry area following the time: prompt (the area where the current time is displayed), and the message line would display:

Enter time

Pressing TAB will always move the highlight from one command prompt to another, in sequence. BACK TAB will perform the same function. However, you should not press RETURN until all information has been entered at the command prompts (or until you have made sure that the current or default entries at the prompts are correct), and you are ready for the command to be executed.

For purposes of this example, suppose that you decided not to change either the date or the time. You could then abort the command by pressing ESC. ESC is a system function key that enables you to cancel any command before RETURN is pressed. More information about this and other system function keys is provided in System Function Keys in this chapter.

In the preceding paragraphs, the SET CLOCK example illustrated what command prompts are. Note, however, that not all command prompts require you to enter information with the keyboard as you would if you entered new values for the SET CLOCK command prompts. Some command prompts provide a list of valid responses from which you can select one response. An example of this type of prompt is that produced by the SET TONE command.

The SET TONE command enables you to specify whether alarms and error conditions will produce an audible tone as well as a visual indicator. Suppose the SET command submenu were displayed, and you selected the SET TONE command by entering T. The command and message lines would then display:

SET TONE for alarm: Audible Mute error: (Audible) Mute
Select option

In this display, for alarm: and error: are command prompts at which you can select one of the listed options. Notice that the first prompt is active and that the current (or default) selection for that prompt (Audible) is highlighted. The current selection for the prompt that is *not* active (that is, the error: prompt) is enclosed in parentheses so that you do not have to move the selection highlight to the prompt in order to see the current selection for that prompt.

For command prompts of this type, you can select each prompt in sequence by pressing the TAB or BACK TAB key. Each time you press TAB the next prompt will become active; similarly, if you press BACK TAB the previous prompt will become active. In either case, the current selection for that prompt will be highlighted.

There are two ways to make a selection from the valid responses listed for a given prompt. When the prompt is active (that is, when the selection highlight is at that prompt), you can do either one of the following:

- Press **SPACE BAR** or **BACK SPACE** until the response you want is selected. The **SPACE BAR** moves the selection highlight from left to right one option (listed response) at a time. **BACK SPACE** moves the selection highlight from right to left one option at a time.
- Enter the first letter of the response you want.

No matter which method you use, TAB (or BACK TAB) always moves the selection highlight from prompt to prompt. **SPACE BAR** and **BACK SPACE** are used only to make a selection at the active prompt.

For example, if the SET TONE command prompts described here were displayed on your screen, and you did not want to change the current setting for alarms, you would press TAB to select the error: prompt. The current (default) selection at that prompt (Audible) would then be displayed in reverse video. If you wished to change this selection (if you did not want an audible indicator upon the occurrence of error conditions), you would enter M or press **SPACE BAR** (or **BACK SPACE**) to select **Mute**. (**Mute** instead of **Audible** would be displayed in reverse video.)

If you entered A, **Audible** would again be highlighted as the current selection. Or, each time you pressed **SPACE BAR** (or **BACK SPACE**), the next (or previous) response would be selected. In the case of this two-response example, the highlight simply shifts between the two possible selections. (When more than two possible responses are listed for a command prompt and you press **SPACE BAR** repeatedly, the selection highlight moves to the right until the last response is selected. Then, if you press **SPACE BAR** again, the selection highlight moves back to the first possible response.) The selection highlight will not move to another prompt until you press TAB or BACK TAB.

For this type of command prompt, the selections you make are not actually entered into the system for command execution until you press RETURN. To avoid reexecuting commands to correct mistakes, you should not press RETURN until you are certain that the default selection or new selection for each prompt is correct.

NOTE: Some commands produce both types of command prompts. That is, they produce prompts at which you must make numerical or text entries via the keyboard and prompts at which you specify your entry by selecting one of several listed responses. In any case, you move from prompt to prompt by using the TAB and/or BACK TAB keys, and the entries and selections you make are not entered into the system for command execution until you press RETURN.

Default Entries and Selections

A *default* is a preselected term or value that will be used by the system in command execution unless you specify a different value.

On command menus and submenus, the default command is the one that is currently selected. This is the command that will be executed if you press RETURN without making any other selection. Note that the System Manager and most applications have a commonly used command that is always the default when the program is first invoked. For example, whenever you enter the System Manager, the RUN command is the initial default command. If you move the selection highlight, the newly selected command becomes the default command.

Default values are also provided throughout the system at most command prompts. For command prompts, the default is the value, term, or setting that is currently being used by the system. Where defaults exist, they are displayed next to the prompt with which they are associated (in the case of prompts that require you to make a text or numerical entry via the keyboard) or they are highlighted or displayed in parentheses (in the case of prompts that require you to select one of several possible valid responses).

The values or selections that are thus displayed when command prompts are first displayed on the screen are called *default entries*, *default selections*, or *defaults*. The defaults will remain in force until you make new entries or selections and press RETURN. This system of displayed defaults makes it simple for you to check settings and values without changing them. For example, suppose you want to check the print format parameters being used by your system. These parameters are defined with the SET PRINTER command. To review them without changing them:

1. Select the SET command from the System Manager command menu (move the selection highlight to **Set**) and press RETURN, or enter **S**. The SET command submenu is displayed:

SET: Clock Printer Sleep Tone Wake

2. Select the SET PRINTER command and press RETURN, or enter P. The SET PRINTER command prompts and default values are displayed:

```
SET PRINTER page width: 85           length: 66
      margin top: 6       bottom: 6     left: 13   right: 12
```

3. After noting the current (default) parameter values, press ESC to abort the SET PRINTER command.

NOTE: If you entered new values and then pressed ESC, the preexisting defaults would still be used.

Executing the Selected Command

For any System Manager command, whether you use default values or enter new values or make new selections, command execution begins when you press RETURN. For most applications commands that act upon a current selection (such as a text selection in Word), command execution begins as soon as the command is invoked.

SYSTEM FUNCTION KEYS

Through the System Manager, Microsoft Works supports *system function keys* and *program function keys*. System function keys are control and function key sequences that can be used throughout Works to effect a given operation or function. That is, system function keys are global keys. Program function keys are defined for a specific application or special program. (For information about a given program's function keys, refer to the reference chapter for that program.)

System function keys enable you to display keymaps of function keys (including program function keys), invoke programs, quit programs and save files, select and edit entries at command prompts, and move the cursor or selection highlight within screen displays. System function keys are described in Table 1.2. More details about the various groups of system function keys are provided following the table.

Table 1.2. System Function Keys

FUNCTION	KEY	DESCRIPTION
ALARM	CTRL-F3	Invokes Alarm program.
BREAK	BREAK (SHIFT-PAUSE)	Aborts an in-progress operation or command execution; cancels certain commands after RETURN is pressed.
CALC	CTRL-F2	Invokes Calc program.
CHARACTER LEFT	F9	Selects character to the immediate left of the current cursor position.
CHARACTER RIGHT	F10	Selects the character to the immediate right of the current cursor position.
DEL	DEL	Deletes the currently selected character or word. NOTE: To delete or erase the character just left of the current cursor position, use BACK SPACE.
DIALING	CTRL-F4	Invokes Dialer program.
ESC	ESC	Aborts a command before RETURN is pressed and returns you to the menu or submenu from which the command was selected.
EXTEND SELECT	F6	Turns Extend Selection feature on and off. (Not supported in System Manager.)
LABEL	F1	Displays keymap of function keys.
	CTRL-F1	Displays keymap of CTRL-modified function keys.
	SHIFT-F1	Displays keymap of SHIFT-modified function keys.
QUIT	CTRL-F10	Quits current program and returns you to application (if you QUIT a special program) or to System Manager (if you QUIT an application or BASIC).

Table 1.2 (continued). System Function Keys

FUNCTION	KEY	DESCRIPTION
RUN PREVIOUS	CTRL-F9	Quits current program or System Manager and loads the last program (not including System Manager or special programs) that you ran prior to the current program.
SCRAP	F5	Changes the mode of the scrap. Press once to turn on Append Scrap mode; press again to turn on No Scrap mode; press a third time to restore normal Blank Scrap mode. (Not supported in System Manager.) When Append Scrap mode is in effect the status line displays Ap; Ns is displayed for No Scrap mode.
WORD LEFT	F7	Selects word to the immediate left of the current cursor position.
WORD RIGHT	F8	Selects word to the immediate right of the current cursor position.

Keys to Invoke Special Programs

One group of system function keys enables you to invoke any one of the special programs at any time, from the System Manager or any application or special program. These are the ALARM, CALC, and DIALING keys.

Whenever you press one of these keys, the current program or operation is suspended and the special program (Alarm, Calc, or Dialer) is invoked. (If a command is being executed when the key is pressed, the special program is loaded as soon as command execution is complete.) No data is lost in the program that was being used, and the program is not terminated. The current state of the program is saved, and you can resume use of the program as soon as you exit the special program by using the QUIT key.

NOTE: You can invoke one special program on top of another, but when you exit the last special program you invoked, all special programs will be terminated.

For more information about Alarm, Calc, and Dialer, refer to Chapters 5, 6, and 7, respectively.

Keys to Terminate and Invoke Applications

Two of the system function keys enable you to terminate any of the programs in Microsoft Works or to terminate the current program and reinvoke the last program you used prior to the current one. These are the QUIT and RUN PREVIOUS keys, respectively.

The QUIT key (CTRL-F10) is used to exit all of the applications, special programs, and BASIC. (Pressing QUIT when the System Manager screen is displayed has no effect other than causing the screen to be redisplayed.)

When you are using any application or BASIC and press QUIT, any files that are open are closed and saved in memory, the program you are running is terminated, and the System Manager screen is displayed. Whenever you use QUIT, a file is saved under the name that was specified at the file: prompt of the RUN command when you invoked the application program. (Or, if you specified no file name, the application's default work file name is used.)

If you are using one of the special programs and press QUIT to exit, the current contents of the program (such as the memory contents of Calc or the number you entered for the Dialer program) are saved and the program is terminated. (Note, however, that the saved data will not appear on the System Manager screen as a file.) When the special program is terminated, you are returned to the program and screen you were using at the time you invoked the special program.

The RUN PREVIOUS key (CTRL-F9) combines the function of the QUIT key with the function of the System Manager RUN command. Whenever you press RUN PREVIOUS, the current program is terminated (the associated open file is closed and saved), then the last (or previous) program and file you used are automatically loaded—you do not have to invoke the program with the System Manager RUN command.

If you press RUN PREVIOUS when the System Manager screen is displayed, the last program and the associated work file you used are loaded.

If you press RUN PREVIOUS while you are using a program and you have not used any other program, you will be returned to the System Manager screen.

If you press RUN PREVIOUS while you are using a program and you have used at least one other program, then you will be returned to the last program (and work file) you used before the current program.

If you press RUN PREVIOUS while you are using one of the special programs, both the special program and the program you were using (if any) are terminated. The last program and associated work file are then loaded. Or, if no other program was previously run, you are returned to the System Manager.

The RUN PREVIOUS key enables you to toggle between programs easily. For example, suppose you have used Plan for some data entry and analysis and are now using Word. In addition, suppose that you want to include some of the data from the Plan worksheet in your document, but that you want to use selected information and do not want to merge a large block of data. While you are using Word, you can press RUN PREVIOUS to check figures and data on the Plan worksheet, and then, when you have noted the information you want, you can press RUN PREVIOUS to return to Word and resume working on your document. You will be returned to the same place in your Word file where you were working when you pressed RUN PREVIOUS. There is no limit on the number of times you can toggle between programs in this manner. Note, however, that when you run a third program, Word will be the application invoked when you use the RUN PREVIOUS key.

NOTE: RUN PREVIOUS will *not* load special programs (that is, Alarm, Calc, and Dialer), only applications and BASIC.

Editing Keys

Some of the system function keys are used to edit entries at command prompts. These are the CHARACTER LEFT, CHARACTER RIGHT, WORD LEFT, and WORD RIGHT keys. (See Selection and Scrolling Keys in this chapter for more information about the ARROW keys as used to make entries at command prompts.)

NOTE: Some of the editing keys are also used *within* some applications, such as when you are editing a Word file. Refer to Chapters 8 through 19 for program-specific information about using these keys when you are creating or modifying files. The description provided here is relevant to making entries at System Manager and application and special program prompts.

When you are making an entry at a command prompt and make a mistake in the text or number you are entering, you can use system function keys to correct the error. For example, suppose you are entering a file name at the RUN command file: prompt and mistakenly enter TEXT instead of TEST. To correct this error, you can do either of the following:

- Press CHARACTER LEFT twice to select the letter X; press DEL to erase the selected letter; then type S.
- Press BACK SPACE twice to erase the final T and X, then type ST.

For another example, suppose you are editing the contents of the NOTE field for an appointment record in Calendar. Suppose the current contents of the field are displayed at the EDIT: prompt as shown, with the cursor located at the end of the text:

EDIT: Business meeting of JA advisors

If you want to change the word *Business* to *Luncheon*, you can:

1. Press F7 five times to select the word **Business**.
2. Press **DEL** to erase the selected word.
3. Type in the word **Luncheon** followed by a space (that is, press **SPACE BAR**). The command line will display:

EDIT: Luncheon meeting of JA advisors

Following are general guidelines for using the editing keys when you are making entries at command prompts. You can:

- Use **CHARACTER LEFT** or **CHARACTER RIGHT** when you want to select a single character to erase or erase and replace, or when you want to add text in front of a character within a word;
- Use **WORD LEFT** or **WORD RIGHT** when you want to select a whole word for editing;
NOTE: WORD LEFT and WORD RIGHT include any trailing spaces as part of the selected word.
- Use **BACK SPACE** when you want to erase one character at a time to the left of the current cursor position; and
- Use **DEL** when you want to erase the currently selected character or word.

Selection and Scrolling Keys

The ARROW keys (UP, DOWN, LEFT, and RIGHT) are called *selection keys* when you use them to make selections for or entries at command prompts. They are called *scrolling keys* when you use them to scroll the display.

The ARROW keys can be used at command prompts in several ways as you make entries. In the System Manager, they can be used to select the file (application, data, or work) from the files display that you want a command to act on. For example, for the **DELETE** and **COPY** commands, the default entry at the **file:** prompt is the file that is selected (highlighted) on the files display when you invoke the command. This enables you to use the ARROW keys to select the file you want *before* you invoke the command. In the System Manager files display:

- UP ARROW moves the selection highlight up one file name,
- DOWN ARROW moves the selection highlight down one file name,
- LEFT ARROW moves the selection highlight left one file name, and
- RIGHT ARROW moves the selection highlight right one file name.

Refer to Chapter 2, "System Manager Reference," for more information about the default entries at specific System Manager command prompts.

Refer to Chapter 3, "ZP-150 Applications," for tutorials on starting applications with selected files.

When a command prompt requiring the entry of a file name is active (that is, contains the selection highlight and is ready to accept an entry), you can press any ARROW key to display a full-page listing of files. (See File Listings and Directories in this chapter.) When a full-page listing is displayed, you can use the ARROW keys as you would in the System Manager files display to select the file you want. At any given point, the currently selected file on the files display is the default entry at the active prompt.

NOTE: This method of displaying and selecting a file from a full-page listing is supported for most, but not all, command prompts requiring the entry of a file name. Refer to the reference chapters in this manual for information about specific commands and command prompts.

When you use the ARROW keys to select a file from the System Manager files display or from a full-page listing of files, you can either use the selected file name verbatim or you can edit the file name by using the system editing keys described in the preceding section. An exception is when you select a file before invoking the System Manager RUN command. Depending upon the type of file you selected, the RUN command prompts may or may not be displayed before command execution begins. (See Chapter 3, "ZP-150 Applications," or the RUN command in Chapter 2, "System Manager Reference.")

SHIFT- or CTRL-modified ARROW keys are also used throughout Microsoft Works as scrolling keys. Their effect and use varies somewhat from the System Manager to applications and from application to application, but they always move the selection highlight more quickly than if you pressed an ARROW key alone. That is, they move the selection highlight a screen's depth or a line's width at a time instead of one file name, record, or field, and so on, at a time. Refer to the reference chapters in this manual for more information about using the scrolling keys in Works programs.

In the files display on the System Manager screen, the scrolling keys have the functions listed in Table 1.3.

When you have too many files to be displayed at one time on the System Manager files display, you can use the scrolling keys to move quickly through the display. Use:

- SHIFT-DOWN ARROW or SHIFT-UP ARROW to display the next or previous screen of files;
- CTRL-DOWN ARROW or CTRL-UP ARROW to display the last or first screen of files;
- SHIFT- or CTRL-RIGHT ARROW and SHIFT- or CTRL-LEFT ARROW to move laterally in a given screen; and
- the ARROW keys to select any single file.

Table 1.3. Scrolling Keys in the System Manager Files Display

KEY	DESCRIPTION
CTRL-UP ARROW	Moves the selection highlight to the first file name on the first screen of the files display.
SHIFT-UP ARROW	Displays the previous screen of the files display.
CTRL-DOWN ARROW	Moves the selection highlight to the first file name on the last screen of the files display.
SHIFT-DOWN ARROW	Displays the next screen of the files display.
CTRL-LEFT ARROW, SHIFT-LEFT ARROW	Moves selection highlight to the leftmost file name in the same row.
CTRL-RIGHT ARROW, SHIFT-RIGHT ARROW	Moves selection highlight to the rightmost file name in the same row.

Keys to Cancel Commands

Sometimes you may want to invoke a command just to check currently defined parameters or settings, or you may accidentally select the wrong command or decide *not* to execute the selected command. In situations such as this, when you want to cancel a selected command before you have pressed RETURN to begin execution, press ESC. When you cancel a command with ESC, any preexisting default values or settings are retained even if you made other entries or selections, and you are returned to the menu or submenu from which the command was selected.

You can also cancel or abort an in-progress operation or command execution. To do this (that is, to cancel a command *after* you have pressed RETURN), press BREAK (SHIFT-PAUSE). The operation will be terminated immediately, and you will be returned to the command menu or submenu that was previously displayed.

The above paragraphs describe the use of the ESC and BREAK keys for menu-driven operations. These keys can also be used *within* some programs, such as in Telcom or BASIC. For information about using ESC and/or BREAK within a program, refer to the program's reference chapter.

Keys to Display Keystrokes

Three of the system function keys allow you to display keystrokes of all supported system and program function keys at any point in Works—in the System Manager or in any application. These are the LABEL keys. Except

for the keymap produced by CTRL-F1 (which always displays system function keys), the keymap produced by a LABEL key is program dependent. That is, only the function keys defined for the current program (or for the System Manager) are displayed.

The keymaps produced by the LABEL keys are nondestructive; no data is lost nor is the current program terminated. The keymaps are displayed at the bottom of the screen in the area where the command, message, and status lines are normally displayed. Any keymap remains on the screen until any key is pressed. A typical keymap is shown in Figure 1.2; it is the keymap displayed when you are using Word and press F1.

The LABEL keys are used as follows:

- F1 displays a keymap of function keys (F1 through F10).
- SHIFT-F1 displays a keymap of SHIFT-modified function keys (SHIFT-F1 through SHIFT-F10).
- CTRL-F1 displays a keymap of CTRL-modified function keys (CTRL-F1 through CTRL-F10).

For any function key that is defined, a label or summary of the key's function is displayed above the number of the function key. For undefined keys, no text is displayed. For example, in Figure 1.2, function keys F1, F2, and F5 through F10 are defined, and function keys F3 and F4 are not defined.

EXTEND SELECT and SCRAP

The two remaining system function keys, EXTEND SELECT and SCRAP, cannot be used in the System Manager, but are nevertheless considered system function keys because of the importance of their functions throughout most applications.

Label	Insert			Scrap Mode	Extend Select	Word Left	Word Right	Sen- tence	Para- graph
1	2	3	4	5	6	7	8	9	10

Figure 1.2. Typical Keymap Produced by LABEL Key

You use the EXTEND SELECT key (F6) within applications to extend the selection highlight to additional characters, words, fields, and so on, depending upon the application. (EXTEND SELECT *cannot* be used in editing entries at command prompts.) Use of EXTEND SELECT gives you more control over data or text selected for an operation or command execution than would otherwise be possible. Pressing EXTEND SELECT once turns the Extend Selection feature on (the **Ex** status line indicator is displayed). The Extend Selection feature stays on until you turn it off by pressing EXTEND SELECT again or until a command affecting an extended selection is executed. When the Extend Selection feature is turned off, the **Ex** indicator is no longer displayed.

The SCRAP key (F5) is used to change the setting of the scrap. The *scrap* is an area of memory that can be used to hold text or data temporarily. Within an application, you can copy or delete data or text to the scrap and insert data from the scrap into a file. The scrap can be used in Word when you are revising a document and want to rearrange text order or when you are boilerplating some text. The scrap can be used in Calendar to insert a set appointment into the Daily Diary for more than one day, and so on. In addition, the scrap can be used to transfer data or text from one application to another.

There are three scrap settings:

- Blank Scrap (the normal mode), in which any data copied or deleted to the scrap overwrites and replaces the existing contents of the scrap. No status line indicator is displayed.
- Append Scrap, in which any data copied or deleted to the scrap is appended to the existing contents of the scrap. When this mode is in effect, the status line displays **Ap**.
- No Scrap, in which you can copy data to the scrap, but any data you delete is simply erased and not sent to the scrap. When this mode is in effect, the status line displays **Ns**.

For more information about using the scrap in applications, refer to Chapter 3, "ZP-150 Applications," and to a given application's introductory and reference chapters.

PROGRAM FUNCTION KEY

One key is reserved for future use as a System Manager program function key. This is the REFERENCE key (F3).

FILES AND FILE NAMES

As mentioned earlier in this chapter, files in Works are grouped into three categories: program files, work files, and data files. *Program files* are Read-Only Memory (ROM) files containing the programs that comprise Microsoft Works. *Work files* are those created and associated with the program files. *Data files* are other files *not* directly associated with any one application. Work and data files are stored in Random Access Memory (RAM).

Work Files

Work files are created with any of the Works programs. For example, Word documents, Plan worksheets, and BASIC programs you write are all stored in work files.

Work files are saved in memory whenever you exit a program by pressing QUIT or RUN PREVIOUS. Any given file is saved under either the file name you specified when you invoked the program, or under the default work file name (WORK, for most programs) if you did not specify a file name. All work files are assigned the program's default work file name extension. The default file name extensions for each Works program are listed in Table 1.4. With the exception of .DAT and .TXT, these extensions are *not* displayed on the System Manager files display. However, they are displayed in full-page listings of files in memory.

NOTE: For File, the .DAT file is a data file that is automatically created when the .FIL work file is created. For Telcom, .TXT is the extension assigned to files created for text captured during a communications session, and .WRK is the extension assigned to the hidden file (TELCOM.WRK) that contains the contents of the Telcom review buffer. .TEL is the default extension for script files created with Telcom.

Table 1.4. Default File Name Extensions

PROGRAM	WORK FILE EXTENSION
BASIC	.BMI
Calendar	.CAL
File	.FIL
	.DAT
Plan	.PLN
Telcom	.TEL .TXT .WRK
Word	.WRD

System Manager

The System Manager uses the default work file name extensions to identify the specific program with which a file is associated. For example, suppose you have a Plan work file named EARNINGS. Although the file is shown on the System Manager files display without an extension, the system has stored it and recognizes it as EARNINGS.PLN. If you select this file by using the ARROW keys and then invoke RUN, two things will happen:

1. Because the file has the extension .PLN, the System Manager automatically loads the Plan application; and
2. The EARNINGS file is loaded and displayed on the screen. Furthermore, you are returned to the exact point in the file (such as a certain cell) that you were at when you last saved the file.

For more information about file names and extensions, refer to File Naming Conventions in this chapter.

Data Files

Data files are not associated with a specific application and may contain either of two types of data. One type is data that you have entered into a program's work file and then stored separately (such as by using the program's PRINT command) in another file. The other type is data that you have read into memory from an external source such as the Dow Jones News/Retrieval Service.

You can save data files in memory in a number of ways. You can:

- Use Telcom to receive data from a host computer system or bulletin board/news service;
- Use Telcom to download data from a desktop computer system such as the Z-100 or Z-100 PC Series systems;
- Exit the File program by pressing QUIT or RUN PREVIOUS. In addition to a work file with the extension .FIL, File creates a data file with the same name and the extension .DAT. A File .DAT file can be used as input to a BASIC program;
- Use the PRINT command in Word, Plan, File, or Calendar to write the data in a work file to a text file; or
- Write data from a BASIC program to a data file.

For more information about performing any of the above, refer to the chapters concerning the program used to create the data file.

While work files contain special information and are in a format specific to their associated application, data files contain no information except data stored as text (ASCII) or binary code. You can use a data file with any application that is capable of reading the data it contains. For example, Word can read any data file that contains ASCII text. If you had a text data file, you could load it directly into Word when you execute the RUN command or merge it into a Word work file. Refer to Chapter 3, "ZP-150 Applications," for more information.

You can also use data files with programs that cannot read the file directly because it is in a format (text or binary) incompatible with that of the program's work files. To do this, you make use of the scrap. As an example, suppose you have a text data file named REPORT.TXT in memory and you wish to use all or part of the file in a Plan worksheet. To transfer the data you want to Plan, you could use the following sequence of steps:

1. Run Word and load the text file. (Word is used in this example because Word can read data files that contain text.)
2. While in Word, select the data that you want to transfer to Plan, reformat it as necessary, and copy it to the scrap.
3. Quit Word.
4. Run Plan, loading the work file into which you want to insert the data from the text file that is now contained in the scrap.
5. Insert the data from the scrap.

This sequence works because whenever you insert information from the scrap into an application, the information is restructured as necessary to fit the requirements of the application. For a more detailed example, refer to Chapter 3, "ZP-150 Applications."

File Naming Conventions

The files you create and use in Works, whether work files or data files, must conform to certain file naming conventions and requirements.

A file name consists of two parts: the primary file name and an optional extension. The primary file name is always required and can be up to eight characters in length. Any printable, nonfunction character *except* the following can be used in a primary file name:

" [] / \ | = + : ; _ < . > ,

Note that you *can* use numbers in file names, but you *cannot* use spaces. You can also use the following special characters:

! # \$ % & ' () - @ ^ ' { } ~

NOTE: The ? and * characters are reserved for use as wildcard characters.

If you do use any of the above special characters in file names and plan to transfer files between your ZP-150 and other systems, you should be aware that some systems may prohibit the use of some special characters in file names. For this reason, you should be aware of the file naming conventions of the system(s) with which you transfer files. You may have to rename some of the files in your system when they are going to be transferred to a system with different character restrictions.

When you are naming (or renaming) a file, you can enter alphabetic characters in uppercase, lowercase, or both. Works converts all alphabetic characters to uppercase.

File name extensions can be up to three characters in length, and all the characters that can be used in primary file names are also valid for file name extensions. User-assigned file name extensions (as for data files) are optional. When a file name extension is used, it *must* be separated from the file name by a period (.).

File name extensions are often used to identify the type of data a file contains. For example, in files created with the Word, Plan, File, and Calendar PRINT commands, the data is formatted as text (ASCII) rather than binary code. To identify such files as text files, you might want to use an extension such as .ASC or .TXT. In addition, consider the default file name extensions used by Works programs (see Table 1.4). These defaults are readily identifiable as being associated with specific programs.

NOTE: In this manual, the term *file name* often is used to refer to both the primary file name and the extension, if one exists. When a distinction is required, the terms *primary file name* and *extension* are used. In addition, the term *file specification* is sometimes used. File specifications are in the form

[*dev:*]filename[.ext]

where *dev:* is an optional device name used by the system to locate files that are not resident in memory (see Chapter 4, "External Devices," for more information about valid external storage devices);

filename is the primary file name; and

.*ext* is the optional file name extension.

In Works, you can name the work files you create by entering a primary file name at the *file:* prompt of the RUN command. You do not need to enter an extension for a work file; the appropriate default extension (Table 1.4) will be used. If you do not enter a name for a work file, a default primary file name will be used. For all applications except Calendar and Telcom, the default primary file name is WORK. In Calendar, the default primary file name is CALENDAR. (You cannot assign any other file name for the Calendar file.) In Telcom, the default file name assigned to a file containing captured text is SESSION. Refer to Chapters 8 through 19 for more information about specific programs.

You name data files when they are created. In Word, Plan, File, and Calendar, you enter the file's name at a PRINT command prompt. In Telcom, you enter the file's name at an OPTIONS or TRANSFER RECEIVE command prompt. Refer to Chapters 8 through 19 for more information about specific programs and commands.

Using Wildcards to Reference Multiple Files

Many of the System Manager and applications commands you use in Works will refer to specific files. However, there may be instances when you wish to reference more than one file, as when you want to perform the same operation for several different files. You could complete an operation for multiple files by invoking a command once for each file, but an easier way is to use wildcard characters in the file name entered for the command so that you invoke the command only once and it is executed for more than one file.

Wildcard characters (or simply *wildcards*) are variables representing one or more file name characters. The two wildcards that you can use in Works are the asterisk (*) and question mark (?). The asterisk represents multiple characters in a file name; it can be used to represent an entire primary file name and/or an entire extension. For example, *.* represents all files with any primary file name and any (or no) extension—that is, *all* files. The file name F*.WRD would represent all files with a primary file name beginning with the letter F that have the extension .WRD.

The question mark wildcard represents only one character in a file name, and its use is position-dependent. More than one question mark can be used in a file name if you want to allow for multiple variable characters. (Note that ????????.??? is equivalent to *.*.) Unlike the asterisk, the question mark can be used in the initial character positions of a primary file name or file name extension. For example, the file name ???JAN.DAT might refer to data files such as ACCTJAN.DAT, LTRSJAN.DAT, PAYRJAN.DAT, and CALLJAN.DAT. (No specific characters can follow an asterisk in a primary file name or extension. That is, you cannot use the asterisk in a file name in the form *1.WRD.)

FILE LISTINGS AND DIRECTORIES

For your convenience, Works enables you to review the names of files in memory in three ways. You can:

- Refer to the files display that is part of the System Manager screen;
- Display a full-page listing of files; and/or
- Use the System Manager LIST command to display a directory of one, some, or all files.

Each of these is separately described in the paragraphs that follow.

System Manager Files Display

Perhaps the most commonly referenced list of files is that provided by the files display of the System Manager screen. Whenever the System Manager screen is displayed, the names of all work and data files are displayed alongside the Works program file names.

Refer to Figure 1.1 again. In that figure, a typical System Manager screen display for a ZP-150 that does not contain any work or data files is shown. This is how your System Manager screen appears when you turn on your system for the first time. Once you have created work and/or data files, their names also appear on the System Manager screen. Work and data files are listed to the right of the vertical bar, as shown in Figure 1.3. Notice that, for work files, only the primary file name is displayed and that each file appears next to the program with which it is associated. Also, notice that data files appear in a general group below the program and work files, and that their file name extensions *are* displayed to the left of the vertical bar.

The System Manager screen files display gives you a quick and easy reference for files in memory. You can identify program, work, and data files at a glance whenever the System Manager screen is displayed. In addition, you can use the ARROW keys to select program, work, and data files to be acted on by System Manager commands. For most commands that require the specification of a file, the default entry is the file that is selected when the command is invoked. For example, the default entry at the DELETE command file: prompt is the currently selected file. Likewise, the default entry at the RUN command application: prompt is the currently selected file if that file is a program file. If the currently selected file is a data or work file, then that file is the default entry at the RUN command file: prompt. For more information about System Manager commands, refer to Chapter 2, "System Manager Reference."

WORD	WORK
CALENDAR	CALENDAR
FILE	TAX
.DAT	TAX
TELCOM	
PLAN	
BASIC	
.TXT	PRINT SESSION
.	SCRAP

```

Microsoft(R) Works V1.10, Copyright (1984, 1985) Microsoft Corp.
> Copy Delete List Name Options Print Run Set
Select option or type command letter
System Manager: WORD      Bytes free: 117856  4/20/85  5:25:25 PM

```

Figure 1.3. Typical System Manager Screen Files Display

Notice that the System Manager files display shows *only* those files that you can access directly for execution, reference, or alteration (that is, program, work, and data files). The System Manager files display does not provide any information about files other than their names and, in the case of work files, the application with which they are associated. If you need a list of hidden files as well as files that are normally accessible, then you must display a full-page listing of files or a directory. If you need information about file size and date of last modification, you must display a directory.

Displaying a Full-Page Listing of Files

There may be times when you need to see a complete list of files before you enter a file name at a command prompt. You may want to check file name extensions, to keep from overwriting an existing file, or to select a file for command execution. In such instances, you can invoke a full-page listing of files that shows the primary file name and extension of every file in memory.

A full-page listing can be invoked at almost any System Manager or application command prompt that requires the entry of a file name. (Exceptions in the System Manager are the LIST command file: prompt, the RUN command application: prompt, and the SET WAKE application: prompt. For information about applications commands, refer to Chapters 8 through 19.)

To invoke a full-page listing of files, simply press any ARROW key when a command prompt requiring the entry of a file name is active. The upper area of the screen will clear, and then a full-paging listing will be displayed in the format shown in Figure 1.4. That is, the full file names (primary file name and extension) of all files will be displayed in five columns across the width of the screen.

ALARM.!00	CALC.!00	DIALING.!00	WORD.!30	CALENDAR.!35
FILE.!40	DAT.!41	TELCOM.!45	PLAN.!50	SYLK.!51
BASIC.!55	BAS.!56	FORMAT.!60	INSTALL.!70	MSDOS.!80
CALENDAR.CAL	TAX.DAT	TAX.FIL	DBCALLS.LIB	ENVIRON.SYS
PRINT.TXT	SESSION.TXT	WORK.WRD	TELCOM.WRK	SCRAP

COPY file: TAX.DAT to:
Enter file name
System Manager: WORD Bytes free: 117856 4/20/85 5:24:42 PM

Figure 1.4. Typical Full-Page Listing of Files

When a full-page listing is displayed, you can use the ARROW keys to select the file name you want entered at the active prompt for use verbatim or for editing, or you can enter a unique file name via the keyboard. Any entry you make will overwrite and replace the default entry.

If there are more files in the full-page listing than will fit on one screen, then you can use the CTRL- or SHIFT-modified DOWN ARROW and UP ARROW keys to scroll the display as follows:

- SHIFT-DOWN ARROW will display the next screen of files in the full-page listing, and the selection highlight will be in a position corresponding to its position on the screen you scrolled from;
- SHIFT-UP ARROW will display the previous screen of files in the listing, and the selection highlight will be in a position corresponding to its position on the screen you scrolled from;
- CTRL-DOWN ARROW will display the last screen of files in the listing and the selection highlight will be on the last file in the listing; and
- CTRL-UP ARROW will move the selection highlight to the first file on the screen, or, if the selection highlight is already in the home position, CTRL-UP ARROW will move the selection highlight to the first file on the first screen of the listing.

You must always use the LEFT and RIGHT ARROW keys to move the selection highlight horizontally in the full-page listing.

Displaying a Directory of Files

When you need to know more than the primary file names and extensions of files, use the System Manager LIST command to display (or print or write to a file) a file directory. You can list the directory for one, some, or all files. The directory provides four types of information for each file listed, as follows:

- primary file name and extension (if any) of the file;
- one-letter codes that provide information about file type and status:
 - A Archive bit set
 - H Hidden file
 - R Read-only file
- the date and time the file was created or last modified; and
- the file size, in bytes.

FORMAT.!60	R H	2/23/85	6:53:14 PM	1232
INSTALL.!70	R H	2/21/85	2:14:32 PM	768
MSDOS.!80	R H	1/ 1/84	2:11:26 AM	128
CALENDAR.CAL	A	4/17/85	5:15:10 PM	417
TAX.DAT	A	4/15/85	11:30:10 PM	172
TAX.FIL	A	4/15/85	11:30:10 PM	1454
DBCALLS.LIB	R H	2/28/85	9:52:02 PM	2947
ENVIRON.SYS	H	2/12/85	4:54:30 PM	240
PRINT.TXT	A	4/17/85	5:14:46 PM	288
SESSION.TXT	A	4/15/85	11:30:26 PM	0
WORK.WRD	A	4/17/85	5:11:38 PM	1391
TELCOM.WRK	H A	4/15/85	11:30:26 PM	2353

LIST file: to:
Type any character to continue
System Manager: WORD Bytes free: 117856 4/20/85 5:23:22 PM

Figure 1.5. Typical Directory Listing

A typical directory listing appears as shown in Figure 1.5. For more information about the LIST command and the types of information provided in directory listings, refer to the LIST command in Chapter 2, "System Manager Reference."

Notice that, unlike the System Manager files display or a full-page listing of files, you cannot select a file directly from a directory display for input to a command. However, the directory provides you information about files that the other displays do not. For example, when your system memory is running low, you may wish to check the directory listing before deleting or transferring files from memory. The directory enables you to see the sizes of listed files and to check the files' currency (dates of last use).

WORKING WITH LIMITED MEMORY

Like any other computer system, your ZP-150 has a fixed amount of storage space, or memory. If you do not periodically "houseclean" by downloading and/or erasing files you no longer need or by deleting unneeded data from within files, you will eventually run out of memory.

The ZP-150 is shipped with 32K of RAM for program execution and data storage. The amount of RAM can be expanded to 416K in 32K increments. In addition, there is a limit on the size of any single file. The maximum file size for any work file or any data file that can be stored in RAM is 64K. The total (system-wide) amount of available memory is called *system memory*. The available space for any given open file is called *workspace*. Without regular housecleaning, you can run low or out of either system memory or workspace, or both.

Low system memory can prevent you from performing operations in the System Manager or within any of the Works programs. In addition, you cannot invoke any of the special programs when system memory falls below

a certain point. If you attempt to perform an operation that cannot be completed due to low system memory, the following error message will be displayed on the message line:

Not enough system memory

Low workspace prevents you from increasing the size of a work file. That is, if workspace is used up, you cannot enter any more text (such as in a Word file) or data (such as records in a File database) into the file. If you run out of workspace while you are using a program, the following error message is displayed on the status line:

Not enough work space

You can avoid running out of memory by monitoring the amount of memory displayed next to the Bytes free: message on the System Manager screen status line and by watching for the Lo status line indicator.

The System Manager status line always displays the amount of system memory available at a given time. If you see that memory is getting low, you can delete the files you no longer need before you run another program or transfer the files that are not immediately needed to an external storage device or to a desktop system.

The Lo status line indicator is displayed when you are working in the System Manager or in a program and you are about to run out of either system memory or workspace. If you are working in the System Manager and the Lo indicator appears, you are running out of System Memory and should free memory before proceeding. (See Increasing System Memory in this chapter.) If you are working in a program and the Lo indicator appears, you should first determine whether you are running out of workspace or system memory. The procedure provided here can be used in any application. It cannot, however, be used in BASIC.

To determine whether you are running out of workspace or system memory:

1. Select the application's OPTIONS command and press RETURN.
2. Check the message displayed on the message line. If the message line displays:

Free work space: nnn

where *nnn* is a number, then you are running out of workspace for the file that is open.

If the message line displays:

Free space in system memory: nnn

where *nnn* is a number, then you are running out of system memory.

In either case, *nnn* is the amount of space remaining, in bytes.

Increasing System Memory

If you determine that you are running out of system memory, then you need to increase the amount of memory available by decreasing the size or number of files that are stored in your system. Unless you do so, you will not be able to use your ZP-150 to its full capacity, and you will soon run out of system memory.

The simplest and fastest way to increase system memory is to delete any work or data files that you no longer need. If you are using an application, press QUIT to return to the System Manager screen. When the System Manager screen is displayed, look at the files listed in the files display. Then, use the DELETE command to erase those files that you do not need.

If you have no files that you can erase (that is, if you need all of the files that are in memory), then you can free system memory by one of the following methods:

- Use the System Manager COPY command to transfer the files that are not immediately needed to an external storage device (such as a data cassette recorder) and then delete them from memory. Later, when the files are needed, they can be copied back into memory. (Refer to COPY in Chapter 2, "System Manager Reference," for information about using the COPY command.)
- Use Telcom to transfer some of the files to a desktop computer system and then delete them from memory. When the files are needed again, they can be downloaded back into ZP-150 memory. When you use this method, it is recommended that XMODEM protocol be used to avoid data transmission errors. (Refer to Chapters 16 and 17 for information about Telcom.)

- If possible, use the System Manager PRINT command to print a hard copy of the contents of some files, and then delete the files you printed from memory. Note that *only* ASCII files can be printed with the System Manager PRINT command. This includes files created with an application PRINT command and text files received or created through Telcom. (Refer to the PRINT section of Chapter 2, "System Manager Reference," for information about the PRINT command.)
- If possible, reduce the size of individual files in memory by deleting any data they contain that is no longer required.

Increasing Workspace

If you determine that you are running out of workspace, you need to increase the amount of workspace available for the currently open file in one or more of the following ways:

- Review your file and delete any unnecessary data from it. Then continue working.
- Move some or all of the data in the file to another file. You can do this by using the scrap or by using the application's PRINT command (in BASIC, use the SAVE command). After moving the data to another file, you can delete the data from your current work file and continue working.
- Quit the program to save the current work file. Then resume your work using a new file.

Low Memory and the Scrap

When system memory or workspace is becoming low, you may run out of memory when you are inserting data from the scrap into a work file. In all cases, the application will insert as much data from the scrap as possible before available memory is used up. If available memory is used up while data is being inserted, the data insertion will stop, the Lo status line indicator will be displayed, and the message line will display one of the following messages:

- Not enough system memory, OR
- Not enough work space

To avoid losing any of the data in the scrap, proceed as follows:

1. Press F5 until the No Scrap mode indicator (N_a) appears on the status line. This ensures that any data you delete will *not* overwrite the data in the scrap, that is, the data you want to recover when sufficient memory has been freed.
2. In your work file, use the application's DELETE command to delete all data that was partially inserted from the scrap before you ran out of memory.
3. If you ran out of system memory (if Not enough system memory was displayed on the message line), press CTRL-F10 to close the file and terminate the application. (This will not alter or destroy the contents of the scrap.) When the System Manager screen is displayed, use one or more of the methods previously described for increasing available system memory.

If you ran out of workspace (if Not enough work space was displayed on the message line), then use one of the methods previously described to increase the amount of available workspace. If you free up workspace by deleting data from the file, *make certain that No Scrap mode is in effect*. Otherwise, you will alter or destroy the data you want to recover from the scrap.

4. Once you have recovered sufficient memory, return to your application and work file and insert the data from the scrap.

NOTE: If you are inserting data into Calendar or into a File database, you should also press F4 (the SORT key). Activating the SORT key when you insert data from the scrap ensures that:

- Appointments entered in Calendar are sorted chronologically and tasks are sorted by priority.
- Data inserted into File is sorted according to your entries in key fields of the SORT record. For File, you should press F4 even if you have not previously sorted your database records. Otherwise, File will ignore any later entries you make in the SORT record.

Low Memory and Application PRINT Commands

You should also be aware that a low system memory condition can prevent you from using an application's PRINT command to print a work file to another file. This is in part due to the fact that the file created by the PRINT command may be larger than the original work file because of the formatting information that it contains. For example, when you print a Word document to a file, the file contains all the line feeds and page breaks that

would have been sent to the printer had you actually printed the file. You cannot print a Word document containing 40,000 bytes of information to a text file if available system memory is 40,000 bytes or less. In any case, you cannot create or store a file that exceeds the available storage space.

For any application, if the number of available bytes for storing data (system memory) is less than the number of bytes of data that you want to print to a file, your ZP-150 will print until all system memory is used and then stop. The message line will display:

Not enough system memory

If you run out of system memory while you are printing a file to another file, perform one or more of the procedures described under Increasing System Memory, above. Then, when you have freed sufficient memory, you can begin the application and PRINT operation again.

Because the file created by an application PRINT command (the output file) is usually larger than the source file, you may also run out of workspace for the output file. Remember, no work or data file in Works can be larger than 64K. Even though the source file may contain less than 64K of text or data, the resulting PRINT command output file may require more than 64K of space for the inclusion of formatting information that is not stored as part of the source file.

If you are using an application PRINT command to print a work file to another file and the output file reaches the 64K limit, then printing will stop and the message line will display:

Output file too large

When you see this message, you can do one of the following:

- Review your source file, delete any unnecessary data from the file to reduce the source file's size, and then invoke the PRINT command again. You can specify the same output file name as you did the first time you tried to print the file. The new PRINT output file contents will overwrite and replace the previous output.
- In the source file, temporarily move any data that you do not need in the output file to another file. You can do this by using the scrap or by printing selected data to a different output file and then reinserting or merging it back into your source file.
- If you need to print all of the source file without any modification or deletions, you can print the file in segments to a series of output files. For example, you could select half of a Word document and print it to one file, then select the next half of the document and print it to another file. (In most cases, an application PRINT command prints the currently selected text or data.)

RESETTING THE SYSTEM

On rare occasions, a ZP-150 may appear to "hang" or "lock up." If the keyboard does not respond to any entry and the screen display is blank, the automatic power-off feature has probably turned your system off. To power up your system again and resume normal operations, move the ZP-150 POWER switch to the OFF position and then back to the ON position. (Refer to SET SLEEP in Chapter 2, "System Manager Reference," for information about the automatic power-off feature.)

If the keyboard does not respond to any entry and the display screen is *not* blank (if the System Manager screen or a command or program screen is displayed), your system probably is locked up. In such cases, try the following steps in sequence. If the system remains locked after you complete one step, proceed to the next step.

WARNING: When you are executing an operation that involves a great amount of data (such as inserting a large amount of data from the scrap or copying many records), your system may *appear* to be locked up when it is not. Wait to make sure that Works is *not* in the middle of processing before performing any of the steps that follow.

1. Press ESC. The command menu should be displayed.
2. Press CTRL-F10. The System Manager screen should be displayed.
3. Press PAUSE.
4. Press BREAK (SHIFT-PAUSE).
5. Press the ZP-150 RESET pushbutton.

CAUTION: Any file that is open when you press RESET will be lost.

6. Press and hold CTRL-ALT and simultaneously turn the POWER switch off and then back on.

CAUTION: When you reset the system in this way, all work and data files in RAM will be lost.

7. If none of the above steps resets your system, you must perform a cold start as described in your *ZP-150 User's Guide*. A *cold start* is a hardware reset that clears all the contents of RAM, including the system clock as well as all work and data files. Only the System Manager and program files stored in ROM will remain.



CHAPTER 2

SYSTEM MANAGER REFERENCE

OVERVIEW

This chapter provides details specific to using System Manager commands. It includes an alphabetical list of System Manager commands and a list of error messages that can occur while you are working in the System Manager.

For information about function keys that can be used in the System Manager, refer to Chapter 1, "System Manager."

COMMANDS

All System Manager commands are listed in alphabetical order in Table 2.1, and a brief description is provided for each command. Following the table is a description of command selection and then a detailed explanation of each command. The detailed explanations include the command submenu or command prompt(s), if any, that appear when you invoke the command and a description of each command prompt.

Using Commands

Any command on the System Manager command menu is selected by either of two methods. You can:

- enter the first letter of the command name; or
- use SPACE BAR or TAB to highlight the command you want and then press RETURN.

The selected command's prompt(s) or a submenu will then be displayed. Submenu selections are made in the same ways as menu selections. For general information about using command menus and submenus, making entries or selections at command prompts, and editing entries at command prompts, refer to Chapter 1, "System Manager."

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System Manager Reference

Table 2.1. System Manager Commands

COMMAND	DESCRIPTION
COPY	Duplicates one or more specified files.
DELETE	Erases one or more specified files.
LIST	Produces a directory listing of one, some, or all files. The directory listing can be displayed, printed, or written to a file.
NAME	Renames an existing file or group of files.
OPTIONS	Reserved for future use.
PRINT	Prints a specified file or files to a parallel printer.
RUN	Invokes a selected program.
SET	Produces a submenu of SET commands used to define values for global options.
SET CLOCK	Sets the system clock (date and time).
SET PRINTER	Specifies the page format for print functions.
SET SLEEP	Sets the idle time for automatic power-off feature.
SET TONE	Specifies whether alarms and errors produce audible signals.
SET WAKE	Specifies the date and time for automatic power-up and the application and file to be loaded at that time.

COPY

PURPOSE

Use the COPY command to duplicate one or more files from any valid source to any valid destination.

EXPLANATION

During execution of the COPY command, the System Manager displays informational messages that show the progress or status of the operation. For example, suppose you are copying a file named MISC.DAT to a file named MERGE.TXT that you plan to merge into a Word document. As the copy operation is in progress, the screen displays:

Copying MISC.DAT to MERGE.TXT

When the copy operation is successfully completed, the screen displays:

Copying MISC.DAT to MERGE.TXT - Done

NOTE: The COPY command's informational messages are not displayed if you are copying a file to the LCD screen.

If the copy operation could not be completed even though the source and destination files were correctly specified (that is, the file names entered were valid), the screen would display:

Copying filenam1.ext to filenam2.ext - Incomplete

or

Copying filenam1.ext to filenam2.ext - Failed

where filenam1.ext and filenam2.ext are the source and destination files, respectively, that you specified.

This is most likely to occur if you attempt to copy a file to or from a device (such as CASS:) and the device is not connected or not ready. If you make an invalid or unusable entry at one of the prompts, an error message (such as Invalid file name OR Cannot find file) will be displayed. Refer to Error Messages later in this chapter.

Using Wildcards to Copy Multiple Files

You can use one or both of the supported wildcard characters (?) and (*) to copy a selected group of files. For example, suppose you have some files that contain records of some Telcom sessions that are named SESSION.TXT,

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SESSION1.TXT, and SESSION2.TXT. Suppose you want to retain the original files and make a copy of each to edit and include in a report.

To copy the contents of all three of the files to three new files that can be edited with Word, you can invoke COPY, then enter:

SESSION?.TXT

at the **file:** prompt and press TAB. At the **to:** prompt, enter:

EDITDOC?.TXT

and press RETURN to begin command execution. This will cause each source file to be copied to a unique destination file named EDITDOC n .TXT, where n is the same digit (if any) present in the source file's name. The normal on-screen message will be displayed for each file as it is copied. When all three files have been copied, the upper area of the screen displays:

```
Copying SESSION.TXT to EDITDOC.TXT - Done
Copying SESSION1.TXT to EDITDOC1.TXT - Done
Copying SESSION2.TXT to EDITDOC2.TXT - Done
```

and the command and message lines display:

```
COPY file: SESSION?.TXT    to: EDITDOC?.TXT
Type any character to continue
```

Press any key to return to the normal System Manager screen display. Notice that the destination files are now listed on the screen, and that the source files are the same as before. The COPY command simply duplicates the contents of the source file(s). It does not alter them in any way.

NOTE: When you copy a single file, the System Manager restores the command line to the screen automatically, and the copy confirmation message is displayed above the command menu. However, when you use wildcards to copy a group of files, the names of all files copied are displayed on the screen, and this display of copied files supercedes the normal System Manager screen. This is why the Type any character to continue message appears. If the entire list of copied files is too long to fit on the screen, you can press any key to see the next screen of files. When the names of all copied files have been displayed, press any key to return to the System Manager screen.

Look at the preceding example again. Suppose you had wanted the destination files to have the same primary file names as the source files, and the extension .DOC. To accomplish this, you could have entered SESSION?.TXT at the **file:** prompt and *.DOC at the **to:** prompt. In this case, when all the files had been copied, the screen would have displayed:

```
Copying SESSION.TXT to SESSION.DOC - Done
Copying SESSION1.TXT to SESSION1.DOC - Done
Copying SESSION2.TXT to SESSION2.DOC - Done
```

For more information about using wildcard characters, refer to Chapter 1, "System Manager."

Copying Files to and from External Devices

As mentioned earlier, you can copy files to and from supported external devices if you precede the source or destination file name with the appropriate device name. For example, suppose that you want to copy all your document files to a data cassette tape for backup purposes. To do this, you must first make certain that the data cassette recorder is properly connected to your ZP-150 and that it is ready for use. (See Chapter 4, "External Devices.")

Then, when you invoke COPY, enter:

***.WRD**

at the **file:** prompt and press TAB. Then, enter:

CASS:

at the **to:** prompt and press RETURN. All files with the extension .WRD will be copied to the data cassette tape, and the destination files will have the same names as the source files.

NOTE: While you can use wildcards to copy multiple files to a data cassette recorder, you can only copy one file at a time from an external source such as a data cassette recorder to memory.

For ASCII files, you can review file contents on the screen by entering CON: at the COPY command **to:** prompt. CON: is the logical device name for the LCD screen. If you copy a non-ASCII file to the screen, the file's contents will be displayed but will not be intelligible.

You can list file contents on a parallel printer by entering PRN: or on a serial printer by entering COM1: at the COPY command **to:** prompt. Note, however, that the PRINT command is normally used to obtain hard copies of printable text files. (See the PRINT command in this chapter.)

NOTE: If you use a serial printer, you must make sure that Works has been configured (with the Telcom program) for the printer you use. Refer to Chapter 4, "External Devices," and Chapter 17, "Telcom Reference," for more information.

COMMAND PROMPTS

There are two COPY command prompts. Following is a description of each prompt, the message that is displayed when the prompt is active, and the entries you can make.

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file:

When this prompt is active, the message line displays **Enter file name.** At this prompt, enter the primary file name and extension of the file you want to copy. Alternatively, you can select the file from a full-page listing as described under **File Listings and Directories** in Chapter 1, "System Manager."

The default entry at this prompt is the file that is currently selected on the System Manager screen. Thus, you can use the ARROW keys to select the source file *before* invoking **COPY** instead of invoking **COPY** and then typing in an entry.

After verifying that the default entry is correct, or after making a valid entry or file selection, press **TAB** to advance to the next command prompt.

to:

When this prompt is active, the message line displays **Enter file name.** At this prompt, enter the primary file name and extension of the destination file and press **RETURN**. You should specify a unique file name; you cannot have more than one file with the same file name and extension. Note that if you do enter the name of a file that already exists, the System Manager will prompt:

File exists, overwrite (y/n)?

If you want the existing file to be overwritten, enter **Y**. The copy operation will continue and the existing file will be overwritten.

If you do not want the existing file to be overwritten, enter **N**. The copy operation will be aborted and you can invoke **COPY** again making sure that you specify a unique file at the **to:** prompt.

NOTE: For either command prompt, if the file you specify is not in memory, you must precede the file name with the appropriate device name, such as **CASS:** for a data cassette recorder. For more information about external devices and device names, refer to Chapter 4, "External Devices."

DELETE

PURPOSE

Use the DELETE command to erase one or more files from memory or from another valid storage device.

EXPLANATION

During execution of the DELETE command, the System Manager displays informational messages that show the progress or status of the operation. For example, suppose you are deleting a file named EXPPROG.BMI from memory. (That is, you invoked DELETE, entered EXPPROG.BMI at the file: prompt, and pressed RETURN.) While the file is being located and erased, the screen displays:

Removing EXPPROG.BMI

If you are deleting a single file (as in this example), this message is displayed just above the command line. When the deletion is complete, the message becomes:

Removing EXPPROG.BMI - Done

If the command could not be successfully executed even though the file to be deleted was correctly specified (that is, a valid file name for an existing file was specified), the screen would display:

Removing filename.ext - Failed

where filename.ext is the file you specified.

This would most likely occur if you attempted to delete a ROM file or a file from an external device (such as CASS:), and the device was not connected or not ready. If you make an invalid entry at the prompt, an error message (such as Invalid file name or Cannot find file) will be displayed. Refer to Error Messages in this chapter.

Using Wildcards to Delete Multiple Files

You can use one or both of the supported wildcard characters (?) and (*) to delete a selected group of files. For example, suppose you have a group of files generated in Telcom sessions that are named SESSION.TXT, SESSION1.TXT, and SESSION2.TXT, and that you no longer need any of the files.

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To delete all three files from memory in one operation, you can invoke **DELETE**, then enter:

SESSION?.TXT

at the file: prompt and press **RETURN** to begin command execution. The system will prompt you to indicate whether each file matching the name you entered should in fact be deleted. This prevents you from accidentally deleting files that *do* match the wildcard file name but that you do *not* want to delete.

In this example, the screen clears, and the first line of the screen displays:

Removing **SESSION.TXT**

The message line prompts:

Delete file (y/n)?

In this message, **file** refers to the file named in the message at the top of the screen. If you do want the file to be erased, you enter **Y**. The file is deleted and the system looks for the next file that matches the name you entered. The screen displays:

Removing **SESSION.TXT - Done**
Removing **SESSION1.TXT**

and the message line prompts:

Delete file (y/n)?

If you want to delete the file, enter **Y**. The process resumes. When this process has been completed for all files matching the file name you entered (that is, when all specified files have been deleted), the screen displays:

Removing **SESSION.TXT - Done**
Removing **SESSION1.TXT - Done**
Removing **SESSION2.TXT - Done**

and the message line displays:

Type any character to continue

Press any key to return to the normal System Manager screen. The files that you deleted will no longer be included in the screen's file listing.

NOTE: If you are using wildcards to delete more than 12 files, the confirmation messages (Removing filename.ext - Done) for all the files will not fit on one screen. As you respond to the prompt (Delete file (y/n)?) for each file, the display will scroll up one line at a time, as necessary.

Look at this example again. Suppose that you had the same files in memory and you invoked the DELETE command in the same way, but then decided that you did *not* want to erase the file named SESSION1.TXT. When the message line prompted:

Delete file (y/n)?

for this file, you could enter N. The confirmation message for the file would read:

Removing SESSION1.TXT - Ignored

to indicate that the file matched the name you entered, but was not deleted. The system then would look for the next file that matched the name you entered and the process would continue. The default response at the Delete file prompt is N.

COMMAND PROMPT

The DELETE command has one command prompt. Following is a description of the prompt, the message that is displayed when the prompt appears, and the entries you can make.

file:

When this prompt appears, the message line displays Enter file name. Enter the primary file name and extension of the file you want to delete. Alternatively, you can select the file from a full-page listing as described under File Listings and Directories in Chapter 1, "System Manager."

The default entry is the file that is currently selected on the System Manager screen. Thus, you can use the ARROW keys to select the file you want to delete *before* you invoke DELETE.

After verifying that the default entry is correct or after making a valid entry or selection, press RETURN to begin command execution.

If the file you want to erase is not in memory but is on an external storage device, you must precede the file name with the appropriate device name. (For more information about device names, refer to Chapter 4, "External Devices.") Note, however, that you *cannot* use wildcards to delete multiple files from an external device. Only one file at a time can be deleted from an external device.

2.10

System Manager Reference

LIST

PURPOSE

Use the LIST command to produce a directory listing of files. The listing can be displayed on the screen, written to an ASCII file, or printed.

EXPLANATION

Perhaps the simplest way to use LIST is to invoke the command (that is, highlight List on the command menu and press RETURN, or enter L), then press RETURN to use the default entries for both command prompts. This will display a directory listing of all files. A typical directory listing is shown in Figure 2.1.

Notice that the directory listing provides four types of information for each file:

- primary file name and extension (if any) of the file;
- one-letter codes that provide information about file type and status:
 - A Archive bit has been set
 - H Hidden file
 - R Read-only file

NOTE: A *hidden file* is a system or program file that is not shown on the normal System Manager screen and whose function and presence are normally transparent to the user;

- the date and time the file was created or last modified; and
- the file size, in bytes.

TELCOM.!45	R	1/ 1/80	1:34:08 PM	18400
PLAN.!50	R	1/ 1/80	1:33:56 PM	32720
SYLK.!51	R	2/12/85	5:34:42 PM	31
BASIC.!55	R	1/ 1/80	1:34:04 PM	42591
BAS.!56	R	2/12/85	5:34:36 PM	32
FORMAT.!60	R H	2/23/85	6:53:14 PM	1232
INSTALL.!70	R H	2/21/85	2:14:32 PM	768
MSDOS.!80	R H	1/ 1/84	2:11:26 AM	128
OMAR.DAT	A	6/11/85	2:40:52 PM	172
OMAR.FIL	A	6/11/85	2:40:52 PM	1454
DBCALLS.LIB	R H	2/28/85	9:52:02 PM	2947
ENVIRON.SYS	H	2/12/85	4:54:30 PM	240

LIST file: to:
Type any character to continue
System Manager: WORD Bytes free: 122816 6/15/85 3:15:30 PM

Figure 2.1. Typical Directory Listing Produced by LIST Command

Any directory listing that you display on the screen will remain on the screen until you press any key. (The message line displays **Type any character to continue.**) This ensures that the listing remains on the screen until you have located the information you want to obtain.

When a directory listing is too lengthy to display on one screen, the message line also displays the prompt:

Type any character to continue

When this prompt appears, press any key to display the next screen of the listing. When all files have been listed, press any key to return to the System Manager screen.

The above prompt will not be displayed when you write lengthy directory listings to a file or when you print them. In these cases, the output of the directory listing is continuous.

The above example outlines the simplest way to use LIST, but this method of listing *all* files may not be the most convenient if you want to find information about a single file or a small group of files. If you want to display (or print or write to a file) a directory listing for a selected group of files, use wildcard characters in your entry at the **file:** prompt.

For example, suppose you want to see a directory listing of all Word work files. To do this, invoke LIST, then, at the **file:** prompt, enter:

***.WRD**

and press RETURN. (Remember, you do not need to make any entry at the **to:** prompt to display a directory listing on the screen.) A directory listing of all files with the extension .WRD will be displayed. The listing will be in the same format as shown in Figure 2.1. That is, the same types of information will be displayed for each file listed, but *only* those files with the extension .WRD will be listed.

For more information about wildcard characters, refer to Chapter 1, "System Manager."

If you want to see directory information for a single file, simply enter the appropriate file name (including the extension, if one exists) at the LIST command **file:** prompt and press RETURN. The directory information for the file will be displayed just above the command line on the System Manager screen.

For example, suppose you have a BASIC program file named MYPROG.BMI and you want to check the size of the file. To do this, you would simply invoke LIST, then enter:

MYPROG.BMI

at the **file:** prompt and press RETURN. The bottom four lines of the screen would then display:

```
MYPROG.BMI      A   6/11/85 6:24:04 PM      168
> Copy Delete List Name Options Print Run Set
Select option or type command letter
System Manager: WORD      Bytes free: 100800 7/13/85 7:27:22 PM
```

The directory entry for the file would remain on the screen until you pressed any key.

If you want to obtain a hard copy of a directory listing, you can follow the general guidelines provided in the above examples, except that you must enter PRN: or COM1: at the **to:** prompt before you press RETURN to begin command execution. PRN: will cause the listing to be printed on a parallel printer, and COM1: will cause the listing to be printed on a serial printer. In either case, you must make sure that the printer you use is properly connected to your ZP-150 and ready for use. Additionally, if you use a serial printer, you must have configured your system with Telcom. (Refer to Chapter 4, "External Devices," and Chapter 17, "Telcom Reference," for more information.)

Similarly, if you want to write a directory listing to a file, you must enter the appropriate file name at the **to:** prompt before you press RETURN. The resulting file will be an ASCII text file.

COMMAND PROMPTS

There are two LIST command prompts. Following is a description of each prompt, the message that appears when each prompt is active, and the entries you can make.

file:

When this prompt is active, the message line displays **Enter file name.** At this prompt, the entry you make specifies whether you want to display directory information for one, some, or all files currently in memory.

If you want to obtain directory information for a single file, enter the file name and extension (if any) of the file.

If you want to obtain a directory listing for a selected group of files, enter a file name and extension that includes one or more wildcard characters. (Refer to Chapter 1, "System Manager," for more information about using wildcards in file names.)

If you want to obtain a directory listing for all files in memory, leave this prompt blank (make no entry) or else enter **.*.** The default or assumed entry at this prompt is **.*.**, or all files.

NOTE: If you enter ***** or **.** at this prompt, only files that have *no* file name extension will be listed.

If you want to obtain a directory listing for files on an external device, you must precede the file name you enter with the appropriate device name. You can use wildcards in the file name.

After making an entry or electing to use the default entry for this prompt, press **TAB** to advance to the next command prompt.

to:

When this prompt is active, the message line displays **Enter file name.** The entry you make at this prompt specifies whether the directory listing will be displayed on the screen, written to a file, or printed.

If you make *no* entry at this prompt, the directory listing will be displayed on the screen. This is the default.

If you want to write the directory listing to a file, enter the file name and extension (if any) of the desired destination file. You *cannot* use wildcard characters. A unique file should be specified. If the file is to be written to an external device, the file name must be preceded by the appropriate device name. (Refer to Chapter 4, "External Devices.")

NOTE: If you enter the name of a file that already exists and press **RETURN**, the message line will display:

File exists, overwrite (y/n)?

Then, if you want the file to be overwritten with the directory listing, enter **Y**. Otherwise, enter **N** or press **RETURN**. (**N** is the default entry at this prompt.) The command will be aborted.

If you want to print the directory listing on a parallel printer, enter **PRN:** at the **to:** prompt. Verify that a parallel printer is properly connected to your ZP-150 and that it is ready for use.

If you want to print the directory listing on a serial printer, enter **COM1:** at the **to:** prompt. Verify that a serial printer is properly connected to your ZP-150 and that Works has been configured (with Telcom) for the serial printer you use.

After making an entry or electing to use the default entry for this prompt, press **RETURN** to begin execution of the **LIST** command.

NAME

PURPOSE

Use the NAME command to rename (assign a new name to) an existing file or group of files.

EXPLANATION

During execution of the NAME command, the System Manager displays informational messages that show the progress or status of the operation. For example, suppose you are renaming a file named MISC.DAT so that it has the name TEST.DAT. As the file is being located and renamed (this is a very brief interval), the screen displays:

Renaming MISC.DAT to TEST.DAT

When the renaming operation has been successfully completed, the screen displays:

Renaming MISC.DAT to TEST.DAT - Done

If the renaming operation could not be completed because you tried to assign an existing file name as the new name or because you tried to rename a file on an external storage device, the screen would display:

Renaming filenam1.ext to filenam2.ext - Ignored

or

Renaming filenam1.ext to filenam2.ext - Failed

where filenam1.ext and filenam2.ext are the source and destination files, respectively, that you specified.

Refer to Error Messages in this chapter for more information.

Using Wildcards to Rename Multiple Files

You can use one or both of the supported wildcard characters (?) and (*) to rename a selected group of files in one operation or to change only the primary file name or extension of a selected file or files.

For example, suppose you have a series of files named MISC1.DAT, MISC2.DAT, MISC3.DAT, and MISC4.DAT, and that you want to rename them to be TEST1.DAT, TEST2.DAT, TEST3.DAT, and TEST4.DAT, respectively. To rename all three files at once, you can invoke NAME and enter:

MISC?.DAT

at the **file:** prompt and press TAB. At the **to:** prompt, enter:

TEST?.*

and press RETURN to begin command execution. All four files will be renamed, and then the upper area of the screen will display:

```
Renaming MISC1.DAT to TEST1.DAT - Done  
Renaming MISC2.DAT to TEST2.DAT - Done  
Renaming MISC3.DAT to TEST3.DAT - Done  
Renaming MISC4.DAT to TEST4.DAT - Done
```

The command and message lines display:

```
NAME file: MISC?.DAT      to: TEST?.*  
Type any character to continue
```

Press any key to return to the normal System Manager screen. Notice that the renamed files now appear in the files display under their new names.

NOTE: When you rename a single file, the System Manager restores the normal command line (that is, the command menu) to the screen automatically and the renaming confirmation message is displayed above the command menu. However, when you use wildcards to rename a group of files, all files renamed are displayed on the screen, and this display supercedes the normal System Manager screen. This is why the Type any character to continue message is displayed. If the entire list of renamed files is too long to fit on the screen, you can press any key to see the next screen of files. When all renamed files have been displayed, press any key to return to the normal System Manager screen.

Look at the previous example again. Suppose you only wanted to rename one file and you only wanted to change the primary file name and not the extension. Assume you wanted to rename MISC1.DAT to be TEST.DAT. To do this using wildcards, you would invoke NAME and, at the **file:** prompt, enter:

MISC1.DAT

and press TAB. At the **to:** prompt, enter:

TEST?.*

and press RETURN to begin command execution. After the file was renamed, the screen would display (just above the command line):

```
Renaming MISC1.DAT to TEST.DAT - Done
```

For more information about using wildcard characters, refer to Chapter 1, "System Manager."

Suppose you were renaming a file and at the NAME command **to:** prompt inadvertently specified a file that already existed. When this happens, the message line will display:

File exists, overwrite (y/n)?

Whenever this message is displayed you must enter either Y or N. (N is the default). You should enter N to abort the NAME command. The message line displays:

Renaming filenam1.ext to filenam2.ext - Ignored

as confirmation, and you can invoke NAME again.

If you enter Y, the NAME command will abort automatically to protect your files and the message line will display:

Renaming filenam1.ext to filenam2.ext - Failed

If this occurs, reinvoke NAME and make sure you enter a unique file name at the **to:** prompt. Remember, you cannot have two files in memory that have the same file name and extension.

COMMAND PROMPTS

There are two NAME command prompts. Following is a description of each prompt, the message that is displayed when the prompt is active, and the entries you can make.

file:

When this prompt is active, the message line displays **Enter file name.** At this prompt, enter the primary file name and extension (if one exists) of the file you want to rename. Alternatively, you can select the file from a full-page listing as described in the File Listings and Directories section of Chapter 1, "System Manager."

The default entry at this prompt is the file that is currently selected on the System Manager screen. Thus, you can use the ARROW keys to select the file *before* invoking NAME instead of invoking NAME and then typing in an entry.

Note that NAME cannot be executed for files that are not resident in memory; you cannot rename files that are resident in an external storage device. Neither can you rename ZP-150 ROM files (System Manager and program files).

After verifying that the default entry is correct or after making a valid entry or file selection, press TAB to advance to the next command prompt.

to:

When this prompt is active, the message line displays **Enter file name.** Enter the new file name and extension to be assigned to the file specified at the **file:** prompt. Then, press **RETURN** to begin command execution. Note that you *must* enter a unique file name, and it must conform to the file naming conventions described in the Files and File Names section of Chapter 1, "System Manager."

If you make *no* entry at this prompt, the assumed or default entry is the file name specified at the **file:** prompt. The renaming operation will be aborted and the screen will display:

Renaming filename.ext to filename.ext - Same file

where **filename.ext** is the file you specified at the **file:** prompt.

If you try to assign a name for a file that already exists, the renaming operation will fail and the screen will display:

Renaming filenam1.ext to filenam2.ext - Ignored

or

Renaming filenam1.ext to filenam2.ext - Failed

where **filenam1.ext** and **filenam2.ext** are the file names you entered at the **file:** and **to:** prompts, respectively.

Refer to Error Messages in this chapter for more information.

OPTIONS

The OPTIONS command is reserved for future use.

PRINT

PURPOSE

Use the PRINT command to print a text file on a parallel printer connected to your ZP-150.

EXPLANATION

Before invoking PRINT, make sure that a parallel printer is properly connected to your ZP-150 and that it is ready for use. Refer to Chapter 4, "External Devices," for information about connecting a parallel printer to your system.

In addition, you may want to verify that the printer parameters, as specified with the SET PRINTER command, are set correctly for the printer and paper you will use. Refer to SET PRINTER in this chapter for more information.

You can specify any valid file at the PRINT command **file:** prompt; however, only ASCII text files will print legibly. Therefore, you should be sure that the file you want to print is indeed printable. Generally, you can print data files that contain ASCII characters, and any file that has been created with an application PRINT command.

During printing, the System Manager displays informational messages that show the status of the operation. For example, suppose you want to review a hard copy of a Telcom session recorded in a file named REPORTS.TXT and have invoked PRINT for the file. As the file is being printed, the following message is displayed just above the command line:

Printing REPORTS.TXT

When printing is complete, the message becomes:

Printing REPORTS.TXT - Done

If the file could not be printed because the printer was not ready or because of some other problem, the screen would display:

Printing REPORTS.TXT - Incomplete

Refer to Error Messages in this chapter for more information.

Using Wildcards to Print Multiple Files

You can use one or both of the supported wildcard characters (?) and (*) to print more than one file. For example, suppose you have a series of Telcom

session files that you want to review and they are named OFFICE.TXT, REPORTS.TXT, and TRANSFER.TXT. To print one copy of each of the files, you can invoke PRINT, then enter:

*.TXT

at the file: prompt and press RETURN to begin command execution. The normal PRINT informational message will be displayed for each file as it is printed. When all three files have been printed, the upper area of the screen displays:

Printing OFFICE.TXT - Done
Printing REPORTS.TXT - Done
Printing TRANSFER.TXT - Done

The command and message lines display:

Printing file: *.TXT
Type any character to continue

Press any key to return to the normal System Manager screen display.

NOTE: When you print a single file, the System Manager restores the command menu to the screen automatically, and the PRINT informational message is displayed just above the command menu. However, when you use wildcards to print a group of files, all files matching the file name you entered are displayed on the screen, and this display of printed files supercedes the normal System Manager screen. This is why the Type any character to continue message is displayed. If the entire list of printed files is too long to print on the screen, you can press any key to see the next part of the list. When the names of all files have been displayed, you can press any key to return to the System Manager screen.

For more information about using wildcard characters, refer to Chapter 1, "System Manager."

COMMAND PROMPT

There is one PRINT command prompt. Following is a description of the prompt, the message that is displayed when the prompt appears, and the entries you can make.

file:

When this prompt appears, the message line displays Enter file name. Enter the primary file name and extension (if any) of the file you want to print. Alternatively, you can select the file from a full-page listing as described in the File Listings and Directories section of Chapter 1, "System Manager."

The default entry at this prompt is the file that is currently selected on the System Manager screen. Thus, you can use the ARROW keys to select the file to be printed *before* invoking PRINT, instead of invoking PRINT and then typing in an entry.

NOTE: If the file you want to print is not in memory, you must precede the file name with the appropriate device name (such as CASS: for a data cassette recorder). For more information about external devices and device names, refer to Chapter 4, "External Devices."

After verifying that the default entry is correct or after making a valid entry or file selection, press RETURN to begin command execution.

RUN

PURPOSE

Use the RUN command to invoke the programs that are built into your ZP-150.

EXPLANATION

When you invoke the RUN command, you will not always have to make entries at one or both prompts. The entry or entries you must make are determined by the currently selected file on the System Manager screen. There are three general types of situations under which RUN can be invoked, and the entry or entries required are different for each type of situation. You can:

- use the ARROW keys to select the program you want and then invoke RUN,
- use the ARROW keys to select the work or data file you want and then invoke RUN, or
- invoke RUN and then verify or enter the program and work or data file names you want.

If you select the program you want from the System Manager screen and then invoke RUN, the selected program is the default entry at the RUN command application: prompt. You need only specify the work or data file at the file: prompt and then press RETURN. If you want to use the program's default work file name, you do not even need to make an entry at the file: prompt. You can simply select the program, invoke RUN, and press RETURN.

NOTE: The Calendar and Telcom applications are the only exceptions to this sequence. Calendar will not let you specify a work file name. Whenever Calendar is run, the work file name is CALENDAR.CAL. If this file does not already exist, it is created automatically. If you select Telcom and then invoke RUN, no RUN command prompts will be displayed. Telcom will be loaded automatically. Then, if you wish to specify a script file or a session file, you must do so at Telcom command prompts.

If you use the ARROW keys to select a data or work file and then invoke RUN, one of two things will happen:

- If you selected a file that is specifically associated with one of the built-in applications, the appropriate application and the selected file will be loaded as soon as you invoke RUN. *No command prompt entries are required.*
- If you selected a file that the System Manager does not recognize as being associated with a specific application, then the selected file is

the default entry at the RUN command file: prompt. You need only specify the program you want to run at the application: prompt and press RETURN. Note that not all programs will read all data files. For information about the types of files that a given application can use, refer to the chapters for that application or to Chapter 3, "ZP-150 Applications."

If the following two conditions are met, you can make the entries you desire at the RUN command prompts:

- You invoke RUN without selecting a program, and
- The currently selected file was either a program file other than Calendar or Telcom or a data file *not* associated with a specific program.

Note, however, that the program and work files you specify *must* be resident in memory. You cannot run an application from an external device. (You can only run built-in programs or program files that have been created with BASIC, and the BASIC program files must be loaded as BASIC work or data files.) Neither can you run a Works program with a work file that is resident on an external device. In the case of a work file that is not resident in memory, you must first copy the file into memory. Then, after using the file in an application, you can copy it back to the external device and delete it from memory in order to make best use of available memory.

COMMAND PROMPTS

There are two RUN command prompts. Following is a description of each prompt, the message that is displayed when each prompt is active, and the entries you can make.

application:

When this prompt is active, the message line displays Enter application name. Enter the name (primary file name) of the Works program you want to invoke. You do not need to enter a file name extension.

The default entry at this prompt is the file that is currently selected on the System Manager screen *if* the currently selected file is a program file. (If the currently selected file is a data file or work file, there is no visible default entry at this prompt.) Thus, you can use the ARROW keys to select the desired program *before* invoking RUN, instead of invoking RUN and then typing in an entry. Note that whenever you enter the System Manager, the initial default for the currently selected file is always the Word program file.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next command prompt.

file:

When this prompt is active, the message line displays Enter work file name. Enter the file name of the work or data file you want to work with in the program you are going to run (as specified at the application: prompt). If you enter a work file name, you do not need to enter the file name extension because the program's default work file name extension is assumed. If you enter a data file name, you must enter the file name extension.

Alternatively, you can select the file from a full-page listing as described in the File Listings and Directories section of Chapter 1, "System Manager."

The default entry at this prompt is the file that is currently selected on the System Manager screen *if* the currently selected file is *not* a program file (that is, if the currently selected file is a work or data file). Thus, you can use the ARROW keys to select the file you want *before* you invoke RUN instead of invoking RUN and then typing in an entry. If the currently selected file is a program file, there is no visible default entry at this prompt.

If you make no entry at the file: prompt and there is no visible default entry, then the selected program's default work file name will be used.

After verifying that the default entry is correct or after making a valid entry or file selection, press RETURN to begin command execution. The specified (or default) program and work or data file will be loaded.

For examples of loading program and work or data files, refer to Chapter 3, "ZP-150 Applications."

SET

PURPOSE

Use the SET command to display a command submenu from which you can select one of five commands that enable you to set certain system-wide (or global) options.

COMMAND SUBMENU

Whenever you invoke SET, the following command submenu is displayed:

SET: Clock Printer Sleep Tone Wake

When this submenu appears, the message line displays Select option or type command letter.

From the SET command submenu, you can select the SET CLOCK, SET PRINTER, SET SLEEP, SET TONE, or SET WAKE command. You select a command from this submenu just as you select a command from the System Manager command menu. That is, either enter the first letter of your selection (such as C for Clock) or use SPACE BAR or TAB to highlight the command you want and press RETURN. Clock, for the SET CLOCK command, is always the initial default selection on the SET command submenu.

Each of the five commands that can be selected from the SET command submenu produces at least one command prompt. Each command and its associated prompt(s) are described on the following pages.

SET CLOCK

PURPOSE

Use the SET CLOCK command to set the date and time used by the system clock.

EXPLANATION

The date and time that you specify with the SET CLOCK command set the system clock. The system clock is used as the reference clock for program functions such as appointments and alarms defined with the Calendar program and the automatic power-on feature provided by the SET WAKE command. It also produces the date and time that are displayed on the status line. (Refer to Chapters 10 and 11 in this manual for information about the Calendar program and to Chapter 5 for information about Alarm. Refer to SET WAKE in this chapter for information about the SET WAKE command.)

The date and time are also used in other internal system functions. For example, the date and time are recorded in the directory entry for any file created or changed. This file data is displayed whenever you use the LIST command and allows you to keep track of current files. (Refer to the LIST command in this chapter for more information about the LIST command.)

Normally, you need only set the date and time once. The system keeps an accurate internal clock and calendar as long as total power failure does not occur and as long as you do not perform a cold start. The clock's integrity, like that of system memory, is maintained by a built-in Ni-Cad battery when the ZP-150 is not connected to an external power supply.

The time is updated continuously and is used by the system to advance the date correctly across days, months, years, and leap years. The only times you may routinely want to change the time is for daylight saving time changes or for time zone changes while you are traveling.

COMMAND PROMPTS

There are two SET CLOCK command prompts. Following is a description of each prompt, the message that is displayed when each prompt is active, and the entries you can make.

date:

When this prompt is active, the message line displays **Enter date**. You can enter the current date in the format:

mm/dd/yy

where *mm* is a value from 1 through 12, designating the month;
dd is a value from 1 through 31, designating the day of the month;
and
yy is a value from 80 through 99, designating the year.

NOTE: If you make an entry at this prompt, you must enter all three values, and the slash (/) delimiter must be used.

The default entry at this prompt is the date currently being used by the system.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next command prompt.

time:

When this prompt is active, the message line displays Enter time. You can enter the current time in the format:

hh:mm:ss

where *hh* is a value from 0 through 23 or from 0 through 12, designating the hour;
mm is a value from 0 through 59, designating the minute; and
ss is a value from 0 through 59, designating the second.

Even though the System Manager always displays the time in a 12-hour clock format, notice that your entry can be in either a 24-hour clock format or a 12-hour clock format. If you make your entry in a 12-hour clock format, you must follow your entry with either A (for AM) or P (for PM). AM is the default. In addition, if you specify either AM or PM, there must be no space between the last digit of the time you entered and A or P.

No matter which clock format you use to make your entry, the minimum entry you can make is a value for the hour (*hh*). If you enter a value for the hour and do not enter a value for minutes and/or seconds, a value of 0 is assumed for the minute and/or second. When more than one value is entered (*hh*, *mm*, and *ss*), the colon delimiter must be used.

The default entry at this prompt is the time currently being used by the system.

After verifying that the default value is correct or after entering a valid time, press RETURN to execute the SET CLOCK command. The date and time will be entered into the system.

SET PRINTER

PURPOSE

Use the SET PRINTER command to specify the page formatting characteristics for PRINT commands. The formatting characteristics are applied to both parallel and serial printers.

NOTE: The page format defined with the SET PRINTER command is the global default. This format is used for all applications, as well as for the System Manager PRINT command, unless you specify a different format for an application *within that application*. For example, Word supports a command (FORMAT DOCUMENT) that enables you to specify print format parameters. If you do not specify a unique format for a Word file, the system values (specified with the SET PRINTER command) will be used when you print the file. If you do specify a unique format, it will be used only for the file that was loaded when you used the Word FORMAT DOCUMENT command.

EXPLANATION

As shipped from the factory, the ZP-150 is set to print on standard 8-1/2 by 11-inch printer paper. The default format parameters are for:

- 60 printable characters per line (85-character total page width),
- 54 printable lines per page (66-line total page length),
- left margin width of 13 characters,
- right margin width of 12 characters,
- top margin depth of 6 lines, and
- bottom margin depth of 6 lines.

You use the SET PRINTER command to change one or more of these defaults to meet your printing needs. Whenever you enter values at the SET PRINTER command prompts, verify that:

- The sum of the values for the left and right margins is less than the value specified for the page width. (The number of printable characters per line is equal to the page width minus the sum of the left and right margins.)
- The sum of the values for the top and bottom margins is less than the value specified for the page length. (The number of printable lines per page is equal to the page length minus the sum of the top and bottom margins.)

If there are any discrepancies in the parameter values that you enter, an error message will be displayed and the SET PRINTER command prompts will remain on the screen. (Refer to Error Messages in this chapter.) You

must either enter correct values or abort the command by pressing ESC. If you abort the command, the preexisting default values will be used.

COMMAND PROMPTS

The SET PRINTER command produces six command prompts. Each of these prompts and their valid entries are described in the paragraphs that follow. For any active SET PRINTER prompt, the message line displays Enter number.

page width:

The entry at this prompt specifies the total number of characters per line, including left and right margin areas. This is the *page width*. The factory-set page width is 85 characters. The default entry at this prompt is the current page width.

If you do not want to use the default entry, enter the desired page width from the range of 10 through 132, inclusive.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next command prompt.

length:

The entry at this prompt specifies the total number of lines per page, including top and bottom margin areas. This is the *page length*. The factory-set page length is 66 lines. The default entry at this prompt is the current page length.

If you do not want to use the default entry, enter the desired page length from the range of 1 through 132, inclusive.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next command prompt.

margin top:

The entry at this prompt specifies the number of blank lines between the physical top of the page and the first line of printed characters. This is the *top margin*. The factory-set top margin is 6 lines. The default entry at this prompt is the current top margin.

If you do not want to use the default entry, enter the desired top margin (number of blank lines) from the range of 0 through 132, inclusive.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next prompt.



bottom:

The entry at this prompt specifies the number of blank lines between the physical bottom of the page and the last line of printed characters. This is the *bottom margin*. The factory-set bottom margin is 6 lines. The default entry at this prompt is the current bottom margin.

If you do not want to use the default entry, enter the desired bottom margin (number of blank lines) from the range of 0 through 132, inclusive.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next prompt.

left:

The entry at this prompt specifies the total number of blank characters to be allowed for the left margin. The factory-set left margin is 13 blank characters. The default entry at this prompt is the current left margin.

If you do not want to use the default entry, enter the desired left margin (number of blank characters) from the range of 0 through 132, inclusive.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next prompt.

right:

The entry at this prompt specifies the total number of blank characters to be allowed for the right margin. The factory-set right margin is 12 blank characters. The default entry at this prompt is the current right margin.

If you do not want to use the default entry, enter the desired right margin (number of blank characters) from the range of 0 through 132, inclusive.

After verifying that the default entry is correct or after making a valid entry, press RETURN to store the SET PRINTER page format parameters in memory.



SET SLEEP

PURPOSE

Use the SET SLEEP command to specify how much idle time (in minutes) will elapse before your ZP-150 automatically turns itself off. Also, use to disable the automatic power-off feature.

COMMAND PROMPT

There is one SET SLEEP command prompt. Following is a description of the prompt, the message that is displayed when the prompt is active, and the entries you can make.

after:

When this prompt appears, the message line displays **Enter number of minutes**. Your entry at this prompt specifies the number of whole minutes that will elapse between the last time a keyboard entry is made and the time that automatic power-off will occur. The factory-set idle time is 5 minutes. The default entry at this prompt is the currently defined idle time.

If you do not want to use the default entry, enter the desired idle time from the range of 1 through 65535 minutes, inclusive.

If you want to disable the automatic power-off feature, enter 0.

After verifying that the default entry is correct or after making a valid entry, press RETURN to execute the SET SLEEP command.

SET TONE

PURPOSE

Use the SET TONE command to specify whether alarms and error conditions are signaled by an audible tone as well as visual indicators.

COMMAND PROMPTS

There are two SET TONE command prompts. Following is a description of each prompt, the message that is displayed when each prompt is active, and the entries you can make.

for alarm:

When this prompt is active, the message line displays **Select option**. At this prompt, you can select one of two valid responses: **Audible** or **Mute**. Your selection specifies whether alarms (corresponding to appointments and reminders entered in the Calendar application or with Alarm) will produce a tone or not. The factory selection is **Audible**. The default at this prompt is the current selection.

If you do not want to use the default, enter the first letter of your selection (A or M) or press SPACE BAR to highlight your selection.

Note that, if you select **Audible**, the loudness of the tone produced by your ZP-150 can be adjusted with the VOLUME control located above function key F1.

After verifying that the default selection is correct or after making your selection, press TAB to advance to the next prompt.

error:

When this prompt is active, the message line displays **Select option**. At this prompt, you can select one of two valid responses: **Audible** or **Mute**. Your selection specifies whether error conditions that produce a message on the message line also generate a tone or not. The factory selection is **Audible**. The default at this prompt is the current selection.

If you do not want to use the default, enter the first letter of your selection (A or M) or press SPACE BAR to highlight your selection.

Note that, if you select **Audible**, the loudness of the tone produced by your ZP-150 can be adjusted with the VOLUME control located above function key F1.

After verifying that the default selection is correct or after making your selection, press RETURN to store your selections in memory.

SET WAKE

PURPOSE

Use the SET WAKE command to set parameters for activation of the automatic power-on feature. Use to specify a program and work or data file that will be loaded automatically when your ZP-150 turns itself on at the specified date and time.

EXPLANATION

In addition to an automatic power-off feature (see SET SLEEP in this chapter), the ZP-150 has an automatic power-on feature. With the SET WAKE command, you specify the date and time that you want your ZP-150 to turn itself on and the program and work or data file you want to be loaded at that time. You might use this feature to plan for a Telcom session at a given time. If you use a script and set the idle time (with the SET SLEEP command) for a reasonable value, you can even have your ZP-150 handle the whole session unattended and then turn itself off. Another example of when you might want to use this capability is to turn your system on when you have alarms and reminders that you do not want to miss.

COMMAND PROMPTS

There are four SET WAKE command prompts. Following is a description of each of the prompts, the message that is displayed when each is active, and the entries you can make.

application:

When this prompt is active, the message line displays Enter application name. Your entry at this prompt specifies the name of the program that you want the System Manager to load when automatic power-on occurs. There is no factory-set default entry for this prompt. (The very first time you turn on your system or when you turn on your system after either pressing the RESET pushbutton or performing a cold start, the entry area following the application: prompt is blank.) Once you have executed the SET WAKE command, the default entry is the last entry you made.

If no default entry is displayed or if you do not want to use the default, enter the name of the Works program that you want loaded automatically. Enter the program file name as it appears on the System Manager screen; you do not need to enter a file name extension.

In order for automatic power-on to occur, you *must* make an entry at this prompt. The entry area cannot be left blank.

NOTE: If you have used the SET WAKE command to specify parameters for automatic power-on and later decide that you want to turn the feature off, you can do so by deleting your entries at the application: and file: prompts. Automatic power-on will not occur unless a program is specified.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next prompt.

file:

When this prompt is active, the message line displays Enter work file name. Your entry at this prompt specifies the work or data file that you want the System Manager to load when automatic power-on occurs. There is no factory-set default entry for this prompt. (The very first time you turn on your system or when you turn on your system after either pressing the RESET pushbutton or performing a cold start, the entry area following the file: prompt is blank.) Once you have executed the SET WAKE command, the default entry is the last entry you made.

If no default entry is displayed or if you do not want to use the default, enter the name of the work or data file that you want loaded automatically. If you enter a work file name, you do not need to enter the file name extension; the default work file name extension (for the program specified at the application: prompt) will be used. If you enter a data file name, enter the file name extension.

If you do not make an entry at this prompt, the default work file name for the specified program will be used.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next prompt.

date:

When this prompt is active, the message line displays Enter date. At this prompt, enter the date on which you want automatic power-on to occur. The date must be entered in the format:

mm/dd/yy

where *mm* is a value from 1 through 12, designating the month;
dd is a value from 1 through 31, designating the day of the month;
and
yy is a value from 80 through 99, designating the year.

NOTE: If you make an entry at this prompt, you must enter all three values, and the slash (/) delimiter must be used.

The default entry at this prompt is the date entered the last time the SET WAKE command was executed. As your unit is shipped (or after a cold start has been performed), the default entry is 0/0/0.

After verifying that the default entry is correct or after entering a valid date, press TAB to advance to the next command prompt.

time:

When this prompt is active, the message line displays Enter time. At this prompt, enter the time at which you want automatic power-on to occur. The time must be entered in the format:

hh:mm:ss

where *hh* is a value from 0 through 23 or from 0 through 12, designating the hour;

mm is a value from 0 through 59, designating the minute; and

ss is a value from 0 through 59, designating the second.

Notice that your entry can be in a 24-hour clock format or a 12-hour clock format. If you make your entry in a 12-hour clock format, you must follow your entry with either A (for AM) or P (for PM). AM is the default. In addition, if you specify either AM or PM, there must be *no* space between the last digit of the time you entered and A or P.

No matter which clock format you use to make your entry, the minimum entry you can make is a value for the hour (*hh*). If you enter a value for the hour and do not enter a value for minutes and/or seconds, a value of 0 is assumed for the minute and/or second. When more than one value is entered (*hh*, *mm*, and *ss*), the colon delimiter must be used.

The default entry at this prompt is the time that was entered the last time the SET WAKE command was executed.

After verifying that the default value is correct or after entering a valid time, press RETURN to execute the SET WAKE command (that is, to store the values you entered in memory). Then, at the specified date and time, your ZP-150 will turn itself on, and the program and file you specified will be loaded.

ERROR MESSAGES

Following are explanations of error messages that can occur as you use the System Manager and error messages that may be generated by the System Manager during execution of the built-in programs. After each message is a brief description of the probable cause and what you are to do to recover from it.

Application has fatally terminated

EXPLANATION: This message is displayed when a serious internal error from which the application could not recover has occurred. The work file that was open when the error occurred will be deleted or lost. You may need to reset your system and will need to recreate the work file. Refer to Resetting the System in Chapter 1, "System Manager," for information about resetting your ZP-150.

Application must be in memory

EXPLANATION: This message is displayed if you specified a file stored on an external device at the RUN command application: prompt (that is, if you preceded the file name with a device name). You cannot load and run applications from external devices. You can only run built-in programs.

Cannot append columns to scrap

EXPLANATION: This message is displayed by the System Manager when you are working in either Plan or File and attempt to append one or more columns to the scrap. If you wish to copy or delete a column to the scrap from Plan or File, you must first make sure that Append Scrap mode is not in effect.

Cannot create file

EXPLANATION: This message is displayed if you were attempting to create or save a file and there is insufficient memory to contain the file. Review the listing of files in memory, delete the files you no longer need, and attempt the operation again. It may be necessary for you to reenter the data for the file.

Cannot find file

EXPLANATION: This message is displayed if you entered a valid file name (that is, a file name conforming to the required file naming conventions), but the file is not in memory or cannot be found on the specified external device. Verify that you entered the correct file name and attempt the operation again. If you are referencing a file on an external device, make sure that the device is properly connected to your ZP-150 and that it is turned on and ready for use.

Cannot load work file from non disk device

EXPLANATION: In this message, disk refers to the RAM (sometimes called a RAM-disk) in which the ZP-150 stores work and data files. This message is displayed if you specified a file on an external device at the RUN command file: prompt (that is, if you preceded the file name with a device name). Work or data files to be loaded and used with an application must be resident in memory. If you want to use a file that is on an external device, you must first copy it into memory.

Cannot open file

EXPLANATION: This message is displayed if the System Manager was unable to open the specified file. Generally, this occurs if the specified file was a read-only file or if you attempted to open a file using a write-only device (such as PRN:). It may also occur if data in the file has become corrupted.

Cannot read file

EXPLANATION: This message is displayed if the System Manager encountered an error condition when attempting to read the contents of a file. A probable cause is corrupted data in the file.

Cannot write file

EXPLANATION: This message is displayed if the System Manager encountered an error condition when attempting to write to a file. Normally, the cause is a device error. Check your equipment and the file you specified and try the operation again.

Copying filenam1.ext to filenam2.ext - Failed

EXPLANATION: In this message, filenam1.ext and filenam2.ext are the source and destination files you specified at the COPY command prompts. This message is displayed if no data could be copied and the copy operation failed completely. The usual cause is a hardware error condition, such as would exist if you tried to copy a file to or from an external device that was not connected or that was not ready. Check your equipment and the files you specified, and reinvoke COPY. Another possible cause is an out-of-memory condition.

Copying filenam1.ext to filenam2.ext - Incomplete

EXPLANATION: In this message, filenam1.ext and filenam2.ext are the source and destination files you specified at the COPY command prompts. This message is displayed if an error condition occurred before all data was copied and the copy operation could not be completed.

Some of the source file contents may have been written to the destination file before the operation failed. If the destination file is listed in the files display, you will probably want to delete it. The probable cause of this error is an out-of-memory condition. Delete the files you no longer need and reattempt the copy operation.

Invalid file name

EXPLANATION: This message is displayed if you entered a file specification that included one or more invalid characters, too many characters, or that was in the wrong syntax. Valid file specifications are in the form:

[*dev*:]*filename*[.*ext*]

where *dev*: is an optional valid device name (and need be entered only if the file is not in memory);
filename is the primary file name; and
.ext is the file name extension, if one exists.

Reattempt the operation or function, entering a valid file specification.

Invalid number

EXPLANATION: This message is displayed when an invalid entry (out of range or text rather than numeric) is made at a prompt or in a field requiring a numeric entry.

Invalid option

EXPLANATION: This message is displayed if the entry or selection you made at a command menu or submenu did not represent a valid option (selection). Check the menu or submenu and make a valid entry.

This message is also displayed if the entry you made at a prompt that lists valid responses did not represent a valid selection. Check the listed responses and make a valid selection.

Invalid value

EXPLANATION: This message is displayed if you entered a value that is out of range or that is inconsistent with other values entered at related command prompts. For example, this message is displayed if you make incompatible entries at the SET PRINTER command prompts. Reenter the correct value(s).

List is empty

EXPLANATION: This message is displayed if you pressed an ARROW key to produce a full-page listing of files and no work or data files are present.

No fields in data file

EXPLANATION: This message is displayed if you invoked an operation that requires the use of the contents of the scrap, and the scrap is empty.

No file specified

EXPLANATION: This message is displayed if you did not enter a file specification at a prompt requiring that a file be specified. Enter a valid file specification.

No scrap

EXPLANATION: This message is displayed if you invoked an operation that requires the use of the scrap area of memory, and the scrap is empty or the No Scrap mode is in effect. Use the SCRAP key to set the scrap status to normal (Blank Scrap mode) or Append Scrap mode, then reinvoke the operation. If you are trying to insert from the scrap and this message still occurs, you must either type in the text you want to insert or copy the text you want into scrap and then insert it.

Not a valid application

EXPLANATION: This message is displayed if the entry you made at the RUN command application: prompt was not the name of one of the built-in programs. Reenter a valid Works program name.

Not enough system memory

EXPLANATION: This message is displayed if there is not enough system memory available to complete the operation just requested or in progress. The operation cannot be successfully completed until system memory is freed by deleting unnecessary files or by transferring some files that are not currently needed to an external storage device and then deleting them from memory. (Refer to Working with Limited Memory in Chapter 1, "System Manager.")

Not enough work space

EXPLANATION: The maximum size of any file that can be stored, created, or used by any ZP-150 program is 64K. (That is, the limit on addressable memory is 64K bytes.) This message is displayed if the current operation caused this limit to be exceeded. For example, this message may be displayed if you try to copy a large file into memory from an external storage device. In order to complete the operation, the data you are working with may have to be split into two or more (rather than one) files. (Refer to Working with Limited Memory in Chapter 1, "System Manager.")

Output file too large

EXPLANATION: This message is displayed if the file you are creating is larger than 64K. This may occur when you are creating a file with Word or when you are using an application PRINT command to print data to a file, and so on. The maximum size for any file in the system is 64K bytes.

Printing filename.ext - Incomplete

EXPLANATION: In this message, filename.ext is the file you specified at the PRINT command prompt. This message is displayed if the file could not be printed. The usual cause is that the printer was not connected or was not ready.

Removing filename.ext - Failed

EXPLANATION: In this message, filename.ext is the file name you entered at the DELETE command prompt. This message is displayed if the file could not be erased because it is a ROM file or because you specified a file on an external device and the device was not connected or was not ready.

Renaming filenam1.ext to filenam2.ext - Failed

EXPLANATION: In this message, filenam1.ext and filenam2.ext are the files you specified at the NAME command prompts. This message is displayed if you tried to rename a file to the name of another existing file. Reinvoke NAME and make sure that you specify a unique file name at the to: prompt.

Renaming filenam1.ext to filenam2.ext - Same file

EXPLANATION: In this message, filenam1.ext and filenam2.ext are the files you specified at the NAME command prompts. This message is displayed if you tried to rename a file to the name it already had. Reinvoke NAME and make sure that you specify a unique file name at the to: prompt.

Response too long

EXPLANATION: This message is displayed if you entered more characters at a command prompt than are allowed in a valid response. Make a valid entry.

Source and destination are the same

EXPLANATION: This message is displayed if the source and destination files you specified were the same and the command or function you are trying to invoke requires that they be unique.

Unable to close scrap

EXPLANATION: This message is displayed if there is an error condition that prevents the System Manager from closing the scrap file. This may be caused by an out-of-memory condition.

Unable to open scrap

EXPLANATION: This message is displayed if there is an error condition that prevents the System Manager from opening the scrap file in order to read from or write to it. This may occur when there is no scrap and you invoked an operation requiring its use or by an out-of-memory condition.

Unable to write to scrap

EXPLANATION: This message is displayed when you are working in an application and attempt to delete or copy to the scrap, and the data cannot be written to the scrap. The probable cause of this error is an attempt to copy/delete more data than will fit in the scrap or insufficient system memory.

Unsuitable device

EXPLANATION: This message is displayed if you specified a device (either alone or as part of a file specification) that is not valid for the command or function you are trying to invoke. For example, if you tried to specify PRN: at the COPY command file: prompt, this message would be displayed.

Wildcarded source files not allowed for non disk device

EXPLANATION: This message is displayed if you attempt to copy more than one file or delete more than one file from an external device. You cannot use wildcard characters for these operations. Enter a unique file name.



CHAPTER 3

ZP-150 APPLICATIONS

OVERVIEW

It is easy to start any of the applications available on your ZP-150 by using the System Manager RUN command. The RUN command allows you to create a new work file for a built-in program, run an existing work file, or run a data file with an appropriate built-in program.

Besides creating and running work files, Microsoft Works also allows you to transfer data easily and quickly from one work file to another. This is done via the scrap, a storage area for temporarily holding data. By using the scrap, you can insert a Plan worksheet into a Word document, use File to extract information from one or more Plan worksheets, use Plan to perform calculations on a File database, and so on.

You can also transfer files between your ZP-150 and a desktop system. This means that documents you write using ZP-150 Word can be polished and printed with desktop Word. You can integrate a ZP-150 Plan spreadsheet with spreadsheets you use on desktop Multiplan. And you can transfer ZP-150 File databases to many popular desktop database programs.

Because you can also transfer desktop files to your ZP-150, you can take the sales forecast, which you prepared using desktop Multiplan, to the sales meeting and update it with any last minute information using Plan. Or you can transfer the database file containing your customers' order information to the ZP-150 and use it, with File, when you make sales calls. You can even take a copy of a speech written on desktop Word and fine tune it with ZP-150 Word on your way to your speaking engagement.

STARTING A PROGRAM

Starting an application is as easy as selecting the program you want and then choosing the System Manager RUN command. You can use the RUN command to create new work files, run existing work files, or run data files that you have created or transferred to your ZP-150 from an external source.

The procedure for creating a work file varies depending upon the program you choose.

Creating a Work File in Word, File, Plan, or BASIC

The general procedure for creating a new work file for Word, File, Plan, and BASIC is as follows:

1. Use the ARROW keys to select the program you want to run.
2. Press RETURN to execute the RUN command.

The RUN command is the default selection in the System Manager command line. This means that when you return to the System Manager from a program, the RUN command is the current selection in the command line. Unless you have changed the default selection, you only have to press RETURN to execute the RUN command.

After you press RETURN, the RUN command prompts will be displayed as follows:

RUN application: file:

The built-in program you selected on the System Manager screen will be the default entry at the application: prompt. If you did not use the ARROW keys to select an application, then WORD, which is the default selection on the System Manager screen, will be the entry at the application: prompt.

3. Press TAB to advance to the file: prompt and then enter a file name. The name you enter at the file: prompt will become the name of the work file.

When you enter a file name, do not enter an extension. Microsoft Works adds the default extension for the work file you are creating. Default extensions for the built-in programs are listed in Table 3.1.

Table 3.1. Default File Name Extensions

PROGRAM	DEFAULT EXTENSION
BASIC	.BMI
Calendar	.CAL
File	.FIL
Plan	.PLN
Word	.WRD

You can also leave the file: prompt blank. If you do, the program will name the file WORK, the default entry for the file: prompt.

4. Press RETURN.

You will then see the display for the program you have chosen, and you can begin creating the work file.

An alternate method for creating a work file is:

1. Select the RUN command in the System Manager command line.
 2. Press RETURN.
 3. At the application: prompt, enter the name of the program you want to run.
 4. Press TAB.
 5. At the file: prompt, enter a file name or leave the prompt blank to choose the default file name WORK.
 6. Press RETURN.

When a work file is created, its name will appear on the System Manager screen to the right of the program to which it belongs. Figure 3.1 shows a sample System Manager screen with work files. The files NEWCUST and ROUTCHG are Word work files. ADDRESS and ORDERS are File work files. The Plan work files are EXPENSES, SALEPRG1, SALEPRG2, and SALEPRG3.

Creating a Work File in Calendar

Calendar can recognize only one work file: CALENDAR.CAL. Therefore, you cannot enter a file name at the file: prompt of the RUN command. The procedure for creating a Calendar work file is:

1. Use the ARROW keys to select the Calendar application.
 2. Press RETURN to execute the RUN command.

WORD	NEWCUST	ROUTCHG
CALENDAR	CALENDAR	
FILE	ADDRESS	ORDERS
.DAT	ADDRESS	ORDERS
TELCOM		
PLAN	EXPENSES	SALEPRG1 SALEPRG2 SALEPRG3
BASIC		
.TXT	ORDER	

Microsoft(R) Works V1.10, Copyright (1984, 1985) Microsoft Corp.
> Copy Delete List Name Options Print Run Set
Select option or type command letter
System Manager: WORD Bytes free: 111568 11/21/85 10:31:03 AM

Figure 3.1. System Manager Display of Work Files

3.4

ZP-150 Applications



As soon as you press RETURN, the current Daily Diary screen of Calendar appears. Notice that for the Calendar application, you bypass the RUN command prompts.

The Calendar work file, CALENDAR.CAL, is displayed to the right of the Calendar application on the System Manager screen as shown in Figure 3.1.

Creating a Work File in Telcom

Telcom cannot actually create any work files of its own. Therefore, when you run Telcom, you will not see the RUN command prompts. To run Telcom:

1. Use the ARROW keys to select Telcom.
2. Press RETURN to execute the RUN command.

As soon as you press RETURN, the system will enter Telcom.

Running an Existing Work File

Once you have created a work file, you will want to be able to update and modify it. You also use the RUN command to run an existing work file. The procedure is:

1. Use the ARROW keys to select the work file (a file on the right side of the vertical line) that you want to run.
2. Make sure the RUN command is selected in the System Manager command line.
3. Press RETURN.

As soon as you press RETURN, your system will enter the work file you selected. You will be returned to the work file at the same place as you were when you quit.

An alternate method for running an existing work file is:

1. Select the RUN command in the System Manager command line.
2. Press RETURN.
3. At the application: prompt, enter the name of the program you want to run.
4. Press TAB to select the file: prompt.



5. At the file: prompt, enter the name of the existing work file you want to run

or

press one of the ARROW keys to display a full-page listing of all the files in memory. Then use the ARROW keys to select (highlight) the file you want to run. Each time you press an ARROW key, the name of the highlighted file will appear as the entry at the file: prompt.

6. Press RETURN.

NOTE: If you use the ARROW keys to select a work file, make sure that you select a work file that belongs to the program you have chosen. Programs cannot read work files belonging to other applications or to the BASIC language. See Table 3.1 for a list of programs and the file name extensions that refer to each one.

Using a Data File

In addition to creating and running work files, you will also want to use data files. *Data files* are files that do not belong to applications, but contain data that can be read by one or more programs. For example, you may have accessed a bulletin board or an electronic mail system with Telcom and saved the information you received in a data file. For that information to be useful, you need to be able to read it with one of the applications. Table 3.2 lists the types of data that each application can read.

Data files are listed on the System Manager screen to the right of their extensions. In Figure 3.2, CALLS, DOWJONES, and ORDER are data files. All of them have the extension .TXT.

Table 3.2. Applications and Their Data Types

APPLICATION	TYPE OF DATA READ				
	Text	Numbers	Dates	Times	Formulas
Calendar	x		x	x	
File	x	x	x	x	
Plan	x	x			x
Word	x				

3.6

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WORD	NEWCUST	ROUTCHG
CALENDAR	CALENDAR	
FILE	ADDRESS	ORDERS
.DAT	ADDRESS	ORDERS
TELCOM		
PLAN	EXPENSES	SALEPRG1 SALEPRG2 SALEPRG3
BASIC	CALLS	DOWJONES ORDER
.TXT		

Microsoft(R) Works V1.10, Copyright (1984, 1985) Microsoft Corp.
> Copy Delete List Name Options Print Run Set
Select option or type command letter
System Manager: WORD Bytes free: 109152 11/21/85 10:56:04 AM

Figure 3.2. Display of Work and Data Files

The procedure for using a data file is as follows:

1. Use the **ARROW** keys to select the data file you want to read.
2. Make sure the **RUN** command is selected in the System Manager command line.
3. Press **RETURN**.

The **RUN** command prompts will be displayed with the data file you selected as the default entry at the **file:** prompt.

4. At the **application:** prompt, enter the name of an appropriate application program (see Table 3.2).
5. Press **RETURN**.

Your system will enter the application. On the status line, you will see the message **Reading line: n** (where *n* is a number). When the entire data file has been read, the information contained in the file will appear on the screen.

If no information appears, it means that the application you selected cannot read the information contained in the data file. If this happens, quit the application and run the data file again with an application that can read the data.

When an application reads a data file, it actually copies the data from the data file into a work file. Therefore, when you read a data file, you have two files by the same name in memory: the original data file and the work file that contains the information from the data file formatted so that the application can manipulate it.

For example, suppose you read with Word the data file **ORDER.TXT** shown in Figure 3.1. You will then have two **ORDER** files in memory as shown in Figure 3.2: **ORDER.TXT**, the original data file, and **ORDER.WRD**, the Word work file containing the information from **ORDER.TXT**.

NOTE: If two files in memory have the same name, an application will always read its own work file. This means that if you want to read a data file that has the same name as one of the application's work files, you will have to rename either the work file or the data file before the application will read the data file.

For example, suppose you had in memory a Word work file named MEMO that contained a memo from you to your secretary. Suppose you also had in memory a data file named MEMO.TXT that contained a memo from your boss to you. If in the RUN command you selected MEMO.TXT as the data file and Word as the application, Word would display MEMO.WRD, the memo from you to your secretary, not MEMO.TXT, the memo from your boss to you. To read MEMO.TXT with Word, you would have to use the NAME command to rename MEMO.TXT, giving it a new name such as BOSS.TXT. Then you could read BOSS.TXT with Word. (Refer to the NAME command in Chapter 2, "System Manager Reference," for information about how to use the NAME command.)

An alternate method for running a data file is:

1. Select the application.
2. Select the RUN command.
3. Press TAB to select the file: prompt.
4. At the file: prompt, enter the complete file name, including the extension, of the data file you want to read.
5. Press RETURN.

TRANSFERRING DATA BETWEEN APPLICATIONS

One of the most powerful features of your ZP-150 is its ability to transfer data between the files you create with the applications. For example, you can transfer data from one Plan worksheet to another Plan worksheet, or you can transfer data from a Plan worksheet to a Word document.

Usually, you will transfer data between applications by copying or deleting data from the source file into the scrap (a special part of your computer's memory) and then inserting the data from the scrap into the destination file. (The *source file* is the work file that initially contains the data you want to transfer. The *destination file* is the work file into which you want to transfer the data.)

When transferring data to a Word document, you have another option. Besides using the scrap, you can print data from the source file to a text file and then merge the text file with the Word document.

Transferring data through the scrap is the faster of the two methods. However, when you print to a text file, in addition to data, you also transfer record and column numbers of a Plan worksheet and control records and record numbers of File and Calendar files. For example, you would transfer data via a text file if, within the text of a Word document, you want to reference by row, column, or record number data transferred from Plan, File, or Calendar.

Using the Scrap

The *scrap* is a special part of your computer's memory reserved for temporarily storing the data you want to transfer between applications. (On the System Manager screen, the data file SCRAP contains whatever you have put into the scrap.) The scrap is independent of any application; after you quit a program, the data you have placed in the scrap remains there until you delete it or replace it with something else.

The general procedure for transferring data through the scrap is as follows:

1. Create or run the work file you want to transfer data from (the source file).
2. Select the data you want to transfer.
3. Set the appropriate setting for the scrap.
4. Copy or delete the selected data to the scrap.
5. Quit the source file.
6. Create or run the work file you want to transfer data to (the destination file).
7. Specify the area in which to insert data from the scrap.
8. Copy or insert data from the scrap.

Details on each step of the procedure are provided in the following sections. For information about how to execute each step for a specific application, see the chapters in this manual that refer to the particular application.

RUN THE WORK FILE

Refer to Starting a Program at the beginning of this chapter for instructions on how to create and run work files. Refer to the chapters for the individual applications in this manual for information about how to enter information in work files with each of the applications.

SELECT THE DATA

In Word, File, and Calendar, you first select the data you want to transfer before copying or deleting it to the scrap. Selected data is highlighted on the screen. In Plan, you specify the data you want to transfer in the command prompts of the COPY or DELETE command.

Selecting Data in a Word File

The destination for the data of a Word file affects how data is selected. Transferring text from Word to Plan, File, or Calendar requires a preliminary step.

Word creates files made up of a series of characters. Plan, File, and Calendar, on the other hand, create files made up of columns and rows. In order for Plan, File, and Calendar to be able to read what is put into the scrap in Word, you have to convert a Word document from a file containing a series of characters into a file that groups characters into columns and rows.

Therefore, before you select the text to be placed in the scrap, separate the text into the equivalent of fields and records for File and Calendar, or cells and rows for Plan. To do so, position the cursor immediately after a unit of text (word, sentence, line, or paragraph) and then press any one of the following keys:

TAB	Separates text into fields or cells
RETURN or	
SHIFT-RETURN	Separates text into records or rows

Any text followed by one of these keystrokes will be stored in the scrap as the type of data unit that the keystroke defines. For example, each word in a table separated by tabs would be placed in an individual cell when transferred from the scrap to a Plan worksheet. Similarly, each row in a table that ends with a RETURN or a SHIFT-RETURN would be read as an individual record when transferred from the scrap to a File work file.

Once you have separated the text that you want to copy or delete to the scrap, select the text. Initially, a single character is selected. You can extend the current selection by using the keys described in Table 3.3.

Selecting Data in a File or Calendar File

In File and Calendar, a single field is initially selected. You can extend the current selection by using the keys described in Table 3.4.

Selecting Data in a Plan File

Rather than highlighting an area of the screen, in Plan you specify the data you want to transfer by typing a cell reference or row-column coordinates at the prompts of the COPY or DELETE command.

Table 3.3. Word Selection Keys

FUNCTION	KEY	ACTION
EXTEND SELECT	F6	After pressing F6, you use the ARROW keys to extend the current selection one character at a time.
WORD LEFT	F7	Selects the word to the left of the currently selected word.
WORD RIGHT	F8	Selects the word to the right of the currently selected word.
SELECT SENTENCE	F9	Extends the current selection to include the entire sentence.
SELECT PARAGAPH	F10	Extends the current selection to include the entire paragraph.
SELECT LINE	SHIFT-F9	Extends the current selection to include the entire line.
SELECT DOCUMENT	SHIFT-F10	Extends the current selection to include the entire document.

NOTE: To append additional words, sentences, paragraphs, or lines to your selection, press F6 before using any of the keys in Table 3.3. Then use the remaining selection keys to further extend your selection.

Some sample specifications are:

- R2C3 places the cell in row 2, column 3 in the scrap
- R2 places row 2 in the scrap
- R2:6 places rows 2 through 6 in the scrap
- C3 places column 3 in the scrap
- C3:7 places columns 3 through 7 in the scrap
- R2C3:R4C5 places a rectangular grouping of cells into the scrap; the cell in row 2, column 3 forms the upper left corner of the rectangle; the cell in row 4, column 5 forms the lower right corner of the rectangle

Table 3.4. File and Calendar Selection Keys

FUNCTION	KEY	ACTION
EXTEND SELECT	F6	After pressing F6, you use the ARROW keys to extend the current selection to include any rectangular grouping of fields and records.
SELECT COLUMN	SHIFT-F8	Extends the current selection to include the entire column. Use the LEFT or RIGHT ARROW key to select additional columns.
SELECT RECORD	SHIFT-F9	Extends the current selection to include the entire record. Use the UP or DOWN ARROW key to select additional records.
SELECT ALL	SHIFT-F10	Extends the current selection to include all data records.

SET THE SCRAP MODE

Before copying or deleting data to the scrap, you need to set the status of the scrap. By using the SCRAP key (F5), you can set the scrap either to replace or to append data to the current contents of the scrap. You can also set the scrap so that the selected data is deleted from the file but is not sent to the scrap. The three states of the scrap are:

Blank Scrap mode	Nothing appears on the status line
Append Scrap mode	Ap appears on the status line
No Scrap mode	Ns appears on the status line

The ZP-150 is shipped from the factory with the scrap set in Blank Scrap mode. In this mode, whatever is sent to the scrap will replace the current contents of the scrap. No indicator will appear on the status line.

If you press F5 once when you are using Blank Scrap mode, Ap appears on the status line, indicating that you are using Append Scrap mode. This indicates that any data you place in the scrap will be appended to the data already in the scrap.

Appending data to the current contents of the scrap is useful if, for example, you want to gather data from two or more different areas of a Plan worksheet, or from two or more work files, to transfer to another work file.

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If you press F5 when you are using Append Scrap mode, **Ns** appears on the status line, indicating that you are using No Scrap mode. This mode does not affect copying to the scrap; that is, even in No Scrap mode, the COPY command will still place data in the scrap. However, if you use the DELETE command or the DEL key, data you delete from the file will not be placed in the scrap.

CAUTION: Use the DELETE command or DEL key in No Scrap mode only if you want to erase data irretrievably from a file.

Pressing F5 when you are in No Scrap mode restores the scrap to its original state; that is, the data you copy or delete to the scrap will replace the current contents of the scrap, and no indicator will appear on the status line.

COPY OR DELETE TO SCRAP

Once you have selected the data to be transferred and have set the scrap, use commands from the application's menu to place the data in the scrap. Table 3.5 lists the commands, by application, that you use to place data in the scrap.

Whether you copy or delete data to the scrap depends on whether or not you want to erase the transferred data from the source file. When you use a DELETE command to delete data to the scrap, the data is erased from the source file. When you use a COPY command to copy data to the scrap, the data remains in the source file.

For example, if you delete a certain number of columns from a Plan worksheet to the scrap, the columns are erased from the worksheet. If you copy the columns to the scrap, they are not erased from the worksheet.

Keep in mind that, in all applications, changing the scrap setting affects how data is copied or deleted to the scrap.

When you use the DELETE command to delete to scrap, the scrap must be set to either Blank Scrap or Append Scrap mode. **Ns** must not appear on the status line.

Table 3.5. Commands that Place Data in the Scrap

APPLICATION	COMMANDS
Calendar	COPY, DELETE
File	COPY, DELETE
Plan	COPY FROM, DELETE COLUMN, DELETE ROW
Word	COPY, DELETE

The COPY command replaces the current contents of the scrap with the copied data, regardless of whether **Ns** or no notation appears on the status line.

Ap on the status line tells you that both the COPY and the DELETE commands will append data to the current contents of the scrap.

In Word, File, and Calendar, the COPY and DELETE commands have no associated submenus or prompts. Once you have selected the data and set the scrap to the status you want, you execute either command simply by selecting it from the command line.

In Plan, the COPY and DELETE commands do have associated submenus and prompts.

To use the COPY command in Plan:

1. Change the scrap setting either to replace (no indicator) or to append to (**Ap** indicator) the current contents of the scrap.
2. Select the COPY command.
3. Select FROM in the COPY command submenu.
4. At the **cells:** prompt, specify the area of the worksheet you want to copy to the scrap. You can specify a single cell, one or more rows or columns, or any rectangular group of cells (see sample specifications in Select the Data).
5. At the **to cells:** prompt, enter SCRAP.
6. Press RETURN.

To use the DELETE command in Plan:

1. Change the scrap setting either to replace (no indicator) or to append to (**Ap** indicator) the current contents of the scrap.
2. Select the DELETE command.
3. Select COLUMN or ROW in the DELETE command submenu.

NOTE: Columns cannot be deleted to the scrap if the scrap is in Append Scrap mode.
4. At the first prompt, enter the total number of columns or rows that you want to delete to the scrap.
5. At the second prompt, enter the number of the first column or row that you want to delete to the scrap.

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6. Press RETURN.

QUIT THE SOURCE FILE

To quit the source file, press CTRL-F10 (the QUIT key). If the work file you want to transfer data to is the last one that you ran, press CTRL-F9 (the RUN PREVIOUS key).

RUN THE DESTINATION FILE

Refer to Starting a Program at the beginning of this chapter for instructions on how to create and run work files.

If you press the RUN PREVIOUS key (CTRL-F9) to quit the source file, you will automatically return to the work file you used just before you ran the source file.

SPECIFY THE INSERTION AREA

Once you have created or run the destination file, you specify an area to receive the data you have stored in the scrap. The method of specifying an area of insertion differs from program to program.

In a Word file, the position of the cursor or selection highlight marks the point at which data will be inserted from the scrap. The inserted data will be placed before the selection highlight in the document. Any subsequent text will move right and, if necessary, down.

In a File or Calendar file, you select (highlight) an area in the file to receive data from the scrap. To do so, use the same keys (listed in Table 3.4) that you use to select data to be placed into the scrap.

In a Plan file, rather than using selection keys to select an area, you specify the area of the worksheet within which you want to insert data by entering one of the following in the prompts of the COPY FROM or INSERT command:

- a cell reference, or
- row and/or column coordinates.

For sample specifications, see Select the Data in this chapter.

COPY OR INSERT THE DATA FROM THE SCRAP

Use commands from the destination application's command line to insert or copy data from the scrap. Table 3.6 lists the commands, by application, that you use to retrieve data from the scrap.

Table 3.6. Commands Used to Retrieve Data

APPLICATION	COMMAND
Calendar	INSERT
File	INSERT
Plan	INSERT COLUMN INSERT ROW
Word	COPY FROM INSERT

Inserting in a Word File

In Word, the INSERT command has no associated submenu or prompts. You execute the INSERT command simply by selecting it from the command line.

Data is inserted from the scrap immediately to the left of the selection. Existing text moves right and/or down to make room for the inserted data. For example, if the selection in a Word document is a paragraph marker between the first and the second paragraph, data from the scrap will be inserted between the two paragraphs. The second paragraph will move down to make room for the inserted data.

Inserting in a File or Calendar File

In File and Calendar, the INSERT command has no associated submenu or prompts. You execute the INSERT command simply by selecting it from the command line.

The way that data is inserted from the scrap depends on what you have selected in the file.

- If you have selected an area that includes partial records (rows) or fields (columns), data inserted from the scrap replaces the contents of the selected area.
- If you have selected an area that is not large enough to receive the entire contents of the scrap, only as much data as will fit in the selected area will be inserted into the file.
- If you have selected an area that is larger (contains more records or fields) than the contents of the scrap, all records or fields in the selected area that do not receive data from the scrap will be blanked.

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- If you have selected one or more entire records (rows), data from the scrap is inserted immediately before the first selected record.
- If you have selected one or more entire fields (columns), data from the scrap is inserted immediately before the first selected field.

Inserting in a Plan File

In Plan, the INSERT and COPY commands do have associated submenus and prompts.

To use the INSERT command:

1. Make sure that the scrap is in either Blank Scrap or Append Scrap mode.

If the scrap is in No Scrap (Ns) mode, the INSERT command will add new columns or rows to the worksheet, but it will *not* copy data from the scrap into those new rows or columns.

2. Select the INSERT command.
3. Select COLUMN or ROW from the INSERT command submenu.
4. At the first prompt, enter the number of new columns or rows you want to open to receive the data from the scrap.
5. At the second prompt, enter the number of the column or row before which you want to insert data from the scrap.
6. Press RETURN.

When you use the INSERT command, data in the scrap is added to the data already in your worksheet. None of your original data is copied over by data from the scrap.

To use the COPY command:

1. Select the COPY command.
2. Select FROM in the COPY command submenu.
3. At the cells: prompt, enter SCRAP.

4. At the **to cells:** prompt, specify the area of the worksheet to receive data from the scrap.

You can specify a single cell, one or more rows or columns, or any rectangular group of cells (see sample specifications in Select the Data)

or

use the ARROW keys to select the first cell of any single column or row you want to copy data into or the cell that forms the upper left corner of the rectangular area you want to copy data into.

Each time you press an ARROW key, the cell you select will appear as the default entry at the **to cells:** prompt.

5. Press RETURN.

When you use the COPY FROM command, data from the scrap replaces the contents of the cells you specify at the **to cells:** prompt.

The way that data is placed on the worksheet depends on whether you use the INSERT command or the COPY FROM command to retrieve the data from the scrap.

When you use the INSERT command, new columns or rows are added to the worksheet to receive the data from the scrap. Columns or rows are added at the point you specify in the command prompts, and data from the scrap is distributed within the new columns or rows. Only as much data will be retrieved from the scrap as will fit in the number of new columns or rows that you have inserted. Therefore, if you are not sure of exactly how many columns or rows data from the scrap will fill, proceed as follows:

1. Insert more columns or rows than you need.
2. Change the scrap setting to No Scrap (N₈ is displayed on the status line).
3. Delete all unfilled columns or rows.

When you use the COPY FROM command, data from the scrap replaces the contents of the cells you specify at the **to cells:** prompt.

When making an entry at the **to cells:** prompt, you can either:

- enter a response, or
- use the ARROW keys to select the cell that will be the upper left corner of the area to receive data from the scrap.

If you enter a reference to a single cell (for example, R2C3), that cell will form the upper left-hand corner of the area to receive data from the scrap. Data will be copied from the scrap in the same size and shape as it was placed into the scrap. For example, if the scrap contains a block of data

from File that is three fields by three records, the data will be copied into Plan as a block that is three cells by three cells.

If you enter a reference to a group of cells (for example, R2:6), only as much data will be copied from the scrap as will fit in the area you specify. If you specify too large an area, all cells within the area that do not receive data from the scrap will be blanked.

Sample Data Transfer

The following example illustrates the process of transferring data between applications.

Assume that you are responsible for keeping records on the monthly sales figures for your company's sales staff. You also calculate and report to the payroll department the amount of each salesperson's monthly commission.

The records on monthly sales figures are kept in a File database called SALES, which is shown in Figure 3.3.

Monthly commissions are 11.5 percent of monthly sales. You could, of course, calculate each commission by hand. However, it would be faster to simply transfer the data in your SALES database to a Plan worksheet, where Plan can calculate the commissions for you.

You can then transfer the data from your worksheet to a Word document containing the memo you write to the payroll department.

TRANSFERRING DATA FROM FILE TO PLAN

Your first step is to select the data in SALES that you want to transfer to the Plan worksheet and then copy the selected data to the scrap.

1. For this example, select all data records by pressing SHIFT-F10. These records will be acted upon by the next command that you choose.
2. Select the COPY command from the File command line.
3. Press RETURN; the selected data is copied to the scrap.

Next, you create a Plan worksheet and copy the data from the scrap to the worksheet.

ID	SALESPERSON	SALES 10/85	NEW
FORM	AAAAAAA	\$ ##,###.##	AAAAAAA
SORT			
FIND			
1	Baxter, Diane	\$ 7,360.00	
2	Fitzgerald, John	\$ 9,560.00	
3	Hill, Carol	\$ 11,850.00	
4	Johnson, Lee	\$ 10,750.00	
5	Lloyd, Stephen	\$ 8,990.00	
6	Peters, Jill	\$ 9,170.00	
7	Rogers, Cheryl	\$ 10,560.00	
8	Scott, Henry	\$ 12,300.00	
NEW			
> Copy Delete Edit Find Insert Jump LookUp Move Options Print			
Select option or type command letter			
File: SALES Records: 8/8			

Figure 3.3. SALES Database File

1. Press **CTRL-F10**. You are returned to the System Manager screen.
2. Use the **ARROW** keys to select the Plan application.
3. Press **RETURN** to execute the **RUN** command.
4. Press **TAB** to advance to the **file:** prompt and enter the name for the Plan worksheet (COMM for our example).
5. Press **RETURN**.

A new Plan worksheet appears on the screen. Cell R1C1 is selected for you. This cell will be the upper left-hand corner of the area into which data will be copied from the scrap.

Next, copy the data from the scrap to the COMM worksheet.

1. Select the **COPY** command.
2. Press **RETURN**.
3. Select **FROM** in the **COPY** command submenu and press **RETURN**.
4. Enter **SCRAP** at the **cells:** prompt.
5. Press **RETURN**.

Your COMM worksheet should now look like Figure 3.4.

PREPARING THE DATA IN PLAN

While working with the COMM worksheet, you will:

- reformat the data so it will look right when you later transfer it to a Word document, and
- calculate the commission for each salesperson.

First, widen the cells on the worksheet to fully display your data. All cells on a Plan worksheet are initially 10 characters wide. Because the longest item of data on your worksheet is 16 characters, you need to increase the width of all cells by six characters.

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#	1	2	3	4	5	6	7
1	Baxter, Di	7360					
2	Fitzgerald	9560					
3	Hill, Caro	11850					
4	Johnson, L	10750					
5	Lloyd, Ste	8990					
6	Peters, Ji	9170					
7	Rogers, Ch	10560					
8	Scott, Hen	12300					
9							
10							
11							

```
> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: COMM      R1C1    "Baxter, Diane"
```

Figure 3.4. COMM Worksheet

1. Press F to select the FORMAT command.
2. Press D to select DEFAULT in the FORMAT submenu.
3. Press W to select WIDTH in the DEFAULT submenu.
4. Enter 16 at the width in chars: prompt.
5. Press RETURN.

Next, you could format the figures in column 2 to represent dollar amounts.

1. Use the ARROW keys to select cell R1C2.
2. Press F to select the FORMAT command.
3. Press D to select DEFAULT in the FORMAT submenu.
4. Press C to select CELLS in the DEFAULT submenu.
5. Press TAB to advance to the format code: prompt.
6. Press SPACE BAR until \$ is selected.
7. Press RETURN.
8. Press F to select the FORMAT command.
9. Press O to select OPTIONS in the FORMAT submenu.
10. Press SPACE BAR until Yes is selected at the commas: prompt.
11. Press RETURN.

Your worksheet now looks like Figure 3.5.

#	1	2	3	4
1	Baxter, Diane	\$7,360.00		
2	Fitzgerald, John	\$9,560.00		
3	Hill, Carol	\$11,850.00		
4	Johnson, Lee	\$10,750.00		
5	Lloyd, Stephen	\$8,990.00		
6	Peters, Jill	\$9,170.00		
7	Rogers, Cheryl	\$10,560.00		
8	Scott, Henry	\$12,300.00		
9				
10				
11				

```
> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: COMM      R1C2    7360
```

Figure 3.5. Formatted COMM Worksheet

Now you can calculate the commission for each salesperson. You do so by entering a formula on the worksheet. The formula you enter will multiply the monthly sales amounts in column 2 by the 11.5 percent commission rate.

1. Use the ARROW keys to select R1C3.
2. Press E to select the EDIT command.
3. Enter 11.5% *.
4. Press the LEFT ARROW key to select R1C2.

Your entry in the EDIT command now reads $11.5\%*RC[-1]$. Plan has completed the formula for you by entering the relative reference to the first cell you want to multiply by 11.5 percent.

5. Press RETURN.

The commission for the first salesperson on your worksheet appears in R1C3.

You do not need to reenter the formula for each dollar amount in column 2. Instead, you could simply copy the formula from R1C3 to the other cells in column 3.

1. Press C to select the COPY command.
2. Press D to select DOWN in the COPY submenu.
3. Enter 7 at the number of cells: prompt.

Your response would tell Plan to copy the formula in R1C3 to the remaining seven cells in column 3.

4. Press RETURN.

The commission for each salesperson appears in column 3 of your worksheet, as shown in Figure 3.6.

#	1	2	3	4
1	Baxter, Diane	\$7,360.00	\$846.40	
2	Fitzgerald, John	\$9,560.00	\$1,099.40	
3	Hill, Carol	\$11,850.00	\$1,362.75	
4	Johnson, Lee	\$10,750.00	\$1,236.25	
5	Lloyd, Stephen	\$8,990.00	\$1,033.85	
6	Peters, Jill	\$9,170.00	\$1,054.55	
7	Rogers, Cheryl	\$10,560.00	\$1,214.40	
8	Scott, Henry	\$12,300.00	\$1,414.50	
9				
10				
11				

```
> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: COMM      R1C3      11.5%*RC[-1]
```

Figure 3.6. Commissions in Column 3

One small task remains before you transfer the data you need from COMM to the memo you will write (using Word) to the payroll department. In your memo, you need to include only the data in columns 1 and 3 of your worksheet. However, data you copy from Plan to the scrap must form a rectangular block of *adjoining* cells. Therefore, you need to reverse the positions of columns 2 and 3 on your worksheet.

1. Press M to select the MOVE command.
2. Press C to select COLUMN in the MOVE submenu.
3. Enter 3 at the from column: prompt.
4. Press TAB.
5. Enter 2 at the to left of column: prompt.
6. Press RETURN.

Your worksheet looks like Figure 3.7.

Now you can place the data in columns 1 and 2 into the scrap.

1. Press C to select the COPY command.
2. Press F to select FROM in the COPY submenu.
3. Enter R1C1:R8C2 at the cells: prompt.

Your cell entry specifies the rectangular block of cells you want to transfer. Cell R1C1 forms the upper left-hand cell of the block; cell R8C2 forms the lower right-hand cell of the block.

4. Press TAB.
5. Enter SCRAP at the to cells: prompt.
6. Press RETURN.

TRANSFERRING THE DATA FROM PLAN TO WORD

You are now ready to write your memo to the payroll department. To do so, quit Plan and, from the System Manager screen, create a new Word document named MEMO. (See Starting a Program at the beginning of this chapter for information about how to create work files.)

When the new Word document appears on the screen, the status line will show you that the data from the COMM worksheet is in the scrap, waiting for you to insert it at the appropriate place in your memo.

#1	1	2	3	4
1	Baxter, Diane	\$846.40	\$7,360.00	
2	Fitzgerald, John	\$1,099.40	\$9,560.00	
3	Hill, Carol	\$1,362.75	\$11,850.00	
4	Johnson, Lee	\$1,236.25	\$10,750.00	
5	Lloyd, Stephen	\$1,033.85	\$8,990.00	
6	Peters, Jill	\$1,054.55	\$9,170.00	
7	Rogers, Cheryl	\$1,214.40	\$10,560.00	
8	Scott, Henry	\$1,414.50	\$12,300.00	
9				
10				
11				

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
 Select option or type command letter
 Plan: COMM R1C3 7360

Figure 3.7. Final COMM Worksheet

NOTE: As a precautionary step, set the scrap to Ns before you begin to type your memo. (Refer to Set the Scrap Mode in this chapter for information about how to set the scrap.) This will ensure that, should you delete a typographical error from your memo, the deleted words or characters will not replace the data from the COMM worksheet that is currently in the scrap.

The first part of your memo is shown in Figure 3.8.

You are now ready to insert data from the scrap. Data will be inserted before the selection, which is on the end mark.

1. Press F5 to change to Blank Scrap mode.
2. Press ESC to enter Command mode.
3. Press I to select the INSERT command.

Data from the scrap is inserted into your document. Because the inserted data is longer than the number of lines remaining on the screen, Word scrolls to the end of the document.

To: Payroll
 From: Sales
 Date: 11/21/85
 Re: Commissions

Here are the October commissions due the sales staff:

> Copy Delete Edit Format Insert Jump Merge Options Print Replace Search
 Edit document or press Esc to use menu
 Word: MEMO {Baxter, Diane} \$846.40 Fitzgerald, ...> Ns

Figure 3.8. MEMO Document

Rogers, Cheryl \$1,214.40
Scott, Henry \$1,414.50

Please make sure that each salesperson's commission is added to his/her paycheck.

Thank you.

cc: Sales Manager

> Copy Delete Edit Format Insert Jump Merge Options Print Replace Search
Edit document or press Esc to use menu
Word: MEMO {Baxter, Diane \$846.40 \$7,360...}

Figure 3.9. MEMO Document with Inserted Data

Now you can finish typing your memo. Figure 3.9 shows the completed document.

You are now ready to print your memo and send it to the payroll department.

Transferring Data to Word through a Text File

In addition to using the scrap, you can also transfer data into a Word document by using Word's MERGE command. The MERGE command places a copy of a text file into the Word document.

WHAT IS A TEXT FILE?

A *text file* is any file that contains only text (that is, only ASCII characters). None of the work files created by the applications contain only text. This includes Word work files. Therefore, you cannot successfully merge any work files, including Word work files, into a Word document.

A work file can be converted to text, however, by printing it. Any time you print a file (for example, a Plan worksheet), your computer treats the printed data as text. Generally, you print the files you create on your printer. You can, however, also print them to another file, known as a *text file*.

Once you have created a text file, you can:

- store the data in the text file and print it later using the System Manager's PRINT command, or
- transfer the data in the text file to a Word document.

HOW TO CREATE A TEXT FILE

In Word, Plan, File, and Calendar, you create a text file simply by entering a file name at the **to:** prompt of the PRINT command. In Telcom, you can store incoming data in a text file by entering a file name at the **to:** prompt of the TRANSFER RECEIVE command.

You can give text files any name that you want. However, the contents of the text files you create will be easy to identify if you give them the same name as the file from which you printed them. Also, you should add an extension to any name you give to a text file. Although your computer will accept any valid extension, you might want to consistently use an extension of .TXT to identify all text files you create.

For example, suppose you want to store a Plan worksheet that you have named PROFITS in a text file. If, before quitting the PROFITS worksheet, you enter PROFITS.TXT in the PRINT **to:** field of the PRINT command and then execute the command, you will have no trouble later identifying both the contents and the type of the file you created.

The text files you create are listed to the right of their extensions on the System Manager screen. For example, if you created the text file PROFITS, it would be listed on the System Manager screen, as shown in Figure 3.10.

HOW TO TRANSFER A TEXT FILE TO A WORD DOCUMENT

You place the contents of a text file into a Word document with Word's MERGE command. To do so:

1. On the System Manager screen, select the Word document (work file) into which you want to merge the data.
2. Make sure that RUN is selected in the command line and press RETURN.
3. Select the point at which you want to insert the merged text file.

When you enter the Word file, you are returned to the exact point in the document where you left off when you quit the document. If necessary, move the selection to the point in the document where you want to merge data from the text file.

4. Select the MERGE command.

```

WORD          PROFITS
CALENDAR      PROFITS
FILE          PROFITS
TELCOM        PROFITS
PLAN          PROFITS
BASIC         PROFITS
.TXT          PROFITS

Microsoft(R) Works V1.10, Copyright (1984, 1985) Microsoft Corp.
> Copy Delete List Name Options Print Run Set
Select option or type command letter
System Manager: WORD           Bytes free: 121056 11/21/85 11:37:03 AM

```

Figure 3.10. Text File Display

5. At the from: prompt, enter the name of the text file you want to merge into the document

or

press any ARROW key to display a full-page listing of all files stored in your computer's memory. Then use the ARROW keys to select the desired text file.

6. Press RETURN.

Data from the text file is merged into the document. Existing text moves down to make room for the merged data.

See Chapter 18, "Introduction to Word," for an example of how to use Word's MERGE command.

TRANSFERRING DATA BETWEEN DESKTOP AND ZP-150 APPLICATIONS

In addition to transferring data between the applications built into your ZP-150, you can transfer data between:

- ZP-150 Word and any version of desktop Word for the Z-100 or Z-100 PC.
- ZP-150 Plan and any version of desktop Multiplan for the Z-100 or Z-100 PC.
- ZP-150 File and a variety of popular desktop database filing programs, such as Condor and dBaseII for the Z-100 or Z-100 PC.

You cannot transfer data directly between Calendar and a desktop system. If you want to transfer data to and from Calendar, however, you can first

transfer the data via the scrap from Calendar to another of the ZP-150's applications, such as File. Then you can use File (or whatever application you have chosen) to transfer the data to a desktop system, and vice versa.

Formatting the File

Each file to be transferred must first be printed to a new file using the application's PRINT command. Files must be saved in the proper format for the specific application that is accepting them.

WORD FILES

To transfer data between ZP-150 Word and desktop Word, files must be unformatted.

To create unformatted Word files on the ZP-150, select No at the formatted: prompt of the PRINT command.

When transferring a text file from desktop Word to ZP-150 Word, select No at the formatted: prompt of the TRANSFER SAVE command.

PLAN FILES

When you are transferring a worksheet from ZP-150 Plan to desktop Multiplan, select Sylk at the style: prompt of the PRINT command.

When transferring a worksheet from desktop Multiplan to ZP-150 Plan, select Sylk at the mode: prompt of the TRANSFER OPTIONS command. Then save the file with the TRANSFER SAVE command.

FILE FILES

When you are transferring a database file from ZP-150 File to a desktop database program, select Interchange at the style: prompt of the PRINT command.

To save a file from a desktop database program in the proper format for transferring to ZP-150 File, refer to the manual for the desktop database program you are using. The desktop database program must enclose each data item (field) in a record with quotation marks, and fields must be separated by commas to be read by ZP-150 File.



Transferring the File

Once you have saved a file in the proper format, you can transfer the file via telecommunications or ZPXFER.

You can use the ZP-150 Telcom application and a desktop telecommunications program to transfer files between the two systems. To do so, you must connect both computers with an appropriate cable (see RS-232C Hardware Connections in Chapter 17, "Telcom Reference"). For information about how to use Telcom to transfer files, see Chapter 16, "Introduction to Telcom," and Chapter 17, "Telcom Reference," in this manual. To use a desktop computer to transfer files, see the manual for the desktop telecommunications program you are using.

If you are unfamiliar with telecommunications programs or do not have one for your desktop system, you can use the ZPXFER program, available from Zenith Data Systems. ZPXFER automatically transfers the files you specify between a Zenith Z-100 or Z-100 PC and the ZP-150 without the need for a separate telecommunications program.



CHAPTER 4

EXTERNAL DEVICES

OVERVIEW

The ZP-150 can communicate with a variety of external devices. These include:

- acoustic converter,
- data cassette recorder,
- external modem,
- parallel printer,
- phone receiver, and
- serial printer.

Some of these devices are specified through the use of *logical device names*. Logical device names are used to direct output to certain kinds of devices (such as printers), without needing to specify the exact device that will be used. Examples are:

CASS: used to manage input and output (I/O) to a cassette recorder
COM1: used to direct output to the serial port
CON: used to direct output to the LCD screen
PRN: used to direct output to an attached parallel printer

Refer to Controls and Switches in Chapter 1 of the *ZP-150 User's Guide* for illustrations of connectors for these devices.

The following sections describe the various devices in more detail.

PARALLEL PRINTER

The ZP-150 supports any parallel printer that has a Centronics interface. You need to use a special cable, available through Heath/Zenith dealers, to connect the printer to the ZP-150. The cable attaches to the connector labeled PRINTER on the rear panel.

Some printing can be done within individual applications. Refer to the specific application chapter for details on using the printer. You can print a text file from the System Manager screen by using the device name PRN: and the COPY command:

COPY file: *filename* to: PRN:

4.2

External Devices

where *filename* is a text file.

Alternatively, the System Manager PRINT command can be used to print a text file to an attached parallel printer.

You can also use PRN: with the LIST command to obtain a hard-copy listing of any files in your ZP-150's memory.

SERIAL PRINTER

The ZP-150 supports any printer that has an RS-232C serial port. Use an RS-232C "null" modem cable with appropriate connectors at each end to complete the interface. Refer to RS-232C Hardware Connections in Chapter 17, "Telcom Reference," for details.

Printing from the System Manager is similar to parallel printing. You can print a file by specifying the device name COM1: and the COPY command.

Within applications, you can print to a serial printer by specifying the device name COM1: instead of PRN: in the PRINT to: prompt.

To properly configure the ZP-150 for your serial printer, you must use the MODIFY command from Telcom. Specify baud rate, word length, stop bits, and parity using the MODIFY menu. Also, select XON/XOFF if the printer you are using supports that type of handshaking. Then, select the CONNECT command from Telcom's main menu. Set the using modem prompt to No, and comm line to 1. Press RETURN to connect to the serial port. Press SHIFT-ESC to return to the main menu. Select Disconnect. The serial port is now configured for printing.

Within BASIC, if you wanted to print to a serial printer the lines of code could be:

```
OPEN"COM1:1200,N,8,1" AS #1  
PRINT #1,"THIS IS A TEST STRING"
```

The first line sets the port to a baud rate of 1200, using no parity checking, 8-bit word lengths, and one stop bit. The second line prints THIS IS A TEST STRING to the attached serial printer.

NOTE: Hardware handshaking is not supported. The ZP-150 supplies no handshaking signals to the serial port. Some printers, such as the Diablo, need pin 6 (Data Set Ready) high before they will print data. In these cases the cable you use must have pin 6 tied to pin 20 on the printer end.

For more information on configuring the serial port, refer to Chapter 17, "Telcom Reference."

EXTERNAL MODEM

The ZP-150 is capable of communicating with other computer systems by using either an acoustic coupler or a direct-connect modem. Although an internal direct-connect modem is standard on the ZP-150, you may want to connect to an external modem that is capable of communicating at much higher speeds.

Direct-Connect Modems

Your computer has an external port (labeled RS 232C) that allows an optional asynchronous modem to be used. Use a standard RS-232C cable to complete the connection. The modem must conform to the RS-232C communications standard. Refer to RS-232C Hardware Connections in Chapter 17 for details.

If you use an external modem, use Telcom's CONNECT command to establish communication. Refer to Chapter 17 for details.

If you want to connect a standard telephone to the ZP-150, refer to Using the VOICE Key in Chapter 16, "Introduction to Telcom."

If you want to connect a telephone receiver (the handset only) to the ZP-150, refer to Chapter 7, "Dialer," for details.

Acoustic Converter

The ZP-150 can be used with an acoustic converter that can help you establish a communications connection with another computer system. An acoustic converter is a device that attaches to the speaking end of your telephone receiver. This device can be used when the line from the phone jack to the telephone set is hard wired, that is, when there is no modular jack to detach.

4.4

External Devices

To use the acoustic converter, you must first unscrew and remove the speaking end of your telephone receiver and replace it with the rubber convertor. Next, plug a standard 4-wire RJ-11 telephone into the device. Plug the other end into the "TEL LINE" jack in the back panel of the ZP-150. This will function the same as if you had directly connected the telephone line from the wall jack to the internal modem.

Refer to Telcom's CONNECT command in Chapter 17 for details in establishing a connection.

The LCD screen on your ZP-150 can be used to view the contents of a text file through the logical device CON:. The logical device name CON: directs output to the LCD screen. Through CON: you can see how a text file will appear when it is printed without actually generating a hard copy.

Replacing the device name PRN: with CON: when attempting to print will direct the output to the screen instead of the printer.

Within applications you can view a text file by specifying the device name CON: instead of PRN: in the PRINT to: prompt. To stop the screen from scrolling during the display, press CTRL-S. To resume scrolling, press any other key. To abort the operation, press the BREAK key.

From the System Manager you could view a text file by using the device name CON: and the COPY command:

COPY file: *filename* to: CON:

where *filename* is a text file.

The BREAK key will abort the file display and return you to the System Manager.





CHAPTER 5

ALARM

OVERVIEW

Your ZP-150 provides a special program, Alarm, that enables you to respond to alarms that have been set through the Calendar program. The Alarm program is activated by pressing CTRL-F3.

Activate Alarm when a preset alarm rings. When activated, Alarm will:

- interrupt the operation that was in progress,
- enable you to turn off a ringing alarm,
- enable you to reset an alarm,
- enable you to view and edit the Calendar record or records that triggered the alarm, and
- enable you to return to the operation that was in progress before you activated Alarm.

Alarms are set using Calendar, through which you also reset, view, and edit alarms. However, you turn off alarms with Alarm, not Calendar.

Alarm

USING ALARM

In order to make practical use of the Alarm special program, you must understand what an alarm is and how one is set. This section explains these concepts and shows the difference between the alarm feature and the Alarm special program.

Ringing Alarms

Like an alarm clock, the ZP-150 alarm enables you to remind yourself of times that you have scheduled important activities. By setting alarms, you can save yourself the anxiety of watching the clock while you are working.

An alarm is said to be ringing when the ☀ symbol flashes in the lower right-hand corner of the screen. This symbol is also accompanied by a bell sound. However, this audible indication of an alarm can be inhibited through the System Manager's SET TONE command.

5.2

Alarm

Alarms can ring normally during sessions with all programs. However, they will not ring in Calendar unless you exit first to automatically set alarms and then return.

Calendar/Alarm Interactions

Alarm works in conjunction with Calendar. The list of one or more events that Alarm displays originates from the CALENDAR.CAL file that has been created with the Calendar program. Therefore, it is important that you be familiar with Calendar (see Chapter 10, "Introduction to Calendar" and Chapter 11, "Calendar Reference") when you use Alarm.

You can set an alarm, following this abbreviated procedure:

1. Select Calendar at the System Manager screen.
2. Enter an appointment with a time in the START field. Alternatively, you can enter a task with a time in the R field (for a reminder). (During the Calendar session, the form of the display might look something like Figure 5.1.) Later, when the start time that was set for the record arrives, the alarm will ring.
3. Exit from Calendar to another program and work until an alarm rings.
4. Press CTRL-F3 when you see the alarm indicator. The screen will display a list of the Calendar record or records that caused the alarm to ring.

See Figure 5.2 for a sample display of the Alarm screen.

ID	Start	Stop	P	R	Note
	8:00 AM	8:30 AM	L		Morning coffee and day's organization chart
	8:30 AM	9:00 AM	H		Prepare report with Word
	9:00 AM	10:00 AM	M	R	Staff meeting, Sixth floor conference room
	10:00 AM		*	R	Coffee break
	11:00 AM	12:00 PM	M		Make phonebook with File
	1:30 PM	3:00 PM	M		Compile YTD earnings with Plan
	3:30 PM	4:00 PM	H	R	Transmit YTD earnings with Telcom
4/ 1/85			M		Evaluate current product line
4/ 4/85			L		Analyze move to new building
NEW					

> Copy Delete Edit Insert Jump Options Print
Select option or type command letter
Calendar: Wednesday, Apr. 4, 1985 4/4/85 10:13:09 AM

Figure 5.1. Calendar Daily Diary with Alarms Set

Alarm Screen

The list of scheduled records that appears when you press CTRL-F3 while an alarm is ringing is in a format similar to that of a Calendar Daily Diary screen (see Figure 5.2).

In contrast to the Calendar, however, the Alarm menu has the NOTE and SNOOZE selections. Furthermore, the Alarm screen includes only Calendar records for which a time has been set in the START field (appointments) or for those with dates in the START field and times in the R field (tasks). The Calendar records displayed are only those for which an alarm has rung.

The cursor initially highlights the list's top record—whether or not the top record was the one that caused the alarm to ring.

At the bottom of the Alarm screen are the following items:

- a command line (which allows you to use the NOTE and SNOOZE commands to edit particular fields within each record);
- a message line (which displays instructions for your entries at each stage of the program, similar to the instructions in Chapter 10); and
- a status line (which displays the name of the Alarm program, the current date, and the current time).

This Alarm display will completely replace the display of the operation you were using when you activated Alarm.

However, if no alarm was ringing when you pressed CTRL-F3, then the following message will be displayed at the bottom of an otherwise blank screen:

No alarms have gone off. Press any key to continue

If this display appears, press a key to return to your program. You will not be able to turn off or edit alarms with the Alarm program until one actually rings. However, you can with Calendar.

Start 9:25 AM	Stop 10:00 AM	P R Note H Prepare report with Word
------------------	------------------	--

> Note Snooze
Copyright (1984, 1985) Microsoft Corp.
Alarm

4/ 2/85 9:25:26 AM

Figure 5.2. An Alarm Screen

5.4

Alarm

Alarm Functions

The Alarm program function keys are listed in Table 5.1. When Alarm's list of Calendar records appears, you can use the SNOOZE command to perform functions similar to those of Calendar's EDIT command in order to change listed records. (See Chapter 11, "Calendar Reference," for more information on the EDIT command.)

SNOOZE lets you change the starting and reminder times of a Calendar record. Select SNOOZE either by pressing S or by highlighting SNOOZE and pressing RETURN. The SNOOZE command menu will display:

SNOOZE start: 10:00 AM remind: 10:15 AM

The prompts will contain the current settings of the highlighted Calendar record. These fields have the same meaning and are used the same way as in Calendar. The `remind:` prompt may have no default response. This means that the original Calendar record did not have any value entered into the R field. Press the TAB key to alternately select the two fields.

Enter the new value and press RETURN. You will see the new value in the Alarm display at the top of the screen.

NOTE: You cannot enter a new value into this prompt if it is blank. This is because Alarm only allows you to *change* the current setting, not create a new one.

The NOTE command is used to view long entries in the NOTE field of the Calendar record. Calendar allows you to create a note as long as 200 characters. However, the normal screen display in Alarm can only show 43 characters. By selecting NOTE, you can view a long message in its entirety.

Alarm does not allow you to edit the NOTE field response made in Calendar.

NOTE: While using Alarm, you may not enter new records, delete existing records, insert records from the scrap, or execute any Calendar command.

Table 5.1. Program Function Keys

ENTRY	ACTION
DEL	Deletes the currently selected portion of an entry line.
DOWN ARROW	Selects the record directly below the currently selected record.
ESC or BREAK	Exits to initial Alarm display. Enables you to abort an entry to a prompt after you have selected the SNOOZE command.
F7	Selects the word directly to the left of the currently selected character(s) within the same response.
F8	Selects the word directly to the right of the currently selected character(s) within the same response.
F9	Selects the character directly to the left of the currently selected character(s) within the same response.
F10	Selects the character directly to the right of the currently selected character(s) within the same response.
UP ARROW	Selects the record directly above the currently selected response.

Exiting from Alarm

You can exit from Alarm and resume work at the place in the program where you left off by pressing CTRL-F10.

You can exit Alarm and return to the program you were using prior to the application that you had interrupted for Alarm by pressing CTRL-F9.

When you exit from Alarm, your ZP-150 will save any changes you have made through Alarm to the appropriate Calendar records.

NOTE: When you exit from a program, you return directly only to a built-in program or to the System Manager—never to a special program. Although you can activate more than one special program (Alarm, Calc, and Dialer) in sequence, exiting will never return you directly to a previously run special program. Therefore, if more than one special program is currently active, exiting from the most recent special program will cause a simultaneous exit from all of them.

5.6

Alarm

ERROR MESSAGES

Following are explanations of error messages that can occur as you use Alarm. After each message is a brief description of the probable cause and what you are to do to recover from it.

Invalid option

EXPLANATION: You tried to edit a field before selecting the SNOOZE command. Select the SNOOZE command and then make your entries.

Invalid value

EXPLANATION: You tried to make an entry that did not conform to ZP-150 conventions. Edit or reenter the entry or press ESC to exit from Edit mode.

No alarms have gone off. Press any key to continue

EXPLANATION: This message will display if you press CTRL-F3 to activate Alarm while no alarm is ringing. Press any key, and you will return to the program that you interrupted in trying to activate Alarm.

Not enough system memory

EXPLANATION: If this message displays briefly (and is then overwritten by the regular screen display) when you try to activate Alarm, then you have too little free system memory to run Alarm. Alarm requires at least 7,200 bytes of free space in system memory.

CHAPTER 6

CALC

OVERVIEW

Your ZP-150 provides a special calculator program to enable you to perform mathematical calculations any time the computer is operating. This special calculator program (called Calc, for short) is activated by pressing CTRL-F2.

When activated, Calc will:

- interrupt whatever operation was in progress,
- enable you to use your computer to calculate, and
- enable you to return to the program that you were performing before activating Calc.

USING CALC

After you press CTRL-F2 to activate Calc, your ZP-150 will operate very much like an ordinary four-function pocket calculator that is also equipped with memory.

However, Calc is more powerful than most four-function pocket calculators because it:

- displays numbers up to 14 digits long,
- has eight memory functions, and
- provides three display areas (so that you can see previous calculations and memory values).

Of course, Calc also enables you to perform simple mathematical calculations—such as addition, subtraction, multiplication, and division.

Calc Keys

You can enter the numbers for your calculations by using the ZP-150's numeric keys or by pressing the NUM key and then using the keypad keys. You can use the period (.) for a decimal point in a number, but you cannot use the comma (,) in a number.

6.2

Calc

If you press a number key unintentionally, you can press the following keys as necessary to correct the mistake:

BACK SPACE or DEL—Press either of these keys to delete one digit at a time from the number you are entering. The digit entered most recently is deleted first.

C—Press this key to clear the number you are entering to 0.

To specify the mathematical operation for a calculation, use the following operation symbol keys:

+	for addition
-	for subtraction
*	for multiplication
/	for division
=	for equals

Calc also has several memory functions. When you use Calc, you can place your most recent entry or result in memory by entering the following memory function:

M=

After you have a number in memory, you can enter other memory functions to use the number for other calculations or to erase it from memory. See Memory Functions later in this chapter.

NOTE: When the NUM key is locked, your ZP-150 will interpret M entries as 0 entries. In order to use memory functions while the NUM key is locked, press SHIFT-M instead of M.

During a Calc session, you can view a map of all available system function key entries by pressing either F1, SHIFT-F1, or CTRL-F1. However, when you press any key to return to Calc after one of these entries, the portion of the keymap to the left of the Calc window will remain on the screen until you exit from Calc. (See Exiting from Calc.) Use care in selecting a key to return you to Calc, as the character for this key will be taken as input to Calc.

NOTE: Refer to Chapter 1, "System Manager," for more information on the system function keys.

If you press keys other than those specified in this chapter, your ZP-150 will prohibit entry of these keys and will emit beeps.

Calc Screen Window

When you press CTRL-F2, the operation or program currently in progress will be suspended and its screen display will be temporarily frozen. Then, the Calc window will appear to the far right of your screen.

NOTE: Although the screen display of your operation or program is overwritten by the Calc window, it will be fully restored after you exit from Calc.

Figure 6.1 shows how your screen might appear if you activated Calc while working in Plan.

Notice in Figure 6.1 that the Calc window is divided by horizontal borders into the following three areas:

Memory area—This is the single line between the word CALCULATOR and the upper horizontal border, and to the right of the letter M. It contains numbers manipulated by the memory features. The contents of this area will be retained and redisplayed if you exit and then reactivate Calc.

Running total area—This is the large 11-line area between the two horizontal borders. It contains a running total of numbers that were entered for, and/or derived from, previous calculations. These numbers scroll upward, like a tape roll in an adding machine. To the right of these numbers, this area contains the operation symbols for your previous calculations.

The most recent total or entry is in the bottom line of the running totals area. You can delete the contents of this area (and abort any calculation in progress) by pressing CTRL-F2. You can also delete the running totals by pressing F1, CTRL-F1, or SHIFT-F1 and then pressing any key to return to Calc.

#1	1	2	3	4	5	CALCULATOR
		Gasoline Purchases for Fall of 1985				0
		GALLONS	\$/GALLON	MILES		
5	09/01/85	8.5	1.209	53353.3		
6	09/08/85	6.929	1.299	53498.6		
7	09/15/85	6.929	1.299	53684.7		
8	09/21/85	7.698	1.299	53765.2		
9	09/26/85	7.4	1.319	53884.7		
10	10/03/85	7.698	1.299	54088.3		
11	10/07/85	7.2	1.219	54235.6		
> Copy Delete Edit Format Jump Insert Lock Move Name Option						
Select option or type command letter						
Plan: GAS R10C4 54088.3 0						

Figure 6.1. Display of a Calc Session Interrupting an Application Session

6.4

Calc

Entry/result area—This is the single line in the bottom area. It contains your current entry and/or result. The results (but not the entries) displayed in this area will be retained and redisplayed if you exit and then reactivate Calc.

If you wish to press CTRL-F2 to activate Calc, the following simple example can illustrate how the various displays are interrelated. Enter these characters slowly, observing how each character displays in the Calc areas:

2 + 5 * 10 =

Notice that each number you enter is first displayed in the entry/result area.

When you enter the operation symbol, both the number and the symbol are displayed in the bottom line of the running total area. (The number also remains displayed in the entry/result area.)

When you enter another number, it replaces the previous number entered in the entry/result area.

When you enter the equal sign (=), the resulting total is displayed in both the running total area (with no adjacent operation symbol) and in the entry/result area.

When the entries and/or results reach the top of the 11-line running total area, they scroll off—beginning with the earliest ones.

In order to begin using the memory area, enter the following:

M=

The M= entry places the contents of the entry/result area into the memory area.

Your Calc window should now look like Figure 6.2.

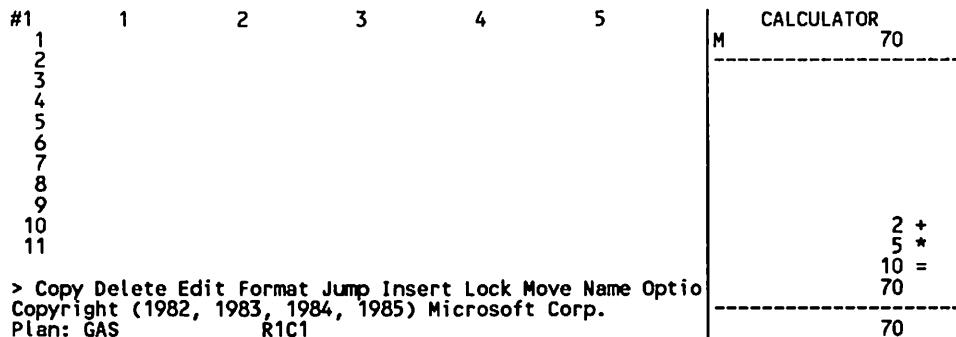


Figure 6.2. Using Calc Memory

Memory Functions

Calc has eight memory functions. Table 6.1 lists the key entry and the action performed by each memory function.

NOTE: When the NUM key is locked, your ZP-150 will interpret M entries as 0 entries. In order to use memory functions while the NUM key is locked, press SHIFT-M instead of M.

Table 6.1. Memory Functions

ENTRY	ACTION
M=	Copies the current contents of the entry/result area into the memory area. Overwrites previous contents of memory area, if any.
M+	Adds the contents of the entry/result area to the memory area and displays the sum in the memory area.
M-	Subtracts the contents of the entry/result area from the contents of the memory area and displays the difference in the memory area.
M*	Multiplies the contents of the entry/result area to the contents of the memory area and displays the product in the memory area.
M/	Divides the contents of the memory area by the contents of the entry/result area and displays the quotient in the memory area.
MC	Clears the contents of the memory area and leaves 0 in the memory area.
ME	Exchanges the contents of the memory area with those of the entry/result area.
MR	Places the contents of the memory area in the entry/result area, overwriting the old contents of the entry/result area and retaining the contents of the memory area.

6.6

Calc



Exiting from Calc

You can exit from Calc and resume work at the same place in the program you were using by pressing CTRL-F10.

You can exit Calc and return to the program you were using prior to the program that you had interrupted for Calc by pressing CTRL-F9.

When you exit from Calc, your ZP-150 will save the last value displayed in the memory area and the last result displayed in the entry/result area. Then, the next time you activate Calc, these values will reappear. All values in the running totals area are lost upon exit.

NOTE: When you exit from a program, you will be directly returned only to a built-in program or to the System Manager—never to a special program. Although you can activate more than one special program (Alarm, Calc, and Dialer) in sequence, exiting will never return you directly to a previously run special program. Therefore, if more than one special program is currently active, exiting from the most recent special program will cause a simultaneous exit from all of them.



TUTORIAL

This brief tutorial provides a step-by-step demonstration of just a few of the many ways to use Calc. If you think such a demonstration would be useful to you, please perform all the numbered steps in sequence.

Assume you are in the middle of a session with one of your ZP-150 applications—perhaps Word or Plan or Telcom. During this session, you need to report a prediction about the gasoline expenses you will incur on an upcoming automobile trip. How can you make such a prediction? Use Calc, of course.

1. Press **CTRL-F2** to activate Calc. Notice that your application and data will remain temporarily inactive on the left-hand side of the screen, while Calc temporarily uses the right-hand side. Depending on the application you were using, your screen might look something like Figure 6.3.

Now, you can make use of the available data. Since the car was purchased, meticulous records have been kept of the gas refills. These records show the amount of gas added, the price of the gas, and the mileage at the time of each refill.

In order to base the prediction on recent data, use records from the previous month's refills. The odometer read 53,353.3 at the beginning of a period of five refills, and 54,088.3 at the end of this period.



DATE: October 12, 1985
 TO: Charles N. Greysuit, Director of Accounting
 FROM: Manny S. Bavigliano, Regional Sales Representative
 RE: Cash Advance

Hey Chuck, I'll need a travel advance for gas to get to a meeting next week in Cincinnati. I'm leaving Monday morning, so please hustle me up \$

> Copy Delete Edit Format Insert Jump Merge Options Print
 Edit document or press Esc to use menu
 Word: CASHADVW ()

CALCULATOR 0
 M -----
 ----- 0

Figure 6.3. Activating Calc during a Word Session

2. Enter the following to determine the number of miles traveled during this period:

$$54088.3 - 53353.3 =$$

Calc will calculate the difference (735) and display it in both the entry/result area and the running total area.

3. Enter the following to copy the result to the memory area:

M=

The Calc window will resemble Figure 6.4.

DATE: October 12, 1985
 TO: Charles N. Greysuit, Director of Accounting
 FROM: Manny S. Bavigliano, Regional Sales Representative
 RE: Cash Advance

Hey Chuck, I'll need a travel advance for gas to get to a meeting next week in Cincinnati. I'm leaving Monday morning, so please hustle me up \$

> Copy Delete Edit Format Insert Jump Merge Options Print
 Edit document or press Esc to use menu
 Word: CASHADVW ()

CALCULATOR 735
 M -----
 ----- 735

54088.3 -
 53353.3 =
 735
 ----- 735

Figure 6.4. Calc Window after Copying Difference to Memory

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Calc

4. When you see 735 in the memory area, clear the entry/result area by entering the following:

C

Now you need to add up the amount of gas that has been purchased from the first refill through the refill preceding the last one. These five refills have included 8.5, 6.929, 6.929, 7.698, and 7.4 gallons of gas.

5. Enter the following to add up the quantities of gas:

8.5 + 6.929 + 6.929 + 7.698 + 7.4 =

Calc will display the sum of the gas quantities in the entry/result area.

Now you have the total number of miles (735) in the memory area and gallons (37.456) in the entry/result area.

6. Enter the following to find out the number of miles per one gallon:

M/

Calc will display the calculated number of miles per gallon (approximately 19.6) in the memory area, as shown in Figure 6.5. Now, use Calc to figure out how many gallons of gas will be required on your trip. Your atlas tells you that your destination is about 405 miles away.

DATE: October 12, 1985 TO: Charles N. Greysuit, Director of Accounting FROM: Manny S. Bavigliano, Regional Sales Representative RE: Cash Advance	CALCULATOR M 19.62302434856
-----	-----
Hey Chuck, I'll need a travel advance for gas to get to a meeting next week in Cincinnati. I'm leaving Monday morning, so please hustle me up \$	54088.3 - 53353.3 = 735 8.5 + 6.929 + 6.929 + 7.698 + 7.4 = 37.456 ----- 37.456

Figure 6.5. Calc Window after Dividing Miles (in Memory) by Gallons (in Entry/Result)

7. Enter the following for total miles:

405

Now Calc has the number of miles per gallon (approximately 19.6) in the memory area and the number of total miles (405) in the entry/result area. However, you must divide the total miles by the miles per gallon.

If you used the M/ (memory division) function now, you would be dividing these numbers backwards. Therefore, you need to make the two numbers exchange areas.

8. Enter the following to make these numbers exchange areas:

ME

Your Calc window will now like Figure 6.6.

Now you can perform division with these two numbers to find out how many gallons of gas the trip will take.

9. Enter the following to divide the current contents of the memory area by that of the entry/result area:

M/

Now that the number of gallons the trip will take (approximately 20.6) is displayed in the memory area, figure out how much all this is going to cost.

The records also show that the gas stations at which you refilled were charging a per-gallon rate of \$1.209, \$1.299, \$1.299, \$1.299, and \$1.319.

DATE: October 12, 1985 TO: Charles W. Greysuit, Director of Accounting FROM: Manny S. Bavigliano, Regional Sales Representative RE: Cash Advance	CALCULATOR
	M 405
Hey Chuck, I'll need a travel advance for gas to get to a meeting next week in Cincinnati. I'm leaving Monday morning, so please hustle me up \$	54088.3 - 53353.3 = 735 8.5 + 6.929 + 6.929 + 7.698 + 7.4 = 37.456
> Copy Delete Edit Format Insert Jump Merge Options Print Edit document or press Esc to use menu Word: CASHADVN { }	19.62302434856

Figure 6.6. Calc Window after Exchanging Contents of Memory and Entry/Result Areas

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Calc

10. Enter the following to add up the per-gallon price for the gas:

1.209 + 1.299 + 1.299 + 1.299 + 1.319 =

The sum of these prices (6.425) will appear in both the bottom line of the running total area and in the entry/result area.

Now, to determine the average per-gallon price, divide this sum by the number of prices added together (5).

11. Enter the following to find the average per-gallon price:

/ 5 =

The calculated average per-gallon price (\$1.285) will appear in both the bottom line of the running total area and in the entry/result area.

12. Finally, multiply the number of gallons needed (in the memory area) by the average price per gallon. The product of this calculation will be the gasoline cost estimate for your trip. Enter the following to multiply the total gallons by the price per gallon:

M*

Calc will display the product in the memory area, as shown in Figure 6.7.

Now you can exit from Calc to the program for which you needed the \$26.52 estimate and continue with the operations of that program.

DATE: October 12, 1985 TO: Charles N. Greysuit, Director of Accounting FROM: Manny S. Bavigliano, Regional Sales Representative RE: Cash Advance ----- Hey Chuck, I'll need a travel advance for gas to get to a meeting next week in Cincinnati. I'm leaving Monday morning, so please hustle me up \$	CALCULATOR M 26.52114122450 7.698 + 7.4 = 37.456 1.209 + 1.299 + 1.299 + 1.299 + 1.319 = 6.425 / 5 = 1.285 ----- 1.285
> Copy Delete Edit Format Insert Jump Merge Options Print Edit document or press Esc to use menu Word: CASHADVN ()	

Figure 6.7. Calc Window after Multiplying Gallons by Average Price

DATE: October 12, 1985
 TO: Charles N. Greysuit, Director of Accounting
 FROM: Manny S. Bavagliano, Regional Sales Representative
 RE: Cash Advance

 Hey Chuck, I'll need a travel advance for gas to get to a
 meeting next week in Cincinnati. I'm leaving Monday
 morning, so please hustle me up \$26.52. Thanks! 10/1
 MB/zp >
 > Copy Delete Edit Format Insert Jump Merge Options Enter
 Edit document or press Esc to use menu Disco
 Word: CASHADVN () 1.285

Figure 6.8. Reviewing Previous Calculation Results

13. Press **CTRL-F10** to exit from Calc. Your ZP-150 will return you to the same program or operation with which you were working when you activated Calc.

If, during a later session with another program, you want to review the most recent contents of Calc's memory or entry/display areas, you can reactivate Calc and do so—as long as your ZP-150 has not been reset since the Calc session.

14. Press **CTRL-F2** to reactivate Calc and review the results of your previous calculations. Your display might appear similar to Figure 6.8, depending on which program(s) you are using.

CAUTION: Before you continue to other chapters in this manual, delete any files you might have created during this chapter. Use the **DELETE** command from the System Manager screen. For further information on the System Manager **DELETE** command, refer to Chapter 2, "System Manager Reference."

ERROR MESSAGES

Following are explanations of error messages that can occur as you use Calc. After each message is a brief description of the probable cause and what you are to do to recover from it. Some of these messages are indicated by a screen-displayed error message. Some are indicated in other ways, as explained.

-- Error --

EXPLANATION: This error message will be displayed in the entry/result line because the result of a calculation is more than 14 digits long (greater than 99999999999999). Press **CTRL-F2** to restart Calc. The contents of the memory area (if any) will be retained, but the contents of running total and

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Calc

entry/result areas will be cleared. Enter another calculation that will produce a result with fewer digits.

This message can also occur if you attempt to divide any number by 0. In this case you also must press CTRL-F2 to restart Calc and avoid dividing by 0.

ERROR CONDITION: Under some conditions, contents of the memory area and the border beneath them vanish. Portions of the background program screen display (on the left) might temporarily blank out also.

EXPLANATION: This error condition can occur because the result of a memory calculation is more than 14 digits long (greater than 99999999999999). Make any entry to resume calculations. Enter future memory calculations that will produce results with fewer digits.

This condition can also occur if you attempt to divide a memory number by 0. Make any entry to resume calculations, but avoid dividing by 0.

ERROR CONDITION: Under some conditions, Calc cannot be activated—even if you press CTRL-F2.

EXPLANATION: Calc can only be activated if you have at least 2,176 bytes of free space in system memory. If you try to activate Calc with less free space, the Calc window will not appear and your current program will continue.

CHAPTER 7

DIALER

OVERVIEW

Your ZP-150 provides a special dialing program that enables you to make a voice phone call while running a built-in program. Your call can be quickly dialed with preentered phonebook numbers or through the keyboard. You can speak and listen through the receiver of a regular telephone.

Dialer can be activated by pressing CTRL-F4 during another program.

When activated, Dialer will:

- temporarily suspend the program that was in progress,
- enable you to make a voice communication, and
- enable you to return to the program operation that was in progress before you activated Dialer.

Dialer can be very handy when, for example, you are creating a document in Word and need some information. By using Dialer, you can interrupt Word to make your call, discuss the information on the phone, and return to your writing—all without actually leaving the Word application.

Dialer also provides a handy clock and timer that you can check quickly during sessions with any application that does not display a clock.

USING DIALER

In order to use Dialer, you must connect the standard telephone jack to the TEL LINE connector on the rear panel of your ZP-150. You must also have some kind of telephone hardware with modular RJ11 connectors. The following two telephone hardware configurations usually work with Dialer:

- Connect the plug of a regular telephone handset to the handset receptacle on the left-hand side of your ZP-150.
- Connect both a regular telephone and your ZP-150 to the main phone line. This configuration will require an additional phone cord and a Y telephone connector. (A Y telephone connector transfers telephone signals between the main phone line and two units of telephone-like communications hardware.) The Y connector can be attached to the main phone line. Then your regular phone cord can be connected

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Dialer

between the Y connector and the main telephone. Then the additional phone cord can be connected between the Y connector and your ZP-150.

When properly set up, Dialer can be used during a session with any ZP-150 program.

Dialer can even be used from within the Telcom program, as long as you are not currently sending or receiving information. If a Telcom call is in progress, attempting to use Dialer will display the Phone line is in use message. Pressing CTRL-F10 will exit Dialer and return you to your online Telcom session.

When using the first hardware configuration, you can answer an incoming call by pressing CTRL-F4 and speaking into the handset. If you are using the second hardware configuration, simply pick up the telephone handset as you normally would to answer an incoming call.

Activating/Deactivating Dialer

Regardless of which telephone hardware configuration you have, you can activate Dialer by pressing CTRL-F4 and deactivate it by pressing CTRL-F10.

If you use Dialer during a session with one or both of the other special programs (Alarm or Calc), you will deactivate the other special program(s) when you deactivate Dialer.

When you deactivate Dialer, the most recently entered number, name, and/or phonebook file name will be saved. Then, when you reactivate Dialer, these items will reappear.

Dialer Screen Window

When activated, the Dialer screen window appears in the lower right-hand portion of the screen. Figure 7.1 shows the Dialer window.

Notice in Figure 7.1 that the Dialer window consists of four lines:

- date/time line,
- entry line,
- message line, and
- status line.

ID	NAME	NUMBER	NEW
FORM	AAAAAAA	AAAAAAA	AAAAAAA
SORT			
FIND			
1	Moe	222-2828	
2	Larry	333-3737	
3	Curley	444-4646	
NEW			

10/12/85 16:21:55 00:01

> Copy Delete Edit Find Insert Jump LookUp Move Opti
 Select option or type command letter
 File: FONEBOOK Records: 3/3

Enter number or name
 Disconnect()T-Fast

Figure 7.1. The Dialer Window

DATE/TIME LINE

The date/time line is at the top of the Dialer window. This line lists the current date, current time of day, and a timer for the minutes and seconds that have elapsed since you activated Dialer (or reset the timer).

If you activated Dialer from the System Manager screen, then the System Manager date/time (beneath the Dialer window) will be frozen at the date/time of activation. However, the Dialer date/time will continue to advance and will adjust the System Manager date/time when you exit from Dialer.

In Dialer, the current time is displayed as on a 24-hour clock.

The elapsed time timer enables you to keep track of the length of your voice communications. It starts at 00:00 whenever you activate Dialer and automatically resets at 00:00 when a call is connected. You can also reset this timer at any time during a Dialer session by pressing F5.

ENTRY LINE

The entry line is the line at which you enter either a telephone number, a phonebook record name, or a phonebook file name. Such entries should not exceed 24 characters in length. The entry line begins with a > prompt and contains a cursor to indicate your current position in the entry.

You can edit the entry line by pressing the F7, F8, F9, F10, BACK SPACE, or DEL keys.

The entry line accepts entries in two different modes: Number/Name mode and Phonebook File mode. (See Entry Modes in this chapter.)

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Dialer

MESSAGE LINE

The message line displays prompts, error messages, or information about dialing.

If you are using the Number/Name mode, this line will display the `Enter number or name` prompt. If you are using the Phonebook File mode, this line will display the `Enter phonebook file name` prompt. For more information about these modes, refer to Entry Modes in this chapter.

After you have entered a phone number—or a name for a number—the Dial... message line will display plus the digits of the appropriate phone number.

The error messages displayed in this line are explained in Error Messages at the end of this chapter.

STATUS LINE

The status line is located at the bottom of the Dialer window. It indicates whether or not there is a connection, the file name of a phonebook (if one has been specified), and the method and speed of dialing.

The left-hand side of this line displays the word `Disconnect`, both by default and after you press F1 during a phone connection (see Table 7.1).

The left-hand side of this line displays the word `Connect` after you have entered a valid phone number or name—regardless of whether the person you are calling actually answers the phone.

In the middle of the status line is a set of braces. By default, these braces are empty. However, if you specify a valid phonebook file (in the Phonebook File mode at the entry line), then the name of this file will be displayed between the braces. For information about phonebook files, refer to Entry Modes in this chapter.

The right-hand side of the message line indicates the method and speed of dialing that will be used. Dialer supports two dialing methods: tone and pulse.

The tone method is indicated by the letter T. This method causes dialing like that on a push-button telephone.

The pulse method is indicated by the letter P. This method causes dialing like that on a rotary dial telephone. The pulse method is provided because push-button dialing is not yet supported in all areas of the United States.

Dialer supports fast and slow dialing speeds. Slow dialing is supported for dialing with old telephone equipment.

Each time you press F2, you select one of the four possible combinations of the method and speed factors. (See Table 7.1.) Therefore, the four possible selections are T-Fast, T-Slow, P-Fast, and P-Slow.

You can select a different dialing method/speed combination at any time during a Dialer session—except while the actual dialing is taking place (while the dialing digits are being displayed on the message line).

Dialer Functions

Table 7.1 lists the entries and actions for Dialer functions.

Table 7.1. Dialer Functions

ENTRY	ACTION
F1	Disconnects the phone line.
SHIFT-F1	Switches to Phonebook File mode. In this mode, you can enter the name of a phonebook file you have created in the File application. After you have entered a valid phonebook name, Dialer automatically switches back to Number/Name mode.
F2	Selects the dialing method/speed.
F5	Resets the elapsed time timer.
F7	Moves the cursor to the far left in the entry line.
F8	Moves the cursor to the far right in the entry line.
F9	Moves the cursor left one character in the entry line.
F10	Moves the cursor right one character in the entry line.
ALT-F10	Exits Dialer to the last built-in program you had used (or to the System Manager) and allows movement to other operations, but maintains the telephone connection.
CTRL-F9	Exits Dialer to the program preceding the last one you had used (or to the System Manager) and disconnects the telephone.
CTRL-F10	Exits Dialer to the last built-in program you had used (or to the System Manager) and disconnects the telephone.

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Dialer

Table 7.1 (continued). Dialer Functions

ENTRY	ACTION
BACK SPACE	Deletes a single character to the left of the cursor in the entry line; or deletes all characters in the entry line if the cursor is extended to the entire line.
DEL	Deletes the currently selected character(s) from the entry line.
ESC or BREAK	Deletes the entire entry from the entry line, leaving the last number/name entry that was connected; or switches from Phonebook File mode to Number/Name mode.

Entry Modes

Dialer has two modes for entering text at the entry line: Number/Name mode and Phonebook File mode.

While using Number/Name mode, you can make either or both of the following kinds of entry:

- number—decimal numerals for a phone number, or
- name—alphanumeric characters for a name that is within a phonebook that was created by File and specified in a Phonebook File mode entry.

NOTE: When entering a phone number, you can include spaces and punctuation symbols (such as hyphens and parentheses) to make the entry more readable. However, do not use exchange letters (such as PR6-8372). Exchange letters are the letters that are inscribed in groups of three on your telephone's buttons or dial holes.

Number/Name mode is the default mode. Dialer returns to this mode automatically after you enter a phonebook file name. You can also return to Number/Name mode during a Phonebook File mode entry by pressing ESC or BREAK (see Table 7.1).

To place a call, simply enter the phone number you want to dial and press RETURN. The number is displayed in the dialer window as it is dialed. Pick up the handset to talk as you would normally when placing a call.

To place a call using a name, you must first enter a phonebook file name. Press SHIFT-F1 to switch to Phonebook File mode (see Table 7.1). In this mode you must specify the phonebook file that contains the name and number of the person you want to call. (You do not need to enter the file

name extension of this file.) A phonebook file is a work file that has been created and closed through the File application (see Chapter 12, "Introduction to File").

A phonebook file must include at least a NAME field (containing names of the persons to be dialed) and a NUMBER field (containing the phone numbers associated with the names).

Phonebook files used by the Telcom application also require the NAME and NUMBER fields (as well as a SETTINGS field). Therefore, you can use your Telcom phonebook files for Dialer, too.

Refer to Developing and Using a Phonebook in Chapter 16, "Introduction to Telcom," for more information on phonebook files.

Once you have entered a valid phonebook file name, Dialer will return you to Number/Name mode. Enter the name of the person you want to dial and press RETURN. Dialer will search the phonebook file you specified for the name and corresponding number to dial. The number will display as it is dialed. Pick up the handset to talk.

Dialer allows you to prefix a number that is contained in your phonebook file so that the total phone number can be up to 19 digits long. This is useful if you are out of town and need to enter an area code or some kind of long distance access number before you dial the phone number contained in the phonebook file.

In Number/Name mode, enter your prefix digits followed by the STILE key (!). Then enter the name of the person you want to dial and press RETURN. Dialer searches the phonebook file for the name and appends the number it finds to the prefix digits you specified.

The number, including the prefix digits, displays as it is dialed.

ERROR MESSAGES

Following are explanations of error messages that can occur as you use Dialer. After each message is a brief description of the probable cause and what you are to do to recover from it.

Cannot open file

EXPLANATION: While using the Phonebook File mode, you entered a character string that does not correspond to the name of a phonebook file that was created through the File application. Enter the name of a valid phonebook file, or exit Dialer to create a phonebook file, or press ESC to switch back to Number/Name mode and enter the phone number itself.

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Dialer

Name/Number column missing

EXPLANATION: While using the Phonebook File mode, you specified the name of a file that was produced through the File application, but that did not contain both the NAME and NUMBER fields. Enter the name of a file that has these fields, or press ESC to switch back to Number/Name mode and enter the phone number itself.

Phonebook entry not found

EXPLANATION: While using the Number/Name mode, you entered a character string that does not correspond to a name within a specified phonebook file. Enter a valid name from the specified phonebook file or enter the desired phone number itself.

CHAPTER 8

INTRODUCTION TO BASIC

OVERVIEW

The BASIC Interpreter is a general-purpose programming tool that is effective for applications in many fields, including business, science, games, and education. It is also interactive; that is, without writing a program, a user can perform processes, calculations, and program testing.

BASIC for the ZP-150 meets the requirements for the ANSI subset standard for BASIC and supports many additional features.

This chapter and Chapter 9 provide complete instructions for using BASIC. However, no training material for BASIC programming has been provided. If you are new to BASIC or need help in learning programming, we suggest you read one of the following:

Dwyer, Thomas A., and Critchfield, Margot. *BASIC and the Personal Computer*. Reading, Mass.: Addison-Wesley Publishing Co., 1978.

Knecht, Ken. *Microsoft BASIC*. Beaverton, Ore.: Dilithium Press, 1982.

Boisgontier, Jacques, and Ropiequet, Suzanne. *Microsoft BASIC and Its Files*. Beaverton, Ore.: Dilithium Press, 1983.

Ettlin, Walter, and Solberg, Gregory. *The MBASIC Handbook*. Berkeley, Calif.: Osborne/McGraw-Hill, 1983.

FEATURES

BASIC includes several features not found in other versions of BASIC and has been designed to take advantage of the operating system environment to enhance programming power.

Some of the new features and improvements over other versions of BASIC are:

- Improved I/O facilities for handling larger files
- Improved graphics: line clipping, VIEW, WINDOW
- Additional event trapping: TIMER, BREAK, RESTART, KEY
- Double-precision transcendentals
- Library of database routines

8.2

Introduction to BASIC

Differences between BASIC and GW-BASIC

Although BASIC is an implementation of Microsoft BASIC, there are some differences between it and desktop versions of Microsoft BASIC such as GW-BASIC and BASICA. There are some new features in BASIC (Table 8.1), several statements and functions that are implemented differently (Table 8.2), and commands, statements, and functions that are not supported (Table 8.3).

Table 8.1. New Statements and Calls

STATEMENT	FUNCTION
BREAK	Enables and disables break trapping.
DBCLOSE	Closes a database.
DBCREATE	Creates a database.
DBDELETE	Deletes a database.
DBERROR	Returns a database error code.
DBOPEN	Opens a database.
DBSORT	Sorts a database.
FCREATE	Creates a field in a database.
FDELETE	Deletes a field from a database.
FGET	Retrieves a field from the open record.
FGID	Returns the ID of a field in a database.
FGNAME	Returns the name of the field.
FGTYPE	Identifies the data type of a field.
FPUT	Puts a value in a field.
FRENAME	Renames a field.
FRGET	Retrieves a field in a database record.
LIBRARY	Allows access to a library of subroutines.
ON BREAK	Executes a subroutine after a break.
ON RESTART	Executes a subroutine after a suspend operation.
QEND	Ends creation of a query.
QFIELD	Defines a query key.
QREND	Ends the definition of a query record.
QRSTART	Starts the definition of a query record.
QUIT	Suspends BASIC and runs another program.
QSTART	Starts creation of a query.
RCLOSE	Closes a record in a database.
RCREATE	Creates a record in a database.
RDELETE	Deletes a record from a database.
RESTART	Enables and disables restart trapping.
RFIND	Searches a database for a record.
RMOVE	Moves a record in a database.
RNUMF	Returns the number of records in a database.
ROPen	Opens a record in a database.

Table 8.2. Changed Commands and Statements

STATEMENT	CHANGE
CALL	Calls routines from a library rather than an address.
CIRCLE	STEP option allows use of relative coordinates; legal colors are 0 and 1.
CLEAR	Does not affect workspace size or stack space.
COLOR	Has only one argument that enables and disables reverse video.
KEY	Allows programming of the function keys only.
KEY(n)	Allows trapping of only the function and arrow keys.
LINE	STEP option allows use of relative coordinates.
LOCATE	Start and stop parameters are not supported.
ON KEY	Recognizes only the function and arrow keys.
ON TIMER	Valid range is 1–65534.
PRESET	Legal color numbers are 0 and 1.
PSET	Legal color numbers are 0 and 1.
VIEW	Legal color numbers are 0 and 1.
WIDTH	Does not affect the text width of the screen.

RELATED APPLICATIONS

BASIC can be used with some of the other applications in Works. The following list illustrates some of these.

File—BASIC can create database files that are in the same format as File's files. Consequently, File can access database files created by BASIC, and BASIC can access files created by File. Thus, through File, BASIC can share data with the other applications.

Word—Use Word to write and edit your BASIC programs.

Telcom—Use Telcom to transfer your BASIC program files to another system. Download BASIC programs from a desktop microcomputer system to the ZP-150.

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Table 8.3. Unsupported Commands, Statements, and Functions

COMMANDS	STATEMENTS	FUNCTIONS
BLOAD	CALLS	CDBL
BSAVE	CHDIR	CDBL\$
	DEF SEG	CSNG\$
	DEF USR	ENVIRON\$
	DRAW	ERDEV
	ENVIRON	ERDEV\$
	IOCTL	INP
	MKDIR	IOCTL\$
	MOTOR	JIS\$
	ON PEN	KLEN
	ON PLAY	KPOS
	ON STRIG	KTN\$
	OUT	PEEK
	PAINT	PEN
	PALETTE	SCREEN
	PALETTE USING	STICK
	PEN ON OFF STOP	STRIG
	PLAY	USR
	PLAY ON OFF STOP	VARPTR
	POKE	VARPTR\$
	RMDIR	
	SCREEN	
	SHELL	
	STRIG ON OFF STOP	
	WAIT	

If you use one of these commands, statements, or functions, you will get a Syntax error message.

USING THE BASIC INTERPRETER

Modes of Operation

You may use the BASIC Interpreter in either of two modes: Direct or Indirect.

In Direct mode, statements and commands are executed as you enter them. They are not preceded by line numbers. After each Direct mode statement followed by a RETURN, the screen displays the ok prompt. You can display the results of arithmetic and logical operations immediately, and you can store them for later use. The instructions themselves, however, are lost after execution. Direct mode is useful for debugging and for using the BASIC

Interpreter as a calculator for quick computations that do not require a complete program.

Use Indirect mode to enter programs. Precede program lines with line numbers; these programs can be stored in memory for later use. BASIC executes the program loaded into the current workspace when the RUN command is entered.

Line Format

BASIC program lines have the following format (square brackets indicate optional input):

nnnnn BASIC statement [:BASIC statement...][comment] RETURN

where *nnnnn* is a line number;

BASIC statement is a valid BASIC command, statement, function, or call;

comment is an optional remark explaining the purpose or function of the statement; and

RETURN terminates the program line.

More than one BASIC statement may be placed on a line, but each statement must be separated from the last by a colon.

A BASIC program line always begins with a line number and ends with a RETURN. Line numbers indicate the order in which the program lines are stored in memory. Line numbers are also used as references in branching and editing. Line numbers must be in the range 0 to 65529.

A line can contain a maximum of 255 characters.

With the Interpreter, you can extend a logical line over more than one physical line by entering a line feed control character (CTRL-J). A line feed lets you continue typing a logical line on the next physical line without entering a RETURN. You can also type up to 255 characters on a logical line without issuing either a line feed or a RETURN; at the end of a physical line, the text wraps around and continues on the next physical line.

A period (.) can be used in EDIT, LIST, AUTO, and DELETE commands to refer to the current line number.

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Character Set

The BASIC character set consists of alphabetic characters, numeric characters, and special characters.

The BASIC alphabetic characters include all the uppercase and lowercase letters of the American English alphabet.

The BASIC numeric characters are the digits 0 through 9. The alphabetic characters A, B, C, D, E, and F can be used as part of hexadecimal numbers.

In addition, BASIC recognizes and will respond to the system function keys CTRL-F2, CTRL-F3, CTRL-F4, CTRL-F9, and CTRL-F10. See System Function Keys in Chapter 1 for further information.

SPECIAL CHARACTERS

The following list shows the special characters that are recognized by BASIC.

CHARACTER MEANING

	Space
=	Equal sign or assignment symbol
+	Plus sign or concatenation symbol
-	Minus sign
*	Asterisk or multiplication symbol
/	Slash or division symbol
^	Caret or exponential symbol
(Left parenthesis
)	Right parenthesis
%	Percent sign or integer declaration character
#	Number (or pound) sign or double-precision declaration character
\$	Dollar sign or string declaration character
!	Exclamation point or single-precision declaration character
[Left bracket
]	Right bracket
,	Comma
.	Period or decimal point
'	Single quotation mark (apostrophe) or comment delimiter
"	Double quotation mark or string delimiter
;	Semicolon
:	Colon or statement delimiter
&	Ampersand
?	Question mark or PRINT abbreviation
<	Less than
>	Greater than
\	Backslash or integer division symbol

CHARACTER MEANING

@	At sign Underscore
ESC	Erases current line before RETURN is entered
TAB	Moves print position to next tab stop; tab stops are set every eight columns
RETURN	Terminates input of a line
DEL	In Edit mode, deletes the character under the cursor

CONTROL CHARACTERS

BASIC supports the following control characters:

CONTROL CHARACTER ACTION

CTRL-G	Sounds a beep.
CTRL-H	Backspace. Deletes the last character typed.
CTRL-I	Tabs to the next tab stop. Tab stops are set every eight columns.
CTRL-J	Line feed. Moves to next physical line.
CTRL-L	Clears the screen.
CTRL-M	RETURN. Starts a new line.
CTRL-R	Toggles the Insert and Overtype modes.

Constants

Constants are the actual values BASIC uses during program execution. There are two types of constants: string and numeric.

STRING CONSTANTS

A string constant is a sequence of up to 255 alphanumeric and special characters enclosed in double quotation marks.

Examples:

"HELLO"
"\$25,000.000"
"Number of Employees"

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NUMERIC CONSTANTS

Numeric constants are positive or negative numbers; they cannot contain commas. There are five types of numeric constants:

1. Integer constants—Whole numbers between -32768 and +32767. Integer constants do not contain decimal points.
2. Fixed-point constants—Positive or negative real numbers; that is, numbers that contain decimal points.
3. Floating-point constants—Positive or negative numbers represented in exponential form (similar to scientific notation). A floating-point constant consists of an optionally signed integer or fixed-point number (the mantissa) followed by the letter E or D (single-precision floating-point constants are denoted by the letter E; double-precision floating-point constants are denoted by the letter D) and an optionally signed integer (the exponent). The allowable range for floating-point constants is 9.9999E+62 to 1E-64.

Examples:

235.988E-7 = .0000235988
2359E6 = 2359000000

4. Hex constants—Hexadecimal numbers, denoted by the prefix &H. Hex constants can be no greater than &HFFFF (decimal 65535).

Examples:

&H76
&H32F

5. Octal constants—Octal numbers with the prefix &O (letter "O") or &. Octal constants cannot exceed &O177777 (decimal 65535).

Examples:

&O347
&O1234

Numeric constants can be either single-precision or double-precision numbers. Single-precision numeric constants are stored with 6 digits of precision and printed with up to 6 digits of precision. Double-precision numeric constants are stored with 14 digits of precision and printed with up to 14 digits.

A single-precision constant is any numeric constant that has one of the following characteristics:

- Seven or fewer digits
- Exponential form denoted by E
- A trailing exclamation point (!)

Examples:

46.8
 -1.09E-06
 3489.0
 225!

A double-precision constant is any numeric constant that has one of the following characteristics:

- Eight or more digits
- Exponential form denoted by D
- A trailing number sign (#)

Examples:

345692811
 -1.09432D-06
 3489.0#
 7654321.1234

Variables

Variables are names that represent values used in a BASIC program. The value of a variable may be assigned explicitly by the programmer, or it may be assigned as the result of calculations in the program. Before a variable is assigned a value, its value is assumed to be zero for a numeric variable or null for a string variable.

VARIABLE NAMES AND DECLARATION CHARACTERS

BASIC variable names can be any length, but only the first 40 characters are significant. Variable names can contain letters, numbers, and the decimal point. However, the first character in a variable name must be a letter. Special type declaration characters (listed later) are also allowed.

Variable names are not case-sensitive. That means that variables with the names ALPHA, alpha, and AlPhA are the same variable.

A variable name cannot be a reserved word (see Chapter 9 for a list of reserved words), but embedded reserved words are allowed, with one

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exception: no variable name may start with the letters USR. For example, the variable USRNAM\$ will generate a Syntax error. Reserved words include all BASIC commands, statements, function names, and operator names. If a variable name begins with FN, it is assumed to be a call to a user-defined function (see DEF FN Statement in Chapter 9 for further information about user-defined functions).

Variables can represent either a numeric value or a string. String variable names are written with a dollar sign (\$) as the last character, such as A\$ = "SALES REPORT". The dollar sign is a variable type declaration character; that is, it declares (tells BASIC) that the variable will represent a string.

Numeric variable names may be declared as integer, single-precision, or double-precision values. The type declaration characters for these variable names are as follows:

%	Integer variable
!	Single-precision variable
#	Double-precision variable

NOTE: The default type for a variable name is double precision.

Examples of BASIC variable names and their significance are:

PI#	Declares a double-precision value.
MINIMUM!	Declares a single-precision value.
LIMIT%	Declares an integer value.
N\$	Declares a string value.
ABC	Represents a double-precision value.

You can change the default variable type selectively by using the BASIC statements DEFINT, DEFSTR, DEFDBL, and DEFSNG. These statements are described in detail in Chapter 9.

ARRAY VARIABLES

An *array* is a group or table of values referenced by the same variable name. Each element in an array is referenced by an array variable that is subscripted with a whole number or an expression representing a whole number. An array variable name has as many subscripts as there are dimensions in the array. For example V(10) would reference a value in a one-dimensional array, T(1,4) would reference a value in a two-dimensional array, and so on. Theoretically, the maximum number of dimensions for an array is 255. Practically, however, you are limited to the number of dimensions that can be entered in a 255-character line. The maximum number of elements per dimension is 32767. The maximum amount of space that you can use for an array is 64K.

Table 8.4. Space Requirements for Variable Names

VARIABLES	BYTES
Integer	2
Single-precision	4
Double-precision	8
String	3 + string length
ARRAYS	BYTES
Integer	2 per element
Single-precision	4 per element
Double-precision	8 per element
String	3 per element + string lengths

SPACE REQUIREMENTS

Table 8.4 lists only the number of bytes occupied by the values represented by the variable names.

Expressions and Operators

An expression can be a string or numeric constant, a variable, or a combination of constants and variables with operators. An expression always produces a single value.

Operators perform mathematical or logical operations on values. BASIC operators are divided into three categories:

- Arithmetic
- Relational
- Logical

PRECEDENCE OF OPERATIONS

The BASIC operators have an *order of precedence*; that is, when several operations take place within the same program statement, certain kinds of operations will be performed before others. *Precedence* is a predetermined order in which expressions are to be evaluated. If the operations are of the same level of precedence, the first to be executed will be the leftmost, and the last, the rightmost. The following is the order in which operations are executed:

1. Exponentiation
2. Negation

3. Multiplication and Floating-point Division
4. Integer Division
5. Modulus Arithmetic
6. Addition and Subtraction
7. Relational Operators
8. NOT
9. AND
10. OR and XOR
11. EQV

ARITHMETIC OPERATORS

The arithmetic operators, in order of precedence, are listed in Table 8.5.

You can change the order of precedence by using parentheses. Operations within parentheses are performed first. Inside parentheses, the usual order of operations is maintained.

Table 8.6 lists some sample algebraic expressions and their BASIC counterparts.

Two consecutive operators must be separated by parentheses, as in:

$X^*(-Y)$

In addition to the six standard operators (addition, subtraction, multiplication, division, negation, and exponentiation), BASIC supports integer division and modulus arithmetic.

Integer division is denoted by the backslash (\). The operands of integer division, which must be in the range -32768 to +32767, are rounded to integers before the division is performed, and the quotient is always rounded to an integer.

Table 8.5. Arithmetic Operators

OPERATOR	OPERATION	SAMPLE EXPRESSION
$^$	Exponentiation	X^Y
$-$	Negation	$-X$
$*, /$	Multiplication, Floating-point Division	$X^*Y, X/Y$
\backslash	Integer division	$12\backslash 6$
MOD	Modulus arithmetic	$10 \text{ MOD } 4$
$+, -$	Addition, Subtraction	$X+Y, X-Y$

Table 8.6. Algebraic and BASIC Expressions

ALGEBRAIC EXPRESSION	BASIC EXPRESSION
X+2Y	X+Y*2
X - $\frac{Y}{Z}$	X-Y/Z
$\frac{XY}{Z}$	X*Y/Z
$\frac{X + Y}{Z}$	(X+Y)/Z
$(X^2)^Y$	(X^2)^Y
$X^{(YZ)}$	X^(Y^Z)

Example:

```
100 LET DIV1 = 10\4
200 LET DIV2 = 25.68\6.99
300 PRINT DIV1, DIV2
RUN
2           3
```

Modulus arithmetic is denoted by the operator MOD. Modulus arithmetic yields the integer value that is the remainder of an integer division.

Example:

```
PRINT 14.4 MOD 4, 25.68 MOD 6.99
2           5
```

The results of the modulus arithmetic in the preceding example are 2 and 5 because $14/4=3$ with a remainder of 2 and $26/7=3$ with a remainder of 5.

RELATIONAL OPERATORS

Relational operators are used to compare two values. The result of the comparison is either true (-1) or false (0). This result can then be used to make a decision regarding program flow.

Table 8.7. Relational Operators

OPERATOR	RELATION TESTED	EXAMPLE
=	Equality	X=Y
<>	Inequality	X<>Y
<	Less than	X<Y
>	Greater than	X>Y
<=	Less than or equal to	X<=Y
>=	Greater than or equal to	X>=Y

The relational operators are listed in Table 8.7.

When arithmetic and relational operators are combined in one expression, the arithmetic operation is always performed first. For example, the expression $X+Y<(T-1)/Z$ is true if the value of X plus Y is less than the value of T-1 divided by Z.

LOGICAL OPERATORS

A *logical operator* performs a bit-by-bit calculation and returns a result that is either true (not zero) or false (zero). In an expression, logical operations are performed after arithmetic and relational operations. The outcome of a logical operation is determined as shown in Table 8.8. The operators are listed in order of precedence.

Just as the relational operators can be used to make decisions regarding program flow, logical operators can connect two or more relations and return a true or false value to be used in a decision.

Examples:

```
IF D<200 AND F<4 THEN 80
IF I>10 OR K<0 THEN 50
IF NOT P THEN 100
```

Logical operators work by converting their operands to 16-bit, signed, two's complement integers in the range -32768 to +32767. (If the operands are not in this range, an *Overflow error* results.) The given operation is performed on these integers bit-by-bit; that is, each bit of the result is determined by the corresponding bits in the two operands. If both operands are supplied as 0 or -1, logical operators return 0 or -1.

Thus, it is possible to use logical operators to test bytes for a particular bit pattern. For instance the AND operator may be used to mask all but one of the bits of a byte. The OR operator may be used to merge two bytes to create a particular binary value. The following examples demonstrate how the logical operators work.

63 AND 16 = 16

63 is	00000000 00111111
16 is	00000000 00010000

63 AND 16 is	00000000 00010000
--------------	-------------------

-1 AND 8 = 8

-1 is	11111111 11111111
8 is	00000000 00001000

-1 AND 8 is	00000000 00001000
-------------	-------------------

4 OR 2 = 6

4 is	00000000 00000100
2 is	00000000 00000010

4 OR 2 is	00000000 00000110
-----------	-------------------

-1 OR -2 = -1

-1 is	11111111 11111111
-2 is	11111111 11111110

-1 OR -2 is	11111111 11111111
-------------	-------------------

5 XOR 6 = 3

5 is	00000000 00000101
6 is	00000000 00000110

5 XOR 6 is	00000000 00000011
------------	-------------------

NOT 8 = -9

8 is	00000000 00001000
------	-------------------

NOT 8 is	11111111 11110111
----------	-------------------

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Table 8.8. Logical Operators (Truth Table)

OPERATION	VALUE	VALUE	RESULT
NOT	X		NOT X
	T		F
	F		T
AND	X	Y	X AND Y
	T	T	T
	T	F	F
	F	T	F
	F	F	F
OR	X	Y	X OR Y
	T	T	T
	T	F	T
	F	T	T
	F	F	F
XOR	X	Y	X XOR Y
	T	T	F
	T	F	T
	F	T	T
	F	F	F
EQV	X	Y	X EQV Y
	T	T	T
	T	F	F
	F	T	F
	F	F	T

STRING OPERATORS

Strings may be concatenated by using the plus sign (+). For example:

```
10 A$ = "FILE": B$ = "NAME"
20 PRINT A$ + B$
30 PRINT "NEW " + A$ + B$
RUN
FILENAME
NEW FILENAME
```

Strings can be compared using the same relational operators that are used with numbers. (See Relational Operators in this chapter for a list of the relational operators.)

String comparisons are made by taking one character at a time from each string and comparing the ASCII codes. If all the ASCII codes are the same, the strings are equal. If the ASCII codes differ, the lower code number precedes the higher. If, during string comparison, the end of one string is reached, the shorter string is said to be smaller. Leading and trailing blanks are significant.

For example:

"AA" is less than "AB"
"FILENAME" is equal to "FILENAME"
"X&" is greater than "X#" (because # comes before &)
"CL " is greater than "CL" (because of the trailing space)
"kg" is greater than "KG"
"SMYTH" is less than "SMYTHE"
B\$ (where B\$ = "8/12/78") is less than "9/12/78"

Thus, you can use string comparisons to test string values or to alphabetize strings. All string constants used in comparison expressions must be enclosed in quotation marks.

Type Conversion

When necessary, BASIC will convert a numeric constant from one type to another. The following rules and examples apply to conversions.

1. If a numeric variable of one type is set equal to a numeric constant of a different type, the number will be stored as the type declared in the variable name.

Example:

```
10 PERCENT%=23.42
20 PRINT PERCENT%
RUN
23
```

2. During expression evaluation, all of the operands in an arithmetic or relational operation are converted to the same degree of precision as that of the most precise operand, but the result of an arithmetic operation is returned and converted to the degree of precision of the destination variable.

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Examples:

```
10 DEDUCTION#=6#/7!
20 PRINT DEDUCTION#
RUN
.85714285714286
```

The arithmetic was performed in double precision, and the result was returned in DEDUCTION# as a double-precision value.

```
10 DEDUCTION!=6#/7!
20 PRINT DEDUCTION!
RUN
.857143
```

The arithmetic was performed in double precision, and the result was rounded to single precision, returned to DEDUCTION! (a single-precision variable), and printed.

3. Logical operators convert their operands to integers and return an integer result. Operands must be in the range -32768 to 32767 or an Overflow error occurs.
4. When a floating-point value is converted to an integer, the fractional portion is rounded.

Example:

```
10 CASH%=55.88
20 PRINT CASH%
RUN
56
```

Functions

BASIC incorporates two kinds of functions: intrinsic and user-defined. A *function* is a predefined process or subprogram that takes one or more quantities as input and returns a single related quantity as output.

When a function is used in an expression, it calls a predetermined operation that is to be performed on an operand. BASIC has functional operators that reside in the system, such as SQR (square root) and SIN (sinc), and these resident functions are called *intrinsic functions*.

BASIC also allows user-defined functions that are written by the programmer. See DEF FN Statement in Chapter 9.

Editing BASIC Programs

BASIC allows you to edit program lines at any time after you have entered them. The BASIC editor is simple, yet it allows you to insert characters, delete characters, or make modifications in any program line in the currently active workspace.

The format of the EDIT command is:

EDIT *line number*
EDIT .

where *line number* is the number of a line existing in the program. If there is no such line, an Undefined line number error message is displayed.

The period in the second form refers to the last line referenced by an EDIT command, LIST command, or error message, or to the last line entered. Thus, if you have just entered a line and notice a mistake, the command EDIT . will allow you to edit the line just entered to correct the mistake.

After you enter the EDIT command, the line you selected appears on the screen with the cursor positioned on the first character after the line number. (The term *cursor* refers to the reverse video marker that indicates the current position on the screen.) You can now use the RIGHT and LEFT ARROW keys to position the cursor on any character in the line. To change the character under the cursor, simply type another character over it. To delete the character under the cursor, press the DEL key.

The editor defaults to Overtype mode; that is, when you first enter Edit mode, any character you might type replaces the character at the cursor position. However, the editor also has an Insert mode. To change from Overtype mode to Insert mode, press CTRL-R. CTRL-R is a toggle; that is, it will also change from Insert mode to Overtype mode.

After you have finished making changes to the line, press RETURN. The cursor does not have to be positioned at the end of the line when you do this; the entire line will be saved as shown. If you wish to abort the edit without saving the changes you have made, press SHIFT-BREAK, and no changes will be saved.

You cannot change the line number of a statement using the EDIT mode.

When writing or making extensive changes to a program, you may need more capabilities than the BASIC editor provides. In these cases, you can use Word to write and edit your BASIC programs.

Writing a program with Word is just like writing a program in BASIC; enter a line number at the beginning of each line and press RETURN at the end. While using Word, you can use any of its commands to edit the program. For example, if you decide to change the name of a variable, you can use Word's

REPLACE command to search for and replace every occurrence of the variable name.

When you are finished writing or editing, you must save the program in ASCII format so that BASIC will be able to read it. To do that, print the program, unformatted, to a file. (For further information about the Word PRINT command, see Word Commands in Chapter 19.) Then exit Word and enter BASIC. You can now load or run the program by using the LOAD or RUN command.

You can also use Word to edit a program that you have written in BASIC. To do that, save the program in ASCII format by using the A option on the SAVE command. (See SAVE Command in Chapter 9 for further information.) Then exit BASIC by pressing CTRL-F10 and start Word using the program you had saved in ASCII format.

WORKING WITH FILES AND DEVICES

BASIC provides device-independent input/output that permits flexible approaches to data processing. Using device independent I/O means that the syntax for access is the same for any device.

Example:

```
10 OPEN "COM1:" for output as #1
.
.
50 PRINT #1, "This text will print to the COM1: device"
```

The device name in this OPEN statement tells BASIC where to look for a file or logical device. Since COM1: is the logical device name for the serial port, whatever device attached to the port—in this case, a printer—will receive the text to be printed in line 50.

To print the text in line 50 to a file, change the OPEN statement to:

```
10 OPEN "file name" for output as #1
```

The following statements, commands, and functions support device-independent I/O (see individual descriptions in Chapter 9):

CHAIN	INPUT#	LOC	PRINT	RUN
CLOSE	INPUT\$	LOF	PRINT#	SAVE
EOF	LINE INPUT	MERGE	PRINT USING	WIDTH
GET	LINE INPUT#	OPEN	PRINT# USING	WRITE
INPUT	LOAD	POS	PUT	WRITE#

Handling Files

WORK FILES AND PROGRAM FILES

When you enter BASIC by using the System Manager RUN command, you are allocated a workspace for your use. That workspace (or work file) is referred to by the name you specified in the file: command prompt of the RUN command and is given a .BMI extension.

BASIC then uses this workspace just as it would use the memory of a desktop computer. You can write, load, and run programs in this space. You can also execute a program, erase it from the workspace, and then execute another program.

But unlike desktop versions of BASIC, the ZP-150's BASIC can have more than one workspace (work file). For example, you could open a workspace for each program that you wanted to run. Or you could open a workspace for each type of program, such as communications and accounting. You could even use a separate workspace for each version of a program that you are developing. Thus, the currently active workspace is the work file you specified when you entered BASIC.

Because the same workspace can be used by multiple programs, programs are saved separately from work files. Therefore, when you save a program, it is written to memory (or whatever device you specify) as a separate file and is independent of the workspace. For example, you could open a workspace named BUDGET and write a program in that workspace. When the program was completely debugged, you could save it to a file named BUDGET.BAS. When you returned to the System Manager, you would have two files named BUDGET: BUDGET.BMI and BUDGET.BAS.

FILE SPECIFICATIONS

File specifications follow the naming conventions described in Chapter 1. All file specifications may begin with a device specification, such as CASS:, if the file is not resident in memory. If you do not specify a device, ZP-150 memory is assumed. If no period (.) appears in the file specification and if the file name is less than nine characters long, the default extension .BAS is appended to file names used in LOAD, SAVE, MERGE, and RUN commands.

Examples:

```
RUN "NEWFILE.BAS"
LOAD "CASS:NEWFILE.BAS"
SAVE "NEWFILE"
```

In the last example, the file is saved in memory with .BAS extension.

PROGRAM FILE COMMANDS

The following is a review of the commands and statements used in program file manipulation. All file specifications may include a device specification. See Chapter 9 for complete details about each of these commands.

SAVE "filespec"[,A|,P]

Writes the program that resides in the currently active workspace to the specified file. The A option writes the program as a series of ASCII characters. With the P option, BASIC encrypts the file in a read-protected format and saves it in an encoded binary format. Use this option only when your program is completed, and after you have made a copy in unprotected format.

LOAD "filespec"[,R]

Loads the program from the specified file into the currently active workspace. The R option runs the program immediately. LOAD always deletes the current contents of the workspace and closes all files before loading. If R is included, however, open data files are kept open. In this way, programs can be chained or loaded in sections, and they can access the same data files. (LOAD *filespec*,R and RUN *filespec*,R are functionally equivalent.)

RUN "filespec"[,R]

Loads the program from the specified file into the currently active workspace and runs it. RUN deletes the current contents of the workspace and closes all files before loading the program. If the R option is included, however, all open data files are kept open. (RUN *filespec*,R and LOAD *filespec*,R are functionally equivalent.)

MERGE "filespec"

Loads the program from the specified file into the currently active workspace but does not delete the current contents of the workspace. The program line numbers in the file are merged with the line numbers in the workspace. If two lines have the same number, only the line from the file program is used. After BASIC executes a MERGE command, the merged program resides in the workspace, and BASIC returns to command level. In order to successfully MERGE a program, you must have saved the program file in ASCII format.

CHAIN [MERGE] "filespec" [,linenum] [,ALL][,DELETE range]]

Passes control to the named program and passes the use of the variables and their current values to the new program. You may choose to start the new program on a specified line, delete some lines from the old program, or, by using the COMMON statement, transfer the values of only some of the variables.

KILL "filespec"

Deletes the specified file. *filespec* can be a program file or a sequential or random access data file.

NAME "filespec1" AS "filespec2"

Changes the name of a file. You can rename program files, random access files, or sequential files.

PROTECTING PROGRAM FILES

If you wish to save a program in an encoded binary format, use the P option with the SAVE command. For example:

SAVE "MYPROG",P

saves the program MYPROG in protected format. If you save a program this way, it cannot be listed or edited. You should also save an unprotected copy of the program for listing and editing purposes.

Data Files: Sequential and Random Access I/O

There are two types of data files that can be created and accessed by a BASIC program: sequential files and random access files.

SEQUENTIAL FILES

Sequential files are easier to create than random access files, but they are limited in flexibility and speed when it comes to locating data. The data written to a sequential file is a series of ASCII characters stored one item after another (sequentially) in the order sent. The data is read back sequentially, one item after another.

The following statements and functions are used with sequential data files. See Chapter 9 for details about each statement and function.

CLOSE	LOF
EOF	OPEN
INPUT#	PRINT#
INPUT\$	PRINT# USING
LINE INPUT#	WIDTH
LOC	WRITE#

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The following program steps are required to create a sequential file and access the data in it.

1. Open the file in Output mode.
2. Get the data to be written to the file. The data can be read from any valid input device, such as the keyboard or another data file.
3. Write data to the file using the PRINT# or WRITE# statement.
4. CLOSE the file.
5. Open it in Input mode.
6. Use the INPUT#, LINE INPUT#, or INPUT\$ statement to read data from the sequential file into the program.

Creating a Sequential File

Program 8.1 creates a sequential file, DATA, from information you enter at the keyboard.

The file is opened in Output mode in line 10. Lines 20–40 then get the data for the file from the keyboard. In line 50, one record (that is, one complete set of data items) is written to the file.

Program 8.1. Creating a Sequential Data File

```
10 OPEN "O",#1,"DATA"
20 INPUT "NAME (Type DONE to end input)":N$
25 IF N$ = "DONE" THEN CLOSE #1:END
30 INPUT "DEPARTMENT":DEPT$
40 INPUT "DATE HIRED":HIREDATE$
50 PRINT#1,N$;",DEPT$;",HIREDATE$
60 PRINT
70 GOTO 20
RUN
NAME (Type DONE to end input)? SAMUEL GOLDWYN
DEPARTMENT? AUDIO/VISUAL AIDS
DATE HIRED? 01/12/72

NAME (Type DONE to end input)? MARVIN HARRIS
DEPARTMENT? RESEARCH
DATE HIRED? 12/03/65

NAME (Type DONE to end input)? DEXTER HORTON
DEPARTMENT? ACCOUNTING
DATE HIRED? 04/27/81

NAME (Type DONE to end input)? STEVEN SISYPHUS
DEPARTMENT? MAINTENANCE
DATE HIRED? 08/16/81

NAME (Type DONE to end input)?DONE
Ok
```

A terminator, also called a delimiter, is a special character that marks the boundary of a data item.

There are only two terminators that will always cause INPUT# to stop accepting characters as part of a given data item. They are:

- the last character in a file. INPUT# will not attempt to read past the end of a file.
- the 255th character in an item of data. INPUT# will not attempt to read more characters than will fit in a single string.

Essentially, there are three different forms that data can take when stored in a sequential file: numeric data, strings that are not enclosed in quotation marks (such as those in line 50 of Program 8.1), and strings that are enclosed in quotation marks.

The usual terminator in all three cases is the comma. With INPUT#, however, the set of acceptable terminators is somewhat different for each storage type. For numeric data, the usual terminator is a space or set of spaces. For unquoted strings, the usual terminator is the comma; and for quoted strings, the quotation mark at the end of each string is the usual terminator.

Because terminators differ, you must use slightly different techniques to code the PRINT# statement used for each type.

For example, if you used the statement PRINT#1,A,B,C,D,E to store the data 1.1, 2.22, 3.333, 4.4444, 5.55555, the data would be stored as follows:

1.1 2.22 3.333 4.4444 5.55555

This form wastes space because INPUT# will accept as little as one space as a valid numeric terminator. Therefore, it is better to use the semicolon terminator (PRINT#1,A;B;C;D;E) to insert just one or two spaces between items and thus save space in the file.

The input of a numeric item is also terminated if INPUT# encounters a RETURN.

When you are using PRINT# and INPUT# with unquoted strings, keep in mind that spaces do not terminate a string. This means that you can include spaces as part of the string itself if the spaces are placed after the first significant character. (The N\$ variable in Program 8.1 illustrates unquoted strings that contain spaces.) The character that you should use to properly end each string is the comma.

The basic method for using commas to terminate unquoted strings (used in line 50 of Program 8.1) is to insert a comma surrounded by quotes, ";", into the PRINT# list wherever a comma should appear in the file. The INPUT# statement will then read each string as terminated by its comma. (You could also use CHR\$(44) to insert a comma between strings.)

Another terminator that works with unquoted strings is RETURN. This means that you do not need a comma to terminate the last item in the PRINT# statement. The RETURN at the end of the PRINT# statement will automatically terminate an unquoted string.

String expressions are enclosed with quotation marks ("") when other terminators, such as commas, are used within the string you are trying to input as data. When INPUT# encounters a quotation mark as the first significant character in a string, it takes this as a direction to include all the following characters up to but not including the next quotation mark as part of the string. This allows you to put commas, RETURNS, or any other character except quotation marks into the string. To include quotation marks in a quoted string, use the CHR\$ function (see CHR\$ Function in Chapter 9).

A program that creates a sequential file can also write formatted data to the file with the PRINT# USING statement. For example, you could use the statement:

```
PRINT#1,USING"####.##,";A,B,C,D
```

to write numeric data to the file without explicit delimiters. The comma at the end of the format string separates the items in the file. (See PRINT# USING Statement in Chapter 9 for complete details.)

If you want commas to appear in the file as delimiters between variables, you can use WRITE#. For example, you could use the statement:

```
WRITE# 1, A, B$
```

to write these two variables to the file with commas delimiting them. (See WRITE# Statement in Chapter 9 for complete details.)

Reading Data from a Sequential File

Program 8.2 accesses the file DATA that was created in Program 8.1 and displays the name of everyone hired in 1981.

Program 8.2 reads, sequentially, every item in the file and prints the names of employees hired in 1981. When all the data has been read, line 20 causes an Input past end error. To avoid this error, use the WHILE . . . WEND control structure, which uses the EOF function to test for the end of file. Program 8.3 lists the revised program.

The LOC function, when used with a sequential file, returns the number of sectors that have been written to or read from the file since it was opened. A sector is a 128-byte block of data.

Program 8.2. Accessing a Sequential File

```

10 OPEN "I",#1,"DATA"
20 INPUT #1,N$,DEPT$,HIREDATE$
30 IF RIGHT$(HIREDATE$,2) = "81" THEN PRINT N$
40 GOTO 20
50 CLOSE #1
60 END
RUN

```

DEXTER HORTON
STEVEN SISYPHUS
Input past end in 20

Adding Data to a Sequential Data File

If you have a sequential file and want to add more data to the end of it, you cannot simply open the file in Output mode and start writing data. As soon as you open a sequential file in Output mode, you destroy its current contents.

Instead, use the Append mode. If the file does not already exist, the OPEN statement will work exactly as it would if you had specified the Output mode.

Program 8.4 adds data to the existing file called DATA.

The program uses the LINE INPUT statement to read the value for DEPT\$ from the keyboard. It does this to permit the user to enter commas and quotes in the string read from the keyboard. BASIC would otherwise assume that those commas or quotes separate two different strings.

RANDOM ACCESS FILES

Creating and accessing random access files requires more program steps than creating and accessing sequential files. However, there are advantages to using random access files. One advantage is that random access files require less space since BASIC stores them in a packed binary format. A sequential file, on the other hand, is stored as a series of ASCII characters.

Program 8.3. Use of EOF Function

```

10 OPEN "I",#1,"DATA"
15 WHILE NOT EOF(1)
20     INPUT #1,N$,DEPT$,HIREDATE$
30         IF RIGHT$(HIREDATE$,2) = "81" THEN PRINT N$
40 WEND
50 CLOSE #1
60 END

```

Program 8.4. Adding Data to a Sequential File

```

110 REM ADD NEW ENTRIES TO FILE
120 OPEN "A",#1,"DATA"
130 INPUT "NAME (Press RETURN to end input)";N$
140 IF N$="" THEN 220 'CARRIAGE RETURN EXITS INPUT LOOP
150 LINE INPUT "DEPARTMENT? ";DEPT$
160 INPUT "DATE HIRED";HIREDATE$
170 PRINT
180 PRINT#1,N$
190 PRINT#1,DEPT$
200 PRINT#1,HIREDATE$
210 GOTO 130
220 CLOSE #1
230 END

```

The biggest advantage to using random access files is that data can be read from anywhere in the file. It is not necessary to read through all the information from the beginning of the file, as with sequential files. This is possible because the information in a random access file is stored and accessed in distinct units called *records*, each of which is numbered.

The statements and functions that are used with random access files are:

STATEMENTS FUNCTIONS

CLOSE	CVD
FIELD	CVI
GET	CVS
LSET	LOC
OPEN	LOF
PUT	MKD\$
RSET	MKI\$
	MKS\$

See Chapter 9 for details about each of these statements and functions.

Creating a Random Access File

As illustrated by Program 8.5, the following program steps are required to create a random access file.

1. OPEN the file for random access ("R" mode). Line 10 of Program 8.5 specifies a record length of 32 bytes. If the record length is not specified, the default value is 128 bytes.

Example:

```
OPEN "R",#1,"FILE",32
```

Program 8.5. Creating a Random Access File

```

10 OPEN "R",#1,"FILE", 32
20 FIELD #1, 20 AS N$, 4 AS A$, 8 AS P$
30 INPUT "2-DIGIT CODE (Enter 0 to end input)";CODE%
40 IF CODE%=0 THEN 140
50 INPUT "NAME";PERSON$
60 INPUT "AMOUNT";AMOUNT!
70 INPUT "PHONE";TELEPHONE$
80 PRINT
90 LSET N$=PERSON$
100 LSET A$=MKSS$(AMOUNT!)
110 LSET P$=TELEPHONE$
120 PUT #1, CODE%
130 GOTO 30
140 CLOSE #1
150 END

```

2. Use the FIELD statement to allocate space in the random access buffer for the variables that will be written to the random access file.

Example:

```
FIELD #1, 20 AS N$, 4 AS A$, 8 AS P$
```

3. Get the data to be written to the file. The data can be read from any input device, such as the keyboard or another data file.
4. Use LSET to move the data into the random access buffer. Numeric values must be made into strings when placed in the buffer. To do this, use the make functions: MKI\$ converts an integer value to a string; MKS\$ converts a single-precision value to a string; and MKD\$ converts a double-precision value to a string.

Example:

```
LSET N$=PERSON$
LSET A$=MKSS$(AMOUNT!)
LSET P$=TELEPHONE$
```

5. Write the data from the buffer to the file using the PUT statement.

Example:

```
PUT #1,CODE%
```

Program 8.5 takes information that is input at the keyboard and writes it to a random access file. Each time the PUT statement is executed, a record is written to the file. The two-digit code that is input in line 30 becomes the record number.

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Program 8.6. Reading a Random Access File

```
10 OPEN "R",#1,"FILE",32
20 FIELD #1, 20 AS N$, 4 AS A$, 8 AS P$
30 INPUT "2-DIGIT CODE (Enter 0 to end program)";CODE%
40 IF CODE% = 0 THEN 100
50 GET #1, CODE%
60 PRINT N$
70 PRINT USING "$$###.##";CVS(A$)
80 PRINT P$:PRINT
90 GOTO 30
100 CLOSE #1
110 END
```

NOTE: In an INPUT or LET statement, do not use a string variable already defined in a FIELD statement. Doing so causes that variable to be redeclared. BASIC will no longer associate that variable with the file buffer. Instead, it will be treated as a new program variable.

Reading a Random Access File

Program 8.6 accesses the random access file called FILE that was created in Program 8.5. By entering a two-digit code at the keyboard, the information associated with that code is read from the file and displayed.

As illustrated in Program 8.6, the following program steps are required to access a random access file.

1. OPEN the file for random access.

Example:

```
OPEN "R",#1,"FILE",32
```

2. Use the FIELD statement to allocate space in the random access buffer for the variables that will be read from the file.

Example:

```
FIELD #1, 20 AS N$, 4 AS A$, 8 AS P$
```

NOTE: In a program that performs both input and output on the same random access file, you can use just one OPEN statement and one FIELD statement. This is because a file opened in Random mode allows you to both write to and read from the file without first closing it.

3. Use the GET statement to move the desired record into the random access buffer.

Example:

```
GET #1, CODE%
```

4. The data in the buffer can now be accessed by the program. Numeric values that were converted to strings by the MKI\$, MKS\$, and MKD\$ statements must be converted back to numbers using the convert functions: CVI for integers, CVS for single-precision values, and CVD for double-precision values. The make and convert functions mirror each other; the former converts a number into a format that can be stored in random access files, while the latter converts the random access file storage format into a format usable by the program.

Example:

```
PRINT N$  
PRINT CVS(A$)
```

The LOC function when used with random access files, returns the current record number. The current record number is the last record number that was used in a GET or PUT statement. For example, the statement:

```
IF LOC(1) > 50 THEN END
```

ends program execution if the current record number in file #1 is greater than 50.

ADVANCED FEATURES

Event Trapping

This section gives an overview of event trapping. For more details on individual statements, see Chapter 9.

Event trapping allows a program to transfer control to a specific program line when a certain event occurs. Control is transferred as if a GOSUB statement had been executed to the trap routine. The trap routine, after servicing the event, executes a RETURN statement that causes the program to resume execution at the place where it was when the event trap occurred.

The events that can be trapped are: detection of certain keystrokes (ON KEY), time passage (ON TIMER), a break (ON BREAK), and restarting after BASIC has been suspended (ON RESTART).

CONTROLLING TRAPS

Event trapping is controlled by the following statements:

eventspecifier ON to turn on trapping
eventspecifier OFF to turn off trapping
eventspecifier STOP to temporarily turn off trapping

where *eventspecifier* is one of the following:

- BREAK—Break trapping allows you to control what happens when the BREAK key is pressed. You can choose to disable trapping, in which case the BREAK key will terminate program execution. You can also choose to execute a subroutine, or you can even ignore the break.
- KEY(*n*)—where *n* is a trappable key number. Trappable keys are numbered 1 through 14.

NOTE: KEY(*n*) ON is not the same statement as KEY ON. KEY(*n*) ON sets an event trap for the specified key. KEY ON displays the values of the function keys on the bottom line of the screen.

When a key is trapped, that occurrence of the key is not available for examination. Therefore, you cannot subsequently use the INPUT or INKEY\$ statements to find out which key caused the trap. If you wish to assign different functions to particular keys, you must set up a different subroutine for each key, rather than assigning the various functions within a single subroutine.

- RESTART—RESTART allows you to detect when a program is being reentered after BASIC has been suspended by the QUIT key or the RUN PREVIOUS key. BASIC does not save the contents of the screen when it is suspended, so one use for this trap is to redraw the screen when the program is restarted.
- TIMER—When TIMER is turned on, the ON TIMER statement can be used to perform background tasks at defined time intervals.

EXECUTING TRAPS

The ON GOSUB statement sets up a line number for the specified event trap. The format is:

ON *eventspecifier* GOSUB *linenum*

A *linenum* of zero disables trapping for that event.

When an event is ON and a nonzero line number has been specified in the ON GOSUB statement, every time BASIC starts a new statement it will check to see if the specified event has occurred (for example, the BREAK key has been pressed).

When an event is OFF, no trapping takes place, and the event is not remembered even if it takes place.

When an event is stopped (*eventspecifier* STOP), no trapping takes place, but the occurrence of the event is remembered so that an immediate trap will take place when an *eventspecifier* ON statement is executed.

When a trap is made for a particular event, the trap automatically causes a STOP on that event, so recursive traps can never occur. A return from the trap routine automatically executes an ON statement unless an explicit OFF has been performed inside the trap routine.

NOTE: Once an error trap takes place, all trapping is automatically disabled. In addition, event trapping will never occur when BASIC is not executing a program.

When an event trap is in effect, a GOSUB statement will be executed as soon as the specified event occurs. For example, the statement:

ON TIMER(10) GOSUB 1000

specifies that the program is to go to line 1000 every ten seconds.

If a simple RETURN statement is executed at the end of a subroutine, program control will return to the statement following the one where the trap occurred. When the RETURN statement is executed, its corresponding GOSUB return address is cancelled.

BASIC includes the RETURN *linenum* enhancement, which resumes processing at a definable line. Normally, the program returns to the statement immediately following the ON GOSUB statement when the RETURN statement is encountered. However, RETURN *linenum* enables you

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to specify another line. If not used with care, however, this capability may cause problems. Assume, for example, that your program contains:

```
10 ON KEY(1) GOSUB 1000
20 FOR I = 1 TO 10
30     PRINT I
40 NEXT I
50 REM NEXT PROGRAM LINE
.
.
.
200 REM PROGRAM RESUMES HERE
.
.
.
999 END
1000 'FIRST LINE OF SUBROUTINE
.
.
.
1050 RETURN 200
```

If the F1 key is pressed while the FOR . . . NEXT loop is executing, the subroutine will be performed. However, the RETURN statement in line 1050 returns program control to line 200 instead of completing the FOR . . . NEXT loop. Thus, the current FOR . . . NEXT loop will remain active, and a FOR without NEXT error may result.

Using DBCALLS.LIB

DBCALLS.LIB is a library of database routines that allow BASIC to create and manipulate database files. These database files are in the same format as files used by File. This means that File can read and manipulate databases created by BASIC and that BASIC can read and manipulate File databases. Thus, DBCALLS.LIB allows BASIC programs to share data with other applications via File.

DBCALLS.LIB contains the following routines.

Databasc File routines

DBCREATE
DBOPEN
DBCLOSE
DBDELETE
DBERROR

Record Management routines

RCREATE
ROPEN
RCLOSE
RDELETE
RNUMF
RMOVE
RFIND

Field Management routines

FCREATE
FGET
FPUT
FRENAME
FDELETE
FGID
FGNAME
FGTYPE
FRGET

Database Query routines

QSTART
QRSTART
QFIELD
QREND
QEND

Sort routine

DBSORT

This section will show you how to use most of these routines. See Chapter 9 for further information about individual routines.

ACCESSING THE LIBRARY

Before you can access the routines in DBCALLS.LIB, you must first tell BASIC where these routines are to be found. You do this with the LIBRARY statement. (The only library supplied with BASIC is DBCALLS.LIB.)

LIBRARY *library name*

Once you have opened the library, you can access the routines contained in it via the CALL statement. The syntax of the CALL statement is:

CALL *routine* [*(argument[,argument...])*]

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You will see many examples of the CALL statement as you read through this section. See CALL Statement in Chapter 9 for additional information.

CREATING A DATABASE

The steps involved in creating a database file are:

1. Open the library.
2. Create the database file.
3. Build the structure of the record.
4. Create a record.
5. Write data to the record.
6. Close the record.
7. Close the database file.
8. Close the library.

Opening the Library

To open the library, use the statement:

```
LIBRARY "DBCALLS.LIB"
```

You can now use the CALL statement to access the library routines that will create the database.

Creating the Database File

To create the database file, use the call:

```
CALL DBCREATE("filename",handle)
```

filename is the name of the file that will contain the database records. *handle* is a numeric variable. DBCREATE will return a number in that variable that identifies the particular database you are creating. Since more than one database can be open at a time, the library routines use the handle to identify the specific database you want to work with. In all subsequent database calls, you will use *handle* to specify the database file to be acted upon.

For example, suppose you were creating a database to hold the names, companies, and phone numbers of your customer accounts. To create that database, you would use the following call:

```
CALL DBCREATE("CUSTOMER.DAT",CUST%)
```

This call has now opened a file named CUSTOMER.DAT for read/write access, and CUST% contains the handle for that file.

Building the Structure of the Record

Before you can put information into a database, you have to define the structure of its records. You build the structure of the record by specifying the fields that the record will contain. To create the fields in the record, use the call:

```
CALL FCREATE(handle,field-name,field-type,field-ID)
```

handle is the numeric variable that you specified as the handle in the DBCREATE call. *field-name* is a string expression that gives a name to the field. *field-type* is a number between 1 and 3 that identifies the type of data to be contained in the field. Only three types of data are allowed:

- 1 String data
- 2 Double-precision numeric data
- 3 Date/time data

When you write to each field, the data must match the type specified in *field-type*. (See Data Types and Conversions in this chapter for information about how to enter date/time data in a database.)

field-ID is a numeric variable. After the call is executed, *field-ID* contains a number that the library routines use to identify each field.

field-name and *field-ID* may seem redundant, but they are provided for the convenience of both you and the computer. Since people have more facility with words than with numbers, the field name allows you to easily remember the contents and purpose of the field. But computers are more at home with numbers. Therefore, the field ID is an easier way for the library routines to identify fields. Two routines are provided to help you convert between field names and field types: FGID and FGNAME. See FGID Call and FGNAME Call in Chapter 9 for information about how to use these calls.

In the example, you will need three fields in each record: contact name, company, and phone number. Therefore, you will need to call FCREATE three times, once for each field.

```
CALL FCREATE(CUST%,"NAME",1,F1)
CALL FCREATE(CUST%,"COMPANY",1,F2)
CALL FCREATE(CUST%,"PHONE",1,F3)
```

You have now created three fields named NAME, COMPANY, and PHONE. Each field will contain string data. The field-ID for NAME is F1, for COMPANY is F2, and for PHONE is F3. Each record you write to the database will contain these three fields.

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Creating a Record

Now that you have opened the database and structured the record, you are ready to begin writing each record. In order to write a record, the record must first be created. To create a record, use the call:

```
CALL RCREATE(handle,[record-ID])
```

handle is the handle that was used when the database was created. *record-ID* is an optional numeric variable. If you do not specify *record-ID*, RCREATE will create the new record at the end of the file. If no records have yet been created, the end of the file is position 0, the first record number in a database. However, if you do specify *record-ID*, BASIC will create the record at the specified position.

For this example, you will create one record at the default position 0.

```
CALL RCREATE(CUST%)
```

You have now created record 0 in the database.

Writing Data to the Record

Now that the record has been created, you can begin writing data to it. Writing data to a record involves writing data in each field of the record. To write data to a field, use the call:

```
CALL FPUT(handle,field-ID,data-var)
```

handle is the numeric variable used as the handle in the DBCREATE call. *field-ID* is the number returned in *field-ID* in the FCREATE call. *data-var* contains the data to be written to the field. The data type of *data-var* must match the data type specified in *field-type* in the FCREATE call.

Since there are three fields in each record of the example, you must call FPUT three times to write data to the entire record. The first call will write data to the NAME field, the second to the COMPANY field, and the third to the PHONE field.

```
CALL FPUT(CUST%,F1,"DONNA HOGAN")
CALL FPUT(CUST%,F2,"SUPERIOR COMPUTER PRODUCTS")
CALL FPUT(CUST%,F3,"312-555-5164")
```

You now have one record in your database.

Closing the Record

After you have written data to a record, you must close the record. To close the record, use the call:

```
CALL RCLOSE(handle,[record-ID])
```

handle is the numeric variable that contains the handle of the database. *record-ID* is an optional numeric variable. If it is included, RCLOSE will return in it the number of the record that is closed by the call.

To close the record in the example, you would use the call:

```
CALL RCLOSE(CUST%)
```

The first record in the database is now closed. If you want to write another record to the database, you would again create a record, write data to each field, and close the record. For example, to write a second record to the database CUSTOMER.DAT, you would use the following sequence of calls.

```
CALL RCREATE(CUST%)
CALL FPUT(CUST%,F1,"DON MORRIS")
CALL FPUT(CUST%,F2,"COMPUTERIZED TYPSETTING")
CALL FPUT(CUST%,F3,"312-555-1200")
CALL RCLOSE(CUST%)
```

Closing the Database

After you have finished working with the database, you must close it. To close the database file, use the call:

```
CALL DBCLOSE(handle)
```

handle, as you know by now, is the handle assigned to the database by DBCREATE.

Before you close the sample database, you could write more records, edit the entries in the fields, create more fields, change the name of fields, and the like. Assume, however, that your database is complete. To close the file, use the call:

```
CALL DBCLOSE(CUST%)
```

The database file CUSTOMER.DAT is now closed.

Closing the Library

At this point, you could create another database file since the library is still open. However, assume that you are finished using the library. Now you must close it using the call:

```
LIBRARY CLOSE
```

The library DBCALLS.LIB is now closed. If you have entered the statements in this example, you now have a database file called CUSTOMER.DAT in memory. If you wish to, you can exit BASIC by pressing CTRL-F10 and examine or manipulate your database with File. (See Chapters 12 and 13 for information about how to use File.)

Example

Program 8.7 summarizes and illustrates how to create a database.

This program creates a database named ADDRESS.DAT and enters four records into it. Line 10 sets up error event trapping and installs the address of the routine to handle errors; this is done for more explicit error messages in the event of problems during a library call. (For further information, see Handling Database Errors in this chapter and DBERROR Call in Chapter 9.)

The error routine in lines 1000–1060 checks for the generic library error 91, and upon finding it calls DBERROR for more specific details on the nature of the problem. After any error, it prints an error message and branches to close the library and stop execution.

Line 20 informs the BASIC Interpreter that calls to a library will be used in this program and tells it the name of the library file that will be used. The Interpreter then opens the library and uses the library for all subsequent CALL operations.

Line 30 creates the database file ADDRESS.DAT and opens it for read/write access. (If any file by that name exists at the time this statement is executed, that file will be deleted and replaced by this new one.)

Lines 40–80 define five fields in the database and assign names to those fields. The fields are defined first because it is necessary to know the structure of a record before creating one. The field identifiers are returned in the variable BS1 and the program places them in array members A(0), A(1), A(2), A(3), and A(4).

Line 90 reads the first DATA item, the number 4, into the variable NITEMS%; this denotes the number of data records that will be created during this program. Since there will be four records, line 100 begins a FOR . . . NEXT loop that will create records numbered 0, 1, 2, and 3.

Program 8.7. Creating a Database

```

10 ON ERROR GOTO 1000
20 LIBRARY "DBCALLS.LIB"
30 CALL DBCREATE("ADDRESS.DAT",A)
40 CALL FCREATE(A,"Name",1,BS1):A(0)=BS1
50 CALL FCREATE(A,"Address",1,BS1):A(1)=BS1
60 CALL FCREATE(A,"City",1,BS1):A(2)=BS1
70 CALL FCREATE(A,"State",1,BS1):A(3)=BS1
80 CALL FCREATE(A,"Zipcode",1,BS1):A(4)=BS1
90 READ NITEMS%
100 FOR I%=0 TO NITEMS%-1
110 CALL RCREATE(A,I%)
120 FOR J%=0 TO 4
130 READ A$
140 CALL FPUT(A,A(J%),A$)
150 NEXT J%
160 CALL RCLOSE(A)
170 NEXT I%
180 ON ERROR GOTO 0
190 CALL DBCLOSE(A)
200 LIBRARY CLOSE
210 END
220 DATA 4
230 DATA "Mike Rommiter","21 Lane by the Wayside",Samaritan,VA,32874
240 DATA "Miss Ann Thrope","3232 Allgonna Way","Bay City",WY,98376
250 DATA "Gail Wind","18236 Harbor Lane","Port Charlie",CT,05873
260 DATA "Richard D. Mayer","111 Washington","Burnham Harbor",IL,60684
1000 IF ERR<>91 THEN 1040
1010 ER=0:CALL DBERROR(ER)
1020 PRINT:PRINT"Library error";ER;"in line";ERL:PRINT
1030 RESUME 180
1040 ON ERROR GOTO 0
1050 ERROR ERR
1060 RESUME 190

```

In the FOR . . . NEXT loop, the program first creates a record, then writes data into each field of that record (the nested FOR . . . NEXT loop), and finally closes the record.

At the end of the outer loop, error handling is returned to normal in line 180, the database is closed in line 190, the library is closed in line 200 (freeing space in memory) because it is no longer needed, and the program stops execution.

HANDLING DATABASE ERRORS

As the error-handling section of Program 8.7 illustrates, database errors are handled somewhat differently than normal BASIC errors. Normally, when the BASIC Interpreter encounters an error, it stops execution and prints an error message that indicates the type of error that occurred. However, when an error occurs in a database call, BASIC returns the generic error message Illegal DBMS call (error code 91). To find out more precisely what kind of error occurred, you need to use the DBERROR call.



The syntax of the DBERROR call is:

CALL DBERROR(*error-code*)

error-code is a numeric variable. When DBERROR is executed, *error-code* contains the code for the specific error. (A list of database error codes and messages can be found in Error Messages in Chapter 9.) You can then print *error-code* to identify the source of the problem. Lines 1000–1060 in Program 8.7 illustrate the use of the DBERROR call.

ACCESSING A DATABASE

The steps involved in accessing an existing database are:

1. Open the library.
2. Open the database file.
3. Open a record.
4. Read the record.
5. Close the record.
6. Close the database file.
7. Close the library.



For information about opening the library, see Accessing the Library in this chapter.

Opening the Database

To open an existing database, use the call:

CALL DBOPEN(*filename,access,handle*)

filename is the name of the database file with which you want to work. *access* is a number between 0 and 2 that indicates what type of operation will be allowed. The types of access are:

- | | |
|---|-------------------|
| 0 | Read-only access |
| 1 | Write-only access |
| 2 | Read-write access |

handle is a numeric variable. Like DBCREATE, DBOPEN returns the database identifier in that variable.

For example, suppose you wanted to read the database CUSTOMER.DAT created previously. After you had opened the library DBCALLS.LIB, you would use the call:

CALL DBOPEN("CUSTOMER.DAT",0,CUST%)



The CUSTOMER.DAT database is now open in read-only mode. CUST% contains the handle.

Opening the Record

Since the file already exists, the structure of the record is known. Therefore, you do not have to specify the structure of the record before you open it as you did when you created the record. To open an existing record in an existing database, use the call:

```
CALL ROPEN(handle,record-ID,[access])
```

handle is the numeric variable that was used in the DBOPEN call. *record-ID* is the number of the record you want to access in the database. *access* is an optional argument. If it is omitted, the record will be opened for the type of access specified in DBOPEN. If you include *access*, it must be a number between 0 and 2. The access types are:

- | | |
|---|-------------------|
| 0 | Read-only access |
| 1 | Write-only access |
| 2 | Read-write access |

To open the first record in the CUSTOMER.DAT file for read-only access, you would use the call:

```
CALL ROPEN(CUST%,0)
```

CUST% is the handle for the file. 0 is the number of the first record in the database. (Remember that you did not specify *record-ID* in the RCREATE call, so the records were numbered starting at 0.) Since no access type was specified, the record is opened for read-only access, the type of access specified in DBOPEN.

Reading the Record

Just as writing a record involves writing data to each field, reading a record involves reading data from each field. To read a field in the open record, use the call:

```
CALL FGET(handle,field-ID,data-var)
```

handle is the handle for the file. *field-ID* is a number, numeric expression, or numeric variable that identifies the field to be read. *data-var* is a variable that will receive the contents of the specified field. *data-var* must match the data type of the specified field. To determine the data type of a field, use the FGTYPE call. (See FGTYPE Call in Chapter 9 for further information.)

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Before you can read the data in CUSTOMER.DAT, however, you need to know the IDs of each of the fields. To determine the ID of a field, use the call:

CALL FGID(*handle,field-name,field-ID*)

handle identifies the database. *field-name* is the name of the field as specified in FCREATE. *field-ID* is a numeric variable. When the call is executed, *field-ID* will contain the identification number of the specified field.

There are three fields, named NAME, COMPANY, and PHONE, in a record in CUSTOMER.DAT, so you need to call FGID three times.

```
CALL FGID(CUST%,"NAME",F1%)  
CALL FGID(CUST%,"COMPANY",F2%)  
CALL FGID(CUST%,"PHONE",F3%)
```

F1% now contains the ID of the NAME field, F2% of the COMPANY field, and F3% of the PHONE field.

There is one more step before you can read the fields. All three fields contain string data, so *data-var* must be a string variable. However, a string variable that is to receive data from a database call must be initialized before you can use it. Therefore, you must initialize three string variables, one for each field.

```
N$=STRING$(20," ")  
COMP$=STRING$(35," ")  
PHONE$=STRING$(12," ")
```

N\$ will receive data from the NAME field, COMP\$ from the COMPANY field, and PHONE\$ from the PHONE field.

Now you are ready to read the first record in the database. Since the record contains three fields, you must call FGET three times.

```
CALL FGET(CUST%,F1%,N$)  
CALL FGET(CUST%,F2%,COMP$)  
CALL FGET(CUST%,F3%,PHONE$)
```

Now you can print the variables and see what is in the first record.

```
PRINT N$;" ";COMP$;" ";PHONE$  
DONNA HOGAN SUPERIOR COMPUTER PRODUCTS 312-555-5164
```

Closing the Record

Since you are now finished with the first record, close it by using the RCLOSE call.

```
CALL RCLOSE(CUST%)
```

To read another record in a database, you would again open a record, read each field, print each field, and close the record. On a second read, it is not necessary to find out the field IDs again since every record in the database has the same structure. For example, to read and print the second record in CUSTOMER.DAT, you would use the following sequence of statements.

```
CALL ROPEN(CUST%,1)
N$=STRING$(20," ")
COMP$=STRING$(35," ")
PHONE$=STRING$(12," ")
CALL FGET(CUST%,F1%,N$)
CALL FGET(CUST%,F2%,COMP$)
CALL FGET(CUST%,F3%,PHONE$)
PRINT N$;" ";COMP$;" ";PHONE$
CALL RCLOSE(CUST%)
```

Closing the Database and the Library

Since you have now read all the records in CUSTOMER.DAT, you are finished with the database and must close it using the DBCLOSE call. Likewise, close the library, since you are finished making database calls.

```
CALL DBCLOSE(CUST%)
LIBRARY CLOSE
```

Program 8.8. Accessing a Database

```
10 ON ERROR GOTO 1000
20 LIBRARY "DBCALLS.LIB"
30 CALL DBOPEN("ADDRESS.DAT",0,A)
40 CALL RNUMF(A,NRECS)
50 CALL FGID(A,"Name",ID%):F%(0)=ID%
60 CALL FGID(A,"Address",ID%):F%(1)=ID%
70 CALL FGID(A,"City",ID%):F%(2)=ID%
80 CALL FGID(A,"State",ID%):F%(3)=ID%
90 CALL FGID(A,"Zipcode",ID%):F%(4)=ID%
100 FOR I%=0 TO NRECS-1
110 CALL ROPEN(A,I%)
120 FOR J%=0 TO 4
130 A$=STRING$(80,0)
140 CALL FGET(A,F%(J%),A$)
150 COLOR 1:PRINT F%(J%);:COLOR 0:PRINT A$;
160 NEXT J%
170 COLOR 1:PRINT " ";:COLOR 0:PRINT
180 CALL RCLOSE(A)
190 NEXT I%
200 CALL DBCLOSE(A)
210 ON ERROR GOTO 0
220 LIBRARY CLOSE
230 END
1000 IF ERR<>91 THEN 1040
1010 ER=0:CALL DBERROR(ER)
1020 PRINT:PRINT "Library error";ER;"in line";ERL:PRINT
1030 RESUME 200
1040 ON ERROR GOTO 0
1050 ERROR ERR
1060 RESUME 200
```

Example

Program 8.8 illustrates how to read an existing database file. This program accesses the previously created database file ADDRESS.DAT, reading all records in it and printing them on the screen. Each field is preceded on the display by its field number.

Lines 10 and 20 are as described in Program 8.7; they set up housekeeping for the database library routines. Line 30 opens the database for read-only access (0) and returns a file handle in the variable A. Line 40 determines the number of records in the database, the routine returning the number in the variable NRECS. (See RNUMF Call in Chapter 9 for further information.)

Lines 100–190 read all records in the database and print them on the screen. Since ADDRESS.DAT has 4 records, the loop will be executed for record numbers 0, 1, 2, and 3. Line 110 opens a record. Since no access was specified, the record is opened for read-only access, which is the default because it was specified in the DBOPEN call.

Lines 120–160 (nested FOR . . . NEXT loop) actually get the record, one field at a time. Line 130 initializes a string variable with a value of 80 null characters. Since 80 characters is enough to contain the longest field in the database, no data will be truncated. Line 140 then gets one of the three fields, according to the value of the loop counter J%, placing it in the string variable just initialized. Line 150 then prints a reverse video number (the field ID), followed by the contents of the field just read.

Line 170 (following the nested loop) prints one reverse video blank, followed by a RETURN. Line 180 closes the currently open record, and the outer FOR . . . NEXT loop continues printing records in the database until there are no more. The remaining lines close the library and the database, reset the error handling to BASIC's default system, and stop execution. Lines 1000 through 1060 are the error event handler.

QUERYING A DATABASE

The query routines provided by DBCALLS.LIB allow you to extract information from a database. To do this, you build a query key, which specifies the field of each record to be searched and the value that must be found in that field. This query key is then used to search the database for the specified information. For example, you could build a query key that would extract all the records for a particular company from a customer database.

The steps involved in querying a database are:

1. Open the library.
2. Open the database file.
3. Determine the size of the query-key buffer.
4. Build the query key.
5. Search the database file.
6. Close the database file.
7. Close the library.

Opening the Library and Database File

To open the library and the database file, use the LIBRARY statement and the DBOPEN call. For example, to open the database CUSTOMER.DAT, you would use the following statements:

```
LIBRARY "DBCALLS.LIB"
CALL DBOPEN("CUSTOMER.DAT",0,CUST%)
```

Determining the Size of the Query-Key Buffer

Once the library and database file are open, you can begin building the query-key buffer. The *query-key buffer* is an array that holds the query key information, such as the field to be searched and the value to be searched for. It must be at least seven bytes long, but it may need to be longer. The question is how do you know what size the query-key buffer should be. You determine the size of the query-key buffer by defining the query key without actually building it. Two calls, QSTART and QEND, provide optional parameters that will calculate the size of the query-key buffer and pass that information back to your program.

All queries begin with the QSTART call. This call directs the library routines to begin creating a query. The syntax of the QSTART call is:

```
CALL QSTART(handle,qbuffer[,mode])
```

handle is the numeric variable that identifies the open database to be queried. *qbuffer* is the name of the array that will hold the query key information. Since the address of the array must be passed to the QSTART call, the array must be dimensioned before QSTART is called. *mode* is an optional numeric argument that directs the library routines to calculate the size of the query-key buffer without actually building the query key. The size of the buffer is then returned in a optional parameter in the QEND call. If *mode* is omitted or set to 0, the query key is actually built.

For example, to determine the size of the query-key buffer for a query of CUSTOMER.DAT, you would first create an array.

```
DIM QBUF(7)
```

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A seven-element, double-precision array will be more than adequate for the calculation of the size of the buffer.

NOTE: Even though the data contained in the array will not be valid numeric data, the use of a numeric type array is recommended.

You would then call QSTART and pass the array by reference. To pass an array by reference, you pass the address of the array descriptor rather than the address of an array element. Do this by referring to the array in the normal manner, but omit the subscript, as in QBUF(). To begin the query definition for CUSTOMER.DAT, you would use the call:

```
CALL QSTART(CUST%,QBUF(),1)
```

This call will start the query definition for the database file identified by CUST%. QBUF() is the address of the array descriptor for the array that will hold the query key. Since the mode is included and is not 0 (1), the subsequent calls will not actually build the query key; instead, the size of the query-key buffer will be calculated.

After the query definition is initiated by QSTART, you can begin to define the query key. The QRSTART call begins the definition of the query key. The syntax of the QRSTART call is:

```
CALL QRSTART(handle,qbuffer)
```

handle identifies the database to be queried. *qbuffer* is the array, passed by reference, that will hold the query key. To start the query key definition for CUSTOMER.DAT, you would use the call:

```
CALL QRSTART(CUST%,QBUF())
```

Once the query key definition is initiated, you can then use QFIELD to define the actual query key. The syntax of the QFIELD call is:

```
CALL QFIELD(handle,qbuffer,field-ID,operator,mode,operand)
```

handle is the numeric variable that identifies the database. *qbuffer* is the array, passed by reference, that will hold the query key information.

field-ID is a numeric expression that identifies the particular field of each database record to be tested. *operand* specifies the value against which *field-ID* is to be tested; it must be the same data type as *field-ID*. For instance, if you wanted to find all the records in an address database whose zip codes were 60632, you would specify the ZIPCODE field as the *field-ID* and 60632 as the *operand*. Similarly, if you wanted a list of all your customers who were in the same city, you would specify the city's *field-ID* in *field-ID* and the name of the city in *operand*.

operator is a numeric expression that defines the test (comparison) to be performed. That is, *field-ID* must have the relation to *operand* specified by *operator* if the record is to be selected from the database. *operator* can have one of the following values:

- 0 equal to (=)
- 1 not equal to (<>)
- 2 less than (<)
- 3 greater than (>)
- 4 less than or equal to (<=)
- 5 greater than or equal to (>=)

Thus, if you wanted to find all records that contained a zip code larger than 60600, you would specify 3 as the operator. Similarly, if you wanted a list of customers who were in the same city, you would select 0 as the operator.

mode is a numeric expression that will be interpreted as a bit-encoded integer. The basic values for *mode* are:

- 0 None of the following options is to be selected.
- 2 "*" and "?" will be interpreted as wildcard characters in string fields and as hex 0F in date fields. If *mode* is 0, "*" and "?" will be interpreted as text characters rather than wildcard characters.
- 4 In string comparisons, case will be ignored. Thus, "JOHNSON" would be considered equal to "Johnson" or "jOhNsOn." If *mode* is 0, case is significant in string comparisons.
- 8 The operand specifies the field-ID of another field in the record to be used in the test (comparison). If the mode is 0, QFIELD assumes that *operand* contains a value against which *field-ID* is to be compared.

The mode values may be added together if you wish to select more than one option. For example, if you wanted to use wildcard characters and you wanted to ignore case in a string comparison, you could specify *mode* as 2+4 or as 6.

For example, suppose you wanted to select from CUSTOMER.DAT all the records relating to Donna Hogan. You would use the following sequence of calls.

```
CALL FGID(CUST%,"NAME",FID%)
CALL QFIELD(CUST%,QBUF(),FID%,0,0,"DONNA HOGAN")
```

The first call, FGID, returns the field-ID for the NAME field so that it can be used in the QFIELD call. The QFIELD call specifies the NAME field, identified by FID%, as the field to be tested and "DONNA HOGAN" as the value against which the field is to be compared. The operator is 0, which means that the test is to be for equality between the field and the operand. That is,

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"DONNA HOGAN" will match "DONNA HOGAN" but not "Donna Hogan." If you had used the case mode (4), upper- and lowercase names would be considered equal.

Once the query key is defined, you must end the query key definition. To end the definition of the query key, use the QREND call.

CALL QREND(*handle,qbuffer*)

handle is the numeric variable that identifies the database being queried. *qbuffer* is the array, again passed by reference, that holds the query key.

For example, to end the definition of the query key for CUSTOMER.DAT, you would use the call:

CALL QREND(CUST%,QBUF())

Once you are finished defining query keys, you must end the query definition. To end the query definition, use the QEND call.

CALL QEND(*handle,qbuffer[,size]*)

handle identifies the database for which the query was defined. *qbuffer* is the array, once again passed by reference, holding the query key. *size* is an optional numeric variable. If it is included, QEND will return in it the number of bytes needed by the query-key buffer for the query definition. After you call QEND, you will not be able to use any of the query calls until you call QSTART again.

For example, to end the query definition for CUSTOMER.DAT, you would use the call:

CALL QEND(CUST%,QBUF(),SIZE%)

The query definition is now ended, and the integer variable SIZE% contains the number of bytes needed by the query-key buffer for this query definition. You can now use that value to dimension the query-key buffer and actually build the query key.

Building the Query Key

To build the query key, repeat the steps you took to determine the size of the query-key buffer. This time, however, in the QSTART call, mode must be omitted or 0. The following sequence of statements will build the query key for CUSTOMER.DAT.

```

ERASE QBUF
DIM QBUF(SIZE%)
CALL QSTART(CUST%,QBUF())
CALL QRSTART(CUST%,QBUF())
CALL QFIELD(CUST%,QBUF(),FID%,0,0,"DONNA HOGAN")
CALL QREND(CUST%,QBUF())
CALL QEND(CUST%,QBUF())

```

Notice that these statements are almost identical to the statements used to determine the size of the query-key buffer. One statement has been added at the beginning of the sequence: ERASE QBUF. Since an array cannot be dimensioned twice, you must erase QBUF before you can redimension it with the value contained in SIZE%.

In addition, the mode in QSTART is omitted. This instructs the query calls to actually build the query. Also QEND no longer contains the optional numeric variable to return the size of the query-key buffer.

Searching the Database File

Now that the query key has been built, you are ready to search the database for records that match the parameters specified in QFIELD.

To search a database for a record that satisfies the query definition, use the RFIND call. The syntax of the RFIND call is:

```
CALL RFIND(handle,start-record,direction,qbuffer,record-ID)
```

handle is the handle of the open database that is to be searched. *start-record* is the number of the record at which the search will begin. *direction* can be either 0 or 1. 0 specifies a forward search through the file, and 1 specifies a backward search. *qbuffer* is the array, passed by reference, that holds the query key; this is the same array that was used in the query calls. *record-ID* is a numeric variable in which RFIND will return the number of the record that meets the conditions specified in the query definition. *record-ID* must be initialized before it is passed to RFIND. If no record is found that meets the query specifications, an error occurs.

Once RFIND locates a record, you can use ROPEN and FGET to read the record, and you can print the information on the screen or printer. You could also write all the records that are found to a sequential or random access data file or to another database.

To find and print the first record in CUSTOMER.DAT that has "DONNA HOGAN" in the NAME field, you would use the following sequence of statements.

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```

CALL FGID(CUST%,"NAME",ID%):FID%(0)=ID%
CALL FGID(CUST%,"COMPANY",ID%):FID%(1)=ID%
CALL FGID(CUST%,"PHONE",ID%):FID%(2)=ID%
RECNO% = 0:FOUND% = 0
CALL RFIND(CUST%,RECNO%,0,QBUF(),FOUND%)
CALL ROPEN(CUST%,FOUND%,0)
FOR I%=0 TO 2
    INFO$=STRING$(40," ")
    CALL FGET(CUST%,FID%(I%),INFO$)
    PRINT INFO$;" ";
NEXT I%
PRINT
CALL RCLOSE(CUST%,FOUND%)

```

The first three statements get the field-IDs of the three fields in the record; they will be used later to access the information in the record located by RFIND. Then two integer variables are initialized. RECNO% will be used to specify the number of the start record (the record where the search will begin), and FOUND% will be used by the RFIND call to return the number of the record that matches the query specifications.

RFIND is called next. It begins searching the database at record 0 and continues until it finds a record that contains "DONNA HOGAN" in the NAME field. Then the record is opened for read-only access, the fields are read, and each field is displayed on the screen as follows:

```
DONNA HOGAN SUPERIOR COMPUTER PRODUCTS 312-555-5164
```

After the found record is printed, the record is closed. RCLOSE includes the numeric variable FOUND%, which contains the number of the record that was closed.

To find the next record in the database that meets the query specifications, assign RECNO% the number of the record one past the record that was read.

```
RECNO% = FOUND% + 1
```

This is done so that when you call RFIND again it does not start searching from the beginning of the file but from the point in the file after the found record. Then repeat the steps beginning with RFIND until the end of the file is reached.

Since there is only one record in CUSTOMER.DAT that contains DONNA HOGAN in the NAME field, RFIND will not locate any more records that meet the query specifications, and the error message Illegal DBMS call will be displayed. If you call DBERROR and print the error code (66) that it returns, you will discover that the error message means that all the records have now been searched. (See Program 8.9 for an example of how to handle this error condition.)

Closing the Database File and the Library

The query is now complete, and all the records that relate to Donna Hogan have been retrieved. It is time to close the file and the library using the following statements:

```
CALL DBCLOSE(CUST%)
LIBRARY CLOSE
```

Example

Program 8.9 illustrates the use of the query calls. It will query the ADDRESS.DAT database created in Program 8.7.

This program searches the database file ADDRESS.DAT for all records that have WY in the STATE field. The records that are found are then printed on the screen with reverse video blanks between the fields.

Line 10 sets up the error event trap. Lines 20 and 30 open the library and the database file. The field IDs of the five fields in the record are then obtained in lines 40–80 and the IDs are stored in an array.

Line 90 initializes the MODE% and SIZE% variables, and line 100 dimensions the array that will hold the query key. In line 110, since MODE%=1, the QSTART call will calculate the size of the query-key buffer. Line 160 tests MODE%, which is still 1, so MODE% is now set to 0 and the QKEY array is erased. When the program again executes line 100, QKEY will be dimensioned for the calculated size of the query-key buffer, and QSTART will build the query key.

Line 190 initializes RECN%, which will contain the number of the start record, and FREC%, which will count the number of records that are found. Then RFIND is called in line 200.

If a record is found, 1 is added to FREC% (since RFIND finds only one record at a time) to keep track of the number of records found. Lines 220–280 then open the record, read the fields, and print them on the screen. Line 290 closes the open record. RECN% is incremented in line 300 so that it now contains the number of the found record + 1, and the program branches back to RFIND, which will now resume the search starting at the position following the last record that was found.

Line 310 returns error trapping to normal, and lines 320 and 330 close the database file and the library, respectively.

Program 8.9. Querying a Database

```

10 ON ERROR GOTO 1000
20 LIBRARY "DBCALLS.LIB"
30 CALL DBOPEN("ADDRESS.DAT",0,A)
40 CALL FGID(A,"Name",ID%):FID%(0)=ID%
50 CALL FGID(A,"Address",ID%):FID%(1)=ID%
60 CALL FGID(A,"City",ID%):FID%(2)=ID%
70 CALL FGID(A,"State",ID%):FID%(3)=ID%
80 CALL FGID(A,"Zipcode",ID%):FID%(4)=ID%
90 MODE%=1:SIZE%=7
100 DIM QKEY(SIZE%)
110 CALL QSTART(A,QKEY(),MODE%)
120 CALL QRSTART(A,QKEY())
130 CALL QFIELD(A,QKEY(),FID%(3),0,0,"WY")
140 CALL QREND(A,QKEY())
150 CALL QEND(A,QKEY(),SIZE%)
160 IF MODE%=0 THEN 190
170 MODE%=0:ERASE QKEY
180 GOTO 100
190 RECN%=0:FREC%=0
200 CALL RFIND(A,RECN%,0,QKEY(),RECN%)
210 FREC%=FREC% + 1
220 CALL ROPEN(A,RECN%,0)
230 FOR I%=0 TO 4
240     A$=STRING%(80,0)
250     CALL FGET(A,FID%(I%),A$)
260     COLOR 1:PRINT " ";COLOR 0:PRINT A$;
270 NEXT I%
280 COLOR 1:PRINT " ";COLOR 0:PRINT
290 CALL RCLOSE(A)
300 RECN%=RECN%+1:GOTO 200
310 ON ERROR GOTO 0
320 CALL DBCLOSE(A)
330 LIBRARY CLOSE
340 END
1000 IF ERR<>91 THEN 1060
1010 CALL DBERROR(ER)
1020 IF ER<>66 OR ERL<>200 THEN 1040
1030 IF ER=66 AND ERL=200 AND FREC%=0 THEN PRINT "No Matching Records
    Found":RESUME 310 ELSE RESUME 310
1040 PRINT:PRINT "Library error";ER;" in line";ERL
1050 RESUME 310
1060 ON ERROR GOTO 0
1070 ERROR ER
1080 RESUME 320

```

Lines 1000–1080 contain the error handling routine. If an error other than a database error occurs, the error message is printed, the database and library are closed, and program execution ends. If a database error is found, the error code and line number are checked. If the database error is not 66 (record not found) or the line number in which the error occurred is not 200, the error code and line number are printed, all files are closed, and execution stops. However, if the error code returned by DBERROR is 66 and the line number of the error is 200, then FREC% is checked. If FREC%=0, a message is printed to indicate that the search did not find any matching records. Otherwise, the program branches to line 310, where files are closed and execution is halted.

Specifying Multiple Query Keys

In Program 8.9, only one query key was specified so the program could retrieve records that met only one criterion. There are times, however, when you may want to search more than one field in order to find records that match more than one criterion. This is done by calling QFIELD for each criterion.

Suppose, for example, that you want to retrieve records from ADDRESS.DAT that meet two criteria, such as the name of the city as well as the name of the state. To do this, you would need two QFIELD calls, one for the city and one for the state. Since you already have a query for the state, you would add the following statement to Program 8.9 to also select records based on the contents of the CITY field.

```
135 CALL QFIELD(A,QKEY(),FID%(2),0,0,"Bay City")
```

You can also create queries that will select a record based on whether it meets one criterion or another criterion. For example, you might want to select from ADDRESS.DAT all the records for everyone who lives in either Wyoming or Illinois. To do this, you would define two query keys. That is, you would use one QRSTART/QFIELD/QREND/ sequence to define a query key for WY and another QRSTART/QFIELD/QREND sequence to define a query key for IL.

For example, you would add the following statements to Program 8.9 to select records that had WY or IL in the STATE field.

```
141 CALL QRSTART(A,QKEY())
142 CALL QFIELD(A,QKEY(),FID%(3),0,0,"IL")
143 CALL QREND(A,QKEY())
```

SORTING A DATABASE

Besides querying a database to extract from it the information you want, you can also sort a database so that it appears in the order in which you want to view the information.

To sort a database, use the call:

```
CALL DBSORT(handle,direction,field-ID[,direction,field-ID]...)
```

handle is the numeric variable that identifies the open database that you want to sort. *direction* can be either 0 or 1. If *direction* is 0, the records will be sorted in ascending order; if 1, in descending order. *field-ID* is the number of the field that will be the sort key; that is, all the records in the database will be arranged in ascending or descending order based on the contents of this field.

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Introduction to BASIC

Program 8.10. Sorting a Database

```
10 ON ERROR GOTO 1000
20 LIBRARY "DBCALLS.LIB"
30 CALL DBOPEN("ADDRESS.DAT",2,A)
40 CALL FGID(A,"State",ID%)
50 CALL DBSORT(A,0,ID%)
60 CALL RNUMF(A,NRECS%)
70 FOR I%=0 TO NRECS%-1
80     CALL ROPEN(A,I%,0)
90     FOR J%=0 TO 4
100        A$=STRING$(80,0)
110        CALL FGET(A,J%,A$)
120        PRINT A$;" ";
130     NEXT J%
140     PRINT
150     CALL RCLOSE(A)
160 NEXT I%
170 ON ERROR GOTO 0
180 CALL DBCLOSE(A)
190 LIBRARY CLOSE
200 END
1000 IF ERR<>91 THEN 1030
1010 CALL DBERROR(ER)
1020 PRINT:PRINT "Library error";ER;" in line";ERL:RESUME 170
1030 ON ERROR GOTO 0
1040 ERROR ERR
1050 RESUME 180
```

You can perform multilevel sorts by specifying more than one *direction.field-ID* pair. The sort precedence is determined by the order in which the fields are specified. The first pair will be the highest order sort, the second pair the next order, and so on.

Program 8.10 illustrates the use of the DBSORT call. This program sorts the database file ADDRESS.DAT in ascending order by state. After the database is sorted, it is read and printed in its sorted order.

Line 50 performs the actual sort. The 0 argument indicates that the sort will be in ascending order. ID%, the field ID of the STATE field that was returned by FGID, tells the sorting routine to sort the records based on the values in the STATE field.

Lines 60–160 then read each record in the sorted database and print it on the screen.

DATA TYPES AND CONVERSIONS

All data in a database must be one of the following types:

- String data,
- Double-precision floating-point numbers, or
- Date/time data.

Since BASIC supports string and double-precision data types internally, no special conversion is needed to pass these values to the database routines. If any conversion of numeric values is needed, BASIC can provide it.

Date/time values, however, are not supported by BASIC, so they must be converted to a format that the database library routines can access. The format of a date/time field in a database file is an 8-byte value with the following definition:

- Byte 0-1 A 16-bit unsigned integer representing the year.
- Byte 2 An 8-bit integer in the range 1-12 representing the month.
- Byte 3 An 8-bit integer in the range 1-31 representing the day of the month.
- Byte 4 An 8-bit integer in the range 0-23 representing the hour of the day.
- Byte 5 An 8-bit integer in the range 0-29 representing the minutes past the hour.
- Byte 6 An 8-bit integer in the range 0-29 representing the seconds past the minute.
- Byte 7 An 8-bit integer in the range 0-99 representing the hundredths of a second past the second.

To match this format, date/time data must be passed to the database library as an integer array with the following assignments:

ELEMENT # CONTENTS

0	Year
1	Month
2	Day
3	Hour
4	Minute
5	Second
6	Hundredths of a second

When the array is passed, it must be passed by reference, as in DATE().

Following is an example of how a date/time field type can be written to a database file.

```
DIM DATTIM%(7)
FOR I%=0 TO 6
    READ DATTIM%(I%)
NEXT I%
DATA 1985,1,11,12,30,0,0
.
.
CALL FPUT(A,1,DATTIM%)
```

In order to read the date/time data from the database, you again need to dimension an integer array. When FGET is called, it will place the date/time data in the array (which was passed by reference). Your program can then

get the data from the array and print it in whatever format you want. The array will have the same structure as the array that you created to pass the date/time data to the database calls.

Before you proceed to Chapter 9 or another application, delete all the files you created during this chapter. Use the DELETE command from the System Manager screen. For further information on the System Manager DELETE command, refer to Chapter 2, "System Manager Reference."

CHAPTER 9

BASIC REFERENCE

INTRODUCTION

This chapter lists all BASIC commands, statements, functions, and variables in alphabetical order. All strings (which includes file names and filespecs) are assumed to be enclosed in quotes even though quotes are not shown in the syntax.

Immediately following the BASIC Commands, Functions, and Statements section are sections that describe the reserved words, ASCII character codes, and the error messages.

Reserved words are words that have a special meaning in BASIC. These reserved words include all BASIC's commands, statements, and functions. All of the reserved words recognized by BASIC are contained in Table 9.1. You should always separate reserved words from other characters in a statement by using spaces or other designated delimiters. This is to allow BASIC to recognize the word. Because these words have special and specific meanings to BASIC, they must not be used as variable or function names.

ASCII character codes consist of all the ASCII codes listed in decimal and hexadecimal notation, as well as the character representation of each code. ASCII codes 1–127 have standard character assignments or meanings used throughout the industry. Codes 128–255 have been assigned graphic symbols.

Error messages are displayed after an error occurs. BASIC stops program execution, displays the error message, and returns to Command mode. In Direct mode, BASIC displays only the error message. In Indirect mode, that is, when an error occurs while a program is running, both the error message and the number of the line in which the error occurred are displayed.

The database errors are handled differently than are standard BASIC errors. See Handling Database Errors in Chapter 8 for more information.

Syntax Notation

The following notation is used in the syntax diagrams in this chapter.

Program Lines All program statements, prompts, and other items displayed on the screen will be shown in this style of type.

[] Brackets indicate the enclosed entry is optional.

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- CAPS Capital letters indicate portions of command, statement, and function lines that must be entered exactly as shown.
- italics* Lowercase italics indicate that the entry is a user-defined variable, such as the name of a file or the argument to a function.
- ... An ellipsis indicates that more arguments of the same type can be included in the statement or function.
- ,; A vertical bar indicates that you may choose either the item on the left of the bar or the item on the right of the bar. Either is acceptable, but both of them cannot be used simultaneously.

For example, look at the following syntax diagram.

`INPUT [:] ["prompt";|,]variable[,variable] ...`

The capitalized word INPUT must be typed as shown. The semicolon after INPUT is optional, as indicated by the brackets. The prompt is also optional. In addition, the specific prompt to be used in the program is defined by the programmer. The quotation marks surrounding the prompt are required. The vertical bar indicates that you can use either a semicolon or a comma at the end of the prompt string. You must include at least one variable of your choice after the keyword, but you may include several variables, as indicated by the ellipsis at the end of the line.

BASIC COMMANDS, FUNCTIONS, AND STATEMENTS

In this section, each command, statement, and function is organized according to Syntax, Purpose, Explanation, and Examples.

Syntax shows how you should enter the command, statement, or function.

Purpose is a brief statement that explains what the command, statement, or function does.

Explanation lists the rules that govern the command, statement, or function. It explains the valid and default parameters, the results that will be obtained with each option, and errors that may occur.

Examples contains one or more examples of the use of the command, statement, or function. The examples are designed both to show you how the command, statement, or function typically appears in a line of a BASIC program and to give you an idea of how you can use it in a program.

ABS Function

SYNTAX

`ABS(x)`

PURPOSE

Use the ABS function to return the absolute value of the numeric expression x .

EXPLANATION

This function returns the absolute value of x . The absolute value of any numeric expression will be positive or zero.

EXAMPLE

```
PRINT ABS(7*(-5))  
35
```

ASC Function

SYNTAX

ASC(*string*)

PURPOSE

Use the ASC function to return the ASCII code for the first character of *string*. (See ASCII Character Codes in this chapter for a list of ASCII codes.)

EXPLANATION

If you enter a multiple-character string as the argument, the ASC function will return the ASCII decimal code for only the first character.

If *string* is null, an illegal function call error message displays.

EXAMPLE

```
10 X$="TEST"
20 PRINT ASC(X$)
RUN
84
```

See CHR\$ Function in this chapter for details on ASCII-to-string conversion.

ATN Function

SYNTAX

ATN(*x*)

PURPOSE

Use the ATN function to return the arctangent of *x*, where *x* is in radians.

EXPLANATION

The expression *x* may be any numeric type, but the default evaluation of ATN is performed in double precision. The result of the ATN function is a value, in radians, in the range $(-\text{PI}/2) - (+\text{PI}/2)$.

EXAMPLE

```
10 LET X = 3
20 PRINT ATN(X)
RUN
1.2490457723983
```

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AUTO Command

SYNTAX

AUTO [*linenum*][,[*increment*]]

PURPOSE

Use the AUTO command to automatically generate line numbers during program entry.

EXPLANATION

AUTO begins numbering at *linenum* and increments each subsequent line number by *increment*. The default for both values is 10. If *linenum* is followed by a comma but *increment* is not specified, the last increment specified in an AUTO command is assumed. If *linenum* is omitted but *increment* (preceded by a comma) is specified, line numbering will begin with 0.

If AUTO generates a line number that is already being used, an asterisk (*) is printed after the number to warn you that any input will replace the existing line. However, if you press RETURN immediately after the asterisk is displayed, you will save the existing line and generate the next line number.

AUTO is terminated by pressing SHIFT-BREAK. The line in which you press SHIFT-BREAK will not be saved. After AUTO is terminated, BASIC returns to Command mode.

EXAMPLE

AUTO

generates line numbers 10, 20, 30, 40 . . .

AUTO 100,50

generates line numbers 100, 150, 200 . . .

BEEP Statement

SYNTAX

BEEP

PURPOSE

Use the BEEP statement to sound the speaker.

EXPLANATION

The BEEP statement outputs an ASCII bell character, which sounds the speaker.

EXAMPLE

20 IF X < 20 THEN BEEP

executes a beep when X is less than 20.



BREAK Statement

SYNTAX

BREAK ON
BREAK OFF
BREAK STOP

PURPOSE

Use the BREAK statement to enable/disable trapping of the BREAK key.

EXPLANATION

BREAK ON enables break trapping.
BREAK OFF disables break trapping.
BREAK STOP suspends break trapping.

These statements are used in conjunction with the **ON BREAK** and **GOSUB** statements. See the descriptions of those statements for more information.



CALL Statement

SYNTAX

CALL routine [(argument[,argument . . .])]

PURPOSE

Use the CALL statement to pass control to an external subroutine located in one of the active library files.

EXPLANATION

routine defines the name of the routine to which control is passed. All user libraries are searched for a routine with this name. If more than one LIBRARY statement has been issued, the libraries are searched in the reverse of the order in which you specified them. If the subroutine is not found in any of the active libraries, an error is generated. Currently only one library is available, DBCALLS.LIB.

argument is a variable or constant that is to be passed to the subroutine. Multiple arguments must be separated by commas.

EXAMPLE

To open and create a file named CUSTOMER.DAT, you would enter the following:

```
.  
. .  
50 LIBRARY "DBCALLS.LIB"  
60 CALL DBCREATE ("CUSTOMER.DAT", CUST%)  
. .
```

See LIBRARY Statement in this chapter for details about its use with the CALL statement.

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CHAIN Statement

SYNTAX

CHAIN [MERGE]*filespec* [,*linenum*] [,ALL] [,DELETE *range*]]

PURPOSE

Use the CHAIN statement to call another program and pass variables to it from the current program.

EXPLANATION

filespec is the name of the program being chained to (called). It must conform to the file naming conventions described in Chapter 1.

linenum is a line number (or an expression that evaluates to a line number) in the called program. It is the starting point for execution of the called program. If you omit it, execution begins at the first line. *linenum* is not affected by a RENUM command.

With the ALL option, every variable in the current program is passed to the called program. If you omit the ALL option, the current program must contain a COMMON statement to list the variables that are passed.

If you use the ALL option and omit *linenum*, a comma must hold the place of *linenum*. For example, CHAIN "NEXTPROG",ALL is correct; CHAIN "NEXTPROG",ALL is incorrect. In the latter case, BASIC assumes that ALL is a variable name and evaluates it as a line number expression.

The MERGE option enables you to bring a subroutine into the BASIC program as an overlay. That is, the current program and the called program are merged (see MERGE Command in this chapter). The called program must be an ASCII file if it is to be merged. (See SAVE Command in this chapter for information about how to save a program file in ASCII format.)

NOTE: The CHAIN statement with MERGE option leaves the files open and preserves the current OPTION BASE setting.

If the MERGE option is omitted, CHAIN does not preserve variable types or user-defined functions for use by the chained program. That is, you must restate in the chained program any DEFINT, DEFSNG, DEFDBL, DEFSTR, or DEFFN statement containing shared variables.

When using the MERGE option, you should place user-defined functions before any CHAIN MERGE statements in the program. Otherwise, the user-defined functions will be undefined after the merge is complete.

After an overlay is used, it is usually desirable to delete it so that a new overlay can be brought in. Line numbers specified by *range* are deleted before a MERGE takes place. To do this, use the DELETE option.

range contains the numbers of the first and last lines to be deleted from the calling program. The line numbers in *range* are affected by the RENUM command.

EXAMPLE

```

10 REM THIS PROGRAM DEMONSTRATES CHAINING USING COMMON TO PASS
    VARIABLES.
20 REM SAVE THIS MODULE AS "PROG1" USING THE A OPTION.
30 DIM A$(2),B$(2)
40 COMMON A$(),B$()
50 A$(1)="VARIABLES IN COMMON MUST BE ASSIGNED "
60 A$(2)="VALUES BEFORE CHAINING."
70 B$(1)=""
80 B$(2) =""
90 CHAIN "PROG2"
100 PRINT
110 PRINT B$(1)
120 PRINT
130 PRINT B$(2)
140 PRINT
150 END

10 REM THE STATEMENT "DIM A$(2),B$(2)" MAY ONLY BE EXECUTED ONCE.
20 REM HENCE, IT DOES NOT APPEAR IN THIS MODULE.
30 REM SAVE THIS MODULE AS "PROG2" USING THE A OPTION.
40 COMMON A$(),B$()
50 PRINT
60 PRINT A$(1);A$(2)
70 B$(1)="NOTE HOW THE OPTION OF SPECIFYING A STARTING LINE NUMBER"
80 B$(2)="WHEN CHAINING AVOIDS THE DIMENSION STATEMENT IN 'PROG1'."
90 CHAIN "PROG1",100
100 END

```

In this example, the two string arrays are dimensioned and then declared as common variables. When the program gets to line 90, it chains to the other program, which loads the strings in B\$. At line 90 of PROG2, control chains back to the first program at line 100. The first program then continues execution from that line. You can observe this process through the descriptive text that prints as the programs execute.

```

10 REM THIS PROGRAM DEMONSTRATES CHAINING USING THE MERGE, ALL, AND
    DELETE OPTIONS.
20 REM SAVE THIS MODULE AS "MAINPRG".
30 A$="MAINPRG"
40 CHAIN MERGE "OVRLAY1",1010,ALL
50 END

1000 REM SAVE THIS MODULE AS "OVRLAY1" USING THE A OPTION.
1010 PRINT A$; " HAS CHAINED TO OVRLAY1."
1020 A$="OVRLAY1"
1030 B$="OVRLAY2"
1040 CHAIN MERGE "OVRLAY2",1010,ALL, DELETE 1000-1050
1050 END

```

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```
1000 REM SAVE THIS MODULE AS "OVRLAY2" USING THE A OPTION.  
1010 PRINT A$; " HAS CHAINED TO ";B$;"."  
1020 END
```

In this example, the MERGE, ALL, and DELETE options are illustrated. After A\$ is loaded in the first program, control chains to line 1010 of the second. At the second program's line 1040, it chains to line 1010 of the third program, keeping all variables and deleting all the second program's (OVRLAY1) lines. Control passes to the third program. This process can be observed through the descriptive text that prints as the programs execute.

If the original program has been saved previously, it will remain intact. The only lines deleted are in the workspace.

CHR\$ Function

SYNTAX

CHR\$(*n*)

PURPOSE

Use the CHR\$ function to convert an ASCII code to the character it represents.

EXPLANATION

CHR\$ is commonly used to send a special character to the screen or printer. For instance, a form feed (CHR\$(12)) could be sent to clear a terminal screen and return the cursor to the home position. Or the double quotation mark character (CHR\$(34)) could be used to place double quotation marks within a quoted string.

EXAMPLE

```
PRINT CHR$(66)  
B
```

See ASC Function in this chapter for details on ASCII-to-numeric conversion.

CINT Function

SYNTAX

CINT (x)

PURPOSE

Use the CINT function to convert x to an integer by rounding the fractional portion.

EXPLANATION

x may be any numeric expression. If x is not in the range -32768 to 32767, an Overflow error occurs.

EXAMPLE

```
PRINT CINT(45.67)
46
```

See CSNG Function in this chapter for details about converting numbers to single-precision data type. See also FIX Function and INT Function in this chapter, both of which return integers.

CIRCLE Statement

SYNTAX

CIRCLE [STEP] (*xcenter*, *ycenter*), *radius*[,*color* [,*start,end* [,*aspect*]]]

PURPOSE

Use the CIRCLE statement to draw an ellipse or circle with the specified center and radius.

EXPLANATION

The STEP option makes the specified *xcenter* and *ycenter* coordinates relative to the most recent point, instead of absolute, mapped coordinates.

xcenter is the x coordinate for the center of the circle.

ycenter is the y coordinate for the center of the circle.

radius is the radius of the circle in the current logical coordinate system.

color is the numeric symbol for regular or reverse video. (See the COLOR Statement.) The default color is regular video.

start and *end* are the start and end angles in radians. The range is $(-2 * \pi)$ through $(2 * \pi)$. These angles allow you to specify where an ellipse will begin and end. If the start or end angle is negative, then the ellipse will be connected to the center point with a line, and the angles will be treated as if they were positive. Note that this is different from adding $(2 * \pi)$. The start angle may be less than the end angle.

aspect is the aspect ratio; that is, the ratio of the x radius to the y radius. When default ratios are specified, a round circle is drawn.

If the aspect ratio is less than 1, the radius given is the x radius. If it is greater than 1, the y radius is given.

The last point referenced after a circle is drawn is the center of the circle. Thus, a subsequent STEP option is based on the center as its most recent point.

It is not an error to supply coordinates that are outside the screen or viewport.

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Coordinates can be shown as absolutes or the STEP can be used to reference a point relative to the most recent point used. The syntax of the STEP option is:

STEP (xoffset, yoffset)

For example, if the most recent point referenced were (10,10), STEP (10,5) would reference a point offset 10 to the right of the current x coordinate and offset 5 down from the current y coordinate, that is, the point (20,15). Likewise, STEP (0,-5) would reference a point offset 0 from the x coordinate and offset -5 from the y coordinate; that is, point (10,5).

EXAMPLE

Assume that the last point plotted was 200,50. Then,

CIRCLE (220,65),50

and

CIRCLE STEP (20,15),50

will both draw a circle at 220,65 with radius 50. The first example uses absolute notation; the second uses relative notation.

CLEAR Statement

SYNTAX

CLEAR

PURPOSE

Use the **CLEAR** statement to set all numeric variables to 0, to set all string variables to null, and to close all open files.

EXPLANATION

The **CLEAR** statement:

- Closes all files.
- Clears all COMMON variables.
- Resets numeric variables and arrays to 0.
- Resets string space.
- Resets all string variables and arrays to null.
- Resets all DEF FN and DEFSNG/DBL/STR statements.

The **CLEAR** statement does *not* erase the program currently in memory.

EXAMPLE

Enter:

CLEAR

It clears all data from memory, but it leaves the current program intact.

CLOSE Statement

SYNTAX

`CLOSE[[#] filenum [,[#] filenum] . . .]`

PURPOSE

Use the CLOSE statement to conclude I/O to a file or device.

EXPLANATION

filenum is the number under which the file was opened. A CLOSE statement with no arguments closes all open files.

The association of a particular file and a file number terminates upon execution of a CLOSE statement. You can then reopen the file using the same or a different file number. Once you close a file, that file's number can be used for any unopened file.

A CLOSE statement for a sequential output file writes the final buffer of output to the file.

The SYSTEM, CLEAR, and END statements; the NEW, RESET, and QUIT commands; and the CTRL-F9 and CTRL-F10 keys always close all files automatically.

EXAMPLE

`CLOSE #1,#2`

CLS Statement

SYNTAX

CLS

PURPOSE

Use the CLS statement to clear the contents of the screen. It does not, however, clear the program from memory.

EXPLANATION

The screen can also be cleared with the CLEAR SCREEN key (CTRL-L).

EXAMPLE

10 CLS 'Clears the screen

COLOR Statement

SYNTAX

COLOR [*parameter*]

PURPOSE

Use the COLOR statement to enable or disable reverse video mode.

EXPLANATION

If the optional numeric parameter is given and evaluates to a nonzero value, reverse video is enabled. If *parameter* is 0 or not present, reverse video is disabled. This statement will only affect text.

NOTE: Since the LCD has only two "colors" (on and off), only 0 and 1 will be accepted as valid colors in graphics commands. The color 0 designates pixels off and 1, pixels on.

EXAMPLE

```
10 COLOR 1
20 PRINT "HELLO, NANCY"
30 REM THIS TEXT WILL APPEAR IN REVERSE VIDEO.
```

COMMON Statement

SYNTAX

COMMON *variable*[,*variable* . . .]

PURPOSE

Use the COMMON statement to pass variables to a chained program.

EXPLANATION

The COMMON statement is used in conjunction with the CHAIN statement. Although COMMON statements can appear anywhere in a program, it is recommended that you use them at the beginning. Any number of COMMON statements can appear in a program, but the same variable cannot appear in more than one COMMON statement. You specify array variables by appending () to the variable name. If all variables are to be passed, use CHAIN with the ALL option and omit the COMMON statement. See the CHAIN Statement for examples.

Some Microsoft products allow the number of dimensions in the array to be included in the COMMON statement. As in GW-BASIC, BASIC will accept that syntax, but will ignore the numeric expression itself. For example, the following statements are both valid and are considered equivalent:

```
COMMON A()  
COMMON A(3)
```

EXAMPLE

```
100 COMMON A,B,C,D(),G$  
110 CHAIN "PROG3",10  
.  
.
```

COM(*n*) Statement

SYNTAX

COM(*n*) ON|OFF|STOP

PURPOSE

Use the COM(*n*) statement to enable/disable trapping of communications activity at the specified communications adapter.

EXPLANATION

n is the number of the communications adapter. In the case of the ZP-150, 1 is the only valid selection.

The COM(*n*) ON statement must be executed before the ON COM statement if the ON COM statement is to function.

If communications event trapping is ON and the ON COM statement contains a nonzero line number, BASIC will check the communications adapter to see if any characters have come in every time it executes a new statement.

When you specify COM(*n*) OFF, no event trapping takes place, and any communications activity that may occur will not be remembered.

The COM(*n*) STOP statement also disables trapping of communications activity. However, any communications activity that takes place will be remembered so that an immediate trap will occur when COM(*n*) ON is executed.

You must execute an OPEN COM statement in order for the COM(*n*) statement to function.

CONT Command

SYNTAX

CONT

PURPOSE

Use the CONT command to continue program execution after you have pressed SHIFT-BREAK or a STOP or END statement has been executed.

EXPLANATION

Execution resumes at the point where the break occurred. If the break occurred after a prompt from an INPUT statement, execution continues with the reprinting of the prompt (?) or prompt string).

CONT is usually used in conjunction with STOP for debugging. When execution is stopped, intermediate values can be examined and changed by using Direct mode statements. Execution can be resumed with CONT or a Direct mode GOTO, which resumes execution at a specified line number.

CONT is invalid if the program has been edited during the break.

EXAMPLE

```
10 INPUT A, B, C
20 K=A^2*5.3:L=B^3/.26
30 STOP
40 M=C*K+100 : PRINT M
RUN
? 1,2,3
Break in 30
Ok
CONT
      115.9
Ok
```

See STOP Statement in this chapter for details about suspending program execution.

COS Function

SYNTAX

COS(*x*)

PURPOSE

Use the COS function to return the cosine of *x*, where *x* is in radians.

EXPLANATION

The calculation of COS is performed in double precision.

EXAMPLE

```
10 X=2*COS(.4)
20 PRINT X
RUN
1.8421219880058
```

CSNG Function

SYNTAX

`CSNG(x)`

PURPOSE

Use the CSNG function to convert *x* to a single-precision number.

EXAMPLE

```
10 A#=975.3421115#
20 PRINT A#, CSNG(A#)
RUN
975.3421115 975.342
```

See CINT Function in this chapter for details about converting numbers to the integer data type.

CSRLIN Function

SYNTAX

CSRLIN

PURPOSE

Use the CSRLIN function to obtain the current line position of the cursor.

EXPLANATION

The CSRLIN function returns the current line position of the cursor. CSRLIN is most often used in conjunction with the POS function, which returns the column position.

EXAMPLE

```
10 Y = CSRLIN 'Record current line.  
20 X = POS(0) 'Record current column.  
30 LOCATE 15,1  
40 PRINT "HELLO"  
50 LOCATE X,Y 'Restore position to old line and column
```

CVI, CVS, CVD Functions

SYNTAX

CVI(*2-byte string*)
CVS(*4-byte string*)
CVD(*8-byte string*)

PURPOSE

Use the CVI, CVS, and CVD functions to convert string values to numeric values.

EXPLANATION

Numeric values that are read from a random access file must be converted from strings back into numbers before they can be used in any numeric operations. CVI converts a 2-byte string to an integer. CVS converts a 4-byte string to a single-precision number. CVD converts an 8-byte string to a double-precision number.

EXAMPLE

```
.  
. .  
70 FIELD #1,4 AS N$, 12 AS B$,...  
80 GET #1  
90 Y=CVS(N$)  
. .
```

See Working with Files and Devices in Chapter 8 for more information about these functions. See also MKI\$, MKS\$, MKD\$ Functions in this chapter for more details about converting numeric values to string values.

DATA Statement

SYNTAX

DATA *constant[,constant . . .]*

PURPOSE

Use the DATA statement to store the numeric and string constants that are used by the program's READ statement(s). (See the READ Statement.)

EXPLANATION

DATA statements are nonexecutable; you can place them anywhere in the program. A DATA statement can contain as many constants, separated by commas, as will fit on a line. Any number of DATA statements can be used in a program. READ statements access DATA statements in order by line number. Therefore, you can think of the data contained in DATA statements as one continuous list of items, regardless of how many items are on a line or where the lines are placed in the program.

constant can be a string constant or a numeric constant in any format; that is, fixed-point, floating-point, or integer. No numeric or string expressions are allowed; an example of this would be an equation. String constants must be surrounded by double quotation marks only if they contain commas, colons, or significant leading or trailing spaces. Otherwise, quotation marks are not needed.

The variable type (numeric or string) you include in the READ statement must agree with the corresponding constant in the DATA statement. If the data types do not agree, a Syntax error occurs.

DATA statements may be reread by using the RESTORE statement.

EXAMPLE

```
.  
. .  
60 OPTION BASE 1  
70 DIM(10)  
80 FOR I=1 TO 10  
90 READ A(I)  
100 NEXT I  
110 DATA 3.08,5.19,3.12,3.98,4.24  
. .  
. .
```

This program segment reads the values from the DATA statements into the array A. After execution, the value of A(1) will be 3.08, A(2) will be 5.19, and so on.

DATE\$ Function

SYNTAX

DATE\$

PURPOSE

Use the DATE\$ function to retrieve the current date.

EXPLANATION

The DATE\$ function returns a 10-character string in the form mm-dd-yy, where mm is the month (01 through 12), dd is the day (01 through 31), and yyyy is the year (1980 through 2099).

EXAMPLE

```
10 DATE$="07-01-83"
20 PRINT DATE$
RUN
07-01-1983
```

DATE\$ Statement

SYNTAX

DATE\$=*string*

PURPOSE

Use the DATE\$ statement to set the current date.

EXPLANATION

string must be in one of the following forms:

mm-dd-yy
mm-dd-yyyy
mm/dd/yy
mm/dd/yyyy

If only yy is entered for the year and if the two digits are in the range of 80 to 99, inclusive, 1900 is added to the value. Otherwise, 2000 is added to the two-digit value. Running this statement in BASIC will change the date that was previously displayed in the System Manager.

Supported ranges are:

1<=mm<=12
1<=dd<=31
1980<=yyyy<=2099

EXAMPLE

10 DATE\$="07-01-1985"

The current date is set at July 1, 1985.

DBCLOSE Call

SYNTAX

CALL DBCLOSE(*handle*)

PURPOSE

Use the DBCLOSE call to close an open database file.

EXPLANATION

handle is returned by DBCREATE or DBOPEN to identify a particular database file. The numeric variable *handle* designates the file to be closed.

If *handle* is not a valid file handle, an error message will be returned.

EXAMPLE

```
20 LIBRARY "DBCALLS.LIB"
30 CALL DBCREATE ("ADDRESS.DAT",A)
.
.
100 CALL DBCLOSE (A)
200 LIBRARY CLOSE
```

See Program 8.7 in Chapter 8 for a more detailed program example.

DBCREATE Call

SYNTAX

CALL DBCREATE(*filename,handle*)

PURPOSE

Use the DBCREATE call to create a new database file and open it for access.

EXPLANATION

This call will create a database file with the name *filename* and open that file for read/write access. Since more than one database file can be open at one time, a unique file *handle* is used on every database call to identify each database file. *filename* is a string expression giving the name of the database file to be created. The *handle* parameter is a numeric variable; DBCREATE returns a value by assigning the value to that variable.

CAUTION: If a database file by the name *filename* already exists, it will be deleted.

EXAMPLE

```
10 LIBRARY "DBCALLS.LIB"  
20 CALL DBCREATE ("ADDRESS.DAT,"A)
```

In this example, line 10 opens the library, while line 20 creates the database file and opens the file for read/write access.

DBDELETE Call

SYNTAX

CALL DBDELETE(*filename*)

PURPOSE

Use the DBDELETE call to delete a database file.

EXPLANATION

This routine will delete the database with the name *filename*. *filename* is a string expression containing the name of the database file to be deleted.

If no file by that name exists, an error message displays.

EXAMPLE

```
10 LIBRARY "DBCALS.LIB"
20 CALL DBDELETE ("ADDRESS.DAT")
30 LIBRARY CLOSE
40 END
```

DBERROR Call

SYNTAX

CALL DBERROR(*error-code*)

PURPOSE

Use the DBERROR call to pinpoint the cause of a library error.

EXPLANATION

If any library call to the operating system results in an error, BASIC will return the generic Illegal DBMS Call error message (error code 91). DBERROR will then return a more specific error code in the numeric variable *error-code*.

See Error Messages in this chapter for a listing of error messages returned by database calls.

EXAMPLE

```
1000 IF ERR <> 91 THEN 1040
1010 ER = 0: CALL DBERROR (ER)
1020 PRINT: PRINT "Library error"; ER; " in line "; ERL:PRINT
1030 RESUME 180
1040 ON ERROR GOTO 0
1050 ERROR ERR
1060 RESUME 190
```

DBOPEN Call

SYNTAX

```
CALL DBOPEN(filename,access,handle)
```

PURPOSE

Use the DBOPEN call to open an existing database file for access.

EXPLANATION

This call will open the database file *filename* with the access mode specified by the *access* parameter. *filename* is a string expression giving the name of the database file to be opened. *access* can be one of the following values:

- | | |
|---|-------------------|
| 0 | Read-only access |
| 1 | Write-only access |
| 2 | Read-write access |

Since more than one database file can be open at one time, a unique file *handle* is used on every database call to identify each database file. *handle* is a numeric variable; DBOPEN returns a value in that variable.

EXAMPLE

Suppose you wanted to read the database CUSTOMER.DAT created previously. After you had opened the library DBCALLS.LIB, you would use the call:

```
CALL DBOPEN ("CUSTOMER.DAT", 0, CUST%)
```

The CUSTOMER.DAT database is now open in read-only mode. CUST% contains the handle.

DBSORT Call

SYNTAX

```
CALL DBSORT (handle,direction,field-ID[,direction,field-ID] . . .)
```

PURPOSE

Use the DBSORT call to sort a database.

EXPLANATION

handle is the unique identifier of the database that was returned by DBCREATE or DBOPEN when the database file was first accessed. *handle* specifies which database is to be sorted. Sorting is then done according to the sort criteria specified in the call.

direction specifies the sort order. If *direction* is 0, the database is sorted in ascending order. If *direction* is 1, the database is sorted in descending order.

field-ID identifies the field to be sorted.

You can perform multilevel sorts by specifying more than one sort field (*direction,field-ID* pair) in the call. The sort precedence is determined by the order in which the sort fields are specified; the highest order sort field is specified first, the next higher order is specified second, and so on.

EXAMPLE

```
1000 CALL DBSORT (A,1,3)
```

In this example, the database identified by handle (A) is sorted in descending order. The fourth field is the sort key.

DEF FN Statement

SYNTAX

DEF FN*name*[(*parameter*[,*parameter* . . .])] = *expression*

PURPOSE

Use the DEF FN statement to define and name a function that you write.

EXPLANATION

name must be a legal variable name. This name, preceded by FN, becomes the name of the function.

parameter is a variable name in the function definition that is to be replaced with a value when the function is called. The items in the list are separated by commas.

expression performs the operation of the function. It is limited to one logical line. Variable names that appear in this expression serve only to define the function; they do not affect program variables that have the same name. A variable name used in a function definition may or may not appear in the parameter list. If it does, the value of the parameter is supplied when the function is called. Otherwise, the current value of the variable is used.

The variables in the parameter list represent, on a one-to-one basis, the argument variables or values that will be given in the function call. This means that when you call the function, you must list the variables or values to be used in the same order in which the parameters are listed in the function definition.

expression can define either numeric or string functions. If you specify a type in the function name (by using the declaration characters described in Variable Names and Declaration Characters in Chapter 8), the value of the expression is forced to that type before it is returned to the calling statement. If a type specified in *name* and the argument type do not match, a Type mismatch error occurs.

A DEF FN statement must be encountered before you can call the function it defines. If a function is called before you have defined it, an Undefined user function error occurs. DEF FN is illegal in the Direct mode.

An error in the function definition statement will show up as an error in the line that calls the function and not as an error in the line where the function is defined.

EXAMPLE

```
410 DEF FNAB(X,Y)=X^3/Y^2
415 I=2,J=3
420 T=FNAB(I,J)
430 PRINT T
RUN
.8888888888889
```

Line 410 defines the function FNAB. The function is called in line 420.

DEFINT/SNG/DBL/STR Statements

SYNTAX

DEF*type* *letter*[-*letter*][,*letter*[-*letter*]] . . .

PURPOSE

Use the DEFINT/SNG/DBL/STR statements to declare variable types as integer, single precision, double precision, or string.

EXPLANATION

type is INT for integer, SNG for single precision, DBL for double precision, or STR for string.

letter is an alphabetic character A-Z. Variable names beginning with this letter or range of letters will be of the specified type.

Any variable names beginning with the letter(s) specified will be considered the type of variable specified in the *type* portion of the statement. However, a type declaration character (% , !, #, \$) always takes precedence over a DEF*type* statement when BASIC determines a variable's type.

If no type declaration statements are encountered, BASIC assumes that all variables without declaration characters are double-precision variables.

A DEF*type* statement must be executed before you use any variables that it declares. Therefore, it is a good idea to put all DEF*type* statements at the beginning of the program.

EXAMPLES

10 DEFDBL L-P

All variables beginning with the letters L, M, N, O, and P will be double-precision variables.

NOTE: Since the default precision for numeric variables is double precision, this statement is redundant.

10 DEFSTR A

All variables beginning with the letter A will be string variables.

10 DEFINT I-N,W-Z

All variables beginning with the letters I, J, K, L, M, N, W, X, Y, and Z will be integer variables.



DELETE Command

SYNTAX

DELETE [*linenum1*][–*linenum2*]

PURPOSE

Use the DELETE command to delete program lines.

EXPLANATION

linenum1 is the number of the first program line to be deleted.

linenum2 is the number of the last program line to be deleted.

BASIC always returns to command level after a DELETE is executed. If you specify a line number that does not exist, an Illegal function call error occurs.



EXAMPLE

DELETE 40

deletes line 40.

DELETE 40-100

deletes lines 40 through 100, inclusive.

DELETE -40

deletes all lines up to and including line 40.

DELETE 40-

deletes lines 40 through the end, inclusive.



DIM Statement

SYNTAX

`DIM variable(subscripts)[,variable(subscripts)] . . .`

PURPOSE

Use the DIM statement to specify the maximum values for array variable subscripts and to allocate storage accordingly.

EXPLANATION

variable is the name given to the array.

subscripts is a list of numeric expressions, separated by commas, that specify the maximum number of elements in each dimension of the array.

If an array variable name is used without a DIM statement, the maximum value of the array's subscript(s) is assumed to be 10. If a subscript is used that is greater than the maximum specified, a Subscript out of range error occurs. The minimum value for a subscript is 0, unless otherwise specified with the OPTION BASE statement.

The DIM statement sets all the elements of the specified numerical arrays to an initial value of 0 and all the elements of string arrays to null strings.

Theoretically, the maximum number of dimensions allowed in a DIM statement is 255. In reality, however, that number would be impossible, since the name and punctuation are also counted as spaces on the line, and the line itself has a limit of 255 characters.

If the default dimension (10) has already been established for an array variable, and that variable is later encountered in a DIM statement, a Duplicate Definition error results. Therefore, it is good programming practice to put the required DIM statements at the beginning of a program, outside of any processing loops.

EXAMPLE

```
10 DIM A(20)
20 FOR I=0 TO 20
30   READ A(I)
40 NEXT I
50 DATA 1, 4, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41
.
.
```

EDIT Command

SYNTAX

EDIT *linenum* |.

PURPOSE

Use the EDIT command to edit the specified line.

EXPLANATION

linenum is the number of a line existing in the program.

The period (.) is a shorthand notation that refers to the last line referenced by an EDIT command, a LIST command, or an error message; it can also refer to the last line entered.

When you use EDIT, BASIC types the specified program line and remains in Direct mode with the cursor on the first character of the program line. Use the right and left ARROW keys to position the cursor on any character in the line. To change the character under the cursor, simply type another character over it.

The editor defaults to Overtype mode; that is, when the system first enters Edit mode, any character you might type replaces the character at the cursor position. However, the editor also has an Insert mode. To change from Overtype mode to Insert mode, press CTRL-R. CTRL-R is a toggle; that is, it will also change from Insert mode to Overtype mode.

After you have finished making changes to the line, press RETURN. The cursor does not have to be positioned at the end of the line when you do this; the entire line will be saved as shown. If you wish to abort the edit without saving the changes you have made, press SHIFT-BREAK, and no changes will be saved.

You cannot change the line number in Edit mode.

See Editing BASIC Programs in Chapter 8 for full details on screen editing capabilities.

EXAMPLE

Enter:

EDIT 100

This command will allow you to edit line 100 in your program.

END Statement

SYNTAX

END

PURPOSE

Use the END statement to terminate program execution, close all files, and return to Command mode.

EXPLANATION

You can place END statements anywhere in the program to terminate program execution. Unlike the STOP statement, END does not cause a Break in line nnnnn message to be printed. An END statement at the end of a program is optional. BASIC always returns to Command mode after an END is executed.

EXAMPLE

```
520 IF K>1000 THEN END ELSE GOTO 20
```

EOF Function

SYNTAX

EOF(*filenum*)

PURPOSE

Use the EOF function to indicate the end of a sequential file.

EXPLANATION

filenum is the number used to open the file.

Returns -1 (true) if the end of a sequential file has been reached. Use EOF to test for end-of-file while inputting data to avoid Input past end errors.

When EOF is used with a communications device, the definition of the end-of-file condition is dependent on the mode (ASCII or binary) in which the device was opened. In binary mode, EOF is true when the input queue is empty ($LOC(n)=0$). It becomes false when the input queue is not empty. In ASCII mode, EOF is false until a CTRL-Z is received—from then on it will remain true until the device is closed.

EXAMPLE

```
10 OPEN "I",1,"DATA"
20 C=0
30 IF EOF(1) THEN 60
40 INPUT #1,M(C)
50 C=C+1:GOTO 30
60
.
.
.
```

ERASE Statement

SYNTAX

ERASE *variable*[,*variable*] . . .

PURPOSE

Use the ERASE statement to eliminate arrays from memory.

EXPLANATION

variable is the name of the array to be erased. It must be the same variable that you used to declare and dimension the array.

You can redimension arrays after they are erased, or you can use the previously allocated array space in memory for other purposes. If you attempt to redimension an array without first erasing it, a Duplicate Definition error occurs.

EXAMPLE

```
10 DIM A(100),B(100)
```

```
.  
450 ERASE A,B  
460 DIM B(99)
```

```
.
```

ERR and ERL Functions

SYNTAX

ERR = *erronum*
ERL = *linenum*

PURPOSE

Use the ERR and ERL functions to obtain the error code and line number associated with an error.

EXPLANATION

erronum is the numeric code for a BASIC error.

linenum is the number of the program line in which the error occurred.

When an error-handling routine is entered, the function ERR contains the error code for the error and the function ERL contains the line number of the line in which the error was detected. The ERR and ERL functions are usually used in IF . . . THEN statements to direct program flow in the error-handling routine.

When a statement causing an error has been entered in the Direct mode, ERL will contain 65535.

If the line number is not on the right side of the relational operator, it cannot be renumbered with RENUM. Because ERL and ERR are reserved words, neither may appear to the left of the equal sign in a LET (assignment) statement. See Error Messages later in this chapter for details about all of the BASIC error messages.

You can use the ERROR statement to set the values of ERR and ERL.

EXAMPLES

To test whether an error occurred in a direct statement, enter:

```
IF 65535 = ERL THEN PRINT "Direct Error"
```

9.50

BASIC Reference

To test within a program, enter:

IF ERR=error code THEN . . .

IF ERL=line number THEN . . .

See **ON ERROR GOTO Statement** for more details about error trapping.

ERROR Statement

SYNTAX

ERROR *n*

PURPOSE

Use the ERROR statement to simulate the occurrence of a BASIC error or to allow error codes to be defined by the user.

EXPLANATION

n is an integer expression in the range 1–255.

ERROR can be used as a statement (part of a program source line) or as a command (in Direct mode).

The value of *n* must be greater than 0 and less than 256. If the value of *n* equals an error code already in use by BASIC (see Error Messages in this chapter), the ERROR statement simulates the occurrence of that error and the corresponding error message will be printed. (See the first example.)

To define your own error code, use a value that is greater than any used by BASIC error codes. Use the highest available values, so compatibility can be maintained when more error codes are added to BASIC. This user-defined error code can then be conveniently handled in an error-handling routine. (See the second example.)

If an ERROR statement specifies a code for which no error message has been defined, BASIC responds with the Unprintable error message. Execution of an ERROR statement for which there is no error-handling routine causes an error message to be displayed and execution to halt.

EXAMPLES

```
20 S=15
30 ERROR S
40 END
RUN
```

String too long in 30

Or, in Direct mode:

ERROR 15	(Type this line.)
String too long	(BASIC displays this line.)

9.52

BASIC Reference

```
110 ON ERROR GOTO 400
120 INPUT "WHAT IS YOUR BET";B
130 IF B>5000 THEN ERROR 210

.
.
.

400 IF ERR=210 THEN PRINT "HOUSE LIMIT IS $5000"
410 IF ERL=130 THEN RESUME 120
```

This example is part of a game program that allows you to make bets. The program traps the error if you exceed the "house limit." Note that the error code is 210, which BASIC does not use. When the error is detected, the error-handling routine (line 110) routes program execution to line 400, where the error code is tested and the error message is printed. Line 410 then causes program execution to resume at line 120.

EXP Function

SYNTAX

$\text{EXP}(x)$

PURPOSE

Use the EXP function to calculate the exponential value of x .

EXPLANATION

x is a numeric expression.

The EXP function returns the mathematical value of e raised to the power of x . e is the base for natural logarithms.

If x is greater than the EXP function can process, machine infinity or an error message will be displayed.

The EXP function returns a double-precision value.

EXAMPLE

```
10 X=5
20 PRINT EXP(X-1)
RUN
54.598150033147
```

FCREATE Call

SYNTAX

CALL FCREATE(*handle*,*field-name*,*field-type*,*field-ID*)

PURPOSE

Use the FCREATE call to define a field in the currently open database.

EXPLANATION

This routine defines a field in the currently open database that is designated by *handle*. The field will be given the name contained in the string expression *field-name* and will be expected to contain the type of data indicated by *field-type*. The routine returns a field identifier in the numeric variable *field-ID*; this identifier is then used to refer to this field in calls to FGET, FPUT, FRGET, FGID, and FGTYPE.

Valid values for *field-type* are:

- 1 Character string
- 2 Numeric (always double precision)
- 3 Date

EXAMPLE

```
100 CALL DBCREATE ("FILE1.DAT", FILE%)
110 CALL FCREATE (FILE%, "NAME", 1, F1)
120 CALL FCREATE (FILE%, "AGE", 2, F2)
130 CALL FCREATE (FILE%, "BIRTH", 2, F3)
```

This section of the program creates a file (FILE1.DAT) that contains three field names in each record (NAME, AGE, and BIRTH). Each record you write to the database will contain these three fields. NAME is a string field, and AGE and BIRTH are numeric fields.

FDELETE Call

SYNTAX

CALL FDELETE(*handle,field-name*)

PURPOSE

Use the FDELETE call to delete a field in a database.

EXPLANATION

This routine deletes a field in the currently open database. *handle* is a numeric variable that specifies an open database, and *field-name* is a string expression containing the name of the field to be deleted.

EXAMPLE

```
10 LIBRARY "DBCALLS.LIB"
20 CALL DBOPEN ("ADDRESS.DAT", 2, DB)
30 CALL FDELETE (DB, "Address")
40 CALL FDELETE (DB, "Zipcode")
50 CALL DBCLOSE (DB)
60 LIBRARY CLOSE
```

FGET Call

SYNTAX

CALL FGET(*handle,field-ID,data-var*)

PURPOSE

Use FGET to get the contents of a specific field in an open record.

EXPLANATION

This routine obtains the contents of a single field in a database record. The record to be used must be selected by a call to RCREATE or ROPEN. *handle* is a numeric variable that specifies an open database, and *field-ID* is the numeric expression that identifies the field to be read. The field is read into *data-var*, which must be a variable of a type that can accept the data (see Data Types and Conversions in Chapter 8).

EXAMPLE

```
30 CALL ROPEN(CUST%,1)
40 N$=STRING$(20," ")
50 COMP$=STRING$(35," ")
60 PHONE$=STRING$(12," ")
70 CALL FGET(CUST%,F1%,N$)
80 CALL FGET(CUST%,F2%,COMP$)
90 CALL FGET(CUST%,F3%,PHONE$)
100 PRINT N$;" ";COMP$;" ";PHONE$
110 CALL RCLOSE(CUST%)
```

FGID Call

SYNTAX

```
CALL FGID(handle,field-name,field-ID)
```

PURPOSE

Use the FGID call to find out the field-ID of a field in a database when the name of the field is known.

EXPLANATION

This routine obtains the field identifier of a field in the currently open database by searching for the field name. *handle* is a numeric variable that specifies an open database, *field-name* is a string expression containing the name of the field to be identified, and *field-ID* is a numeric variable in which the field identifier will be returned.

EXAMPLE

There are three fields, named NAME, COMPANY, and PHONE, in a record in CUSTOMER.DAT, so you need to call FGID three times to find out the field-ID of each field.

```
90 CALL FGID(CUST%,"NAME",F1%)  
100 CALL FGID(CUST%,"COMPANY",F2%)  
110 CALL FGID(CUST%,"PHONE",F3%)
```

F1% now contains the ID of the NAME field, F2% of the COMPANY field, and F3% of the PHONE field.

FGNAME Call

SYNTAX

```
CALL FGNAME(handle,field-ID,field-name$)
```

PURPOSE

Use the FGNAME call to find out the name of a field in a database.

EXPLANATION

This routine obtains the name of a field in the currently open database. *handle* is a numeric variable that specifies an open database, *field-ID* is a numeric expression that identifies the field for which the name is requested, and *field-name\$* is a string variable in which the name of the field will be returned.

EXAMPLE

```
10 LIBRARY "DBCALLS.LIB"
20 CALL DBOPEN ("ADDRESS.DAT",0,A)
30 CALL FGNAME (A,1,F1$)
40 CALL FGNAME (A,2,F2$)
50 CALL FGNAME (A,3,F3$)
60 PRINT F1$,F2$,F3$
70 CALL DBCLOSE (A)
80 LIBRARY CLOSE
```

FGTYPE Call

SYNTAX

```
CALL FGTYPE(handle,field-ID,field-type)
```

PURPOSE

Use the FGTYPE call to find out the type of data contained in a particular field in a database.

EXPLANATION

This routine finds out what type of data a field in the currently open database can contain. *handle* is a numeric variable that specifies an open database, *field-ID* is a numeric expression that identifies the field for which the information is requested, and *field-type* is a numeric variable in which the information will be returned.

Valid values for *field-type* are:

- 1 Character string
- 2 Numeric (always double precision)
- 3 Date

Each field in a database may only have one field-type designation. Use character string (1) data for alphanumeric data not used in calculations; numeric (2) data for fields on which arithmetic calculations can be performed; and date (3) data for any field containing date or time information.

EXAMPLE

```
10 LIBRARY "DBCALLS.LIB"
20 CALL DBOPEN ("ADDRESS.DAT", 0, X)
30 CALL FGTYPE (X, 1, TYPE)
40 IF TYPE=1 PRINT "FIELD CONTAINS STRING DATA"
50 IF TYPE=2 PRINT "FIELD CONTAINS NUMERIC DATA"
60 IF TYPE=3 PRINT "FIELD CONTAINS DATE/TIME DATA"
70 CALL DBCLOSE (X)
80 LIBRARY CLOSE
90 END
```

FIELD Statement

SYNTAX

FIELD [#]*filenum*,*width AS variable*[,*width AS variable*] ...

PURPOSE

Use the FIELD statement to allocate space for variables in a random access file buffer.

EXPLANATION

filenum is the number under which the file was opened.

width is the numeric expression that specifies the number of character positions to be allocated to *variable*.

variable is a string variable that will be used to access the data in the buffer.

Before a GET statement or PUT statement can be executed, a FIELD statement must be executed to format the random file buffer.

The total number of bytes that you allocate in a FIELD statement must not exceed the record length that you specified when you opened the file. Otherwise, a FIELD overflow error occurs. The default record length is 128 bytes.

Any number of FIELD statements can be executed for the same file. All FIELD statements that have been executed will remain in effect at the same time. Using more than one FIELD statement means that you can have multiple field definitions for each record.

Do not use a variable name that has been defined in a FIELD statement in an INPUT or LET statement. A variable in a FIELD statement points to the correct place in the random access file buffer. If you execute an INPUT or LET statement with that variable name, the variable's pointer is moved from the file buffer to string space.

EXAMPLES

FIELD 1,20 AS N\$,10 AS ID\$,40 AS ADD\$

Allocates the first 20 bytes in the random access file buffer to the string variable N\$, the next 10 bytes to ID\$, and the next 40 to ADD\$. FIELD does not place any data in the random file buffer, nor does it remove data from the buffer. (See GET, PUT, and LSET Statements.)

```
10 OPEN "R",#1,"PHONELIST",35
15 FIELD #1,2 AS RECNBR$,33 AS DUMMY$
20 FIELD #1,25 AS NM$,10 AS PHONENBR$
25 GET #1
30 TOTAL=CVI(RECNBR$)
35 FOR I=2 TO TOTAL
40   GET #1,I
45   PRINT NM$,PHONENBR$
50 NEXT I
```

Illustrates a multiple-definition FIELD statement. In statement 15, the 35-byte field is defined for the first record to keep track of the number of records in the file. In the next loop of statements (35–50), statement 20 defines the field for individual names and phone numbers.

See Random Access Files in Chapter 8.

FILES Statement

SYNTAX

FILES [filespec]

PURPOSE

Use the FILES command to display the names of files residing in memory.

EXPLANATION

filespec is a string expression containing the file name. The file name must conform to the rules for naming files described in Files and File Names in Chapter 1.

If *filespec* is omitted, all the files in memory will be listed. *filespec* is a string formula that may contain question marks (?) or asterisks (*) used as wildcards. A question mark will match any single character in the file name or extension. An asterisk will match one or more character(s) starting at that position. The asterisk is a notation for a series of question marks.

EXAMPLES

FILES

Shows all files in memory.

FILES "*.BAS"

Shows all files with the .BAS extension.

FILES "TEST?.BAS"

Shows all four- and five-letter file names that start with TEST and end with the .BAS extension.

FIX Function

SYNTAX

`FIX(x)`

PURPOSE

Use the FIX function to return the truncated integer part of *x*.

EXPLANATION

The difference between FIX and INT is that FIX does not return the next lower number when *x* is negative.

EXAMPLES

```
PRINT FIX(58.75)  
58
```

```
PRINT FIX(-58.75)  
-58
```

The FIX function strips the fractional portion of *x* and returns the integer. No rounding is done.

FOR . . . NEXT Statement

SYNTAX

FOR *variable* = *x* TO *y* [STEP *z*]

.

.

NEXT [*variable*][,*variable*] . . .

PURPOSE

Use the FOR . . . NEXT statement to execute a series of instructions to be performed in a loop a given number of times.

EXPLANATION

variable is an integer or numeric variable used as a counter. *x* is a numeric expression that is the initial value of the counter. *y* is a numeric expression that is the final value of the counter. *z* is a numeric expression that is used to increment or decrement the counter.

The program lines following the FOR statement are executed until the NEXT statement is encountered. Then the value of the counter is increased or decreased by the value of *z*. A check is then performed to see if the value of the counter is now greater than the final value. If it is not greater, BASIC branches back to the statement after the FOR statement, and the statement(s) in the loop is repeated. If it is greater, execution continues with the statement following the NEXT statement.

If you do not specify the STEP, the increment is assumed to be 1. If STEP is negative, the final value of the counter must be less than the initial value. The counter is decreased each time through the loop. The loop is executed until the counter is less than the final value.

The loop is never executed if the sign of the STEP contradicts the values of *x* and *y*. In other words, if *x* is 1 and *y* is 10, a STEP value of -1 would not allow the loop to be executed.

Nested Loops

FOR . . . NEXT loops can be *nested*; that is, a FOR . . . NEXT loop can be placed within the context of another FOR . . . NEXT loop. When loops are nested, each loop must have a unique variable name as its counter. The NEXT statement for the inside loop must precede the NEXT statement for the outside loop. If nested loops have the same end point, a single NEXT statement can be used for all of them.

You can omit the variable(s) in the NEXT statement, in which case the NEXT statement will match the most recent FOR statement. If a NEXT statement is encountered before its corresponding FOR statement, a NEXT without FOR error message is issued and program execution is terminated.

EXAMPLES

```
10 K=10
20 FOR I = 1 TO 10 STEP 2
30 PRINT I;
40 LET K = K+10
50 PRINT K
60 NEXT I
RUN
1 20
3 30
5 40
7 50
9 60
```

In this example, the loop counter, I, is incremented by 2 on each cycle. The loop prints the counter, increments K, and prints K.

```
10 J=0
20 FOR I=1 TO J
30 PRINT I
40 NEXT I
RUN
```

In this example, the loop does not execute because the initial value of the loop exceeds the final value.

```
10 I=5
20 FOR I=1 TO I+5
30 PRINT I;
40 NEXT I
RUN
1 2 3 4 5 6 7 8 9 10
```

In this example, the loop executes ten times. The final value for the loop variable is always set before the initial value is set.

FPUT Call

SYNTAX

```
CALL FPUT (handle,field-ID,data-var)
```

PURPOSE

Use the FPUT call to write a field in a database record.

EXPLANATION

This routine writes data into a field of the currently open database record. *handle* is a numeric variable that specifies an open database, and *field-ID* is the numeric expression that identifies the field to be written. The field is written from *data-var*, which must be a variable or constant of the same type as the field designated by *field-ID* (see Data Types and Conversions in Chapter 8).

EXAMPLE

When there are three fields in each record, you must call FPUT three times to write data to the entire record.

```
CALL FPUT(CUST%,F1,"DONNA HOGAN")
CALL FPUT(CUST%,F2,"SUPERIOR COMPUTER PRODUCTS")
CALL FPUT(CUST%,F3,"312-555-5164")
```

FRE Function

SYNTAX

FRE(*x*)
FRE(*x\$*)

PURPOSE

Use the FRE function to obtain the number of free bytes in the workspace.

EXPLANATION

x is a dummy numeric argument. 0 is usually used.

x\$ is a dummy string argument. The null string ("") is usually used.

When FRE with a numeric argument is executed, the function returns the number of free bytes in the workspace. No housekeeping takes place.

When the FRE function with a string argument is executed, BASIC will perform some housekeeping activities in the string workspace area before it returns the number of free bytes in the workspace.

Housekeeping is necessary because of the way that BASIC stores string variables. When you define a string variable, BASIC stores the variable name in one area and the actual string data in another. With the variable name is a pointer that tells BASIC where to look in memory for the string that has been assigned to that variable.

When you change the value of the string variable, BASIC does *not* erase the old string. Instead, it stores the new string data in a new memory location and updates the pointer that is attached to the variable. Consequently, both the old string value and the new string value of the variable are in memory.

When using FRE(*x\$*), housekeeping does occur. BASIC collects all the strings that are currently active (that is, all those strings that are being pointed to by a pointer) and packs them together in one place. It then frees up the rest of the string memory area so that new string data can be stored.

EXAMPLE

```
PRINT FRE(0)
14542
```

FRENAME Call

SYNTAX

```
CALL FRENAME(handle,old-name,new-name)
```

PURPOSE

Use the FRENAME call to rename a field in a database.

EXPLANATION

This routine changes the name of a field in the currently open database. *handle* is a numeric variable that specifies an open database, *old-name* is a string expression containing the present name of the field, and *new-name* is a string expression containing the new name for the field.

EXAMPLE

```
10 LIBRARY "DBCALLS.LIB"
20 CALL DBOPEN("ADDRESS.DAT",2,DB)
30 CALL FRENAME(DB,"Address", "Street")
40 CALL FRENAME(DB,"Zipcode", "Zip")
50 CALL DBCLOSE (DB)
60 LIBRARY CLOSE
70 END
```

FRGET Call

SYNTAX

CALL FRGET(*handle,record-ID,field-ID,data-var*)

PURPOSE

Use the FRGET call to get the contents of a specific field in a randomly selected database record.

EXPLANATION

This routine obtains the contents of a single field in a randomly selected database record. *handle* is a numeric variable that specifies an open database, *record-ID* is a numeric expression that identifies the record to be used, and *field-ID* is the numeric expression that identifies the field to be read. The field is read into *data-var*, which must be a variable of a type that can accept the data (see Data Types and Conversions in Chapter 8).

EXAMPLE

```
10 LIBRARY "DBCALLS.LIB"
20 CALL DBOPEN("ADDRESS.DAT",0,N)
30 CALL RNUMF(N,NRECS)
40 FOR I=0 TO NRECS-1
50     FOR J=0 TO 4
60         F$=STRING$(80," ")
70         CALL FRGET(N,I,J,F$)
80         PRINT F$;" ";
90     NEXT J
100    PRINT
110 NEXT I
120 CALL DBCLOSE(N)
130 LIBRARY CLOSE
140 END
```

GET Statement (File I/O)

SYNTAX

GET [#]*filenum[,recnum]*

PURPOSE

Use the GET statement to read a record from a random access file into a random buffer.

EXPLANATION

filenum is the number under which the file was opened. *recnum* is the number of the record to be read. It must be in the range 1–16,777,215. If you omit a *recnum*, the next record is read into the buffer. The next record is the record whose number is one higher than the number of the record used in the last GET or PUT statement.

Before you use a GET statement, you must open the file for random access and define the file buffer with a FIELD statement.

The GET and PUT statements allow fixed-length input and output for BASIC files. However, because of the low performance of many telephone line communications, it is recommended that you do not use GET and PUT for telephone communications.

After a GET statement has moved the record into the random access file buffer, the numeric values that were converted to strings by the MKI\$, MKS\$, and MKD\$ statements must be converted back to numbers using the CVI, CVS and CVD functions. The EOF function can be used after a GET statement to see if that GET was beyond the end of file marker.

EXAMPLE

```
.  
. .  
50 GET #1,75  
. .
```

In this example, the 75th record is read from random access file number 1 into the file buffer.

GET Statement (Graphics)

SYNTAX

GET(*x1,y1*)–(*x2,y2*),*array name*

PURPOSE

Use the GET statement to transfer graphic images to and from the screen.

EXPLANATION

(*x1,y1*)–(*x2,y2*) is a rectangular area on the display screen. The rectangle is defined with (*x1,y1*) and (*x2,y2*) becoming the upper left- and the lower right-hand vertices, and *array name* is the name assigned to the place that will hold the image. The array can be any type except string. It must be dimensioned large enough to hold the entire image. Unless the array is integer type, the contents of the array after a GET will be meaningless when interpreted directly.

The GET statement transfers a screen image bounded by the rectangle described by the specified points into the array.

The PUT statement transfers the image stored in the array onto the screen.

One of the most useful things that can be done with GET and PUT is animation. (See the PUT statements in this chapter for a discussion of animation.)

The Array

The array is used as a place to hold the image from the screen and must be numeric; however, it may be any precision. The formula used to determine required array sizes in bytes is:

$$4+\text{INT}((x*bits+7)/8)*y$$

where *x* and *y* are the lengths of the horizontal and vertical sides of the rectangle, respectively. The value of *bits* is 2 in medium resolution and 1 in high resolution.

For example, if you want to use the GET statement to transfer a 10 by 12 image in medium resolution into an array, the number of bytes required is:

$$4+\text{INT}((10*2+7)/8)*12=40 \text{ bytes}$$

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BASIC Reference

The bytes per element of an array are:

- 2 for integer
- 4 for single precision
- 8 for double precision

If you declared the array to be an integer (%), you would compute $40/2=20$ elements in the array. If you declared the array to be single precision, you would compute $40/4=10$ elements in the array. If the array were declared double precision, you would compute $40/8=5$ elements in the array.

The information from the screen is stored in the array as follows:

- 2 bytes giving the X dimension in bits.
- 2 bytes giving the Y dimension in bits.
- the array itself.

It is possible to examine the X and Y dimensions and even the data, itself, if an integer array is used. The X dimension is in element 0 of the array, and Y dimension is in element 1. Remember that integers are stored low byte first, then high byte; but the data is actually transferred high byte first, then low byte.

For details on file I/O, see Working with Files and Devices in Chapter 8.

EXAMPLE

```
10 CLS
20 PRINT: PRINT "AB"
30 LINE (0,0)-(20,20),1,B
40 DIM A#(16)
45 FOR J=1 TO 200: NEXT
50 GET (0,0)-(20,20),A#
55 FOR J=1 TO 200: NEXT
60 PUT (17,17),A#
70 END
```

GOSUB . . . RETURN Statement

SYNTAX

GOSUB *linenum*

.

.

RETURN

PURPOSE

Use the GOSUB . . . RETURN statement to branch to and return from a subroutine.

EXPLANATION

linenum is the number of the first line of the subroutine. GOSUB sends program control to *linenum*. Execution then proceeds from that line.

A subroutine can be called any number of times in a program. A subroutine can also be called from within another subroutine. Such nesting of subroutines is limited only by available memory.

Simple RETURN statement(s) in a subroutine cause BASIC to branch back to the statement following the most recent GOSUB statement. A subroutine can contain more than one RETURN statement.

Subroutines can be inserted anywhere in the program, but it is good programming practice to separate the subroutine from the main program. To prevent inadvertent entry into the subroutine, precede it with a STOP, END, or GOTO statement that directs program control around the subroutine.

EXAMPLE

```
10 GOSUB 40
20 PRINT "BACK FROM SUBROUTINE"
30 END
40 PRINT "SUBROUTINE ";
50 PRINT " IN ";
60 PRINT " PROGRESS"
70 RETURN
RUN
SUBROUTINE IN PROGRESS
BACK FROM SUBROUTINE
```

GOTO Statement

SYNTAX

GOTO *linenum*

PURPOSE

Use the GOTO statement to branch unconditionally to a specified line number.

EXPLANATION

If *linenum* is an executable statement, that statement and those following it are executed. If it is a nonexecutable statement, execution proceeds with the first executable statement encountered after *linenum*.

EXAMPLE

```
10 READ R
20 PRINT "R =";R,
30 A=3.14*R^2
40 PRINT "AREA =";A
50 GOTO 10
60 DATA 5,7,12
RUN

R = 5           AREA = 78.5
R = 7           AREA = 153.86
R = 12          AREA = 452.16
Out of DATA in 10
```

HEX\$ Function

SYNTAX

`HEX$(x)`

PURPOSE

Use the HEX\$ function to return a string that represents the hexadecimal value of the decimal argument.

EXPLANATION

HEX\$ returns a string and not a numeric result. x is rounded to an integer before `HEX$(x)` is evaluated.

EXAMPLE

```
10 INPUT D
20 A$=HEX$(D)
30 PRINT D "DECIMAL IS " A$ " HEXADECIMAL"
RUN
? 32
32 DECIMAL IS 20 HEXADECIMAL
```

See OCT\$ Function in this chapter for details on octal conversion.

IF Statement

SYNTAX

```
IF expression[,]THEN statement(s)|linenum[,] ELSE statement(s)|linenum]
IF expression[,]GOTO linenum[,] ELSE statement(s)|linenum]
```

PURPOSE

Use the IF statement to make a decision regarding program flow based on the result of an expression.

EXPLANATION

If the result of *expression* is true (not 0), the THEN or GOTO clause is executed. THEN can be followed by either a line number for branching or one or more statements to be executed. GOTO is always followed by a line number. If the result of *expression* is false (0), the THEN or GOTO clause is ignored and the ELSE clause, if present, is executed. Execution continues with the next executable statement. A comma is allowed before THEN.

Nesting of IF Statements

IF . . . THEN statements may be nested. That is, a second IF statement may follow THEN or ELSE. Nesting is limited only by the maximum line length of 255 characters.

If the statement does not contain the same number of ELSE and THEN clauses, each ELSE is matched with the closest unmatched THEN.

An Undefined line number error message will be displayed if you include a line number that does not exist in the program or if you use the IF . . . THEN statement in Direct mode and include a line number that you have not previously entered.

When you are using IF to test equality for a value that is the result of a single- or double-precision computation, remember that the internal representation of the value may not be exact. Therefore, the test should be against the range over which the accuracy of the value may vary. For example, to test a computed variable A against the value 1.0, use:

```
IF ABS (A-1.0)<1.0E-6 THEN ...
```

The expression will be true if the value of A is 1.0 with a relative error of less than 1.0E-6.

EXAMPLES

```
200 IF I THEN GET#1,I
```

This statement will GET record number I if I is not 0.

```
100 IF I<20 AND I>10 THEN DB=1979-1:GOTO 300  
110 PRINT "OUT OF RANGE"
```

.

In this example, a test determines if I is greater than 10 and less than 20. If I is in this range, DB is calculated and execution branches to line 300. If I is not in this range, execution continues with line 110.

```
210 IF IOFLAG THEN PRINT A$ ELSE LPRINT A$
```

This statement causes printed output to go either to the screen or the line printer, depending on the value of the variable IOFLAG. If IOFLAG is 0, output goes to the line printer; otherwise, output goes to the screen.

```
100 IF Y>X THEN PRINT "GREATER" ELSE IF Y<X THEN PRINT "LESS THAN" ELSE PRINT  
"EQUAL"
```

.

The IF . . . THEN . . . ELSE statements in this example are nested. If the first part of this statement is true, that is, if Y is greater than X, GREATER is printed and program execution continues at the next line. If the expression is false, the ELSE clause that contains the second IF statement is executed.

INKEY\$ Variable

SYNTAX

INKEY\$

PURPOSE

Use the INKEY\$ variable to return either a one-character string containing a character read from the keyboard, a null string if no character is pending there, or a two-byte string for extended key codes.

EXPLANATION

You must assign the result of INKEY\$ to a string variable before you can use the character with any BASIC statement or function. No characters will be echoed. All characters are passed through to the program except for SHIFT-BREAK, which terminates the program.

EXAMPLE

```
100 'Stop program until a key is pressed
110 PRINT " PRESS ANY KEY TO CONTINUE "
120 A$=INKEY$:IF A$="" THEN 120
130 PRINT A$
RUN
PRESS ANY KEY TO CONTINUE
T
```

In this example, the key that is read from the keyboard and stored in the string variable, A\$, is displayed.

INPUT\$ Function

SYNTAX

INPUT\$(*n*,[#]*filenum*)

PURPOSE

Use the INPUT\$ function to return a string of *n* characters read from the keyboard or from file number *filenum*.

EXPLANATION

n is the number of characters to be read. *filenum* is the number under which the file was opened. If *filenum* is omitted, characters are read from the keyboard.

If the keyboard is used for input, the characters are not displayed on the screen. All control characters are passed through except SHIFT-BREAK, which is used to interrupt the execution of the INPUT\$ function.

All the characters read by INPUT\$ can be assigned to one string variable.

INPUT\$ can be used if you need to read special ASCII characters, such as BACK SPACE. INPUT and LINE INPUT do not read these special characters.

EXAMPLES

```
5 'LIST THE CONTENTS OF A SEQUENTIAL FILE IN HEXADECIMAL
10 OPEN "I",1,"DATA"
20 IF EOF(1) THEN 50
30 PRINT HEX$(ASC(INPUT$(1,#1)));
40 GOTO 20
50 PRINT:CLOSE
60 END
```

In this example, the contents of a sequential file are read one character at a time. As each character is read, it is converted to its ASCII value and then to its hexadecimal value and printed as such.

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BASIC Reference

```
100 PRINT "TYPE P TO PROCEED OR S TO STOP"
110 X$=INPUT$(1)
120 IF X$="P" THEN 500
130 IF X$="S" THEN 700 ELSE 100
```

In this example, the INPUT\$ function reads the character from the keyboard.

INPUT Statement

SYNTAX

```
INPUT[;]["prompt";,]variable[,variable] . . .
```

PURPOSE

Use the INPUT statement to receive input from the keyboard during program execution.

EXPLANATION

When an INPUT statement is encountered, program execution pauses and a question mark is displayed to indicate that the program is waiting for data to be input from the keyboard. If "*prompt*" is included, the string is printed before the question mark.

A comma can be used instead of a semicolon after the prompt string to suppress the question mark. For example, the statement INPUT "ENTER BIRTHDATE",B\$ prints the prompt with no question mark.

BASIC does not insert a RETURN/line feed sequence after the user's response to the prompt if a semicolon is included after the keyword INPUT. The cursor remains on the same line as the response rather than advancing to the beginning of the next line.

The data that is entered is assigned to the variable(s) given in *variable*. The number of data items supplied must be the same as the number of variables in the list. Data items are separated by commas.

variable can be either numeric or string. This includes subscripted variables. The type of each data item that you input must agree with the type specified by the variable name. Strings input to an INPUT statement need not be surrounded by quotation marks.

Responding to INPUT with too many or too few items or with the wrong type of value (numeric instead of string, for example) causes the message ?Redo from start to be displayed. No assignment of input values is made until an acceptable response is given.

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BASIC Reference

EXAMPLES

```
10 INPUT X
20 PRINT X "SQUARED IS" X^2
30 END
RUN
?
```

User types 5.

5 SQUARED IS 25

```
10 PI=3.14
20 INPUT "WHAT IS THE RADIUS";R
30 IF R=-1 THEN END
40 A=PI*R^2
50 PRINT "THE AREA OF THE CIRCLE IS";A : PRINT
60 GOTO 20
WHAT IS THE RADIUS?
```

User types 7.4.

THE AREA OF THE CIRCLE IS 171.9464

WHAT IS THE RADIUS?

and so on.

NOTE: If an INPUT statement is interrupted during a running program by either the QUIT or RUN PREVIOUS keys, BASIC will restart the INPUT statement when BASIC is reentered.

INPUT# Statement

SYNTAX

INPUT#*filenum*,*variable*[,*variable*] . . .

PURPOSE

Use the INPUT# statement to read data items from a sequential file and assign them to program variables.

EXPLANATION

filenum is the number used when the file is opened for input. *variable* contains the variable names to which the items in the file will be assigned. It can be a string or numeric variable or an array element. The variable type must match the type specified by the variable name. With INPUT#, no question mark is printed, as is with INPUT.

The data items in the file should appear just as they would if data were being typed in response to an INPUT statement. When entering numeric values, all leading spaces, RETURNS, and line feeds are ignored. The first character encountered that is not a space, RETURN, or line feed is assumed to be the start of a number. The number terminates on a space, RETURN, line feed, or comma.

If BASIC is scanning the sequential data file for a string item, it will also ignore leading spaces, RETURNS, and line feeds. The first character encountered that is not a space, RETURN, or line feed is assumed to be the start of a string item. If this first character is a quotation mark ("), the string item will consist of all characters read between the first quotation mark and the second. Thus, a quoted string cannot contain a quotation mark as a character. If the first character of the string is not a quotation mark, the string is an unquoted string and will terminate on a comma, RETURN, or line feed (or after 255 characters have been read). If an end-of-file condition is reached when a numeric or string item is being INPUT, the item is terminated.

EXAMPLE

```
10 OPEN "I",#1,"DATA"
20 IF EOF(1) THEN END
30 INPUT#1,N$,D$,H$
40 PRINT N$,H$
50 GOTO 20
```

See Sequential Files in Chapter 8 for more information.

INSTR Function

SYNTAX

INSTR([n,]x\$,y\$)

PURPOSE

Use the INSTR function to search for the first occurrence of string *y\$* in *x\$* and to return the position at which the match is found. Optional offset *n* sets the position for starting the search.

EXPLANATION

n is an integer in the range 1–255. *x\$*,*y\$* can be string variables, string expressions, or string constants. If *n* is greater than the number of characters in *x\$* (LEN(*x\$*)), or if *x\$* is null or *y\$* cannot be found, INSTR returns 0. If *y\$* is null, INSTR returns *n*.

If *n* is not specified, BASIC uses the default value of 1.

If *n* is out of range, an Illegal function call error occurs.

EXAMPLE

```
10 X$="ABCDEB"  
20 Y$="B"  
30 PRINT INSTR(X$,Y$);INSTR(4,X$,Y$)  
RUN  
2 6
```

INT Function

SYNTAX

`INT(x)`

PURPOSE

Use the INT function to return the largest integer $\leq x$.

EXPLANATION

x is any numeric expression.

INT truncates positive numbers and returns the integer portion of *x*. INT rounds negative numbers to the closest negative integer.

EXAMPLES

```
PRINT INT(99.89)
99
```

```
PRINT INT(-12.11)
-13
```

See CINT Function and FIX Function, which also return integer values.

KEY Statement

SYNTAX

KEY *keynum,string*
KEY LIST|ON|OFF

PURPOSE

Use the KEY statement to assign soft key values to function keys and to display the values.

EXPLANATION

keynum is the number of the function key. It must be in the range 1–10.

string is a string expression up to 15 characters long that will be assigned to the function key.

The KEY statement allows function keys to be designated for special soft key functions. That is, you can set the key to automatically type a sequence of characters. Each of the function keys can be assigned a 15-byte string that will be input to BASIC when that key is pressed.

Initially, the soft keys are assigned the following default values:

F1—LIST
F2—RUN <—
F3—LOAD"
F4—SAVE"
F5—CONT <—
F6—EDIT
F7—TRON <—
F8—TROFF <—
F9—FILES"
F10—KEY

(<— indicates an automatic RETURN as part of the programmed function.
No other key must be pressed to perform the desired function.)

When you quit a BASIC session, all soft keys are reassigned their default values. Soft keys can be displayed with the KEY ON, KEY OFF, and KEY LIST statements.

KEY ON causes the soft key values to be displayed on the bottom line of the screen.

KEY OFF erases the display of the soft key values from the bottom line, making that line available for program use. It does not disable the function keys.

KEY LIST displays all soft key values on the screen, with all 15 characters of each key displayed.

Assigning a null string (string of length 0) to a soft key disables the function key as a soft key.

If the function key number is not in the range of 1–10, an Illegal function call error message is displayed, and the previous key string expression is retained.

When a soft key is assigned, the INKEY\$ function returns one character of the soft key string each time the function is executed.

EXAMPLES

```

50 KEY ON 'Displays the values of the soft keys on bottom line
55 FOR I=1 TO 500 : NEXT I
60 KEY OFF 'Erases soft key values display
70 KEY 1,"MENU"+CHR$(13)'
80 KEY 1,"" 'Disables soft key 1

```

This example assigns the string MENU followed by a RETURN to soft key 1. Line 80 disables function key 1 as a soft key.

```

10 KEY OFF 'Turns off key display during initialization
20 DATA "EDIT ","LET ","SYSTEM","PRINT ","LPRINT "
30 FOR I = 1 TO 5
40 READ SOFT KEY$(I)
50 KEY I,SOFT KEY$(I)
60 NEXT I
70 KEY ON

```

This routine initializes the first five soft keys.

NOTE: KEY(*n*) ON is not the same statement as KEY ON. KEY(*n*) ON sets an event trap for the specified key. KEY ON displays the values of all the function keys on the bottom line of the screen.

KEY(*n*) Statement

SYNTAX

KEY(*n*) ON | OFF | STOP

PURPOSE

Use the KEY(*n*) statement to activate or deactivate trapping of function key or cursor control key activity for the specified trappable key.

EXPLANATION

n is a numeric expression in the range 1–14 that designates the key to be captured. *n* indicates the following keys:

- 1–10 function keys F1 through F10
- 11 up ARROW key
- 12 left ARROW key
- 13 right ARROW key
- 14 down ARROW key

The KEY(*n*) ON statement enables function key or cursor control key event trapping by an ON KEY statement (see the ON KEY Statement). While trapping is enabled, and if a nonzero line number is specified in the ON KEY statement, BASIC checks between every statement to see if a function key or cursor control key has been used. If it has, the ON KEY statement is executed. The text that would normally be associated with a function key used as a soft key will not be printed.

A *soft key* is a function key that the user can set to automatically type a sequence of characters. The KEY statement allows function keys to be designated as soft keys. Through the KEY statement, each of the function keys can then be assigned a 15-byte string that will be input to BASIC when that key is pressed.

KEY(*n*) OFF disables the event trapping. If an event takes place, it is not remembered.

KEY(*n*) STOP disables the event trapping. However, if an event occurs, it is remembered and an ON KEY statement will be executed as soon as trapping is enabled.

For additional information on key event trapping, see Event Trapping in Chapter 8 and ON KEY Statement in this chapter.

EXAMPLE

```
5 KEY 1,"" 'disables function key F1
10 KEY (1) ON 'enables event trapping
20 ON KEY (1) GOSUB 100
30 PRINT "PRESS F1 TO SEE WHAT HAPPENS.":FOR I=1 TO 1000:NEXT I
40 PRINT "PRESS F1 AGAIN.":FOR I=1 TO 1000:NEXT I
50 END
100 BEEP:KEY(1)OFF:RETURN
```

NOTE: KEY(*n*) ON is not the same statement as KEY ON. KEY(*n*) ON sets an event trap for the specified key. KEY ON displays the values of all the function keys on the bottom line of the screen.

KILL Command

SYNTAX

KILL *filespec*

PURPOSE

Use the KILL command to delete a file.

EXPLANATION

filespec is a string expression containing the file name. The file name must conform to the requirements for naming files that are described in Files and File Names in Chapter 1. KILL is used for all types of files—program files, random access data files, and sequential data files.

The KILL command does not assume a .BAS extension as the SAVE command does. If the file name for the file you want to delete contains an extension, that extension must be included in the *filespec* used with the KILL command.

If a KILL command is given for a file that is currently open, a File already open error occurs. You must close a file before you can kill it.

The *filespec* can contain question marks (?) or asterisks (*) used as wildcards. A question mark will match any single character in the file name or extension. An asterisk will match one or more character(s) starting at its position.

EXAMPLES

200 KILL "DATA1?.DAT"

The position taken by the question mark will match any valid file name character. This command deletes any file that has a six-character name starting with DATA1 and has the file name extension .DAT. This includes DATA10.DAT and DATA1Z.DAT.

210 KILL "DATA1.*"

Deletes all files named DATA1, regardless of the file name extension.

LEFT\$ Function

SYNTAX

LEFT\$(*x\$*,*n*)

PURPOSE

Use the LEFT\$ function to return a string composed of the leftmost *n* characters of *x\$*.

EXPLANATION

n must be in the range 0–255. If *n* is greater than the number of characters in *x\$*, (LEN(*x\$*), the entire string (*x\$*) will be returned. If *n* = 0, the null string (length zero) is returned.

EXAMPLE

```
10 A$="BASIC LANGUAGE"
20 B$=LEFT$(A$,5)
30 PRINT B$
RUN
BASIC
```

See MID\$ Function and RIGHT\$ Function in this chapter for details about other string length functions.

LEN Function

SYNTAX

LEN(*x\$*)

PURPOSE

Use the LEN function to return the number of characters in *x\$*.

EXPLANATION

Nonprinting characters and blanks are included in the count returned by LEN.

EXAMPLE

```
10 X$="PORTLAND, OREGON"
20 PRINT LEN(X$)
RUN
16
```

LET Statement

SYNTAX

[LET]*variable=expression*

PURPOSE

Use the LET statement to assign the value of an expression to a variable.

EXPLANATION

variable is the name of a numeric or string variable, or an array element, that is to receive the value.

expression is a numeric or string expression whose value will be assigned to *variable*.

The type of the expression (string or numeric) must be the same as the type of the variable. Otherwise, a Type mismatch error will occur.

Notice that the word LET is optional; that is, the equal sign is sufficient for assigning an expression to a variable name.

EXAMPLE

```
110 LET D=12  
120 LET E=12^2  
130 LET F=12^4  
140 LET SUM=D+E+F
```

.

.

Or

```
110 D=12  
120 E=12^2  
130 F=12^4  
140 SUM=D+E+F
```

.

.

LIBRARY Statement

SYNTAX

```
LIBRARY library name
LIBRARY CLOSE
```

PURPOSE

Use the LIBRARY statement to enable or disable library files to be searched for subroutines specified in the CALL statement.

EXPLANATION

library name is a string expression that indicates the name of an in-memory data file that is formatted as a library file which will be searched for subroutines specified in the CALL statement. Currently only one library is available, DBCALLS.LIB.

The CLOSE option allows the user to remove ALL libraries from the list of active libraries being searched on CALL statements. It is not possible to remove a specific library from the list.

EXAMPLE

To open the library, use the statement:

```
LIBRARY "DBCALLS.LIB"
```

LINE Statement

SYNTAX

`LINE [[STEP] (x_1, y_1)]-[STEP] (x_2, y_2)[,color][,B[F]][,style]]`

PURPOSE

Use the LINE statement to draw a line or box on the screen.

EXPLANATION

x_1, y_1 is the coordinate for the starting point of the line.

x_2, y_2 is the ending point for the line.

The STEP option makes the specified coordinates relative to the most recent point (that is, the set of screen coordinates that were last referenced), instead of absolute, mapped coordinates.

color is the number of the color in which the line should be drawn. (See the COLOR Statement for valid parameters.) If the B or BF option is used, the box is drawn in this color. The valid color numbers are 0 and 1.

B draws a box with the points x_1, y_1 and x_2, y_2 specifying the upper left and lower right corners.

BF draws a filled box.

style is a 16-bit integer mask used to put pixels down on the screen. This is called *line styling*. This option is used for normal lines and boxes but cannot be used with filled boxes (BF). Using style with BF results in a syntax error message.

When coordinates specify a point that is not in the current viewport, the line segment is clipped to the viewport.

The relative coordinate form STEP can be used in place of an absolute coordinate. For example, assume that the most recent point referenced was (10,10). The statement LINE STEP (10,5) would specify a point at offset 10 from x and offset 5 from y, that is, (20,15).

If the STEP option is used for the second coordinate on a LINE statement, it is relative to the first coordinate in the statement. Other ways to establish the screen coordinates last referenced are to initialize the screen with CLS then use the PSET, PRESET, and CIRCLE statements to establish a new most recent point.

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BASIC Reference

Each time LINE plots a point on the screen, it uses the current circulating bit in *style*. If that bit is a 0, then no drawing will be done; if the bit is a 1, the point is drawn. After each point is drawn, the next bit position in *style* is selected. Since a 0 bit in *style* causes no change to the point on the screen, the user may prefer to draw a background line before a 'styled' line in order to force a known background. Style is used for normal lines and boxes, but has no effect on filled boxes.

EXAMPLES

The following examples assume a screen 480 pixels wide by 128 pixels high.

```
20 LINE(0,0)-(479,127)
```

draws a diagonal line across the screen (downward).

```
30 LINE(0,100)-(479,100)
```

draws a horizontal line across the screen.

```
10 FOR X=0 TO 479  
20 LINE(X,0)-(X,127),,X AND 1  
30 NEXT
```

draws an alternating line-on/line-off pattern.

```
10 LINE (0,0)-(100,100),,B
```

draws a box in the foreground (note that the color is not included).

```
20 LINE STEP(0,0)-STEP(200,200),1,BF
```

draws a filled box in color 1. Coordinates are given as offsets.

The style option works by using the bit mask to decide if a bit should be plotted or not. The bit mask is used as if it started at the leftmost pixel of the line and were repeated all along the line. Anywhere that there is a 1 in the bit mask, the point is plotted. If there is a 0 in the bit mask, no point is plotted.

```
10 LINE(100,50)-(400,50),1,,&HF0FO
```

In the previous example, a dotted line is drawn. The bit mask is 1111000011110000. This means that four dots are drawn, then four pixels are skipped, then four more are drawn. Go ahead and experiment with values ranging from &H0000 to &HFFFF to see the various styles you can create.

LINE INPUT Statement

SYNTAX

LINE INPUT[;] ["*prompt*";] *variable*

PURPOSE

Use the LINE INPUT statement to input an entire line (up to 254 characters) from the keyboard to a string variable, without the use of delimiters.

EXPLANATION

"*prompt*" is a string constant that is displayed on the screen before input is accepted. A question mark is not printed unless it is part of "*prompt*". *variable* is the name of a string variable or array element to which the line will be assigned. All input from the end of "*prompt*" to the RETURN is assigned to *variable*. However, if a line feed/RETURN sequence (this order only) is encountered, both characters are echoed; but the carriage return is ignored, the line feed is put into *variable*, and data input continues.

If LINE INPUT is immediately followed by a semicolon, then the RETURN you press to end the input line does not echo a RETURN/line feed sequence on the screen.

A LINE INPUT statement may be aborted by pressing SHIFT-BREAK. BASIC will return to command level. You can then enter CONT to resume execution at the LINE INPUT statement.

EXAMPLE

```
10 LINE INPUT "TYPE YOUR NAME";N$  
20 PRINT N$  
30 END
```

LINE INPUT# Statement

SYNTAX

LINE INPUT#*filenum*,*variable*

PURPOSE

Use the LINE INPUT# statement to read an entire line (up to 254 characters), without delimiters, from a sequential file into a string variable.

EXPLANATION

filenum is the number under which the file was opened. *variable* is the string variable name to which the line will be assigned. LINE INPUT# reads all characters in the sequential file up to a RETURN. It then skips over the RETURN/line feed sequence. The next LINE INPUT# reads all characters up to the next RETURN. (If a line feed/RETURN sequence is encountered, it is preserved and returned as part of the string.)

LINE INPUT# is especially useful if each line of a data file has been broken into fields, or if a BASIC program saved in ASCII format is being read as data by another program. (See SAVE Command in this chapter.)

EXAMPLE

```
10 OPEN "O",1,"LIST"
20 LINE INPUT "CUSTOMER INFORMATION? ";C$
30 PRINT #1, C$
40 CLOSE 1
50 OPEN "I",1,"LIST"
60 LINE INPUT #1, C$
70 PRINT C$
80 CLOSE 1
RUN
CUSTOMER INFORMATION? LINDA JONES 234,4 MEMPHIS
LINDA JONES 234,4 MEMPHIS
```

LIST Command

SYNTAX

LIST[*linenum1*][−*linenum2*] [,*filespec* | *dev*]

PURPOSE

Use the LIST command to list all or part of the program currently in memory.

EXPLANATION

linenum1 is the number of the first line to be listed.

linenum2 is the number of the last line to be listed.

Line numbers are in the range 0–65529.

filespec is the string expression containing the file name to which program lines will be listed.

dev is a device designation string, such as PRN:.

NOTE: The command does not work properly when trying to LIST to COM1:.

BASIC always returns to command level after executing a LIST.

If both line numbers are omitted, the entire program is listed, beginning at the lowest line number. (Listing is terminated either when the end of the program is reached or by pressing SHIFT-BREAK.) If only *linenum1* is included, only the specified line will be listed.

If you include only the hyphen after *linenum1*, that line and all higher-numbered lines are listed.

If you include only a hyphen before *linenum2*, BASIC lists all program lines from the beginning of the program through *linenum2*.

If both line number(s) are specified, the entire range is listed.

If you include *filespec* or *dev*, the program lines are listed to the specified file or device.

If *filespec* and *dev* are omitted, the listing is shown on the screen.

9.100

BASIC Reference

EXAMPLES

LIST

lists the program currently in memory.

LIST 500

lists line 500.

LIST 150-

lists all lines from 150 to the end.

LIST -1000

lists all lines from the lowest number through 1000.

LIST 150-1000

lists lines 150 through 1000, inclusive.

LIST 150-1000,"PRN:"

lists lines 150 through 1000 on the parallel printer. This statement is equivalent to **LLIST 150-1000**.

LIST 150-1000,"MYPROG.TXT"

saves lines 150 through 1000 of the current program to **MYPROG.TXT**.

LLIST Command

SYNTAX

LLIST [*linenum1*][-*linenum2*]]

PURPOSE

Use the LLIST command to list all or part of the program currently in memory on the parallel printer.

EXPLANATION

linenum1 is the number of the first line to be listed.

linenum2 is the number of the last line to be listed.

LLIST assumes a line width of 80 characters.

BASIC always returns to command level after LLIST is executed. The line number options for LLIST work in the same way as those for the LIST command. See LIST Command in this chapter for explanations.

EXAMPLE

LLIST

lists the entire program on the printer.

LLIST 100

lists line 100 on the printer.

LLIST 100-

lists on the printer all program lines from line 100 to the end of the program.

LLIST -1000

lists on the printer all program lines from the beginning of the program through line 1000.

LOAD Command

SYNTAX

LOAD *filespec*[,R]

PURPOSE

Use the LOAD command to load a file into the current workspace.

EXPLANATION

filespec is a string expression containing an optional device name and a file name where CASS: is the device specified. It must conform to the requirements for naming a file described in Files and File Names in Chapter 1.

R runs the program immediately after it is loaded.

The *filespec* must include the file name that was used when the file was saved. BASIC will append a default extension .BAS if one was not included in the *filespec*.

LOAD closes all open files and deletes all variables and program lines in the currently active workspace before it loads the designated program. However, if the R option is used with LOAD, the program is run after it is loaded, and all open data files are kept open. Thus, LOAD with the R option can be used to chain several programs or segments of the same program. Information can be passed between the programs using data files.

EXAMPLE

LOAD "STRTRK",R

loads and runs the program STRTRK.BAS.

LOC Function

SYNTAX

`LOC(filenum)`

PURPOSE

Use the LOC function to obtain the current position in a file.

EXPLANATION

filenum is the number that was used when the file was opened.

With random access files, LOC returns the actual record number within the file. The LOC function returns the number of the last record read from or written to the file.

With sequential files, LOC returns the number of records that have been read or written since the file was opened. A record is a 128-byte block of data.

For a communications file, LOC(*x*) is used to determine if there are any characters in the input buffer that are waiting to be read. If there are more than 255 characters in the queue, LOC(*x*) returns 255. Since the string is limited to 255 characters, this practical limit alleviates the need for you to test for string size before reading data from the communications buffer into a string variable.

If fewer than 255 characters remain in the buffer, the value returned by LOC(*x*) depends on whether the device was opened in ASCII or binary mode. In either mode, LOC will return the number of characters that can be read from the device. However, in ASCII mode, the low-level routines stop queuing characters as soon as the end-of-file character is encountered. The end of file itself is not queued and cannot be read. An attempt to read the end of file will result in an Input past end error.

EXAMPLE

```
200 IF LOC(1)>50 THEN STOP
```

This line first tests the current position in a file. If the file has been read past the fiftieth record, then the program will stop.

LOCATE Statement

SYNTAX

```
LOCATE [row][,[col]][,[cursor]]]
```

PURPOSE

Use the LOCATE statement to move the cursor to the specified position. Optional parameters turn the cursor on and off.

EXPLANATION

row is a line number on the screen. *row* should be a numeric expression returning an unsigned integer. Values must be in the range 1–15.

col is the column number on the screen where you want to place the cursor. It should be a numeric expression returning an unsigned integer. Values must be in the range 1–80.

cursor is a Boolean value indicating whether the cursor should be visible or not. 0 indicates cursor off, and 1 indicates cursor on.

Any value outside the specified ranges will result in an **Illegal function call** error. In this case, previous values are retained.

You can omit any parameter from the statement. If a parameter is omitted, the previous value is assumed.

The last line on the screen is reserved for soft key display and is not accessible to the cursor unless the soft key display is off.

EXAMPLE

```
10 LOCATE 1,1
```

moves cursor to upper left corner of the screen.

```
20 LOCATE,,1
```

makes the cursor visible; position remains unchanged.

LOF Function

SYNTAX

`LOF(filenum)`

PURPOSE

Use the LOF function to return the length of the specified file in bytes.

EXPLANATION

filenum is the file number used when the file was opened.

With random access files, the LOF function can be used to determine the last record number in the file. LOF divided by the length of a record is equal to the number of records in the file.

With communication files, LOF returns the amount of free space in the input buffer.

EXAMPLE

```
10 IF REC*RECSIZ>LOF(1) THEN PRINT "INVALID ENTRY"
```

In this example, the variables REC and RECSIZ contain the record number and record length, respectively. The calculation determines whether the specified record is beyond the end of file.

9.106

BASIC Reference

LOG Function

SYNTAX

$\text{LOG}(x)$

PURPOSE

Use the LOG function to return the natural logarithm of x .

EXPLANATION

x must be greater than 0; otherwise, an Illegal function call error will occur.

The natural logarithm is the logarithm to the base e.

EXAMPLE

```
10 PRINT LOG(45/7)
RUN
1.860752340715
```

LPOS Function

SYNTAX

`LPOS(n)`

PURPOSE

Use the LPOS function to return the current position of the line printer print head within the printer buffer.

EXPLANATION

n is the index of the printer being tested; that is PRN: would be tested with `LPOS(1)`.

LPOS does not necessarily give the physical position of the print head.

EXAMPLE

```
100 IF LPOS(X)>60 THEN LPRINT CHR$(13)
```

LPRINT and LPRINT USING Statements

SYNTAX

```
LPRINT [expression[,;expression] . . . ][;]  
LPRINT USING "string";expression[,;expression] . . . [;]
```

PURPOSE

Use the LPRINT and LPRINT USING statements to print data on the printer.

EXPLANATION

expression is a numeric or string expression to be printed.

string is a string constant or variable that identifies the format in which *expression* is to be printed.

The LPRINT and LPRINT USING statements function the same as PRINT and PRINT USING, except output goes to the parallel printer, and the file number option is not permitted. See the PRINT and PRINT USING statements for explanations.

LPRINT assumes an 80-character-wide printer.

EXAMPLES

```
10 X=5  
20 LPRINT X+5,X-5,X*(-5),X^5  
30 END  
RUN
```

10 0 -25 3125

```
10 A$="LOOK":B$="OUT"  
20 LPRINT USING "!";A$  
30 LPRINT USING "&";B$  
RUN
```

LOUT

LSET and RSET Statements

SYNTAX

LSET *variable*=*expression*
 RSET *variable*=*expression*

PURPOSE

Use the LSET and RSET statements to move data from memory to a random access file buffer in preparation for writing the data to a random access file, or in order to left or right justify the value of a string into a string variable.

EXPLANATION

variable is a string variable that was defined in a FIELD statement.

expression is a string expression whose value will be assigned to *variable*.

If *expression* contains fewer characters than were allocated to *variable*, LSET left justifies the string in the field, and RSET right justifies the string. Spaces are used to pad the extra positions. If the string is too long for the field, characters are dropped from the right of *expression*. Numeric values must be converted to strings before they are LSET or RSET. See the MKI\$, MKS\$, MKD\$ functions in this chapter for information about converting numeric values to string values.

EXAMPLES

```
.
.
.
100 A$="R. Ricardo"
110 AMT=(K+T)
120 OPEN "R",#1,"CUSTOMER.DAT"
130 FIELD #1,8 AS D$, 20 AS N$
140 RSET D$=MKD$(AMT)
150 LSET N$=A$
160 PUT #1,1
```

In line 140, the value of the numeric variable AMT is converted to a string and then right justified in the field when it is moved to the file buffer by the RSET statement. In line 150, the string A\$ is left justified in N\$ in the file buffer.

```
110 A$=SPACE$(20)
120 RSET A$=N$
```

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BASIC Reference

LSET or RSET can also be used with string variables that have not been defined in a FIELD statement to left justify or right justify a string in a given field as shown in the second example.

MERGE Command

SYNTAX

MERGE *filespec*

PURPOSE

Use the MERGE command to merge a specified file into the program in the currently active workspace.

EXPLANATION

filespec is a string expression containing the file name of the file to be merged.

The *filespec* is a file name that conforms to the file name requirements that are described in the Files and File Names section of Chapter 1. BASIC appends the default file name extension .BAS if the user specifies no extensions, and the file has been saved with the BASIC SAVE command.

The file to be merged with the program currently in memory must have been saved in ASCII format. For example:

```
SAVE "DEMO",A
```

The A tells BASIC to save the file in the ASCII format.

If you forget to save a file and your system powers off, restart the system. There will be no loss of data, but you must save the file name in the above form to merge it in the future.

If any lines in the ASCII file to be merged have the same line numbers as lines in the program in the active workspace, the lines from the file to be merged will replace the corresponding lines in the workspace. (Merging may be thought of as inserting the program lines in the ASCII file into the program in the workspace.)

BASIC will return to command level after executing a MERGE command.

EXAMPLE

```
MERGE "NUMBRS"
```

Inserts sequentially all lines in the program NUMBRS.BAS into the program in the current workspace.

9.112

BASIC Reference

MID\$ Function

SYNTAX

MID\$(*x\$*,*n*[,*m*])

PURPOSE

Use the MID\$ function to return a string of length *m* characters from *x\$*, beginning with the *n*th character.

EXPLANATION

x\$ is any string expression. *n* must be in the range 1–255. *m* must be in the range of 0–255. If *m* is omitted or if there are fewer than *m* characters to the right of the *n*th character, all rightmost characters beginning with the *n*th character are returned. If *n* is greater than the number of characters in *x\$*; that is, (LEN(*x\$*)), MID\$ returns a null string.

EXAMPLE

```
10 A$="GOOD "
20 B$="MORNING EVENING AFTERNOON"
30 PRINT A$;MID$(B$,9,7)
RUN
GOOD EVENING
```

See LEFT\$ Function and RIGHT\$ Function in this chapter for details about other string length functions.

MID\$ Statement

SYNTAX

MID\$(*string1,n[,m]*)=*string2*

PURPOSE

Use the MID\$ statement to replace a portion of one string with another string.

EXPLANATION

string1 is a string expression or array element. It is the string whose characters will be replaced.

string2 is a string expression. It is the replacement string.

n and *m* are integer expressions.

The characters in *string1*, beginning at position *n*, are replaced by the characters in *string2*. The optional *m* refers to the number of characters from *string2* that will be used in the replacement. If *m* is omitted, all of *string2* is used. However, regardless of whether *m* is omitted or included, the replacement of characters never goes beyond the original length of *string1*.

EXAMPLE

```
10 A$="KANSAS CITY, MO"
20 MID$(A$,14)="KS"
30 PRINT A$
RUN
KANSAS CITY, KS
```

MID\$ is also a function that returns a substring of a given string. See MID\$ Function in this chapter.

9.114

BASIC Reference

MKI\$, MKS\$, MKD\$ Functions

SYNTAX

MKI\$(*expression%*)
MKS\$(*expression!*)
MKD\$(*expression#*)

PURPOSE

Use the MKI\$, MKS\$, and MKD\$ functions to convert numeric values to string values.

EXPLANATION

expression% is an integer expression.

expression! is a single-precision numeric expression.

expression# is a double-precision numeric expression.

Any numeric value that is placed in a random access file buffer with an LSET or RSET statement must be converted to a string. MKI\$ converts an integer to a 2-byte string. MKS\$ converts a single-precision number to a 4-byte string. MKD\$ converts a double-precision number to an 8-byte string.

EXAMPLE

```
90 AMT=(K+T)
100 FIELD #1,8 AS D$,20 AS N$
110 LSET D$=MKD$(AMT)
120 LSET N$=A$
130 PUT #1,1
.
.
.
```

See also CVI, CVS, CVD Functions in this chapter.

NAME Command

SYNTAX

NAME *filespec1* AS *filespec2*

PURPOSE

Use the NAME command to change the name of a file.

EXPLANATION

filespec1 must exist and *filespec2* must not exist; otherwise, the error message File not found OR File already exists will display.

filespec1 must be closed before the renaming command is executed.

EXAMPLE

NAME "ACCTS" AS "LEDGER"

In this example, the file that was formerly named ACCTS will now be named LEDGER.

NEW Command

SYNTAX

NEW

PURPOSE

Use the NEW command to delete the program in the current workspace and clear all variables.

EXPLANATION

Enter the NEW command to clear the workspace before you enter a new program. NEW is usually issued at the command level. BASIC always returns to command level after a NEW is executed.

NEW closes all files and turns tracing off.

EXAMPLE

```
10 CLS
20 PRINT "THIS IS THE OLD PROGRAM"
30 END
NEW
Ok
10 CLS
20 PRINT "THIS IS THE NEW PROGRAM"
30 END
```

OCT\$ Function

SYNTAX

OCT\$(*x*)

PURPOSE

Use the OCT\$ function to return a string that represents the octal value of the decimal argument. *x* is rounded to an integer before OCT\$(*x*) is evaluated.

EXAMPLE

```
10 PRINT OCT$(24)
RUN
30
```

See HEX\$ Function in this chapter for details on hexadecimal conversion.

ON BREAK Statement

SYNTAX

ON BREAK GOSUB *linenum*

PURPOSE

Use the ON BREAK statement to branch to the specified subroutine when the BREAK key is pressed.

EXPLANATION

linenum is the statement line number of the break event trap handler.

This trap is provided so that the program can detect when the BREAK key is pressed. If break trapping is not being used, pressing the BREAK key will stop any statement being executed and return to command level. Using break trapping, the program can control what happens (including ignoring the key) when the BREAK key is pressed.

The BREAK statement controls whether the trap is detected or not. A BREAK ON statement enables the GOSUB to occur.

If a BREAK OFF statement has been executed, the GOSUB will not be performed and the event is not remembered.

If a BREAK STOP statement has been executed, the GOSUB will not be performed but will be performed as soon as a BREAK ON statement is executed.

When a BREAK GOSUB is executed, an automatic BREAK STOP is executed so that all other trapping is disabled. The RETURN from the subroutine will perform an automatic BREAK ON unless an explicit BREAK OFF is executed inside the subroutine.

See BREAK Statement in this chapter.

EXAMPLE

```
10 BREAK ON
20 ON BREAK GOSUB 100
30 PRINT "PRESS BREAK TO SEE WHAT HAPPENS":FOR I=1 TO 1000:NEXT I
40 PRINT "PRESS BREAK AGAIN":FOR I-1 TO 100:NEXT I
50 END
100 BEEP:BREAK OFF:RETURN
```

ON COM Statement

SYNTAX

ON COM(1) GOSUB *linenum*

PURPOSE

Use the ON COM statement to specify the first line number of a subroutine to be performed when activity occurs on a communications port.

EXPLANATION

1 is the number of the communications port.

linenum is the number of the first line of a subroutine that is to be performed when activity occurs on the specified communications port.

A *linenum* of zero disables the communications event trap.

The ON COM statement will only be executed if a COM(n) ON statement has been executed to enable event trapping. (See the COM Statement.) If event trapping is enabled, and if the *linenum* in the ON COM statement is not zero, BASIC checks between statements to see if communications activity has occurred on the specified port. If communications activity has occurred, a GOSUB will be performed to the specified line.

If a COM OFF statement has been executed for the communications port, the GOSUB is not performed and is not remembered.

If a COM STOP statement has been executed for the communications port, the GOSUB is not performed but will be performed as soon as a COM ON statement is executed.

When an event trap occurs (that is, the GOSUB is performed), an automatic COM STOP is executed so that all other trapping is disabled. The RETURN from the trapping subroutine will automatically perform a COM ON statement unless an explicit COM OFF was performed inside the subroutine.

The RETURN *linenum* form of the RETURN statement can be used to return to a specific line number from the trapping subroutine. Use this type of return with care, however, because any other GOSUBs, WHILEs, or FORs that were active at the time of the trap will remain active, and errors such as FOR without NEXT may result.

You must execute an OPEN COM statement in order for the ON COM statement to function.

9.120

BASIC Reference

Event trapping does not take place when BASIC is not executing a program, and event trapping is automatically disabled when an error trap occurs.

EXAMPLE

```
ON COM1 GOSUB 100
```

In this example, 100 is the number of the first line of the trap routine.

ON ERROR GOTO Statement

SYNTAX

ON ERROR GOTO *linenum*

PURPOSE

Use the ON ERROR GOTO statement to enable error handling and specify the first line of the error-handling routine.

EXPLANATION

linenum is the first line of the error-handling routine.

Once error handling has been enabled, all errors detected, including Direct mode errors, will cause a jump to the specified error-handling routine. If *linenum* does not exist, an Undefined line error results.

To disable error handling, insert an ON ERROR GOTO 0 statement. Subsequent errors will print an error message and halt execution. An ON ERROR GOTO 0 statement that appears in an error-handling routine causes BASIC to stop and print the error message for the error that caused the trap. It is recommended that all error-handling routines execute an ON ERROR GOTO 0 if an error is encountered for which there is no recovery action.

NOTE: If an error occurs during execution of an error-handling routine, that error message is printed and execution terminates. Error trapping does not occur within the error-handling routine.

EXAMPLE

```
10 ON ERROR GOTO 1000
```

ON . . . GOSUB and ON . . . GOTO Statements

SYNTAX

```
ON expression GOTO linenum[,linenum] . . .
ON expression GOSUB linenum[,linenum] . . .
```

PURPOSE

Use the ON . . . GOSUB and ON . . . GOTO statements to branch to one of several specified line numbers, depending on the value returned when an expression is evaluated.

EXPLANATION

expression is a numeric expression in the range 0–255.

linenum is the number of the line to which the program will jump.

The value of *expression* determines which line number in the list will be used for branching. For example, if the value is three, the third line number in the list will be the destination of the branch. (If the value is a noninteger, the number is rounded.)

In the ON . . . GOSUB statement, each line number in the list must be the first line number of a subroutine.

If the value of *expression* is either zero or greater than the number of items in the list, control drops to the next BASIC statement.

If the value of *expression* is negative or greater than 255, an Illegal function call error occurs.

EXAMPLE

```
10 INPUT "ENTER A, B OR C:";C$
20 ON ASC (C$)-64 GOTO 30,40,50
30 PRINT "YOUR CHOICE WAS A.": GOTO 60
40 PRINT "YOUR CHOICE WAS B.": GOTO 60
50 PRINT "YOUR CHOICE WAS C."
60 END
```

Line 10 displays a prompt and asks for input. Line 20 then uses the ON . . . GOTO statement to route program execution to the appropriate line.

The expression ASC (C\$)-64 first converts C\$ to its ASCII value, which in the case of a *B* entry would be 66. Sixty-four is then subtracted from the ASCII value making 2 the value of the expression. Consequently, the program jumps to the second line—number 40.

This statement can be useful for controlling the flow of menu-driven programs.

ON KEY Statement

SYNTAX

ON KEY(*n*) GOSUB *linenum*

PURPOSE

Use the ON KEY statement to specify the first line number of a subroutine to be executed when a specified key is pressed.

EXPLANATION

n is the number of a function key or cursor control key.

linenum is the number of the first line of a subroutine that is to be performed when the specified function or cursor control key is pressed.

A *linenum* of zero disables the event trap.

The ON KEY statement will only be executed if a KEY(*n*) ON statement has been executed to enable event trapping. (See the KEY(*n*) Statement.) If key trapping is enabled and if the *linenum* in the ON KEY statement is not zero, BASIC checks between statements to see if the specified function or cursor control key has been pressed. If so, the program will branch to a subroutine specified by the GOSUB statement.

If a KEY(*n*) OFF statement has been executed for the specified key, the GOSUB is not performed and the event is not remembered.

If a KEY(*n*) STOP statement has been executed for the specified key, the GOSUB is not performed, but will be performed as soon as a KEY(*n*) ON statement is executed.

When an event trap occurs (that is, the GOSUB is performed), an automatic KEY(*n*) STOP is executed so that all other trapping is disabled. The RETURN from the trapping subroutine will automatically perform a KEY(*n*) ON statement unless an explicit KEY(*n*) OFF was performed inside the subroutine.

The RETURN *linenum* form of the RETURN statement can be used to return to a specific line number from the trapping subroutine. Use this type of return with care, however, because any other GOSUBs, WHILEs, or FORs that were active at the time of the trap will remain active, and errors such as FOR without NEXT may result.

Event trapping takes place only when BASIC is executing a program. When an error trap (resulting from an ON ERROR statement) occurs, all other trapping is automatically disabled.

Any key that is trapped is not passed on. That is, the key is not read by BASIC.

NOTE: When a key is trapped, that occurrence of the key is destroyed. Therefore, you cannot subsequently use the INPUT or INKEY\$ statements to find out which key caused the trap. So if you wish to assign different functions to particular keys, you must set up a different subroutine for each key, rather than assigning the various functions within a single subroutine.

EXAMPLE

```
10 KEY 4,"MENU"+CHR$(13) 'assigns soft key 4
20 KEY ON 'displays the function keys showing MENU <- value in F4
30 KEY(4) ON 'enables event trapping
.
.
70 ON KEY(4) GOSUB 200
.
.
key 4 pressed
.
.
200'Subroutine for menu
```

ON RESTART Statement

SYNTAX

ON RESTART GOSUB *linenum*

PURPOSE

Use the ON RESTART statement to branch to the specified subroutine when BASIC is restarted after a suspended operation.

EXPLANATION

linenum is the statement line number of the restart event trap handler.

This trap is provided so that the program may detect when it has been suspended. Since BASIC does not maintain the contents of the screen during a suspend, this trap may be used to redraw the screen when BASIC is restarted.

Both the QUIT key (CTRL-F10) and the RUN-PREVIOUS (CTRL-F9) keys are supported by BASIC. Except for the difference in which application is activated when BASIC suspends, these two operations cause the same action in BASIC. These keys will only be detected when BASIC is waiting for input from the keyboard. Thus, if BASIC is at command level, the keys will always be detected. But if a program is running, the keys will only be detected if the program is waiting for input from the keyboard (that is, INPUT, INKEY\$, and so on). When the key is detected, BASIC operates as if a QUIT command had been executed. See the QUIT Command for the difference in operation between command level and a running program.

The RESTART statement controls whether the trap is detected or not.

If a RESTART OFF statement has been executed, the GOSUB will not be performed and the event will not be remembered.

If a RESTART STOP statement has been executed, the GOSUB will not be performed until a RESTART ON statement is executed.

When a RESTART GOSUB is executed, an automatic RESTART STOP is executed so that all other trapping is disabled. The return from the subroutine will perform an automatic RESTART ON unless an explicit RESTART OFF is executed inside the subroutine.

See RESTART Statement in this chapter.

EXAMPLE

```
10 RESTART ON
20 ON RESTART GOSUB 1000
30 FL$="CLIENT.DAT"
40 OPEN "R",1,FL$,30:FIELD 1,30 AS A$
50 CLS:INPUT "Enter client name";N$
60 IF N$="END" OR N$="end" THEN 100
70 LSET A$=N$:PUT 1
80 GOTO 50
100 'END ROUTINE
150 PRINT "Entries completed."
155 CLOSE
160 END
1000 CLS: PRINT "WELCOME BACK TO CLIENT INPUT"
1010 FOR I=1 TO 1000:NEXT I
1020 PRINT "Proceed with entries."
1025 RESTART OFF
1030 RETURN
```

In this example, if you respond to the input prompt by pressing CTRL-F10, the execution of BASIC will be suspended. Control will pass to the System Manager. When you again execute that BASIC program, the subroutine indicated by line 1000 in the ON RESTART statement will be executed. Within the restart subroutine, trapping is disabled in line 1025 with the RESTART OFF statement. Now, if CTRL-F10 or CTRL-F9 is pressed in response to the input prompt, the restart subroutine will not be performed on return to this BASIC program.

ON TIMER Statement

SYNTAX

ON TIMER (*n*) GOSUB *linenum*

PURPOSE

Use the ON TIMER statement to provide an event trap during real time.

EXPLANATION

ON TIMER causes an event trap every *n* seconds. *n* must be a numeric expression in the range of 1 to 65,534. Values outside this range generate an Illegal function call error.

The ON TIMER statement will only be executed if a TIMER ON statement has been executed to enable event trapping. If event trapping is enabled, and if the *linenum* in the ON TIMER statement is not zero, BASIC checks between statements to see if the time has been reached. If it has, a GOSUB will be performed to the specified line.

If a TIMER OFF statement has been executed, the GOSUB is not performed and the event is not remembered.

If a TIMER STOP statement has been executed, the GOSUB is not performed until a TIMER ON statement is executed.

When an event trap occurs (that is, the GOSUB is performed), an automatic TIMER STOP is executed so that all other trapping cannot take place. The RETURN from the trapping subroutine will automatically perform a TIMER ON statement unless an explicit TIMER OFF was performed inside the subroutine.

The RETURN *linenum* form of the RETURN statement can be used to return to a specific line number from the trapping subroutine. Use this type of return with care, however, because any other GOSUBs, WHILEs, or FORs that were active at the time of the trap will remain active, and errors such as FOR without NEXT may result.

EXAMPLE

```
10 ON TIMER(60) GOSUB 10000
20 TIMER ON
.
.
.
10000 LET OLDROW=CSRLIN 'Save current Row
10010 LET OLDCOL=POS(0) 'Save current Column
10020 LOCATE 1,1:PRINT TIME$;
10030 LOCATE OLDROW,OLDCOL 'Restore Row & Col
10040 RETURN
```

In this example, the time of day is displayed on the first line once every minute.

See TIMER Statement in this chapter.

OPEN Statement

SYNTAX

```
OPEN "mode1",[#]filenum,filespec,reclen  
OPEN filespec [FOR mode2] AS [#]filenum [LEN=reclen]
```

PURPOSE

Use the OPEN statement to allow I/O to a file or device.

EXPLANATION

filespec is a string expression containing a file name that conforms to the rules for naming files described in Files and File Names in Chapter 1 or device name.

filenum is an integer expression whose value is between 1 and 255. The number is then associated with the file for as long as it is OPEN and is used to refer other I/O statements to the file.

reclen is an integer expression that, if included, sets the record length for random access files. BASIC will ignore this option if it is used in a statement to OPEN a sequential file. The default length for records is 128 bytes.

mode1 is a string expression that must be one of the following:

- O Specifies sequential output mode.
- I Specifies sequential input mode.
- R Specifies random input/output mode.
- A Specifies sequential output mode and sets the file pointer at the end of file and the record number as the last record of the file. A PRINT# or WRITE# statement will then extend (append) the file. This option does not work when you are trying to append to a data cassette file.

mode2 is an expression which is one of the following:

OUTPUT Specifies sequential output mode.

INPUT Specifies sequential input mode.

APPEND Specifies sequential output mode and sets the file pointer at the end of file and the record number as the last record of the file. A PRINT# or WRITE# statement will then extend (append) the file.

If *mode2* is omitted, the default random access mode is assumed. Random, however, cannot be expressed explicitly as the file mode.

Files

A file or device must be opened before any I/O operation can be performed on that file. OPEN allocates a buffer for I/O to the file or device and determines the mode of access that will be used with the buffer.

The LEN option is ignored if the file being opened has been specified as a sequential file.

BASIC devices are:

KYBD:

SCRN:

COM1:

PRN:

CASS:

NOTE: A file can be opened for sequential input or random access on more than one file number at a time. A file can be opened for output, however, on only one file number at a time.

EXAMPLES

10 OPEN "I",2,"INVEN"

In this example, a sequential file is opened in Input mode. The file is assigned file number 2 and file name "INVEN."

10 OPEN "MAILING.DAT" FOR APPEND AS 1

In this example, the sequential file "MAILING.DAT" is opened in Append mode as file number 1. The file is opened for sequential output with the file pointer positioned at the end of the file.

100 OPEN "PRN:" FOR OUTPUT AS 1

In this example, the parallel printer is opened for output.



OPEN COM Statement

SYNTAX

```
OPEN "COM1: [speed][,[parity]][,[data]][,[stop]][,RS][,CS[n]][,DS[n]][,CD[n]] [,BIN  
|ASC][,LF]]]"[LEN= numbytes] AS [#] filenum
```

PURPOSE

Use the OPEN COM statement to open and initialize a communications channel for input/output.

EXPLANATION

COM1 is the name of the device to be opened. Only communications port 1 is recognized.

speed is the baud rate, in bits per second, of the device to be opened.

parity designates the parity of the device to be opened. Valid entries are: N (none), E (even), O (odd), S (space), M (mark), or I (ignore). On input from a COM device, parity checking is always performed unless the I parity option is given.

data designates the number of data bits per byte. Valid entries are: 5, 6, 7, or 8.

stop designates the stop bit. Valid entries are: 1 or 2.

RS suppresses RTS (Request To Send).

CS[n] controls CTS (Clear To Send).

DS[n] controls DSR (Data Set Ready).

CD[n] controls CD (Carrier Detect).

n is an integer in the range 0–65,535 that specifies the number of milliseconds to wait for the signal before returning Device Timeout error. The timeout will be rounded to the nearest number of seconds.

LF specifies that a line feed is to be sent after a carriage return.

BIN opens the device in binary mode. BIN is selected by default unless ASC is specified.

filenum is the number of the file to be opened.



numbytes is the maximum number of bytes that can be read from the communications buffer with a GET.

The OPEN COM statement must be executed before a device can be used for RS-232 communication.

Any syntax errors in the OPEN COM statement will result in a Bad File name error.

The *speed*, *parity*, *data*, and *stop* options must be listed in the order shown in the syntax. The remaining options can be listed in any order, but they must be listed after the *speed*, *parity*, *data*, and *stop* options.

A Device timeout error will occur if Data Set Ready (DSR) is not detected.

LF allows communication files to be printed on a serial line printer. When LF is specified, a line feed character (0AH) is automatically sent after each RETURN character (0CH). This includes the RETURN sent as a result of the width setting. Note that INPUT# and LINE INPUT#, when used to read from a COM file that was opened with the LF option, stop when they see a RETURN, ignoring the line feed.

The LF option is superseded by the BIN option.

In the BIN mode, tabs are not expanded to spaces, a RETURN is not forced at the end-of-line, and CTRL-Z is not treated as end-of-file. When the channel is closed, CTRL-Z will not be sent over the RS-232 line. The BIN option supersedes the LF option.

In ASC mode, tabs are expanded, RETURNS are forced at the end-of-line, CTRL-Z is treated as end-of-file, and XON/XOFF protocol (if supported) is enabled. When the channel is closed, CTRL-Z will be sent over the RS-232 line.

EXAMPLE

```
10 OPEN "COM1:9600,N,8,1,BIN" AS 2
```

This statement will open communications channel 1 at a speed of 9600 baud with no parity bit, 8 data bits, and 1 stop bit. Input/Output will be in the Binary mode. Other lines in the program can now access channel 1 as file number 2.

OPTION BASE Statement

SYNTAX

OPTION BASE 0 | 1

PURPOSE

Use the **OPTION BASE** statement to declare the minimum value for array subscripts.

EXPLANATION

The default base is 0. If the statement:

OPTION BASE 1

is executed, the lowest value an array subscript can have is 1.

The **OPTION BASE** statement must be coded before an array is dimensioned.

If you use CHAIN, the program you are chaining to may not contain an **OPTION BASE** statement, even if both the calling and chained-to programs have the same minimum value for array subscripts.

EXAMPLE

```
10 OPTION BASE 1
20 DIM A%(3)
30 FOR I=1 TO 3
40 READ A%(I)
50 NEXT I
60 DATA 5,27,35
```

PMAP Function

SYNTAX

PMAP *expression, function*

PURPOSE

Use the PMAP function to map world coordinate expressions to physical locations or to map physical expressions to a world coordinate location.

EXPLANATION

expression is the coordinate of the point to be mapped.

The four PMAP functions allow the user to find equivalent point locations between the world coordinates created with the WINDOW statement and the physical coordinate system of the screen or viewport as defined by the VIEW statement.

function =

- 0 Maps world expression to physical x coordinate.
- 1 Maps world expression to physical y coordinate.
- 2 Maps physical expression to world x coordinate.
- 3 Maps physical expression to world y coordinate.

EXAMPLES

X = PMAP(200,0)

If a user had defined a WINDOW SCREEN (200,50)–(300,100), then the upper left coordinate of the window would be (200,50) and the lower right would be (300,100). The screen coordinates can be (0,0) in the upper left-hand corner and (479,127) in the lower right.

```

10 DEFINT A-Z:CLS
20 WINDOW (200,50)-(300,100)
30 XCENTER=(300+200)\2 'X-AXIS RELATIVE TO WINDOW
40 YCENTER=(100+50)\2 'Y-AXIS RELATIVE TO WINDOW
50 XPHYSICAL=PMAP(XCENTER,0) 'X-AXIS PHYSICAL SCREEN
60 YPHYSICAL=PMAP(YCENTER,1) 'Y-AXIS PHYSICAL SCREEN
70 XWIDTH=PMAP(300,0) 'SCREEN WIDTH (COLUMN)
80 YWIDTH=PMAP(50,1) 'SCREEN WIDTH(ROW)
90 PRINT USING "#####";XCENTER;YCENTER;XPHYSICAL;YPHYSICAL;XWIDTH;YWIDTH
100 CIRCLE(XCENTER,YCENTER),5
RUN

```

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BASIC Reference

The program will produce a circle centered on the screen. Listed below the circle will be:

250 75 240 64 479 127

POINT Function

SYNTAX

`POINT (x,y)`

or

`POINT (function)`

PURPOSE

Use `POINT (x,y)` to allow the user to read the color number of a pixel from the screen. If the specified point is out of range, the value -1 is returned.

`POINT` with one argument allows the user to retrieve the current graphics cursor coordinates.

EXPLANATION

x and *y* are the coordinates of the pixel that is to be referenced.

`x = POINT (function)`

returns the value of the current *x* or *y* graphics coordinates as follows:

function =

- 0 Returns the current physical *x* coordinate.
- 1 Returns the current physical *y* coordinate.
- 2 Returns the current logical *x* coordinate. If the `WINDOW` statement has not been used, this will return the same value as the `POINT(0)` function.
- 3 Returns the current logical *y* coordinate if `WINDOW` is active, or else returns the current physical *y* coordinate as in 1.

The physical coordinate refers to the coordinate on the screen or current viewport.

EXAMPLES

```
10 LET C=1
20 PSET (10,10),C
30 IF POINT(10,10)=C THEN PRINT "This point is color ";C
```

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BASIC Reference

In this example, the POINT function returns the color number of point C.

```
10 IF POINT(I,I)<>0 THEN PRESET (I,I) ELSE PSET (I,I) 'invert current state of a point  
20 PSET(I,I),1-POINT(I,I) 'another way to invert a point.
```

POS Function

SYNTAX

POS(*n*)

PURPOSE

Use the POS function to return the current horizontal (column) position of the cursor.

EXPLANATION

The leftmost position is 1. *n* is a dummy argument. To return the current vertical line position of the cursor, use the CSRLIN function. POS is most often used in conjunction with the CSRLIN function.

EXAMPLE

```
10 Y=CSRLIN 'RECORD CURRENT LINE
20 X=POS(0)'RECORD CURRENT COLUMN
30 LOCATE 15,1
40 PRINT "HELLO"
50 LOCATE X,Y 'RESTORE POSITION TO OLD LINE AND COLUMN
```

See LPOS Function in this chapter for more details about the line printer position. See CSRLIN Function in this chapter for more details about current cursor line (or row) position.



PRESET Statement



SYNTAX

PRESET [STEP](*x,y*) [,color]



PURPOSE

Use the PRESET statement to draw a specified point on the screen. PRESET works exactly like PSET except that if you do not specify *color*, the background color is selected.



EXPLANATION



x and *y* specify the pixel that is to be set; *color* is the color number that is to be used for the specified point. Valid color numbers are 0 and 1.



The STEP option indicates that the given *x* and *y* coordinates will be relative, not absolute. That means the *x* and *y* are distances from the last point referenced, not distances from the (0,0) screen coordinate.



If a coordinate is outside the current viewport, no action is taken, nor is an error message given.



Coordinates can be shown as absolutes, as in the syntax, or the STEP option can be used to reference a point relative to the most recent point used. For example, if the most recent point referenced were (10,10), STEP (10,5) would reference the point at (20,15).



EXAMPLE



```
5 REM DRAW A LINE FROM (0,0) TO (100,100)
10 FOR I=0 TO 100
20 PRESET (I,I),1
30 NEXT I
31 FOR I=1 TO 1000:NEXT I 'delay
35 REM NOW ERASE THAT LINE
40 FOR I=0 TO 100
50 PRESET STEP (-1,-1)
60 NEXT I
```



This example draws a line from (0,0) to (100,100) and then erases that line by overwriting it with the background color.



PRINT# and PRINT# USING Statements

Syntax

PRINT#[*filenum*],[USING"*string*";]*expression*[,];*expression*] . . .

PURPOSE

Use the PRINT# and PRINT# USING statements to write data to a sequential file.

EXPLANATION

filenum is the number used when the file was opened for output. *string* consists of formatting characters as described in the PRINT USING Statement. The expressions in *expression* are the numeric and/or string expressions that will be written to the file.

PRINT# does not compress data. An image of the data is written to the file just as it would be displayed on the screen with a PRINT statement. For this reason, you should take care to delimit the data so that it will be input correctly. See Creating a Sequential File in Chapter 8 for more information about delimiters.

EXAMPLES

In the list of expressions, numeric expressions should be delimited by semicolons. For example:

PRINT#1,A;B;C;X;Y;Z

(If commas are used as delimiters, the extra blanks that are inserted between print fields will also be written to the file.)

String expressions must be separated by semicolons in the list. To format the string expressions correctly in the file, use explicit delimiters in the list of expressions.

For example, let A\$="CAMERA" and B\$="93604-1". The statement:

PRINT#1,A\$;B\$

would write CAMERA93604-1 to the file. Because there are no delimiters, this could not be input as two separate strings. To correct the problem, insert explicit delimiters into the PRINT# statement as follows:

PRINT#1,A\$,";B\$

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BASIC Reference

The image written to the file is:

CAMERA,93604-1

which can be read back into two string variables.

If the strings themselves contain commas, semicolons, significant leading blanks, carriage returns, or line feeds, write them to the file surrounded by explicit quotation marks; that is, CHR\$(34).

For example, let A\$="CAMERA, AUTOMATIC" and B\$=" 93604-1". The statement:

PRINT#1,A\$;B\$

would write the following image to file:

CAMERA, AUTOMATIC 93604-1

And the statement:

INPUT#1,A\$,B\$

would input "CAMERA" to A\$ and "AUTOMATIC 93604-1" to B\$. To separate these strings properly in the file, write double quotation marks to the file image using CHR\$(34). The statement:

PRINT#1,CHR\$(34);A\$;CHR\$(34);CHR\$(34);B\$;CHR\$(34)

writes the following image to the file:

"CAMERA, AUTOMATIC"" 093604-1"

And the statement:

INPUT#1,A\$,B\$

would input "CAMERA, AUTOMATIC" to A\$ and " 93604-1" to B\$.

The PRINT# statement can also be used with the USING option to control the format of the file. For example:

PRINT#1,USING"## ########.##,";J;K;L

NOTE: See WRITE# Statement for details about writing data to a sequential file.

PRINT Statement

SYNTAX

PRINT [?][*expression*,;[*expression*,;] . . .][,;]

PURPOSE

Use the PRINT statement to output data on the screen.

EXPLANATION

If you omit *expression*, a blank line is printed. If you include *expression*, the values of the expressions are printed on the screen. The expressions in the list can be numeric and/or string expressions. (String constants must be enclosed in quotation marks.)

A question mark (?) can be used as a form of shorthand. It will be interpreted as the word PRINT and will appear as PRINT in subsequent listings.

Print Positions

The position of each printed item is determined by the punctuation used to separate the items in the list. BASIC divides the maximum BASIC line of 255 characters into print zones of 14 spaces each. In the list of expressions, a comma causes the next value to be printed at the beginning of the next zone. A semicolon causes the next value to be printed immediately after the last value. Typing one or more spaces between expressions has the same effect as typing a semicolon.

If a comma or a semicolon terminates the list of expressions, the next PRINT statement begins printing on the same line, spacing according to instructions. If the list of expressions terminates without a comma or a semicolon, a carriage return is printed at the end of the line. If the printed line is wider than the screen width, BASIC goes to the next physical line and continues printing.

Printed numbers are always followed by a space. Positive numbers are preceded by a space. Negative numbers are preceded by a minus sign. Single-precision numbers that can be represented with 6 or fewer digits in the fixed-point format no less accurately than they can be represented in the floating-point format are output using the fixed-point format. For example, 1E-7 is output as .0000001, and 1E-8 is output as 1E-08. Double-precision numbers that can be represented with 14 or fewer digits in the fixed-point format no less accurately than they can be represented in the floating-point

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BASIC Reference

format are output using the fixed-point format. For example, 1D-13 is output as .0000000000001 and 1D-16 is output as 1D-16.

EXAMPLES

```
10 X=5
20 PRINT X+5,X-5,X*(-5),X^5
30 END
RUN
10      0      -25      3125
```

In this example, the commas in the PRINT statement cause each value to be printed at the beginning of the next print zone.

```
10 INPUT X
20 PRINT X "SQUARED IS" X^2 "AND";
30 PRINT X "CUBED IS" X^3
40 PRINT
50 GOTO 10
RUN
? 9
9 SQUARED IS 81 AND 9 CUBED IS 729

? 21
21 SQUARED IS 441 AND 21 CUBED IS 9261

?
```

In this example, the semicolon at the end of line 20 causes both PRINT statements to be printed on the same line. Line 40 causes a blank line to be printed before the next prompt.

```
10 FOR X=1 TO 5
20 J=J+5
30 K=K+10
40 ?J;K;
50 NEXT X
RUN
5 10 10 20 15 30 20 40 25 50
```

In this example, the semicolons in the PRINT statement cause each value to be printed immediately after the preceding value. (Remember, a number is always followed by a space, and positive numbers are preceded by a space.) In line 40, a question mark is used instead of the word PRINT.

PRINT USING Statement

SYNTAX

`PRINT USING "string";expression[,|;expression] . . . [,|;]`

PURPOSE

Use the PRINT USING statement to print strings or numbers using a specified format.

EXPLANATION

expression is comprised of the string expressions or numeric expressions that are to be printed, separated by semicolons or commas.

string is a string literal (or variable) composed of special formatting characters. These formatting characters (described here) determine the field and the format of the printed strings or numbers.

EXAMPLES

When PRINT USING is used to print strings, one of three formatting characters can be used to format the string field:

"!" Specifies that only the first character in the given string is to be printed.

"\n spaces\" Specifies that 2 + n characters from the string are to be printed. If the backslashes are typed with no spaces, two characters will be printed; with one space, three characters will be printed, and so on. If the string is longer than the field, the extra characters are ignored. If the field is longer than the string, the string will be left-justified in the field and padded with spaces on the right.

```

10 A$="LOOK":B$="OUT"
30 PRINT USING "!" ;A$;B$
40 PRINT USING "\      \" ;A$;B$
50 PRINT USING "\      \" ;A$;B$;"!!"
RUN
LO
LOOKOUT
LOOK OUT !!

```

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BASIC Reference

"&" Specifies a variable length string field. Any field specified with "&" outputs the string without modification.

```
10 A$="LOOK":B$="OUT"
20 PRINT USING "I";A$;
30 PRINT USING "&";B$
RUN
LOUT
```

When PRINT USING is used to print numbers, the following special characters may be used to format the numeric field:

- # A number sign is used to represent each digit position. Digit positions are always filled. If the number to be printed has fewer digits than positions specified, the number will be right-justified (preceded by spaces) in the field.

A decimal point can be inserted at any position in the field. If the format string specifies that a digit is to precede the decimal point, the digit will always be printed (as 0, if necessary). Numbers are rounded as necessary.

```
PRINT USING "##.##";.78
0.78
```

```
PRINT USING "###.##";987.654
987.65
```

```
PRINT USING "##.## ";10.2,5.3,66.789,.234
10.20 5.30 66.79 0.23
```

In the last example, three spaces were inserted at the end of the format string to separate the printed values on the line.

- + A plus sign at the beginning or end of the format string will cause the sign of the number (plus or minus) to be printed before or after the number.

```
PRINT USING "+##.## "; -68.95,2.4,55.6,-.9
-68.95 +2.40 +55.60 -0.90
```

- A minus sign at the end of the format field will cause negative numbers to be printed with a trailing minus sign.

```
PRINT USING "##.##- "; -68.95,22.449,-7.01
68.95- 22.45 7.01-
```

- ** A double asterisk at the beginning of the format string causes leading spaces in the numeric field to be filled with asterisks. The ** also specifies positions for two more digits.

```
PRINT USING "***#.## ";12.39,-0.9,765.1
*12.4 *-0.9 765.1
```

\$\$ A double dollar sign causes a dollar sign to be printed to the immediate left of the formatted number. The \$\$ specifies two more digit positions, one of which is the dollar sign. The exponential format cannot be used with \$\$. Negative numbers cannot be used unless the minus sign trails to the right.

```
PRINT USING "$$###.##";456.78
$456.78
```

****\$** The **\$ at the beginning of a format string combines the effects of the above two symbols. Leading spaces will be asterisk-filled and a dollar sign will be printed before the number. **\$ specifies three more digit positions, one of which is the dollar sign.

The exponential format cannot be used with **\$. When negative numbers are printed, the minus sign will appear immediately to the left of the dollar sign.

```
PRINT USING "**$##.##";2.34
***$2.34
```

, A comma is to the left of the decimal point in a formatting string causes a comma to be printed to the right of every fourth digit left of the decimal point. A comma that is at the end of the format string is printed as part of the string. A comma specifies another digit position. The comma has no effect if used with exponential (^^^^) format.

```
PRINT USING "###,.##";1234.5
1,234.50
```

```
PRINT USING "###.##,";1234.5
1234.50,
```

^^^^ Four carets (or up arrows) can be placed after the digit position characters to specify exponential format. The four carets allow space for E + xx to be printed. Any decimal point position can be specified. The significant digits are left-justified, and the exponent is adjusted. Unless a leading + or trailing + or - is specified, one digit position will be used to the left of the decimal point to print a space or a minus sign.

```
PRINT USING "#.###^^^^";234.56
2.35E+02
```

```
PRINT USING ".####^^^^-";-888888
.8889E+06-
```

```
PRINT USING "+.###^^^^";123
+.12E+03
```

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- An underscore in the format string causes the next character to be output as a literal character.

```
PRINT USING "___!#.##_!";12.34  
!12.34!
```

The literal character itself may be an underscore by placing "___" in the format string.

- % If the number to be printed is larger than the specified numeric field, a percent sign is printed in front of the number. If rounding causes the number to exceed the field, a percent sign will be printed in front of the rounded number.

```
PRINT USING "##.##";111.22  
%111.22
```

```
PRINT USING ".##";.999  
%1.00
```

If the number of digits specified exceeds 24, an Illegal function call error will result.

PSET Statement

SYNTAX

PSET [STEP](*x,y*) [,color]

PURPOSE

Use the PSET statement to draw a point at the specified position.

EXPLANATION

(*x,y*) specify the point on the screen to be colored; *color* is the number of the color to be used. Valid color numbers are 0 and 1.

The STEP option, when used, indicates the given *x* and *y* coordinates will be relative, not absolute. That means the *x* and *y* are distances from the most recent point referenced, not distances from the (0,0) screen coordinate.

For example, if the most recent point referenced were (0,0), PSET STEP (10,0) would reference a point at offset 10 from x and offset 0 from y.

The coordinate (0,0) is always the upper left-hand corner of the screen.

When BASIC scans coordinate values, it will allow them to be beyond the edge of the screen. However, values outside the integer range -32,768 to 32,767 will cause an Overflow error.

PSET allows the color to be left off the command line. If it is omitted, the default is the foreground color.

EXAMPLE

```

5 REM DRAW A LINE FROM (0,0) TO (100,100)
10 FOR I=0 TO 100
20  PSET (I,I)
30 NEXT I
31 FOR I=1 TO 1000:NEXT I 'delay
35 REM NOW ERASE THAT LINE
40 FOR I=0 TO 100
50  PSET STEP (-1,-1),0
60 NEXT I

```

This example draws a line from (0,0) to (100,100) and then erases that line by writing over it with the background color.

PUT Statement (File I/O)

SYNTAX

PUT [#]*filenum*[,*recnum*]

PURPOSE

Use the PUT statement to write a record from a random buffer to a random access file.

EXPLANATION

filenum is the number under which you opened the file. If *recnum* is omitted, the record will assume the next available record number (after the last PUT or GET). The largest possible record number is 16,777,215. The smallest record number is 1.

The GET and PUT statements allow fixed-length input and output for BASIC COM files. However, because of the low performance associated with telephone line communications, we recommend that you do not use GET and PUT for telephone communication.

NOTE: LSET, RSET, PRINT#, PRINT# USING, and WRITE# can be used to put characters in the random file buffer before executing a PUT statement.

In the case of WRITE#, BASIC pads the buffer with spaces up to the carriage return character. Any attempt to read or write past the end of the buffer causes a FIELD overflow error.

EXAMPLE

```
100 PUT #1, 1
```

A value is read into the first record of a file opened as #1.

PUT Statement (Graphics)

SYNTAX

`PUT (x1,y1),array name[,action verb]`

PURPOSE

Use the PUT statement to transfer graphic images to the screen.

EXPLANATION

The GET and PUT statements are used together to transfer graphic images to and from the screen.

The GET statement transfers the area defined by the specified points into the array. See GET Statement (Graphics) in this chapter for details.

The PUT statement transfers the image stored in the array onto the screen.

The *action verb* specifies the interaction between the stored image and the one already on the screen.

(*x1,y1*) in the PUT statement specifies the point where a stored image is to be displayed on the screen. The specified point is the coordinate of the top left-hand corner of the image. If the image to be transferred is too large to fit in the current viewport, an Illegal function call error will result.

action verb is one of: PSET, PRESET, AND, OR, XOR.

- PSET transfers the data point by point onto the screen. Each point has the exact color attribute it had when it was taken from the screen with a GET statement.
- PRESET is the same as PSET except that a negative image (reverse video) is produced.
- AND is used when the image is to be transferred over an existing image on the screen. The resulting image is the product of the logical AND expression; points that have the same color in both the existing image and the PUT image will remain the same color; points that do not have the same color in both the existing image and the PUT image, will not.

- OR is used to superimpose the image onto an existing image.
- XOR is a special mode often used for animation. It causes the points on the screen to be inverted where a point exists in the array image. This behavior is exactly like that of the cursor. When an image is PUT against a complex background twice, the background is restored unchanged. This allows a user to move an object around the screen without erasing the background.

The default action verb is XOR.

One of the most useful things that can be done with GET and PUT is animation. To program an animation routine:

1. PUT the object(s) on the screen.
2. Recalculate the new position of the object(s).
3. PUT the object(s) on the screen a second time at the old location(s) (using XOR) to remove the old image(s).
4. Go to step 1, but this time PUT the object(s) at the new location.

Movement done this way will leave the background unchanged. Flicker can be cut down by minimizing the time between steps 4 and 1 and by making sure that there is enough time delay between 1 and 3. If more than one object is being animated, every object should be processed at once, one step at a time.

If it is not important to preserve the background, animation can be performed using the PSET action verb. The idea is to leave a border around the image when it is first used that is as large or larger than the maximum distance the object will move. Thus, when an object is moved, this border will effectively erase any points left by the previous PUT. This method may be somewhat faster than the method using XOR described here, since only one PUT is required to move an object (although you must PUT a larger image).

It is possible to examine the x and y dimensions and even the data itself if an integer array is used. With the interpreter, the x dimension is in element 0 of the array, and the y dimension is found in element 1. Remember that integers are stored low byte first, then high byte, but the data is transferred high byte first (leftmost) and then low byte.

QEND Call

SYNTAX

```
CALL QEND(handle,qbuffer[,size])
```

PURPOSE

Use the QEND call to end the creation of a query.

EXPLANATION

This routine is used to terminate the specification of a query. *handle* is a numeric variable that specifies an open database, and *qbuffer* is the array that was passed by reference to QSTART. *size* is an optional numeric variable. If *size* is included, QEND will return in it the number of bytes needed by the query key buffer for the query definition.

EXAMPLE

To end the query definition where *handle* is CUST%, *qbuffer* is QBUF(), and *size* is SIZE%, use the call:

```
CALL QEND (CUST%,QBUF(),SIZE%)
```

The query definition is now ended, and the integer variable SIZE% contains the number of bytes needed by the query-key buffer QBUF for this query definition. You can now use that value to dimension the query-key buffer and actually build the query key.

QFIELD Call**SYNTAX**

CALL QFIELD(*handle*,*qbuffer*,*field-ID*,*operator*,*mode*,*operand*)

PURPOSE

Use the QFIELD call to define a query key.

EXPLANATION

This is the routine that actually defines the query key. *handle* is a numeric variable that specifies an open database, *qbuffer* is the array of at least seven bytes in length that is passed by reference and that has been initialized by QSTART and QRSTART, and *field-ID* is a numeric expression that identifies the field to be tested. *operator* is a numeric expression that defines the test operation (comparison) to be performed during the query; it can have one of the following values:

0	=	(equal to)
1	<>	(not equal to)
2	<	(less than)
3	>	(greater than)
4	<=	(less than or equal to)
5	>=	(greater than or equal to)

mode is a numeric expression that will be interpreted as a bit-encoded integer. The basic values for mode are:

- 0 None of the following options are to be selected.
- 2 "*" and "?" will be interpreted as wildcard characters in string fields and as hex 0F in date fields. If *mode* is 0, "*" and "?" will be interpreted as text characters rather than wildcard characters.
- 4 In string comparisons, case will be ignored. Therefore, "JOHNSON" would be considered equal to "Johnson" or jOhnSon. If mode is 0, case is significant in string comparisons.
- 8 The operand specifies the field-ID of another field in the record to be used in the test (comparison). If the mode is 0, QFIELD assumes that *operand* contains a value against which *field-ID* is to be compared.

The mode values may be added together if you want to select more than one option. For example, if you wanted to use wildcard characters and you wanted to ignore case in a string comparison, you could specify *mode* as 2+4 or as 6.

The query key created by this function is a specially encoded conditional statement that can be used by RFIND as a basis for selecting records from the database.

EXAMPLE

Suppose you wanted to select from CUSTOMER.DAT all the records relating to Donna Hogan. You would use the following calls:

```
CALL FGID(CUST%,"NAME",FID%)  
CALL QFIELD(CUST%,QBUF(),FID%,0;0,"DONNA HOGAN")
```

The first call FGID returns the field-ID for the NAME field so that it can be used in the QFIELD call. The QFIELD call specifies the NAME field, identified by FID%, as the field to be tested and "DONNA HOGAN" as the value against which the field is compared. The operator is 0, which means that the test is to be for equality between the field and the operand. That is, "DONNA HOGAN" will match "DONNA HOGAN" but not "Donna Hogan." If you had used the case mode (4), upper- and lowercase names would be equal.

QREND Call

SYNTAX

```
CALL QREND(handle,qbuffer)
```

PURPOSE

Use the QREND call to end the definition of a query key.

EXPLANATION

This routine ends the definition of the query key begun with the closest preceding QRSTART. *handle* is a numeric variable that specifies an open database, and *qbuffer* is the array that was passed by reference to QRSTART.

EXAMPLE

To end the definition of the query key for CUST%, you would use the call:

```
CALL QREND(CUST%,QBUF())
```

QRSTART Call

SYNTAX

```
CALL QRSTART(handle,qbuffer)
```

PURPOSE

Use the QRSTART call to start a query key.

EXPLANATION

This routine starts the definition of a new query key. *handle* is a numeric variable that specifies an open database, and *qbuffer* is the array, passed by reference, that has been previously initialized by QSTART.

EXAMPLE

To start the query key definition for CUST%, you would use the call:

```
CALL QRSTART(CUST%,QBUF())
```

QSTART Call

SYNTAX

```
CALL QSTART(handle,qbuffer[,mode])
```

PURPOSE

Use the QSTART call to start the creation of a query.

EXPLANATION

This routine is used to initiate the specification of a query or to obtain information about the amount of space that will be needed to create a query specification. *handle* is a numeric variable that specifies an open database, and *qbuffer* is an array having at least seven bytes allocated to it, which is passed by reference (see example that follows). *mode* is a numeric expression that can evaluate to either zero or one; if zero, the process (including subsequent query routines) will build the query. If *mode* is one, the process will only determine the amount of space required in *qbuffer* to build the actual query; then the program can define an array large enough to hold the query definition and repeat the process with *mode* set to zero. If *mode* is not specified, it is assumed to be zero.

An array is passed by reference by passing the address of the array descriptor, rather than the address of an array element. This is done by referring to the array in the normal manner, except that the array subscript is omitted. To pass the array named QBUF, use:

QBUF()

as a parameter in the CALL statement. Some examples using QSTART are:

```
CALL QSTART(HANDL,QBUF())
CALL QSTART(FILE1,BUFFR(),1)
```

The number of bytes allocated to the array is a function of the type of array used and of the number of elements in the array. An array of one double-precision, two single-precision, or four integer elements will provide the absolute minimum of seven bytes required (it is highly recommended that you allocate more). The array must have had storage allocated to it *before* it is passed to this routine; hence it must either have been dimensioned (using the DIM statement) or had a value assigned to at least one element before calling QSTART.

Even though the data contained in the array will not be valid numeric data, the use of an array of numeric type is recommended.

EXAMPLE

To begin the query definition for CUST%, you would use the call:

```
CALL QSTART(CUST% QBUF(),1)
```

QUIT Command

SYNTAX

QUIT

PURPOSE

Use the QUIT command to suspend BASIC and activate another application.

EXPLANATION

If this command is encountered at command level, only the currently loaded program text is saved. In this case, it will be impossible to use the CONT command or resume this program. All open files will be closed, all numeric variables will be set to 0, and all string variables to null. When this work file is reactivated, the currently loaded program will still be loaded.

If this command is encountered in a running program, the entire state of the running program is saved. When this work file is reactivated, the program will continue as if it had never been suspended.

EXAMPLE

```
500 IF K>1000 THEN QUIT ELSE GOTO 20
```

This example is designed to perform a group of program instructions 1,000 times, but no more. If the instructions have not exceeded this limit, the code will be executed. When the program instructions have been executed more than 1,000 times, the program will end.

RANDOMIZE Statement

SYNTAX

RANDOMIZE [*x*]

PURPOSE

Use the RANDOMIZE statement to reseed the random number generator.

EXPLANATION

If *x* is omitted, BASIC suspends program execution and asks for a value by displaying:

Random Number Seed (-32768 to 32767)?

If *x* is a variable, the value of that variable is used to seed the random numbers.

If *x* is the word "TIMER," then the TIMER function is used to pass a random number seed.

If the random number generator is not reseeded, the RND function returns the same sequence of random numbers each time the program is run. To change the sequence of random numbers every time the program is run, place a RANDOMIZE statement at the beginning of the program and change the argument with each run.

EXAMPLES

```
10 RANDOMIZE
20 FOR I=1 TO 2
30 PRINT RND;
40 NEXT I
RUN
Random Number Seed (-32768 to 32767)? 3
```

```
.39724200963967 .058194041252126
OK
RUN
Random Number Seed (-32768 to 32767)? 4
```

```
.80362933874116 .22965705394741
OK
```

Note that the numbers your program produces may not be the same as the ones shown here.

RCLOSE Call

SYNTAX

CALL RCLOSE(*handle*[,*record-ID*])

PURPOSE

Use the RCLOSE call to close the currently open record in a database.

EXPLANATION

This routine closes an open database record and terminates processing on that record. If the *record-ID* parameter is used, RCLOSE will return in it the record number of the record it closes. *record-ID* must be a numeric variable.

EXAMPLE

To close a record in CUST%, you would use the call:

CALL RCLOSE(CUST%)

RCREATE Call

SYNTAX

```
CALL RCREATE(handle[,record-ID])
```

PURPOSE

Use the RCREATE call to create a record in a database.

EXPLANATION

In order to write a record, the record must first be created. If the *record-ID* parameter is omitted, the record will be created at the end of the database. If *record-ID* is specified, it will be used to determine the position of the new record within the database. (The first record in a database is record number 0.) The fields within the record must be created using the FCREATE call before the record can be created.

EXAMPLE

To write a record to CUST%, a file with three fields, use the following calls:

```
CALL RCREATE(CUST%)
CALL FPUT(CUST%,F1,"DON MORRIS")
CALL FPUT(CUST%,F2,"COMPUTERIZED TYPESETTING")
CALL FPUT(CUST%,F3,"312-555-1200")
```

RDELETE Call

SYNTAX

CALL RDELETE(*handle*,*record-ID*)

PURPOSE

Use the RDELETE call to delete a database record.

EXPLANATION

handle specifies an open database. *record-ID* is the number of the record to be deleted.

This routine deletes a database record. Once the record is deleted, it cannot be restored. The record need not be open, but the database must be open.

EXAMPLE

```
10 LIBRARY "DBCALLS.LIB"
20 CALL DBOPEN("ADDRESS.DAT",2,A)
30 CALL RDELETE(A,3)
40 CALL DBCLOSE(A)
50 LIBRARY CLOSE
60 END
```

READ Statement

SYNTAX

READ *variable*[,*variable*] . . .

PURPOSE

Use the READ statement to read values from a DATA statement and assign them to variables. (See the DATA Statement in this chapter.)

EXPLANATION

A READ statement must always be used in conjunction with a DATA statement. READ statements assign DATA statement values to variables on a one-to-one basis. READ statement variables can be numeric or string, and the values read must agree with the variable types specified. If they do not agree, a Syntax error will result.

A single READ statement can access one or more DATA statements (they will be accessed in order), or several READ statements can access the same DATA statement. If the number of variables in the READ statement exceeds the number of elements in the DATA statement(s), an Out of data error message is displayed. If the number of variables specified is fewer than the number of elements in the DATA statement(s), subsequent READ statements will begin reading data at the first unread element. If there are no subsequent READ statements, the extra data is ignored.

To reread DATA statements from the start, use the RESTORE statement. See RESTORE Statement in this chapter.

EXAMPLES

```
60 OPTION BASE 1
70 DIM (10)
80 FOR I=1 TO 10
90 READ A(I)
100 NEXT I
110 DATA 3.08,5.19,3.12,3.98,4.24
120 DATA 5.08,5.55,4.00,3.16,3.37
.
.
```

This program segment READs the values from the DATA statements into the array A. After execution, the value of A(1) will be 3.08, A(2) will be 5.19, and so on.

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BASIC Reference

```
10 PRINT "CITY", "STATE", "ZIP"
20 READ C$,S$,Z$
30 DATA "DENVER", "COLORADO","80211"
40 PRINT C$,S$,Z$
RUN
CITY      STATE      ZIP
DENVER    COLORADO   80211
```

This program reads string data from the DATA statement in line 30.

REM Statement

SYNTAX

REM | ' [remark]

PURPOSE

Use the REM statement to insert explanatory remarks in a program.

EXPLANATION

REM statements are not executed but are output exactly as entered when the program subsequently is listed.

You may branch to a REM statement from a GOTO or GOSUB statement. Execution will continue with the first executable statement after the REM statement.

Remarks can be added to a line by preceding the remark with a single quotation mark instead of REM.

If you put a REM statement on a line with other BASIC statements (by preceding it with :REM or a single quotation mark), it must be the last statement on the line.

NOTE: Do not use REM in a data statement, because the data statement would treat the REM line as legal data.

EXAMPLES

```
.  
. .  
120 REM CALCULATE AVERAGE VELOCITY  
130 FOR I=1 TO 20  
140 SUM=SUM + V(I)  
150 NEXT I  
. .
```

The REM statement in line 120 explains the function of the calculation that follows.

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BASIC Reference

```
120 FOR I=1 TO 20 'CALCULATE AVERAGE VELOCITY  
130   SUM=SUM+V(I)  
140 NEXT I
```

This is another way to include comments (remarks) in a program.

RENUM Command

SYNTAX

RENUM [*newnum*][,[*oldnum*][,*increment*]]

PURPOSE

Use the RENUM command to renumber program lines.

EXPLANATION

newnum is the first line number to be used in the new sequence. The default is 10. *oldnum* is the line in the current program where renumbering is to begin. The default is the first line of the program. *increment* is the increment to be used in the new sequence. The default is 10.

RENUM also changes all line number references following GOTO, GOSUB, THEN, ELSE, ON . . . GOTO, ON . . . GOSUB, RESTORE, RESUME, and ERL statements to reflect the new line numbers. If a nonexistent line number appears after one of these statements, the error message *Undefined line number xxxx in yyyy* is printed. The incorrect line number reference is not changed by RENUM, but line number *yyyy* may be changed.

NOTE: RENUM cannot be used to change the order of program lines (for example, RENUM 15,30 is illegal when the program has three lines numbered 10, 20 and 30) or to create line numbers greater than 65529. An *Illegal function call* error will result.

EXAMPLES

RENUM Renumbers the entire program. The first new line number will be 10. Lines will be numbered in increments of 10.

RENUM 300,,50 Renumbers the entire program. The first new line number will be 300. Lines will be numbered in increments of 50.

RENUM 1000,900,20 Renumbers the lines from 900 up so that they start with line number 1000 and are numbered in increments of 20.

RESET Command

SYNTAX

RESET

PURPOSE

Use the RESET command to close all files.

EXPLANATION

RESET closes all open files and forces all blocks in the currently active workspace to be written to memory. In the event that the machine loses power, all files will be properly updated and variables will be preserved.

EXAMPLE

```
.  
. .  
998 RESET  
999 END
```

RESTART Statement

SYNTAX

```
RESTART ON  
RESTART OFF  
RESTART STOP
```

PURPOSE

Use the RESTART statement to enable, disable, or suspend restart trapping.

EXPLANATION

RESTART allows you to detect when a program is being reentered after BASIC has been suspended by the QUIT key or the RUN PREVIOUS key. BASIC does not save the contents of the screen when it is suspended, so one use for this trap is to redraw the screen when the program is restarted.

RESTART ON enables restart trapping.

RESTART OFF disables restart trapping.

RESTART STOP suspends restart trapping.

EXAMPLE

```
10 RESTART ON  
20 ON RESTART GOSUB 1000  
30 FL$="CLIENT.DAT"  
40 OPEN "R",1,FL$,30:FIELD 1,30 AS A$  
50 CLS:INPUT "Enter client name";N$  
60 IF N$="END" OR N$="end" THEN 100  
70 LSET A$=N$:PUT 1  
80 GOTO 50  
100 'END ROUTINE  
150 PRINT "Entries completed."  
155 CLOSE  
160 END  
1000 CLS: PRINT "WELCOME BACK TO CLIENT INPUT"  
1010 FOR I=1 TO 1000:NEXT I  
1020 PRINT "Proceed with entries."  
1025 RESTART OFF  
1030 RETURN
```

RESTORE Statement

SYNTAX

RESTORE [*linenum*]

PURPOSE

Use the RESTORE statement to allow DATA statements to be reread from a specified line.

EXPLANATION

After a RESTORE statement that does not contain a specified line number is executed, the next READ statement accesses the first item in the first DATA statement in the program.

If *linenum* is specified, the next READ statement accesses the first item in the specified DATA statement.

EXAMPLE

```
10 READ A,B,C
20 RESTORE
30 READ D,E,F
35 PRINT A; B; C; D; E; F
40 DATA 57, 68, 79
RUN
57 68 79 57 68 79
```

RESUME Statement

SYNTAX

RESUME [0 | NEXT | *linenum*]

PURPOSE

Use the RESUME statement to continue program execution after an error-handling subroutine has been performed.

EXPLANATION

Any one of the four syntax variations shown can be used, depending upon where execution is to resume:

RESUME or RESUME 0 causes execution to resume at the statement that caused the error.

RESUME NEXT causes execution to resume at the statement immediately following the one that caused the error.

RESUME *linenum* causes execution to resume at *linenum*.

A RESUME statement that is not in an error-handling routine causes a RESUME without error message to be displayed.

If you do not include a RESUME in your error-handling routine, BASIC will continue execution with the statements that follow the error-handling routine.

EXAMPLE

```
10 ON ERROR GOTO 900
.
.
900 IF (ERR=52) AND (ERL=90) THEN PRINT "TRY AGAIN":RESUME 80
.
```

RETURN Statement

SYNTAX

RETURN[*linenum*]

PURPOSE

Use the RETURN statement to return to the main program after branching to a subroutine.

EXPLANATION

linenum is the number of the line to which the program will return.

The RETURN statement without *linenum* causes BASIC to branch back to the statement following the most recent GOSUB statement.

A subroutine can contain more than one RETURN statement.

The RETURN *linenum* form of the RETURN statement can be used to return to a specific line number from the trapping subroutine. Use this type of return with care, however, because any other GOSUBs, WHILEs, or FORs that were active at the time of the trap will remain active, and errors such as FOR without NEXT may result.

EXAMPLE

```
10 GOSUB 40
20 PRINT "BACK FROM SUBROUTINE"
30 END
40 PRINT "SUBROUTINE ";
50 PRINT " IN ";
60 PRINT " PROGRESS "
70 RETURN
RUN
SUBROUTINE IN PROGRESS BACK FROM SUBROUTINE
```

RFIND Call

SYNTAX

```
CALL RFIND(handle,start-record,direction,qbuffer,record-ID)
```

PURPOSE

Use the RFIND call to find a specific database record that meets one or more query key specifications.

EXPLANATION

This routine will search the open database specified by *handle*, starting at the specified *start-record* and continuing in the specified *direction*, for the next record that satisfies the *query-key* contained in *qbuffer*. The number of the record found (if any) will be returned in *record-ID*. This record number can then be used by ROPEN to open the record for access. If no record is found that meets the query specifications, an error occurs.

start-record is a numeric expression that indicates the record number of the first record that should be checked. *direction* is a numeric expression; its only valid values are 0 for a forward search or 1 for a backward search. *query-key* is an array-by-reference parameter containing a query that was built using the query calls. *record-ID* is a numeric variable that must have been initialized (assigned a value) before being passed to RFIND.

EXAMPLE

To find the first record in CUST% that matches the query specifications contained in QBUF, use the following statement:

```
RECNO%=0  
.  
.CALL RFIND(CUST%,RECNO%,0,QBUF(),FOUND%)
```

RIGHT\$ Function

SYNTAX

RIGHT\$(*x\$*,*n*)

PURPOSE

Use the **RIGHT\$** function to return the rightmost *n* characters of string *x\$*.

EXPLANATION

If *n* is greater than or equal to the length of *x\$*, the function will return the entire string. If *n* = 0, the null string (length zero) is returned.

EXAMPLE

```
10 A$="DISK BASIC"
20 PRINT RIGHT$(A$,5)
RUN
BASIC
```

See **LEFT\$** Function and **MID\$** Function in this chapter for details about other string character functions.

RMOVE Call

SYNTAX

```
CALL RMOVE(handle,old-ID,new-ID)
```

PURPOSE

Use the RMOVE call to move a record in a database to another position within the database.

EXPLANATION

This routine moves the record in position *old-ID* of the database designated by *handle* to position *new-ID* within the database. Other records are moved as necessary to fill the newly opened position. This routine does not overwrite one record with another; rather, it simply changes the sequence of records.

EXAMPLE

```
10 LIBRARY "DBCALLS.LIB"
20 CALL DBOOPEN("ADDRESS.DAT",2,DB)
30 CALL RMOVE(DB,2,0)
40 CALL DBCLOSE(DB)
50 LIBRARY CLOSE
60 END
```



RND Function

SYNTAX

RND[(*x*)]

PURPOSE

Use the RND function to return a random number between 0 and 1.

EXPLANATION

The same sequence of random numbers is generated each time the program is run unless the random number generator is reseeded (see the RANDOMIZE Statement in this chapter).

If *x* is positive or omitted, BASIC generates the next random number in the sequence.



EXAMPLE

```
10 FOR I=1 TO 5
20 PRINT INT(RND*100);
30 NEXT I
RUN
24 30 31 51 5
```

The values produced by the RND function in this example may be different from the ones displayed on your screen.



RNUMF Call

SYNTAX

CALL RNUMF(*handle,nrecs*)

PURPOSE

Use the RNUMF call to determine the number of records in a database.

EXPLANATION

This routine returns the number of records contained in the open database specified by *handle*. The quantity is returned in the numeric variable *nrecs*.

EXAMPLE

```
40 CALL RNUMF(A,NRECS)
```

ROOPEN Call

SYNTAX

CALL ROPEN(*handle*,*record-ID*[,*access*])

PURPOSE

Use the ROPEN call to open a record in a database.

EXPLANATION

This routine opens a database record. *handle* is a numeric variable that specifies the open database. *record-ID* is a numeric expression that identifies the record to be opened. If the *access* parameter is omitted, the access specified when the database was opened will be in effect. *access* can be one of the following values:

- | | |
|---|-------------------|
| 0 | Read-only access |
| 1 | Write-only access |
| 2 | Read-write access |

EXAMPLE

To open the first record in CUST% for read-only access, you would use the call:

CALL ROPEN(CUST%,0)

RUN Command

SYNTAX

```
RUN [linenum]  
RUN filespec[,R]
```

PURPOSE

Use the RUN command to execute the program in the current workspace or to load a file into memory and run it.

EXPLANATION

For a program in the current workspace, if *linenum* is specified, execution begins on that line. Otherwise, execution begins at the lowest line number. BASIC always returns to command level after a RUN statement is executed.

filespec is a string expression containing the file name used when the file was saved. It must conform to the rules for naming files described in Files and File Names in Chapter 1. BASIC appends the default file name extension .BAS if the user specifies no extensions. The R option leaves open all data files.

RUN closes all open files and deletes the current contents of the workspace before loading the designated program. However, with the R option, all data files remain open.

EXAMPLE

```
RUN "NEWFIL",R
```

The file NEWFILE will be executed. The R option indicates that the data files are to remain open.

SAVE Command

SYNTAX

SAVE *filespec*[,A|,P]

PURPOSE

Use the SAVE command to save a program file.

EXPLANATION

filespec is a string expression containing a file name. It must conform to the file naming conventions described in Chapter 1. BASIC appends the default file name extension .BAS if you do not specify an extension. If a file with the same file name already exists, the old file will be overwritten.

The A option saves the file in ASCII format. If the A option is not specified, BASIC saves the file in a compressed binary format. ASCII format takes more space, but some actions require that files be in ASCII format. For instance, the MERGE command requires an ASCII format file.

The P option protects the file by saving it in an encoded binary format. When a protected file is later run (or loaded), any attempt to list or edit it will fail, and an Illegal function call error message is displayed. Use this option only when your program is completed and after you have made a copy in unprotected format.

EXAMPLES

100 SAVE "COM1",A

In this example, the program COM1.BAS is saved in ASCII format.

100 SAVE "PROG",P

In this example, the program PROG.BAS is saved as a protected file that cannot be altered.

SGN Function

SYNTAX

$\text{SGN}(x)$

PURPOSE

Use the SGN function to indicate the value of x , relative to zero.

EXPLANATION

x is a numeric expression.

If $x > 0$, SGN returns 1.
If $x = 0$, SGN returns 0.
If $x < 0$, SGN returns -1.

EXAMPLE

```
90 ON SGN(A)+2 GOTO 100,200,300
```

branches to line 100 if A is negative, 200 if A is 0, and 300 if A is positive.



SIN Function

SYNTAX

$\text{SIN}(x)$

PURPOSE

Use the SIN function to return the sine of x , where x is in radians.

EXPLANATION

SIN is calculated in double precision. To convert from degrees to radians, use the formula:

$$\text{radians} = \text{degrees} * (\text{PI}/180)$$

where PI = 3.141593



EXAMPLE

```
10 PRINT SIN(1.5)
RUN
.99749498660403
```

In this example, the sine of 1.5 radians is calculated and displayed in double precision.



SOUND Statement

SYNTAX

SOUND *frequency,duration*

PURPOSE

Use the SOUND statement to generate a sound through the speaker.

EXPLANATION

frequency is the desired frequency in Hertz (cycles per second). This must be a numeric expression returning an unsigned integer in the range 37–32,767.

duration is the duration of the sound in clock ticks. (Clock ticks occur 18.2 times per second.) This must be a numeric expression, returning an unsigned integer in the range 0 to 2,978.

When the SOUND statement produces a sound, the program continues to execute until it reaches another SOUND statement. If the duration is zero, any current SOUND statement that is running will be turned off. If no SOUND statement is currently running, a SOUND statement with a duration of zero will have no effect.

EXAMPLE

```
30 SOUND RND*1000+37,2  
40 GOTO 30
```

This program creates random sounds.

SPACE\$ Function

SYNTAX

SPACE\$(*n*)

PURPOSE

Use the SPACE\$ function to return a string of spaces of length *n*.

EXPLANATION

The expression *n* is rounded to an integer and must be in the range 0–255.

EXAMPLE

```
10 FOR I=1 TO 5
20 X$=SPACE$(I)
30 PRINT X$;I
40 NEXT I
```

will yield

```
1
2
3
4
5
```

See SPC Function in this chapter for details about printing blanks to your screen or printer.

SPC Function

SYNTAX

`SPC(n)`

PURPOSE

Use the SPC function to skip spaces in a PRINT statement.

EXPLANATION

n is the number of spaces to be skipped.

The SPC function can only be used with PRINT, LPRINT, and PRINT# statements. *n* must be in the range 0–255. A semicolon (;) is assumed to follow the SPC function. This means that a RETURN is not added after SPC.

EXAMPLE

```
10 PRINT "OVER" SPC(15) "THERE"  
RUN  
OVER           THERE
```

See SPACE\$ Function in this chapter for details about strings of spaces.

SQR Function**SYNTAX** $\text{SQR}(x)$ **PURPOSE**

Use the SQR function to return the square root of x .

EXPLANATION

x must be ≥ 0 .

SQR is calculated in double precision.

EXAMPLE

```
10 FOR X=10 TO 25 STEP 5
20 PRINT X, SQR(X)
30 NEXT X
```

will yield

```
10      3.1622776601684
15      3.8729833462074
20      4.4721359549996
25      5
```

STOP Statement

SYNTAX

STOP

PURPOSE

Use the STOP statement to suspend program execution and return to command level.

EXPLANATION

STOP statements can be used anywhere in a program to suspend execution. STOP is often used for debugging. When a STOP is encountered, the following message is printed:

Break in nnnnn

where nnnnn is the number of the line in which the STOP occurred.

The STOP statement does not close files.

BASIC always returns to command level after a STOP is executed. Execution is resumed by issuing a CONT command.

EXAMPLE

```
10 INPUT A,B,C  
20 K=A^2*5.3:L=B^3/.26  
30 STOP  
40 M=C*K+100:PRINT M  
RUN  
?
```

Enter 1,2,3

Break in 30

Enter Print L

30.769230769231

Enter CONT

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STR\$ Function

SYNTAX

STR\$(*n*)

PURPOSE

Use the STR\$ function to return a string representation of the value of *n*.

EXPLANATION

If *n* is positive, the string returned by STR\$ will contain a leading blank space, which is reserved for the plus sign. If *n* is negative, a leading minus sign is returned as part of the string.

EXAMPLE

```
10 INPUT "TYPE A NUMBER";N
20 B$ = "NUMBER ENTERED WAS" + STR$(N)
30 PRINT B$
RUN
TYPE A NUMBER ?
```

Enter 3

NUMBER ENTERED WAS 3

See VAL Function in this chapter for details about converting strings to numeric values.

STRING\$ Function

SYNTAX

STRING\$(*n,m|x\$*)

PURPOSE

Use the STRING\$ function to return a string of length *n* whose characters all have ASCII code *m* or the first character of *x\$*.

EXPLANATION

n and *m* are integer expressions in the range 0–255. *x\$* is any string expression.

EXAMPLES

```
10 DASH$ = STRING$(10,45)
20 PRINT DASH$;"MONTHLY REPORT";DASH$
RUN
```

-----MONTHLY REPORT-----

```
10 LET A$ = "HOUSTON"
20 LET X$ = STRING$(8,A$)
30 PRINT X$;A$
RUN
```

HHHHHHHHHOUSTON



SWAP Statement

SYNTAX

SWAP variable1,variable2

PURPOSE

Use the SWAP statement to exchange the values of two variables.



EXPLANATION

Any type of variable can be swapped (integer, single-precision, double-precision, string), but the two variables must be of the same type or a Type mismatch error results.

If the second variable is not already defined when SWAP is executed, an Illegal function call error will result.

EXAMPLE

```
10 A$= "ONE" : B$= "ALL" : C$= "FOR"
20 PRINT A$;" "; C$;" " B$
30 SWAP A$, B$
40 PRINT A$;" " C$; B$" "
RUN
ONE FOR ALL
ALL FOR ONE
```



SYSTEM Command

SYNTAX

SYSTEM

PURPOSE

Use the SYSTEM command to close all open files and return control to the System Manager.

EXPLANATION

When a SYSTEM command is executed, all files are closed, all variables are cleared, and BASIC exits to the System Manager. Using the SYSTEM command will not save a program in the current workspace. Use the QUIT command or CTRL-F10 to save the program in the workspace (work file) before returning to the System Manager.

EXAMPLE

To leave the BASIC program at any time, enter:

SYSTEM

Control will be returned to the System Manager.

TAB Function

SYNTAX

TAB(*n*)

PURPOSE

Use the TAB function to move the print position to *n*.

EXPLANATION

If the current print position is already beyond space *n*, TAB goes to that position on the next line. Space 1 is the leftmost position, and the rightmost position is the width minus one. *n* must be in the range 1–255. TAB may only be used in PRINT and LPRINT statements.

EXAMPLE

```
10 PRINT "NAME" TAB(25) "AMOUNT" : PRINT
20 READ A$,B$
30 PRINT A$ TAB(25) B$
40 DATA "G. T. JONES","$25.00"
RUN
NAME          AMOUNT
G. T. JONES    $25.00
```

TAN Function

SYNTAX

$\text{TAN}(x)$

PURPOSE

Use the TAN function to return the tangent of x . x should be given in radians.

EXPLANATION

TAN is calculated in double precision. If TAN overflows, the Overflow error message is displayed.

EXAMPLE

```
10 PI = 3.141593: DEGREES = 60
20 PRINT TAN (DEGREES*PI/180)
RUN
1.7320512694493
```



TIME\$ Function

SYNTAX

TIME\$

PURPOSE

To retrieve the current time. (To set the time, use the TIME\$ statement, described in this chapter.)

EXPLANATION

The TIME\$ function returns an 8-character string in the form *hh:mm:ss*, where *hh* is the hour (00 through 23), *mm* is minutes (00 through 59), and *ss* is seconds (00 through 59). A 24-hour clock is used; 8:00 p.m., therefore, would be shown as 20:00:00.

EXAMPLE

10 PRINT TIME\$

This example prints the time, calculated from the time set with the TIME\$ statement or from the system clock.



TIME\$ Statement

SYNTAX

TIME\$=*string*

PURPOSE

Use the TIME\$ statement to set or retrieve the current time.

EXPLANATION

A 24-hour clock is used; 8:00 p.m., therefore, would be entered as 20:00:00, where 20 is the hour, 00 are minutes, and 00 are seconds.

To set the current time, *string* may be entered in one of the following forms:

hh (sets the hour; minutes and seconds default to 00)
hh:mm (sets the hour and minutes; seconds default to 00)
hh:mm:ss (sets the hour, minutes, and seconds)

To retrieve the current time, use the TIME\$ function described in this chapter.

EXAMPLES

```
10 TIME$="09:00:00"
```

In this example, the current time in the system is set at 9:00 a.m.

```
10 TIME$="09:00:00"
20 PRINT TIME$
RUN
09:00:00
```

This example prints the time, calculated from the time set with the TIME\$ statement.

TIMER Statement

SYNTAX

TIMER ON
TIMER OFF
TIMER STOP

PURPOSE

Use the TIMER statement to enable, disable, or suspend event trapping during real time.

EXPLANATION

The TIMER ON statement enables real time event trapping by an ON TIMER statement (see the ON TIMER Statement in this chapter). While trapping is enabled with the ON TIMER statement, BASIC checks the elapsed time between every statement to see if the timer has reached the specified level. If it has, the ON TIMER statement is executed.

TIMER OFF disables the event trap. If an event takes place, it is not remembered if a subsequent TIMER ON is used.

TIMER STOP disables the event trap, but if an event occurs, it is remembered and an ON TIMER statement will be executed as soon as trapping is enabled.

See ON TIMER Statement in this chapter for details about event trapping during real time.

EXAMPLE

```
10 ON TIMER(60) GOSUB 10000
20 TIMER ON
.
.
10000 LET OLDROW=CSRLIN 'Save current Row
10010 LET OLDCOL=POS(0) 'Save current Column
10020 LOCATE 1,1:PRINT TIME$;
10030 LOCATE OLDROW,OLDCOL 'Restore Row & Col
10040 RETURN
```

TRON/TROFF Commands

SYNTAX

TRON
TROFF

PURPOSE

Use the TRON/TROFF commands to trace the execution of program statements.

EXPLANATION

As an aid in debugging, the TRON command can be executed in either direct or indirect mode. With TRON in operation, each line number of the program is printed on the screen as it is executed.

The line numbers appear enclosed in square brackets. The trace flag is disabled with the TROFF command (or when a NEW command is executed).

EXAMPLE

Enter TRON before entering the following program.

```
10 K=10
20 FOR J=1 TO 2
30 L=K + 10
40 PRINT J;K;L
50 K=K + 10
60 NEXT J
70 END
RUN
[10][20][30][40] 1 10 20
[50][60][30][40] 2 20 30
[50][60][70]
```

VAL Function

SYNTAX

VAL(*string*)

PURPOSE

Use the VAL function to return the numeric value of *string*. The VAL function also strips leading blanks, tabs, and line feeds from the argument string.

EXPLANATION

string must be a numeric character stored as a string.

EXAMPLES

```
10 X=VAL(" -3")
20 PRINT X
RUN
-3
```

```
10 READ NAME$,CITY$,STATE$,ZIP$
20 IF VAL(ZIP$)>90000 OR VAL(ZIP$)>96699 THEN PRINT NAME$ TAB(25) "OUT OF STATE"
30 IF VAL(ZIP$)>=90801 AND VAL(ZIP$)<=90815 THEN PRINT NAME$ TAB(25) "LONG BEACH"
.
.
.
```

See STR\$ Function in this chapter for details on numeric-to-string conversion.

VIEW Statement

SYNTAX

```
VIEW [ [SCREEN] [(x1,y1)–(x2,y2) [,color][,[border]]] ]
```

PURPOSE

Use the VIEW statement to define screen limits for graphics activity.

EXPLANATION

VIEW defines a physical viewport limit from $x1,y1$ (upper left x,y coordinates) to $x2,y2$ (lower right x,y coordinates). The x and y coordinates must be within the physical bounds of the screen. The physical viewport defines the rectangle within the screen into which graphics may be mapped.

When VIEW has no arguments, the entire screen is defined as the viewport. RUN resets the viewport back to the full screen.

The *color* attribute allows the user to fill the view area with a color. If *color* is omitted, the view area is not filled. Since the LCD has only two colors (on and off), only 0 and 1 will be accepted as valid colors. *color* 0 designates pixels off and 1, pixels on.

The *border* attribute allows the user to draw a line surrounding the viewport if space for a border is available. If *border* is omitted, no border is drawn.

The SCREEN option dictates that the x and y coordinates are absolute to the screen, not relative to the border of the physical viewport, and only graphics within the viewport will be plotted.

For the form:

```
VIEW (x1,y1)–(x2,y2)
```

all points plotted are relative to the viewport. That is, $x1$ and $y1$ are added to the x and y coordinates before putting the point down on the screen.

If:

```
VIEW (10,10)–(200,100)
```

were executed, then the point set down by the statement PSET (0,0),1 would actually be at the physical screen location 10,10.

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For the form:

VIEW SCREEN (x_1, y_1)–(x_2, y_2)

all coordinates are screen absolute rather than viewport relative.

If:

VIEW SCREEN (10,10)–(200,100)

were executed, then the point set down by the statement **PSET (0,0),1** would actually not appear, because 0,0 is outside of the viewport. **PSET (10,10),1** is within the viewport and places the point in the upper left-hand corner of the viewport.

A number of **VIEW** statements may be executed. If the newly described viewport is not wholly within the previous viewport, the screen can be reinitialized with the **VIEW** statement. Then the new viewport can be stated. If the new viewport is entirely within the previous one, as in the following example, the intermediate **VIEW** statement is not necessary.

EXAMPLE

```
10 VIEW (10,10)-(190,100)
20 CLS
30 LINE (0,0)-(190,110)
35 FOR I=1 TO 1000:NEXT I
40 VIEW (0,0)-(100,50)
45 CLS
50 LINE (0,0)-(190,110)
END
```

WHILE . . . WEND Statement

SYNTAX

WHILE *expression*

[BASIC statements]

WEND

PURPOSE

Use the WHILE . . . WEND statement to execute a series of statements in a loop for as long as a given condition is true.

EXPLANATION

If *expression* is not zero (that is, true), BASIC statements are executed until the WEND statement is encountered. BASIC then returns to the WHILE statement and checks *expression*. If it is still true, the process is repeated. If it is not true, execution resumes with the statement following the WEND statement.

WHILE . . . WEND loops can be nested to any level. Each WEND will match the most recent WHILE. An unmatched WHILE statement causes a WHILE without WEND error, and an unmatched WEND statement causes a WEND without WHILE error.

EXAMPLE

```
90 'BUBBLE SORT ARRAY A$ WHICH HAS J ELEMENTS.  
100 FLIPS=1 'FORCE ONE PASS THRU LOOP  
110 WHILE FLIPS  
115   FLIPS=0  
120   FOR I=1 TO J-1  
130     IF A$(I)>A$(I+1) THEN SWAP A$(I),A$(I+1):FLIPS=1  
140   NEXT I  
150 WEND
```

NOTE: Do not direct program flow into a WHILE . . . WEND loop. Enter through the WHILE statement only.

WIDTH Statement

SYNTAX

WIDTH ["*device*", | *filenum*,] *size*

PURPOSE

Use the WIDTH statement to set the printed line width in number of characters for the line printer.

EXPLANATION

size is a numeric expression in the range 0–255. It specifies the width of the printed line. The default width is 80 characters. If the numeric expression is 255, the line width is infinite; that is, BASIC never inserts a RETURN. However, the position of the cursor or the print head, as given by the LPOS function, returns to zero after position 255.

filenum is a numeric expression in the range 1–15. This is the number of the file that is open. If *filenum* is specified, the width of the device associated with *filenum* is immediately changed to the new value specified by *size*.

device is a string expression indicating the device that is to be used.

Valid devices are:

PRN: parallel or serial printer
COM1: RS-232 communications

If *device* is specified, the default line width for the specified device is set to *size*. The line widths of currently open files are not modified. A subsequent OPEN *filespec* FOR OUTPUT AS #*n* uses the specified value for the width initially.

EXAMPLE

```
10 WIDTH "PRN:", 5
20 OPEN "PRN:" FOR OUTPUT AS 1
30 PRINT 1, "1234567890"
35 PRINT# 1
40 WIDTH 1, 6
50 PRINT# 1, "1234567890"
RUN
12345
67890

123456
7890
```

In this example, the output will be on the printer, if one is attached.

NOTE: As in the example, the WIDTH statement must precede the OPEN statement in a program in order to work properly.

WINDOW Statement

SYNTAX

WINDOW [[SCREEN] (x_1, y_1) — (x_2, y_2)]

PURPOSE

Use the WINDOW statement to redefine the coordinates of the screen.

EXPLANATION

WINDOW allows you to redefine the screen border coordinates. With WINDOW, you can draw lines, graphs, or objects in space not bounded by the physical dimensions of the screen. This is done by using programmer-defined coordinates called world coordinates. When the programmer has redefined the screen, graphics can be drawn within a customized mapping system.

(x_1, y_1) — (x_2, y_2) are the world coordinates specified by the programmer to define the coordinates of the lower left and upper right screen border.

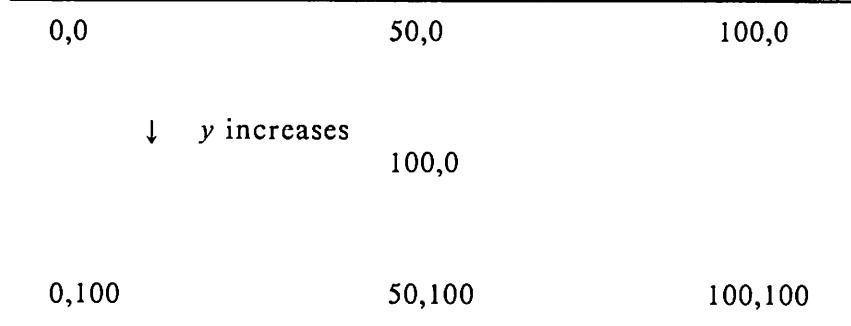
SCREEN inverts the y axis of the world coordinates so that screen coordinates coincide with the traditional Cartesian arrangement: x increases left to right, and y decreases top to bottom.

BASIC converts world coordinates into physical coordinates for subsequent display within the current viewport. To make this transformation from world space to the physical space of the viewing surface (screen), one must know what portion of the (floating point) world coordinate space contains the information to be displayed. This rectangular region in world coordinate space is called a *window*.

RUN (or WINDOW with no arguments) disables Window transformation.

The WINDOW SCREEN variant inverts the normal Cartesian direction of the y coordinate. Consider the following:

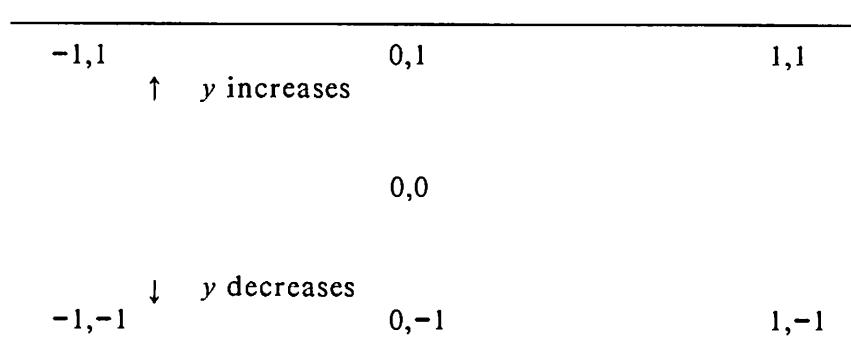
In the default, a section of the screen appears as:



now execute:

WINDOW (-1,-1)-(1,1)

and the screen appears as:



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If the variant:

WINDOW SCREEN (-1,-1)-(1,1)

is executed then the screen appears as:

-1,-1 0,-1 1,-1
↑ *y decreases*

0,0

-1,1 0,1 1,1
↓ *y increases*

EXAMPLE

```
10 WINDOW (-8,-8)-(7,7)
20 CIRCLE (3,-3),1
```

WRITE Statement

SYNTAX

WRITE [*expression*]

PURPOSE

Use the WRITE statement to output data to the screen.

EXPLANATION

If *expression* is omitted, a blank line is output. If the list of expressions is included, the values of the expressions are output to the screen. The expressions in the list may be numeric and/or string expressions. They must be separated by commas or semicolons.

When the printed items are output, each item is separated from the last by a comma. Printed strings are delimited by quotation marks. After the last item in the list is printed, BASIC inserts a RETURN/line feed.

EXAMPLE

```
10 A=80:B=90:C$="THAT'S ALL"
20 WRITE A,B,C$
RUN
```

80, 90,"THAT'S ALL"

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WRITE# Statement

SYNTAX

WRITE# *filenum,expression[;expression] . . .*

PURPOSE

Use the WRITE# statement to write data to a sequential file.

EXPLANATION

filenum is the number under which the file was opened in O mode (see the OPEN Statement in this chapter). The expressions in the list are string or numeric expressions. They must be separated by commas or semicolons.

The difference between WRITE# and PRINT# is that WRITE# inserts commas between the items as they are written to the file, does not put a blank space in front of a positive number, and delimits strings with quotation marks. Therefore, it is not necessary for the user to put explicit delimiters in the list. A RETURN/line feed sequence is inserted after the last item in the list is written to the file.

EXAMPLE

```
100 A$="CAMERA" and B$="93604-1"
110 WRITE#1,A$,B$
```

This WRITE# statement writes the following image.

"CAMERA","93604-1"

A subsequent INPUT# statement, such as:

```
INPUT#1,A$,B$
```

would assign "CAMERA" to A\$ and "93604-1" to B\$.

RESERVED WORDS

Table 9.1. Reserved Words Used in BASIC

ABS	END	LOCATE	RESTART
AND	EOF	LOF	RESTORE
ASC	ERASE	LOG	RESUME
ATN	ERL	LPOS	RETURN
AUTO	ERR	LPRINT	RFIND
BEEP	ERROR	LSET	RIGHT\$
BREAK	EXP	MERGE	RMOVE
CALL	FCREATE	MIDS	RND
CDBL	FDELETE	MKD\$	RNUMF
CHAIN	FGET	MKI\$	ROPEN
CHDIR	FGID	MKS\$	RSET
CHR\$	FGNAME	MOD	RUN
CINT	FGTYPE	NAME	SAVE
CIRCLE	FIELD	NEW	SGN
CLEAR	FILES	NEXT	SIN
CLOSE	FIX	NOT	SOUND
CLS	FOR	OCT\$	SPACE
COLOR	FPUT	ON	SPC
COM	FRE	OPEN	SQR
COMMON	FRENAME	OPEN COM	STOP
CONT	FRGET	OPTION	STR\$
COS	GET	OR	STRING\$
CSNG	GOSUB	PMAP	SWAP
CSRLIN	GOTO	POINT	SYSTEM
CVD	HEX\$	POS	TAB
CVI	IF	PRESET	TAN
CVS	IMP	PRINT	THEN
DATA	INKEY\$	PRINT# USING	TIMER
DATES\$	INPUT	PSET	TIME\$
DBCLOSE	INPUT#	PUT	TO
DBCREATE	INPUT\$	QEND	TROFF
DBDELETE	INSTR	QFIELD	TRON
DBERROR	INT	QREND	USING
DBOPEN	KEY	QRSTART	VAL
DBSORT	KILL	QSTART	VIEW
DEFDBL	LEFT\$	QUIT	WAIT
DEFINT	LEN	RANDOMIZE	WEND
DEFSNG	LET	RCLOSE	WHILE
DEFSTR	LIBRARY	RCREATE	WIDTH
DEF FN	LINE	RDELETE	WINDOW
DELETE	LIST	READ	WRITE
DIM	LLIST	REM	WRITE#
EDIT	LOAD	RENUM	XOR
ELSE	LOC	RESET	

ERROR MESSAGES

Table 9.2 lists the BASIC error messages by error number. The ERR and ERL functions contain one of these error numbers when an error occurs. See the ERR function in this chapter for further details.

Table 9.2. Summary of Error Codes and Error Messages

CODE	MESSAGE	CODE	MESSAGE
1	NEXT without FOR	29	WHILE without WEND
2	Syntax error	30	WEND without WHILE
3	RETURN without GOSUB	50	FIELD Overflow
4	Out of DATA	51	Internal error
5	Illegal function call	52	Bad file number
6	Overflow	53	File not found
7	Out of memory	54	Bad file mode
8	Undefined line number	55	File already open
9	Subscript out of range	57	Device I/O error
10	Duplicate Definition	58	File already exists
11	Division by zero	62	Input past end
12	Illegal direct	63	Bad record number
13	Type mismatch	64	Bad file name
14	Out of string space	66	Direct statement in file
15	String too long	67	Too many files
16	String formula too complex	68	Device Unavailable
17	Can't continue	69	Communication buffer overflow
19	No RESUME	75	File Access Error
20	RESUME without error	78	Bad Library Format/Version
22	Missing operand	79	Undefined Library Routine
23	Line buffer overflow	81	Illegal Argument Count
24	Device Timeout	82	Illegal Argument Type
25	Device Fault	83	Illegal Argument Value
26	FOR without NEXT	91	Illegal DBMS Call
27	Out of Paper		

Errors from Library Calls Via DBERROR(X)

4	too many open files
9	invalid memory block
11	bad file format
12	invalid access request
20	file too big
22	bad file name

Table 9.2 (continued). Summary of Error Codes and Error Messages

CODE	MESSAGE
Error Codes from Database Operating System Calls	
64	record already opened
65	no opened record
66	record not found
67	field not found
68	too many fields
69	no fields defined
70	uninitialized data
71	bad field data size
72	field already exists
73	bad sort key specified
74	query buffer overflow error
75	bad field type specified
76	too many records
77	record too big

Following are the error messages that can display as you use BASIC. After each message is a brief description of the probable cause for the error and what you are to do to recover from it.

Bad file mode

EXPLANATION: You attempted to execute a GET or PUT with a sequential or a closed file, to execute an OPEN with a file mode other than I, O, A, or R, or to MERGE a file that is not in ASCII format. Make sure a file is opened in random access mode before you use a GET or PUT. Make sure that the OPEN statement contains a valid file mode. Make sure that the file you are merging is in ASCII format.

Bad file name

EXPLANATION: You used an invalid form for the file name. Check the Files and File Names section in Chapter 1 for information about how to form valid file names. Then correct the filename.

Bad file number

EXPLANATION: A statement or command references a file with a file number that is not OPEN or is out of the range of file numbers. Make sure that you open the file you want to access. Make sure that you use a valid file number in the OPEN statement.

Bad Library Format/Version

EXPLANATION: The file called as a library file is not a library file, is a defective library file, or was created by a software version incompatible with the present version.

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BASIC Reference

Bad record number

EXPLANATION: In a GET or PUT statement, the record number is either greater than the maximum allowed (16,777,215) or equal to 0. Change the record number in the GET or PUT statement to one that is valid.

Can't continue

EXPLANATION: You have attempted to continue a program that has halted due to an error, has been modified during a break in execution, or does not exist. Use RUN to execute a program you have modified. Make sure the program you want to execute has been loaded.

Communication buffer overflow

EXPLANATION: You have tried to execute a communication input statement, but the communications input buffer is full. Use an ON ERROR statement to trap this error and then retry this input. Increase the size of the communications buffer. Use a lower baud rate to transmit and receive.

Device Fault

EXPLANATION: You have attempted an I/O activity with a device that has a hardware problem. This problem may be caused by a number of conditions, such as being out of paper or not finding the proper communications signal in the specified amount of time. Check the device referenced in the I/O statement and correct the fault.

Device I/O error

EXPLANATION: An error has occurred when you tried to execute an I/O operation. Check the device referenced and reenter the command.

Device Timeout

EXPLANATION: You have attempted I/O activity with a device that was not ready. Check the device being referred to in the I/O statement and then retry the operation.

Device Unavailable

EXPLANATION: You have attempted to execute an I/O activity for a device that does not exist in your system or for a device that has been disabled. Make sure that the hardware device (if it does exist) is installed correctly.

Direct statement in file

EXPLANATION: BASIC encountered a Direct mode statement while it was loading or chaining to a file in ASCII format. The LOAD or CHAIN is terminated. Make sure that every line in the ASCII file is preceded by a line number.

Division by zero

EXPLANATION: You tried to divide a number by 0 or raise 0 to a negative power. Check and correct your program.

Duplicate Definition

EXPLANATION: Two DIM statements dimension the same array. Or, a DIM statement occurs for an array that has already been established with the default dimension of 10. Remove one of the two DIM statements or change the array name in one of the statements.

FIELD Overflow

EXPLANATION: You are attempting to allocate more bytes in the FIELD statement than were specified for the record length in the OPEN statement. Change the number of bytes allocated to the record in the OPEN statement, or change the number of bytes allocated to each field in the FIELD statement so that the record lengths in both statements are the same.

File Access Error

EXPLANATION: You have used the KILL command with the wildcard character to delete all files, or you have attempted to kill a .BMI file from within the selected .BMI or .BAS file. Remove the KILL *.* command. Use a different BASIC work file to delete .BMI files using the KILL command.

File already exists

EXPLANATION: The file name specified in the NAME command is the same as the file name that already exists. Change the new file name in the NAME command and retry the command.

File already open

EXPLANATION: You have tried to execute an OPEN statement in sequential output or append mode for a file that is already open. Close the file before you reopen it or eliminate the second OPEN statement.

File not found

EXPLANATION: You referred to a file that does not exist. Make sure that you have entered the file name correctly.

FOR without NEXT

EXPLANATION: BASIC encountered a FOR statement but did not find a corresponding NEXT statement. Add to the program a NEXT statement that will close the FOR . . . NEXT loop.

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BASIC Reference

Illegal Argument Count

EXPLANATION: You have passed too few or too many arguments. Check the documentation for the function you are using.

Illegal Argument Type

EXPLANATION: One or more of the arguments you passed to a function is of a type that is not usable for the purpose intended. Check and correct the argument types.

Illegal Argument Value

EXPLANATION: One of the arguments which you have entered is outside the range allowed for that argument. Check and correct the argument range.

Illegal DBMS Call

EXPLANATION: A generic database error message. It can refer to any of the DB errors. Use DBERROR to determine which one is the cause.

Illegal direct

EXPLANATION: A statement that is illegal in Direct mode is entered as a Direct mode command. Use a valid Direct mode command or include the Indirect mode statement in a program.

Illegal function call

EXPLANATION: You have:

- tried to pass an out-of-range parameter to a mathematical or string function,
- used a negative subscript in an array variable, or
- given an improper or invalid argument in a function or statement.

Check the function in the Commands section of this chapter to determine the valid range for the parameter and its valid arguments. Then change the statement that contains the error. Change the subscript in the array variable to a positive number.

Input past end

EXPLANATION: The INPUT statement is executed after all the data in the file has been INPUT or executed for a null file. To avoid this error, use the EOF function to detect the end-of-file.

Internal error

EXPLANATION: An internal malfunction has occurred in BASIC. Check the hardware, and then retry the operation. If the error occurs again, report to Zenith Data Systems Software Consultation the conditions under which the message appeared.

Line buffer overflow

EXPLANATION: You tried to enter a line that has too many characters. If you use multiple statements on the line, separate them so that they are on different lines.

Missing operand

EXPLANATION: An expression contains an operator with no operand following it. Include the missing operand in the expression.

NEXT without FOR

EXPLANATION: A NEXT statement does not have a matching FOR statement. Correct the program so that each NEXT has a corresponding FOR.

No RESUME

EXPLANATION: You have written an error-handling routine that does not contain a RESUME statement. Add a RESUME statement to the error-handling routine.

Out of DATA

EXPLANATION: You have executed a READ statement, but there are no more DATA statements that contain unread data. You may:

- add constants to the DATA statements to match the number of variables in the READ statements,
- eliminate some of the variables from the READ statement, or
- execute a RESTORE statement so that the data in the DATA statements can be reread.

Out of memory

EXPLANATION: There is no more memory available in the workspace for BASIC to work in because you have written a program that is too large, has too many nested FOR . . . NEXT loops or nested GOSUBs, or has too many variables. Divide the program into subprograms and use CHAIN to run them in sequence. Return to the System Manager screen and delete unnecessary files.

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BASIC Reference

Out of paper

EXPLANATION: The printer device is out of paper. Insert paper in the printer.

Out of string space

EXPLANATION: String variables have caused BASIC to exceed the amount of free memory remaining in the workspace. BASIC will allocate string space dynamically, until it runs out of memory. Reduce the size of your strings or use the FRE(x\$) function to clear unused strings.

Overflow

EXPLANATION: The result of a calculation is too large to be represented in BASIC number format. Integer overflow halts execution. Use a smaller number. Use a higher precision number, such as a single-precision number instead of an integer.

RESUME without error

EXPLANATION: BASIC has encountered a RESUME statement, but no error has been trapped. Eliminate the RESUME statement or move it to its proper place in the error-handling routine.

RETURN without GOSUB

EXPLANATION: BASIC has encountered a RETURN statement that does not match a previously executed GOSUB. Remove the RETURN or move it to its proper location in the subroutine.

String formula too complex

EXPLANATION: A string expression is too long or too complex. Break up the long or complex expression into a series of smaller expressions.

String too long

EXPLANATION: In an expression, you have attempted to create a string that will contain more than 255 characters. Rewrite the expression.

Subscript out of range

EXPLANATION: You have referenced an array element with subscripts that are out of range of the dimensions of the array, or that contain the wrong number of subscripts. Check the DIM statement for the valid dimensions of the array.

Syntax error

EXPLANATION: A line contains an incorrect sequence of characters, such as an unmatched parenthesis, a misspelled keyword, incorrect punctuation, or a missing keyword or parameter. BASIC will automatically display the line

in which the syntax error occurred. Check the syntax diagram for the command, statement, or function in the commands section of this chapter.

Too many files

EXPLANATION: You have tried to create a new file (using SAVE or OPEN) when all directory entries are full. Delete unnecessary files from the directory.

Type mismatch

EXPLANATION: You have given a string value where a numeric value was expected, or you have given a numeric value where a string value was expected. Change the string value to a numeric value, or change the numeric value to a string value.

Undefined Library Routine

EXPLANATION: The routine that you have specified is not contained in the current library.

Undefined line number

EXPLANATION: In a statement or command, you have used a line number that does not exist in your program. Check your program for the correct line number.

WEND without WHILE

EXPLANATION: A WEND statement was encountered without a matching WHILE. Correct the program to include a WHILE for every WEND.

WHILE without WEND

EXPLANATION: A WHILE statement does not have a matching WEND. Add a WEND statement to correct the program.

Errors from Library Calls Via DBERROR(X)

OPERATING SYSTEM ERRORS

4 too many open files

EXPLANATION: You have exceeded the maximum of 16 open files.

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BASIC Reference

9 invalid memory block

EXPLANATION: An internal error has occurred. Check the hardware and then retry the operation. If the error occurs again, report the conditions under which the message appeared to Zenith Data Systems Software Consultation.

11 bad file format

EXPLANATION: You have attempted to access a file that is not a database file using database calls.

12 invalid access request

EXPLANATION: You have tried to write to a read-only file or read from a write-only file. Close the file and reopen it with the correct access mode.

20 file too big

EXPLANATION: Your file exceeds the file limit of 64K.

22 bad file name

EXPLANATION: The file name you have used is too long or contains illegal characters. Consult Files and File Names in Chapter 1 for the rules relating to naming files. Correct the file name to conform to these guidelines.

ERROR CODES FROM DATABASE OPERATING SYSTEM CALLS

64 record already opened

EXPLANATION: You have tried to open a record that has already been opened.

65 no opened record

EXPLANATION: You have tried to access a field in a record that has not been opened. Open the record.

66 record not found

EXPLANATION: The record requested does not exist in the database, or the query key specifications are inaccurate. Use the RNUMF call to determine how many records are in the database.

67 field not found

EXPLANATION: The field you have named in your call statement does not exist. Check the call statement and retry.

68 too many fields

EXPLANATION: You have exceeded the limit of fields in the database.

69 no fields defined

EXPLANATION: You have tried to FPUT or FGET before the fields have been defined. Issue an FCREATE before doing FPUT or FGET.

70 uninitialized data

EXPLANATION: A record was created but nothing was written to it.

71 bad field data size

EXPLANATION: The size specified in the FIELD statement for this field does not match the size of the field in the database. Correct the FIELD statement and retry.

72 field already exists

EXPLANATION: You have tried to create a field using FCREATE for a field that already exists. Provide a new name for the field you are creating.

73 bad sort key specified

EXPLANATION: The sort key is the wrong data type or contains invalid data. Correct the DBSORT statement.

74 query buffer overflow error

EXPLANATION: The array you have passed to the database library is not big enough. Retry using a larger array.

75 bad field type specified

EXPLANATION: You have specified an invalid field type. The three field types are string, numeric, and date. Correct the field type specification in the function you are using.

76 too many records

EXPLANATION: The record you are creating would exceed the maximum number of records allowed in the database. Delete any unnecessary records.

77 record too big

EXPLANATION: The size of the record exceeds the maximum allowable number of characters for a record. Delete any unnecessary fields.

ASCII CHARACTER CODES

Table 9.3 is a list of the standard ASCII codes in decimal, hexadecimal, and character representation for each code.

ASCII codes 1–127 have standard character assignments or meanings that are used throughout the computer industry. Codes 128–255 have not yet been assigned a standard meaning and are not listed here.

Table 9.3. Standard ASCII Codes

DEC	HEX	CHR	DEC	HEX	CHR
000	00	NUL	032	20	SPACE
001	01	SOH	033	21	!
002	02	STX	034	22	"
003	03	ETX	035	23	#
004	04	EOT	036	24	\$
005	05	ENQ	037	25	%
006	06	ACK	038	26	&
007	07	BEL	039	27	,
008	08	BS	040	28	(
009	09	HT	041	29)
010	0A	LF	042	2A	*
011	0B	VT	043	2B	+
012	0C	FF	044	2C	,
013	0D	CR	045	2D	-
014	0E	SO	046	2E	.
015	0F	SI	047	2F	/
016	10	DLE	048	30	0
017	11	DC1	049	31	1
018	12	DC2	050	32	2
019	13	DC3	051	33	3
020	14	DC4	052	34	4
021	15	NAK	053	35	5
022	16	SYN	054	36	6
023	17	ETB	055	37	7
024	18	CAN	056	38	8
025	19	EM	057	39	9
026	1A	SUB	058	3A	:
027	1B	ESCAPE	059	3B	;
028	1C	FS	060	3C	<
029	1D	GS	061	3D	=
030	1E	RS	062	3E	>
031	1F	US	063	3F	?

DEC = decimal, HEX = hexadecimal, CHR = character.

LF = Line Feed, FF = Form Feed, CR = Carriage Return, DEL = Rubout.

Table 9.3 (continued). Standard ASCII Codes

DEC	HEX	CHR	DEC	HEX	CHR
064	40	@	096	60	'
065	41	A	097	61	a
066	42	B	098	62	b
067	43	C	099	63	c
068	44	D	100	64	d
069	45	E	101	65	e
070	46	F	102	66	f
071	47	G	103	67	g
072	48	H	104	68	h
073	49	I	105	69	i
074	4A	J	106	6A	j
075	4B	K	107	6B	k
076	4C	L	108	6C	l
077	4D	M	109	6D	m
078	4E	N	110	6E	n
079	4F	O	111	6F	o
080	50	P	112	70	p
081	51	Q	113	71	q
082	52	R	114	72	r
083	53	S	115	73	s
084	54	T	116	74	t
085	55	U	117	75	u
086	56	V	118	76	v
087	57	W	119	77	w
088	58	X	120	78	x
089	59	Y	121	79	y
090	5A	Z	122	7A	z
091	5B	[123	7B	{
092	5C	\	124	7C	
093	5D]	125	7D	}
094	5E	^	126	7E	~
095	5F	_	127	7F	DEL

DEC = decimal, HEX = hexadecimal, CHR = character.

LF = Line Feed, FF = Form Feed, CR = Carriage Return, DEL = Rubout.

If you want to see the graphics character codes for 128–255, enter the following program:

```
10 PRINT "THIS IS A PROGRAM TO CONVERT KEYBOARD CHARACTERS"
20 PRINT "TO GRAPHICS CHARACTERS." : PRINT
30 INPUT "PRESS 1- FOR AUTO SEARCH  2- FOR MANUAL SEARCH";2$
40 IF 2$="1" GOTO 90
50 A$=INKEY$: IF A$="" THEN GOTO 50 ELSE A = ASC(A$)
60 PRINT "KEY VALUE CHR$(";A;")==> "CHR$(A);
70 IF A < 128 THEN PRINT "  EXTENDED CHR$(";A+128;")==>";CHR$(A+128) ELSE PRINT
80 PRINT: GOTO 50
90 FOR X=0 TO 255
100 PRINT "  CHR$(";X;")==>";CHR$(X)
110 FOR Z=0 TO 50: NEXT
120 NEXT X
130 GOTO 10
```

Extended Codes

Some keys and key combinations cannot be represented in ASCII code. Consequently, these keys have a special extended code. This extended code is two bytes long.

When these special keys are pressed, INKEY\$ will return a two-character string. The first byte will always be 000, the ASCII null character, and the second byte will contain the key scan code. Thus, when INKEY\$ returns a two-character value, you must examine the second character to determine which key has been pressed.

Table 9.4 lists some of the common extended codes.

For a more complete look at all possible extended codes permutations, enter the following program:

```
10 FOR I=1 TO 10: KEY I, " " : NEXT I: KEY OFF
20 A$=INKEY$
30 IF LEN(A$)=1 THEN PRINT "ASCII    "; ASC(A$) : GOTO 20
40 IF LEN(A$)=0 THEN 20
50 PRINT "ASCII    "; ASC(A$); " EXTENDED CODE    "; ASC (RIGHT$ (A$,1)) : GOTO 20
```

Run the program. Press any key combination to view the extended code.

Table 9.4. Common Extended Key Codes

CHARACTER(S)	SECOND CODE
F1–F10	59–68
CTRL-LEFT ARROW	71
DOWN ARROW	72
UP ARROW	73
LEFT ARROW	75
RIGHT ARROW	77
CTRL-RIGHT ARROW	79
INS	82
DEL	83
SHIFT F1–F10	84–93
CTRL-DOWN ARROW	118
CTRL-UP ARROW	132
SHIFT-RETURN	135



CHAPTER 10

INTRODUCTION TO CALENDAR

OVERVIEW

Calendar is similar to the other built-in programs included in your ZP-150. For example, you choose and execute commands, or enter and change responses in command prompts in Calendar as in File, Plan, or Word. Yet, Calendar is quite separate from the other applications; it aids you in special activities—such as remembering appointments and being more punctual.

The next few pages introduce you to some of Calendar's major features, describe your working environment (the screens), and discuss the basics of entering and editing tasks and appointments, viewing different months on the screen, moving from one day's activities to another's, and erasing unwanted records.

In Chapter 11, "Calendar Reference," the various keys and their usage specific to Calendar are described. Chapter 11 also includes an alphabetical listing of Calendar commands, including the submenus or command prompts that appear when you choose the command and a description of each command prompt.

FEATURES

The ZP-150 Calendar application helps make better use of your time. It provides:

- freedom to plan your time more efficiently,
- a simplified way to keep track of your activities, and
- an accurate record of your activities for future reference.

How does Calendar help achieve these three fundamentals of time management?

- Calendar helps you plan your time more efficiently by giving you the freedom to organize your activities into *tasks* (by date) and *appointments* (by time). Calendar records and keeps track of both.
- Calendar tracks your tasks and appointments by easily organizing your time into two readily accessible and easy-to-read screen formats—a Monthly Calendar screen and a Daily Diary screen.

10.2

Introduction to Calendar

Consider the Monthly Calendar screen as a quick reference. The monthly calendar lets you see at a glance the days with scheduled activities. It provides no details, just a record of the days of the month you will be busy. An alarm indicator (⊗) will be displayed next to each day for which you have an appointment or a task with a scheduled reminder.

The Daily Diary screen, on the other hand, displays the details of a specific day's scheduled activities—their times, their level of relative importance, and perhaps a note or two. The Daily Diary screen is the means by which you add, change, or check on any given day's activities.

- Calendar will help you maintain more accurate records for both your present and future reference. For example, unless you specifically delete a given task or mark it as complete, it will reappear in the next day's screen. The list of to-be-completed tasks is, therefore, displayed from day to day, forming a dynamic to-do list. Similarly, instead of deleting appointments after they occur, you can retain them and use them as a planning guide in the future.
- Finally, Calendar also has an alarm, which signals you when an activity is due. You can set the alarm to go off at any time, regardless of which program you happen to be using at the time.

RELATED APPLICATIONS

Calendar can be used with two of the other applications in Works. The following list illustrates some of these.

Word—Data from Calendar's Daily Diary can be inserted into a Word document.

Alarm—Regardless of the currently active program, Calendar interacts with the Alarm program to signal you when an activity or task is to begin. You can set the alarm to ring at any time, even if your ZP-150 is off.

There is one exception, however. If you set a reminder or schedule an appointment and are still in the Calendar program when the alarm should ring, it will not ring. An alarm is not set when you initially enter the task or appointment; rather, the alarm is set when you exit the Calendar program.

When the alarm does ring, the alarm indicator will appear in the lower right-hand corner of your screen. If your ZP-150 has the power turned off, the alarm will still ring, causing an audible tone and the computer to power on, as long as the System Manager SET TONE command has the for alarm: prompt set for audible.

TUTORIAL

In order for you to become familiar with Calendar's features, several tutorial sessions are included. These tutorials are designed to take you through some of the more commonly used operations of Calendar. Following are some of the operations discussed:

- Entering and editing appointments and tasks,
- Erasing and copying appointments and tasks,
- Creating a to-do list on the Daily Diary screen, and
- Using the Monthly Calendar screen.

Starting Calendar

When you first power up your computer, the System Manager screen appears. Or, if you are working with another program, press **CTRL-F10** to return to the System Manager. The Word program in the upper left-hand corner should be highlighted, indicating that it is the currently selected program. In addition, the **RUN** command will be highlighted at the bottom of the screen in the command line.

In order to effectively set tasks and appointments, it is important that the system clock reflect the current date and time. Therefore, before entering the Calendar program, make sure the system clock settings are current. To set the system clock:

1. Press **S** to choose the **SET** command at the System Manager screen. The **SET** command submenu appears:

Set: Clock Printer Sleep Tone Wake

2. Press **C** to choose the **CLOCK** command from the **SET** submenu, and the **SET CLOCK** command line appears:

SET CLOCK date: time:

3. If the date and time entries are correct, then press **RETURN** to accept the defaults. If the entries are not current, then enter the current date in the MM/DD/YY format, such as 11/21/85 for November 21, 1985.

4. Press **TAB** to move to the **time:** prompt.

5. Enter the current time in the HH:MM:SS AM/PM format, such as 10:35:45 AM for 10:35 and 45 seconds in the morning. (You can select the default entries by pressing **RETURN**).

NOTE: You can also enter the time in a 24-hour clock format and Calendar will convert the entry for a 12-hour clock.

10.4

Introduction to Calendar

6. Press RETURN, and the System Manager screen appears with the current date and time in the status line.

Now you are ready to begin using the Calendar program. To run Calendar:

1. Press the DOWN ARROW key once to highlight the CALENDAR program on the System Manager screen.
2. Press RETURN, and the Daily Diary screen appears.

The Daily Diary Screen

The Daily Diary screen for the current date appears as shown in Figure 10.1. This is the blank slate on which you will construct your daily schedule. It consists of the appointment and task entry area and the command, message, and status lines.

The appointment and task entry area is divided into six columns:

- ID—the number of the record entry.
- START—time or date when an appointment or task is to begin.

NOTE: Calendar differentiates between a task and an appointment by checking the entry in the START column. If you enter a date or enter nothing, the activity is stored as a task. If you enter a time, the activity is stored as an appointment.

- STOP—time or date when the scheduled activity is to end. This is an optional entry.

ID	Start	Stop	P	R	Note	
NEW						

> Copy Delete Edit Insert Jump Options Print
Copyright (1984, 1985) Microsoft Corp.
Calendar: Wednesday, Nov. 21, 1985 11/21/85 10:36:04 AM

Figure 10.1. Daily Diary Screen

- P—priority level of the scheduled activity in the scheme of the entire day.
- R—set a reminder alarm.
- NOTE—descriptive reference to the scheduled activity.

The NEW row indicates where records of tasks and appointments are entered.

The three lines at the bottom of the screen are the command, message, and status lines. The *command line* contains a menu of available commands. (Refer to Calendar Commands in Chapter 11, "Calendar Reference," for more information on the individual commands.) The *message line* initially contains copyright information, but once you begin using the application, this line displays prompts and error messages. The *status line* contains the name of the application running, the Daily Diary screen's date, the current date and time, and any status line indicators. (Refer to Table 1.1 in Chapter 1 for a complete list of possible status line indicators.)

Organizing Your Activities

Before beginning the step-by-step tutorial for appointment and task entry, you should know the following.

The Daily Diary screen is a grid of rows and columns, as in File and Plan. Calendar expects you to enter information on your activities into specific categories called *fields*. Each column contains one *field* within each record. Each row contains one *record* of related items. To create a record, you enter information about an appointment or a task (that is, one field of information) into each of the five columns.

Look at the sample appointment and task records in Figure 10.2. As you enter records, Calendar sorts your activities into appointments, which are listed as the first group of records, and tasks, which are listed as the second.

ID	Start	Stop	P	R	Note
	12:10 PM	12:50 PM	H	R	LUNCH WITH PAT
	1:30 PM	2:00 PM	H		STATUS MEETING
	4:00 PM	4:45 PM	M	R	INTERVIEW WITH PROSPECTIVE EMPLOYEE
	11/ 1/85		*	R	DRAFT CONTRACT FOR PRY ACCOUNT
NEW	11/21/85		*	R	WRITE UP REPORT ON MARKETING STRATEGY

> Copy Delete Edit Insert Jump Options Print
 Copyright (1984, 1985) Microsoft Corp.
 Calendar: Wednesday, Nov. 21, 1985 11/21/85 10:42:11 AM

Figure 10.2. Sample Appointment and Task Records

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Notice how the presentation of information in the appointment and task records is identical except for the first two fields in each—appointments have start and stop times; tasks have starting dates and completion dates. Calendar regards a task as incomplete as long as its completion date (STOP field) is left blank.

You can enter a character in the third field, P, if and when you want to assign a particular priority to the activity. If you do not enter a priority for a task, the Calendar default is M (moderate) priority. The possible priority entries are:

ENTRY DESCRIPTION

*	urgent
H	high
M	moderate
L	low

As mentioned earlier, Calendar automatically sets an alarm every time you create a new appointment record. This alarm will sound at the time you entered in the START column except when you are still in Calendar.

You can also set an alarm to sound before the time in the START field by entering a value in the R field. The R stands for reminder and, like the priority, it is an optional feature. When you enter a time in this field, an alarm indicator appears at the reminder time as well as when the appointment begins.

If an entry is made in the R field, the time will not display in the R column, but can be examined by using the EDIT command. If you do not type in a time, Calendar will sound an alarm only at the time specified in the START field. There is no proposed time for tasks, so no alarm sounds unless you enter a time in the R field. Note that even if the R field is left blank for an appointment, an alarm will appear on your screen at the appointment time.

The last field, NOTE, is the area in which you can enter a descriptive reference to the scheduled activity. This field holds up to 200 characters, which is more than can be displayed on the screen at one time. (To display the entire entry, select the NOTE field and enter the EDIT command.)

RECORD ENTRIES

As discussed previously, Calendar classifies your record entries into appointments or tasks, according to the information you provide. Regardless of the fact that your information may be incomplete, Calendar will classify it and organize it for you as soon as you press RETURN.

After you press RETURN, your records may at first look different. That is because pressing RETURN signals Calendar to list your appointments in

chronological order and your tasks in order of priority. If you enter a date later than the present date, Calendar puts the task on that day and removes it from the present Daily Diary screen.

Appointments appear on the screen as the first group of records. In the event that you schedule two appointments at the same time, the one with the highest priority (providing you have assigned priorities) will list first.

Tasks display on the screen as the second group of records. Again, regardless of the order in which you may have entered the tasks, Calendar will list them according to their dates and priorities. A task is not considered complete until you enter a completion date in the STOP field. Consequently, the screen for any day will list all uncompleted tasks, including those scheduled on any previous days that have not been completed. An alarm will not sound if the completion date in the STOP field for a task is entered before the alarm time occurs.

You do not have to fill in all the fields you see on the screen. In fact, Calendar will work with as little as one field, by using its own built-in, default entries.

NOTE: If you intend to rely on Calendar's default entries, remember that Calendar differentiates between an appointment and a task by whether or not you enter a time or date in the START field. If you enter a time, Calendar stores the record as an appointment; if you do not enter a time—or you enter a date instead—Calendar stores the entry as a task.

Entering Appointments and Tasks

Following are step-by-step directions on entering records for a fictitious day. Be sure you have followed the procedure for starting Calendar, as described earlier. If you make any typing mistakes as you are entering records, press the BACK SPACE key to erase and then reenter the correct response.

When you enter Calendar, the first display you will see is a Daily Diary screen that is ready to be filled in, as shown in Figure 10.1. The first time you enter Calendar, the date displayed in the status line will be the current date.

The selection highlight appears in the START field of the NEW record. This indicates that the START field is currently selected. The EDIT command in the command menu is also highlighted, indicating that it, too, is selected.

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ENTERING APPOINTMENTS

To begin entering appointment records:

1. Press **E** to select the EDIT command. (If the command is already highlighted, you could press RETURN instead.) The EDIT command prompt appears:

EDIT:

The Enter an appointment (HH:MM PM) or a task (MM/DD/YY) prompt appears in the message line.

2. Enter **12:10 PM**.
3. Press the **RIGHT ARROW** (*not* RETURN) once to advance the selection highlight to the STOP field. (Use the ARROW keys to move from field to field.)

NOTE: In Calendar's EDIT command, you press RETURN only when you are finished entering and editing activities (appointments and tasks). If you press RETURN before you are finished entering and editing, you must wait for Calendar to sort all the activities into categories and chronological order. Then you can resume entering records by pressing E to reselect the EDIT command.

4. Notice as the selection highlight moves from the START to the STOP field, **12:10 PM** appears in the first record and the **NEW** record moves down one line. **NEW** always indicates the start of the next new record. The EDIT command is still active. Calendar is waiting for your next entry. The message line reads:

Enter an appointment (HH:MM PM) or a task (MM/DD/YY)

5. Enter **12:50 PM**.
6. Press the **RIGHT ARROW** key once to advance to the P field. Notice that the letter **M** appears in both the P field and in the EDIT command line. The Enter a priority (*, H, M, or L) prompt appears in the message line.
7. Enter **H** to indicate a high priority.
8. Press the **RIGHT ARROW** key once to advance to the R field. The Enter a time for a reminder (HH:MM PM) prompt appears in the message line.
9. Enter **11:55 AM**. You have now entered a reminder alarm to sound 15 minutes before your appointment is scheduled to begin. If you had skipped this field and not entered a time, Calendar would have set only one alarm—at the time specified in the START field.

10. Press the **RIGHT ARROW** key once to advance to the **NOTE** field. Notice as you do so, that the time you typed in does not show. Instead, an **R** (for reminder) appears in this field. The **Enter a note (up to 200 characters)** prompt appears in the message line.

The **NOTE** field is ready to receive the description of, or note about, your appointment.

11. Enter **LUNCH WITH PAT**.

This entry completes your first appointment record and you are ready to enter a second record. (Remember, if you accidentally press **RETURN**, you can reenter the **EDIT** command by pressing **E**.)

12. To advance to the beginning (the **START** field) of the next **NEW** record, press the **DOWN ARROW** key once and the **LEFT ARROW** key four times. The system date is automatically entered in the **START** field.
13. Continue by entering the additional appointment records listed in Table 10.1. Type directly over the system date in the **START** field. Use the same procedure as you did for entering the first record. Press the appropriate **ARROW** keys once to skip from field to field—or twice (or more) to leave any given field blank. After entering the second and third records, enter **3:55 PM** and **5:45 PM** in the **R** field for records 4 and 5, respectively. However, they will only be listed as an **R** on your screen. (Remember, if you press **RETURN**, you can reenter the **EDIT** command by pressing **E**.)

You now have five appointment records on your screen. You are ready to enter some task records.

Instead of pressing **RETURN**, simply use the **ARROW** keys to move down to the first field of the **NEW** record and start typing.

Table 10.1. Additional Appointment Records

RECORD	START	STOP	P	R	NOTE
2	1:30 PM	2:00 PM	H		Status meeting
3	2:00 PM		L		Call Elliot to discuss Costin contract
4	4:00 PM	4:45 PM	M	R	Interview with prospective employee
5	6:00 PM		*	R	Be home for dinner or else!

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ENTERING TASKS

Task records are identical to appointment records, except for the first one or two fields. Instead of entering a time in the START and STOP fields, you enter a date in the START field and a completion date in the STOP field. These dates can be the same. However, since you may not know the completion date as you enter the task, you will normally enter a starting date in the first field, skip the STOP field (the completion date field), and move directly to the P field.

To begin entering task records:

1. Use the appropriate ARROW keys to make sure the selection highlight appears in the START field of the NEW record. (If you are not in the EDIT command mode, press E.) The Enter an appointment (HH:MM PM) or a task (MM/DD/YY) prompt appears in the message line.
2. Enter today's date in the MM/DD/YY format.
3. Advance to the P field by pressing the RIGHT ARROW key twice. You will skip the STOP field (the completion date, which you will fill in only when the task is completed). The Enter a priority (*, H, M, or L) prompt appears in the message line.

NOTE: In Calendar's EDIT command, you press RETURN only when you are finished entering activities (appointments and tasks) and making changes. If you press RETURN before you are finished entering and editing, you must wait for Calendar to sort all the activities into categories and chronological order. Then you can resume entering records by pressing E for EDIT.

4. Press * (the asterisk) to indicate a priority rating of urgent.
 5. Press the RIGHT ARROW key to advance to the R field. The Enter a time for a reminder (HH:MM PM) prompt appears in the message line.
 6. Enter the time that it will be in ten minutes. For example, 10:40 AM. You have now set an alarm to go off at 10:40 AM, on the day you have planned to perform the given task. No alarm will sound unless you specifically request one (or if the current time is later than the time you entered).
 7. Press the RIGHT ARROW key once to advance to the NOTE field. Notice, as you do so, that the letter R appears in the R field of this record to let you know a reminder is set. The Enter a note (up to 200 characters) prompt appears in the message line.
- The NOTE field is ready to receive the description of, or note about, your task.
8. Enter WRITE UP REPORT ON MARKETING STRATEGY.

This entry completes your first task record, and you are ready to enter a second record. (Remember, if you press RETURN, you can reenter the EDIT command by pressing E.)

9. To advance to the beginning (the START field) of the next NEW record, press the DOWN ARROW key once and the LEFT ARROW key four times.
10. Enter tomorrow's date in the MM/DD/YY format.
11. Advance to the P field by pressing the RIGHT ARROW key twice. Again, you will skip the STOP field (the completion date, which you will fill in only when the task is completed). The Enter a priority (*, H, M, or L) prompt appears in the message line.
12. Press H to indicate a high priority rating.
13. Press the RIGHT ARROW key to advance to the R field. The Enter a time for a reminder (HH:MM PM) prompt appears in the message line.
14. Enter 10:30 AM. You have now set an alarm to go off at 10:30 AM, on the day you have planned to perform the given task.
15. Press the RIGHT ARROW key once to advance to the NOTE field. Notice, as you do so, that the letter R appears in the R field of this record. The Enter a note (up to 200 characters) prompt appears in the message line.
16. Enter WRITE SPEECH FOR MARKETING PRESENTATION.
17. Continue by entering the additional task records listed in Table 10.2. Use the same procedure as you did for the first task record. Press the appropriate ARROW keys once to skip from field to field—or twice (or more) to leave any given field blank. For record 4, enter 10:30 AM as the value for the R field.

Table 10.2. Additional Task Records

RECORD	START	STOP	P	R	NOTE
3	1/1/85		*		Draft contract for Pry account
4	1/1/85		H	R	Mail spec to all concerned
5	1/1/85		M		Draft memo for record
6	1/1/85		L		Deposit paycheck
7	1/1/85		L		Get a haircut

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Note that all the tasks are scheduled to begin on 1/1/85, with the exception of the first two records you entered. Since no date was entered in the STOP field, these records will appear on the current Daily Diary screen. If you enter a date in the START field later than the current date, the task will not appear on the current Daily Diary screen once you press RETURN. Instead, the record is moved to the Daily Diary of the date entered in the START field.

Once you have entered all of the sample tasks, press RETURN. This will signal Calendar to sort all of your appointments and tasks into chronological order. By completing the practice session, you now have five appointment records and six task records for this day, as shown in Figure 10.3. The second task record you entered does not appear on the current Daily Diary screen.

Appointments are listed first in the order of time. If two appointments are scheduled to begin at the same time, the one with the highest priority is listed first. The tasks are listed from highest to lowest priority.

NOTE: If you put an entry in a field that you had intended to leave blank, you can either erase the entire record using the DELETE command or select the field while in the EDIT command and press SPACE BAR.

You have worked through the example and have a Daily Diary screen showing a list of activities for a particular day, as shown in Figure 10.3. Now that you have entered some records into Calendar, save the file.

Saving the Calendar File

Calendar automatically saves the file and quits the Calendar session simultaneously. This means that whenever you end a Calendar session, your schedule of records is saved; and whenever you save the Calendar file, the Calendar session ends. Save the records you just created.

ID	Start	Stop	P	R	Note
	12:10 PM	12:50 PM	H	R	LUNCH WITH PAT
	1:30 PM	2:00 PM	H		STATUS MEETING
	2:00 PM		L		CALL ELLIOT TO DISCUSS COSTIN CONTRACT
	4:00 PM	4:45 PM	M	R	INTERVIEW WITH PROSPECTIVE EMPLOYEE
	6:00 PM		*	R	BE HOME FOR DINNER OR ELSE!
	1/ 1/85		*	R	DRAFT CONTRACT FOR PRY ACCOUNT
	11/21/85		*	R	WRITE UP REPORT ON MARKETING STRATEGY
	1/ 1/85		H	R	MAIL SPEC TO ALL CONCERNED
	1/ 1/85		M		DRAFT MEMO FOR RECORD
	1/ 1/85		L		DEPOSIT PAYCHECK
	1/ 1/85		L		GET A HAIRCUT

NEW
> Copy Delete Edit Insert Jump Options Print
Select option or type command letter
Calendar: Wednesday, Nov. 21, 1985 11/21/85 10:45:14 AM

Figure 10.3. Sample Daily Diary Screen

Press **CTRL-F10** (the **QUIT** key). The Calendar file is saved and you are returned to the System Manager.

Calendar stores and displays files on the System Manager screen in substantially different ways from the other applications. When you work with other applications, you can create several work files, which are displayed to the right of their corresponding application name on the System Manager screen. When you work with Calendar, everything you need is kept in a single file.

Now you can look at how the Monthly Calendar screen shows the particular day's activities.

The Monthly Calendar Screen

First, load the Calendar file.

1. Press the appropriate **ARROW** keys to select **CALENDAR** in the far left column of the System Manager screen.
2. Press **RETURN** (to choose the **RUN** command).

The Monthly Calendar screen is the same as on a paper calendar. To review a Monthly Calendar screen, use the **JUMP** command.

1. Press **J**. The **JUMP** command line appears:

JUMP to month: day: year:

The **month:** prompt will be highlighted, indicating the default entry, which is the current month. (When you want to view a different Monthly Calendar screen, you can enter the number of the desired month in the **month:** prompt.)

2. Press **RETURN**. The Monthly Calendar screen for the current month will appear with an alarm indicator (next to each day for which you entered your example activities. A sample of the Monthly Calendar screen is shown in Figure 10.4. Notice also that, in this instance, the current day is highlighted, indicating that it is currently selected.

The lower portion of the screen shows the command line (COPY, DELETE, INSERT, JUMP, PRINT), the message line, and the status line. In Figure 10.4, the status line tells you:

- the Calendar application is currently running,
- the number of appointments scheduled on the currently selected day,
- the current date, and
- the current time.

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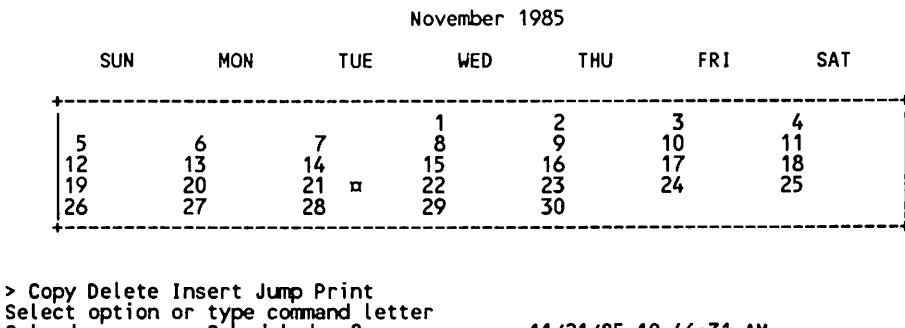


Figure 10.4. Monthly Calendar Screen

The status line may also show any status line indicators. (Refer to Table 1.1 in Chapter 1 for a complete list of possible status line indicators.)

An alarm indicator following a date indicates that appointments and/or tasks are scheduled for that day. A Daily Diary screen, giving all the details, is also available. By highlighting the day marked with an alarm indicator on the Monthly Calendar screen and using the JUMP command, you will jump to the Daily Diary screen for more details.

Return to the Daily Diary screen.

VIEWING DAILY SCREENS

To return to the current Daily Diary screen or to select a different day's Daily Diary screen, use the JUMP command. To view the Daily Diary screen for tomorrow:

1. Press the **RIGHT ARROW** key to advance to tomorrow's date on the Monthly Calendar screen.
2. Press **J**. The JUMP command line appears.

JUMP to month: day: year:

This time, the default entry in the day: prompt will be whichever day on the Monthly Calendar screen is selected (the default appears in reverse video).

3. Press **RETURN**. The Daily Diary screen for tomorrow appears displaying the speech-writing task entry as shown in Figure 10.5. (If you want to view the Daily Diary screen for a date other than the default date, press **TAB** to advance to the prompts and enter the appropriate information.)

ID NEW	Start 11/22/85	Stop	P R H R	Note WRITE SPEECH FOR MARKETING PRESENTATION
-----------	-------------------	------	------------	---

> Copy Delete Edit Insert Jump Options Print
 Copyright (1984, 1985) Microsoft Corp.
 Calendar: Wednesday, Nov. 22, 1985 11/21/85 10:57:04 AM

Figure 10.5. Tomorrow's Daily Diary Screen

To return to the current day's Daily Diary screen:

1. Press **J** to choose the JUMP command.
2. Press **TAB** to advance to the day: prompt.
3. Enter the number of the current day.
4. Press **RETURN**. You will be returned to your Daily Diary screen for the current day, which is filled with the sample activities.

Editing Your Activities

Editing is modifying previous entries. You already have some experience in this procedure if you worked through the sample. You edit your entries the same way you enter them—with the EDIT command. Press **E** or **RETURN**, move the selection highlight over to the field you want to change, and enter the new response.

Ask yourself two questions when you are considering editing:

- How long is the entry I want to edit—A character? A word? A sentence?
- What kind of editing changes do I want to make—Additions? Deletions? Both?

The method of editing usually depends on the answers to these two questions. For example:

For entries that are short—a single word or short phrase—you may find that retyping the entry is the most practical method.

For longer entries that require minimal editing—such as correcting a misspelled word—you can use F7 through F10 program function keys (also called Edit function keys) to select and type your correction.

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Practice editing your example appointments and tasks. Change the DRAFT MEMO FOR RECORD entry in the NOTE field to **PREPARE SPEECH FOR NEW PRODUCT INTRO.**

To erase/retype:

1. Use the ARROW keys to select the DRAFT MEMO FOR RECORD entry in the NOTE field.
2. Press E to select the EDIT command. The field that you have selected is highlighted at the EDIT: prompt.
3. Enter **PREPARE SPEECH FOR NEW PRODUCT INTRO.** This new entry automatically replaces the previous entry.

Next, change the WRITE UP REPORT ON MARKETING STRATEGY entry in the NOTE field to **DRAFT REPORT ON MARKETING STRATEGY FOR NEW PRODUCT** using the program function keys.

To select/retype, using the program function keys:

1. Use the ARROW keys to select the WRITE UP REPORT ON MARKETING STRATEGY entry in the NOTE field.
2. The field that you have selected is highlighted at the EDIT: prompt. If it is not, press E to select the EDIT command.
3. Press F7 and the word **WRITE** is selected.
4. Press DEL to delete this word.
5. Press F7 again, and the word **UP** is selected.
6. Press DEL to delete this word.
7. Enter **DRAFT.** (Be sure to include a space after the word.)
8. Press F8 until the space after the word **STRATEGY** is selected.
9. Enter **FOR NEW PRODUCT.** (Be sure to include a space before the word **FOR.**)
10. Press RETURN to execute the EDIT command.

Notice how the entire new entry does not appear on the screen. Only the first 43 characters of the NOTE field are visible on the screen.

FIELD WIDTHS

As you entered records, dates were entered in a strict format—MM/DD/YY. When you entered times, again you were requested to enter them in a strict format—HH:MM AM or PM. But if you want to make lengthier entries in a field, you must use the NOTE field, as all other fields have a fixed width.

Like all the other fields, the NOTE field has a limited display. There is room to store 200 characters, but they cannot all be displayed. This means that when you run out of display room, your words will stop displaying on

your screen, but they will still be stored. You can see what you have typed beyond the field's display limit only if you are using the EDIT command. Follow the same procedure as you would to enter information:

1. Use the ARROW keys to select the NOTE field containing the DRAFT REPORT ON MARKETING STRATEGY FOR NEW entry.
2. Press E to select the EDIT command. The entire contents of the NOTE field appears as the default entry in the EDIT command line.
3. Look at the field entry. Since you do not want to change the field contents, press ESC. The command line will reappear on your screen.

The PRINT command is also limited by field width constraints. Even though you are allowed 200 characters of space for the NOTE field, only the first 43 will be printed with the PRINT command. You can view the remainder by using the EDIT command.

DATE AND TIME FORMATS

Calendar allows you to change the manner in which dates and times are entered and appear on the screen. Both of these formats are specified with the OPTIONS command.

To change the date and time format:

1. Press O to select the OPTIONS command.
2. Press SPACE BAR to choose 24-Hour in the time format: prompt.
3. Press TAB to advance to the day format: prompt.
4. Enter MMM DD YYYY and be sure to include a space between each group of the same letters.
5. Press RETURN to execute the command. Your screen will look like Figure 10.6.

After you execute the OPTIONS command, the Free Work space: message appears on the message line telling you the status of available memory.

ID	Start	Stop	P	R	Note
	12:10	12:50	H	R	LUNCH WITH PAT
	13:30	14:00	H		STATUS MEETING
	14:00		L		CALL ELLIOT TO DISCUSS COSTIN CONTRACT
	16:00	16:45	M	R	INTERVIEW WITH PROSPECTIVE EMPLOYEE
	18:00		*	R	BE HOME FOR DINNER OR ELSE!
	Jan 1 1985		*	R	DRAFT CONTRACT FOR PRY ACCOUNT
	Nov 21 1985		*	R	DRAFT REPORT ON MARKETING STRATEGY FOR NEW
	Jan 1 1985		H	R	MAIL SPEC TO ALL CONCERNED
	Jan 1 1985		M		PREPARE SPEECH FOR NEW PRODUCT INTRO
	Jan 1 1985		L		DEPOSIT PAYCHECK
	Jan 1 1985		L		GET A HAIRCUT
NEW					
	> Copy Delete Edit Insert Jump Options Print				
	Free Work space: 64423				
	Calendar: Wednesday, Nov. 21, 1985				
	11/21/85 10:51:29 AM				

Figure 10.6. New Date and Time Formats

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To change the date and time back to their original formats:

1. Press **O** to select the OPTIONS command.
2. Press **SPACE BAR** to select AM-PM in the time format: prompt.
3. Press **TAB** to advance to the day format: prompt.
4. Enter **MM/DD/YY** and press **RETURN**. The date and time formats return to their original settings.

For further information on changing the date and time format in Calendar, refer to the OPTIONS command in Chapter 11, "Calendar Reference."

SCROLLING

The sample activities you entered during your practice session were designed to familiarize you with the basics of entering records. However, before you start entering actual records and even as you continue to practice, you should become familiar with the scrolling feature.

When you have filled your first screen and want to continue entering records, or when you have filled several screens with records and want to review an item, you can scroll backward or forward in the activity list. Just as you use the RIGHT and LEFT ARROW keys to move from field to field on your screen, you use the UP and DOWN ARROW keys to move up or down between records.

Before you can get a brief overview of the functions of the ARROW keys, you will need more than a full screen of records. Add one more appointment record with the following information: start at 2:30 PM, stop at 3:30 PM, H (high) priority, no reminder alarm, and no description.

When you have filled in your first screenful of records, you will want to move to a NEW record on the next screen. To do so, follow these procedures.

1. Press the **DOWN ARROW** key. Notice that one record has scrolled off the top of the screen. An empty NEW record is now visible beneath the last record.
2. As you fill in your additional NEW records, the scrolling pattern repeats itself with each record added.
3. Press the **UP ARROW** key to restore the records (one by one) that have disappeared from view.

The scrolling keys describe the function of the ARROW keys used in combination with the SHIFT or CTRL keys. For complete details about how they work, see Scrolling Keys in Chapter 11, "Calendar Reference."

Answering an Alarm in Calendar

When an alarm rings, the alarm indicator will appear in the lower right-hand corner of your screen.

To answer an alarm, you simply press CTRL-F3. Once you do this, your screen will display a subset of the familiar Daily Diary screen. In the screen you can view the NOTE field or use the SNOOZE command to change the start and/or reminder times.

If you do not want to make any changes but only to acknowledge an alarm, press CTRL-F3, then CTRL-F10. CTRL-F3 turns off the alarm indicator and CTRL-F10 returns you to the Calendar program.

For further information about using the Alarm program, refer to Chapter 5, "Alarm."

Printing

Now you will learn about printing. The ZP-150 can be used with a serial or parallel printer. If you have a serial printer, your ZP-150 must be configured. Refer to Chapter 4, "External Devices," for information on configuring your ZP-150 for a serial printer.

If you do not know how to connect or operate your printer, read your printer manual before attempting to print records produced in Calendar.

Check to see that the printer:

- is plugged in,
- cable is plugged into the printer and into the ZP-150 printer port located on the rear panel,
- is turned on and ready, and
- paper and ribbon are installed correctly. Paper can be lined up so that the top edge of each page is at the bottom of the print head.

Once your printer is set up, you can print your records.

From the Daily Diary screen, you can print whatever is currently selected (fields, columns, or records) to either a file or to a hard copy.

Practice printing. Select your NOTE fields from the current day and print to a hard copy or a file.

1. Make sure the Daily Diary screen for today appears on your screen.
2. Use the ARROW keys to select the NOTE field of the first record at the top of the screen.

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3. Press F6 to turn on the Extend Selection feature.
4. Press the DOWN ARROW key until the NOTE field for all the current day's records is selected.
5. Press P to select the PRINT command. The PRINT command prompt appears.
6. Enter COM1: to print to a parallel printer. Proceed to step 7 to print to a serial printer. Enter NOTES.TXT to print to a file.
7. Press RETURN. If you printed to a file, you can verify the data printed correctly by exiting Calendar, selecting the NOTES.TXT file, and running it under Word.

From the Monthly Calendar screen, you can print appointments and/or tasks for the currently select day(s) to either a file or to a hard copy. For further information on using the PRINT command from either the Daily Diary or the Monthly Calendar screen, refer to the PRINT command in Chapter 11, "Calendar Reference."

ADVANCED FEATURES

The following section describes using the scrap in Calendar. You may want to explore this feature as you become more experienced with Calendar.

Using the Scrap

Deleting, erasing, moving, and copying data all require an understanding of how the scrap works; more specifically, you should know how the SCRAP key operates.

In Calendar, you use the DELETE command either to erase unwanted data or to move data into the scrap. You use the COPY command to send a duplicate of data to the scrap. You decide what data does not go to the scrap and what does, as well as how the existing contents of the scrap are affected by using the SCRAP key.

Remember seeing the Ap and Ns indicators on the status line? They told you what the setting of the scrap was, as entered with the SCRAP key (F5). When nothing appears, the scrap is still active—it is merely replacing old data to or from the scrap.

If the setting is in No Scrap mode when you use the DELETE command, your selection will not go to the scrap; instead, it will be permanently erased.

If the setting is in Append Scrap mode when you use the DELETE or COPY command, your selection will be added to the end of the existing contents of the scrap.

If the setting is in Blank Scrap mode when you use the DELETE or COPY command, your selection will replace the existing contents of the scrap. The old information in the scrap is lost.

Following is a review of the types of activities for which you will use the SCRAP key as you work with Calendar.

DELETING ACTIVITIES

Deleting with the DELETE command sends data either to the scrap (when you want to move data) or not to the scrap (when you want to erase information).

Use the following procedure periodically to erase records you no longer want to keep.

CAUTION: Records that you erase are *not* retrievable.

To erase records:

1. Press RETURN (or ESC) to restore the command line to the screen if you are in the EDIT command.
2. Check the status of the SCRAP key. Press F5 until the N_s indicator appears in the status line. The setting should be No Scrap mode in order to completely erase the data.
3. Press the appropriate ARROW key(s) to position the highlight in the ID field of the record you wish to erase.
4. Press the LEFT ARROW key to select the record. (Calendar allows you to erase only entire records.)

If you wish to erase more than one record, press F6 and then press the ARROW key(s) to extend the highlight selection to include all the records you wish to delete.

5. Press D to select the DELETE command.

NOTE: If you try to erase fields with the DELETE command, the Can only delete entire records message will appear in the message line.

When you want to move data to other Calendar locations or even to other programs, first move the data into the scrap with the DELETE command. Make sure N_s is *not* displayed. Once the data is in the scrap, you can then use the INSERT command to place the data in its new location.

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For example, you might create a Calendar routine that you perform every Monday in a month. You would copy it the first time it is entered, then insert it on successive Mondays in the month. Since next Monday is a holiday, you want to change the activity from Monday to Friday of the preceding week.

Moving records to the scrap is similar to erasing records.

To move data into the scrap:

1. Press **RETURN** (or **ESC**) to restore the command line to the screen if you are in the **EDIT** command.
2. Check the status of the **SCRAP** key. Press **F5** until no indicator appears in the status line. The setting should be Blank Scrap mode (no indicator appears) in order to replace the existing contents of the scrap with the records being moved.
3. Press the appropriate **ARROW** key(s) to position the highlight in the ID field of the record to be moved.
4. Press the **LEFT ARROW** key to select the record. (Calendar allows you to move only entire records.)

If you wish to move more than one record, press **F6** and then press the **ARROW** key(s) to extend the highlight selection to include all the records you wish to move.

5. Press **D** to select the **DELETE** command.

Once you have deleted the record to the scrap, you will insert it into the appropriate Daily Diary screen—in this case, the Daily Diary screen for the Friday preceding the holiday.

1. Press **J** to select the **JUMP** command.
2. Enter the date for the Friday to contain the record.
3. Press **RETURN**.
4. Use the **ARROW** keys to select any field in the **NEW** record.
5. Press **SHIFT-F9** to select the record.
6. Press **I** to select the **INSERT** command to copy the record from the scrap to the Friday selected.

NOTE: If you try to move fields with the **DELETE** command, the **Can only delete entire records** message will appear in the message line.

To compare moving and copying data, see **Copying Activities**.

COPYING ACTIVITIES

The COPY command sends data to the scrap; but, rather than moving the data (as with the DELETE command), it makes a copy of the data and moves the copy into the scrap. Once the data is in the scrap, you can use the INSERT command to place it in its new location.

Like the DELETE command, COPY is affected by the setting of the SCRAP key. The Append Scrap mode appends your copy to the scrap, and the Blank Scrap mode replaces the current contents of the scrap with your copy. However, since it does not make sense to permanently erase your copy, No Scrap mode will not apply. (COPY will copy your selection to the scrap, regardless of No Scrap mode.)

A typical use for the COPY command is scheduling the same activity on several days without entering the record each time.

For the sake of illustration, imagine you wanted to schedule the second entry in your practice file—a status meeting from 1:30 PM to 2:00 PM—for every Tuesday of next month.

To do so, follow these procedures:

1. Check the status of the SCRAP key. Press F5 until no indicator appears in the status line. The setting should be Blank Scrap mode (your copy will replace the existing contents of the scrap).
2. Use the ARROW keys to select any field in the record.
3. Select the record by pressing SHIFT-F9.
4. Press C to select the COPY command to send a duplicate of the record to the scrap.

Once you have sent the copy of the record to the scrap, you will insert it into the appropriate Daily Diary screen—in this case, the Daily Diary screens for every Tuesday of the next month. You do not have to jump to each Tuesday's Daily Diary screen to do this. Instead, you can do it all via the Monthly Calendar screen.

1. Press J to select the JUMP command.
2. Press RETURN. The Monthly Calendar screen for the current month appears.
3. Press F2 to move to the Monthly Calendar screen for the next month.
4. Use the ARROW keys to select the first Tuesday of the month.
5. Press F6.
6. Press the DOWN ARROW key until the column of Tuesdays is selected.
7. Press I to select the INSERT command to copy the record from the scrap to each Tuesday selected.

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To make sure the record was copied to each of the Tuesdays, look at the Daily Diary screen for any of the Tuesdays in that month.

To return to the current Monthly Calendar, press **SHIFT-F2** (PREV MONTH key).

If you decide to jump to the Daily Diary screen to copy a record rather than use the Monthly Calendar screen, the procedure is as follows:

1. Press **J** to select the JUMP command. Enter the month, day, and year for the Daily Diary screen in which you want the record copied.
2. Press **RETURN**. The Daily Diary screen for the specified day appears.
3. Use the **ARROW** keys to select any field in the NEW record.
4. Press **SHIFT-F9** to select the record.

NOTE: When data is inserted onto the Daily Diary screen, you must select the entire area where the data is to be inserted. If you select one field, only the first field of the scrap will be inserted into the selected field. The remainder of the scrap will not be inserted.

5. Press **I** to select the INSERT command. A duplicate of the record in scrap appears on the Daily Diary screen.

When you feel comfortable entering data, scrolling, and editing, you can start using Calendar for your own purposes. Before you do, erase all the entries you entered during your practice session(s). Otherwise, Calendar will store them and display them as that day's entries.

Before you proceed to Chapter 11, "Calendar Reference" or another application, delete the file you created during this chapter. Use the **DELETE** command from the System Manager screen. For further information on the System Manager **DELETE** command, refer to Chapter 2, "System Manager Reference."

CHAPTER 11

CALENDAR REFERENCE

In this chapter you will find the details specific to operating your ZP-150 Calendar application. This chapter includes a description of the function keys that implement Calendar's features, an alphabetical list of Calendar's commands, and a list of error messages that may occur while you use Calendar.

FUNCTION KEYS

Calendar makes use of the following sets of keys:

- Selection Keys
- Scrolling Keys
- Program Function Keys

Selection Keys

The ARROW keys (UP, DOWN, LEFT, or RIGHT) move the selection highlight to any field on the Daily Diary screen or any day on the Monthly Calendar screen. Table 11.1 describes the movement of the highlight when you use these keys.

Table 11.1. ARROW Key Functions

KEY	DAILY DIARY	MONTHLY CALENDAR
UP ARROW	Selects the field directly above the currently selected field.	Selects the day directly above the currently selected day.
DOWN ARROW	Selects the field directly below the currently selected field.	Selects the day directly below the currently selected day.
LEFT ARROW	Selects the field directly to the left of the currently selected field.	Selects the day directly to the left of the currently selected day.
RIGHT ARROW	Selects the field directly to the right of the currently selected field.	Selects the day directly to the right of the currently selected day.

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Once you have selected a particular day or field, you can extend the selection by using the EXTEND SELECT key (F6) to include:

- any rectangular grouping of days or fields,
- an entire week or record, or
- an entire calendar or day's activities.

For details, see Program Function Keys in this chapter.

Scrolling Keys

You can also use the ARROW keys to scroll the display. When the selection highlight is in the last visible record on the screen, the DOWN ARROW key scrolls the display forward (up) one record at a time. When the selection highlight is in the first visible record on the screen, the UP ARROW key scrolls the display backward (down) one record at a time.

USING THE ARROW KEYS WITH THE SHIFT KEY

By holding down the SHIFT key and pressing the appropriate ARROW key, your highlight moves to the top, bottom, far left, or far right field or day, depending on the Calendar screen. Table 11.2 describes how the SHIFT-modified ARROW keys operate in both of the Calendar screens.

Table 11.2. SHIFT-Modified ARROW Keys

KEY	DAILY DIARY	MONTHLY CALENDAR
SHIFT-UP ARROW	Displays the screen of records prior to the record containing the selection highlight.	Moves the selection highlight from the currently selected day to the corresponding day in the top row of the calendar.
SHIFT-DOWN ARROW	Displays the screen of records beyond the record containing the selection highlight.	Moves the selection highlight from the currently selected day to the corresponding day in the bottom row of the calendar.
SHIFT-LEFT ARROW	Moves the selection highlight to the far left field of the screen.	Moves the selection highlight to the day on the far left of the currently selected week.
SHIFT-RIGHT ARROW	Moves the selection highlight to the far right field of the screen.	Moves the selection highlight to the day on the far right of the currently selected week.

USING THE ARROW KEYS WITH THE CTRL KEY

By holding down the CTRL key and pressing the appropriate ARROW key, your highlight moves to the top, bottom, far left, or far right field or day, depending on the Calendar screen. Table 11.3 describes how the CTRL-modified ARROW keys operate in both the Calendar screens.

Program Function Keys

Calendar contains two sets of program function keys. The first set consists of F2, F4, and F6. Their functions are described in Table 11.4. The second set employs the SHIFT key and is shown in Table 11.5.

USING THE PROGRAM FUNCTION KEYS WITH THE SHIFT KEY

You use the second set of Calendar's program function keys by holding down the SHIFT key and pressing F2, F8, F9, or F10. Their functions are described in Table 11.5.

Table 11.3. CTRL-Modified ARROW Keys

KEY	DAILY DIARY	MONTHLY CALENDAR
CTRL-UP ARROW	Moves the selection highlight from the currently selected field to the corresponding field in the first record listed for that day.	Same as SHIFT-UP ARROW (see Table 11.2).
CTRL-DOWN ARROW	Moves the selection highlight from the currently selected field to the corresponding field in the last record listed for that day.	Same as SHIFT-DOWN ARROW (see Table 11.2).
CTRL-LEFT ARROW	Same as SHIFT-LEFT ARROW (see Table 11.2).	Same as SHIFT-LEFT ARROW (see Table 11.2).
CTRL-RIGHT ARROW	Same as SHIFT-RIGHT ARROW (see Table 11.2).	Same as SHIFT-RIGHT ARROW (see Table 11.2).

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Table 11.4. Program Function Keys

FUNCTION	KEY	ACTION
NEXT MONTH	F2	Used in the Monthly Calendar screen only—moves highlight forward to the next month's screen.
SORT	F4	When low memory prevents Calendar from inserting from the scrap, Calendar's sorting capability is turned off. After you have recovered enough memory and inserted all data from the scrap, press F4 to turn Calendar's sorting capability back on. Calendar then sorts appointments or tasks by chronological order by priority.
EXTEND SELECT	F6	Once pressed, this key allows you to use the ARROW keys to expand the current selection to any rectangular grouping of fields, records, or days. Press F6 again to turn off this feature and cause the ARROW keys to again select individual fields. This function will not work in the EDIT command mode.

Table 11.5. SHIFT-Modified Program Function Keys

FUNCTION	KEY	ACTION
PREVIOUS MONTH	SHIFT-F2	Used in the Monthly Calendar screen only—moves highlight backward to the previous month's screen.
SELECT COLUMN	SHIFT-F8	Used in the Daily Diary screen only—expands the current field selection to all fields in the same column. Press F6 and the LEFT or RIGHT ARROW key to select additional columns. Press F6 again to erase the extended selection and return to standard field-by-field selection.
SELECT RECORD	SHIFT-F9	Used in the Daily Diary screen only—expands the current field selection to all fields in the same record. Press F6 and the UP or DOWN ARROW key to select additional records.
SELECT ALL	SHIFT-F10	Used in the Daily Diary screen only—selects the entire day's entries.

CALENDAR COMMANDS

Table 11.6 lists each Calendar command with a brief description. Following the table is an explanation of each command. This explanation includes:

- the command submenu or command prompts that appear when you choose the command, and
- a description of each command prompt.

Using Commands

In Calendar, you enter, revise, format, and print your activities by using commands from command menus. Specifically:

- before you choose a command, in many instances you must select the field(s) or record(s) you want the command to act on.
- after choosing a command, you sometimes must supply additional information in command prompts.

Table 11.6. Calendar Command Summary

COMMAND	DESCRIPTION
COPY	Use to move a duplicate of the selected appointments and/or tasks into the scrap.
DELETE	Use to remove or erase the selected appointments and/or tasks.
EDIT	Use to enter new records or modify existing ones. Available only from the Daily Diary screen.
INSERT	Use to insert appointments and/or tasks from the scrap. In the Monthly Calendar screen, can insert activities into a Daily Diary screen via the Monthly Calendar screen.
JUMP	Use to quickly move to another Daily Diary or Monthly Calendar screen.
OPTIONS	Use to select the format for dates and times in Calendar. Available only from the Daily Diary screen.
PRINT	Use to print the appointments and/or tasks to a file or to a hard copy.

11.6

Calendar Reference

Choose a command either by typing the initial letter of the command name or by pressing TAB or SPACE BAR to position the selection highlight over the command and pressing RETURN. For example, if you wanted to choose the PRINT command, you would either press P, or you could press SPACE BAR until the selection highlight is positioned over PRINT in the command menu and then press RETURN. (You may need to press ESC to return to the command line first.)

For commands with command prompts, you must select responses or make entries (assuming that the default responses do not suit you) before Calendar can execute the command. If commands do not have command prompts, Calendar executes the command as soon as you choose it.

At command prompts you must either make an entry or make a selection from a list of valid responses. The responses in command prompts reflect the choice you made (in a menu), the response you filled in the last time you used the command, or the built-in responses Calendar will use if you do not specify one. Either way, they are called *default selections* or *default entries*. If all the responses are acceptable, you simply press RETURN.

If a response is unacceptable, either make a new selection or enter a different response.

To choose a selection in a command prompt, either:

- press the initial letter of the option, or
- press SPACE BAR to highlight your choice.

NOTE: Use SPACE BAR to move from option to option within a command prompt. Do not press TAB—within command prompt listings, TAB moves you from prompt to prompt and SPACE BAR moves you from option to option.

To enter a different response, either type a new entry or change the existing entry by using the keys shown in Table 11.7.

Table 11.7. Key Entries in Command Prompts

KEY	ACTION PERFORMED IN COMMAND PROMPTS
F7	Moves highlight one word to the left.
F8	Moves highlight one word to the right.
F9	Moves highlight one character to the left.
F10	Moves highlight one character to the right.
INS/DEL	Erases the highlighted character(s).
BACK SPACE	Erases one character to the left of the highlight.

Once you have completed answering the command's prompts, you are ready to tell Calendar to execute the command or to cancel it. To execute commands, press RETURN. To cancel a command before you have pressed RETURN, simply press ESC. To cancel a command, such as PRINT, after RETURN has been pressed, simply press the BREAK key.

11.8

Calendar Reference

COPY

PURPOSE

Use the COPY command to place a duplicate of the selected appointments and/or tasks in the scrap.

EXPLANATION

The COPY command is available from both the Daily Diary screen and the Monthly Calendar screen. To facilitate your understanding, this explanation section is divided into two parts. The first part gives specific information for executing the COPY command from the Daily Diary screen, and the second part gives specific information for executing the COPY command from the Monthly Calendar screen.

Daily Diary Screen

In the Daily Diary screen, the COPY command does not have associated submenus or command prompts. To execute the COPY command from the Daily Diary screen:

1. If necessary, press ESC to return to the command line.
2. Select the fields or records to be copied.
3. Select the COPY command.

The selection is copied to scrap. How the data is copied to the scrap depends on the status of the scrap. Table 11.8 lists the scrap modes and how the selection is copied in each of the modes.

Once you have copied a selection to the scrap, you can:

- insert the selection in another record of the same Daily Diary screen,
or
- transfer the selection to another Daily Diary screen or application.

NOTE: You can only move *entire* records from a Daily Diary screen to a Monthly Calendar screen.

When fields or records of appointments and tasks are used repeatedly, the COPY command can be used with the INSERT command. The text to be repeated is highlighted, copied to the scrap, and inserted wherever necessary. Thus, you have to actually enter the information only once.

For more information on transferring duplicates of material to another application, see Transferring Data between Applications in Chapter 3, "ZP-150 Applications."

Table 11.8. COPY and the Scrap Modes

MODE	RESULT
Append Scrap (Ap)	The selection is added to the existing scrap.
Blank Scrap	The selection replaces the contents of the scrap.
No Scrap (Ns)	The selection replaces the contents of the scrap.

Monthly Calendar Screen

In the Monthly Calendar screen, there are three commands available with the COPY command submenu. To execute the COPY command from the Monthly Calendar screen:

1. If necessary, press **ESC** to return the command line.
2. Select the day(s) containing the information to be copied.
3. Select the COPY command. The COPY command submenu appears:
COPY: Appointments Day Tasks
4. Press **SPACE BAR** to select the appropriate submenu command (described in the following section).
5. Press **RETURN**. The selection is copied to scrap.

How the data is copied to the scrap depends on the status of the scrap. Table 11.8 lists the scrap modes and how the selection is copied in each of the modes.

Once you have copied a selection to the scrap, you can:

- insert the selection in another day(s) on the same Monthly Calendar screen,
- insert the selection in a Daily Diary screen, or
- transfer the selection to another Monthly Calendar screen or application.

When fields or records of appointments and tasks are used repeatedly, the COPY command can be used with the INSERT command. The field(s) or record(s) to be repeated are highlighted, copied to the scrap, and inserted wherever necessary. Thus, you have to actually enter the information only once.

For more information on transferring duplicates of material to another application, see *Transferring Data between Applications* in Chapter 3, "ZP-150 Applications."

11.10

Calendar Reference

SUBMENU COMMANDS

There are three submenu commands available with the COPY command on the Monthly Calendar screen. Following is a description of each COPY submenu command.

Appointments	Copies the appointments for the selected day(s) to the scrap.
Day	Copies appointments and tasks for the selected day(s) to the scrap.
Tasks	Copies the tasks for the selected day(s) to the scrap.

Day is the default selection for the COPY command submenu.

DELETE

PURPOSE

Use the DELETE command to remove the selected appointments and/or tasks.

EXPLANATION

The DELETE command is available from both the Daily Diary screen and the Monthly Calendar screen. To facilitate your understanding, this explanation section is divided into two parts. The first part gives specific information for executing the DELETE command from the Daily Diary screen, and the second part gives specific information for executing the DELETE command from the Monthly Calendar screen.

Daily Diary Screen

In the Daily Diary screen, the DELETE command does not have associated submenus or command prompts. To execute the DELETE command from the Daily Diary screen:

1. If necessary, press ESC to return the command line.
2. Select the fields or records to be removed.
3. Select the DELETE command.

The selection is removed. How the data is removed depends on the status of the scrap. Table 11.9 lists the scrap modes and how the selection is removed in each of the modes.

Once you have removed a selection to the scrap, you can:

- insert the selection in another record of the same Daily Diary screen,
- insert the selection in a Daily Diary screen, or
- transfer the selection to another Daily Diary screen or application.

NOTE: You can move only *entire* records from a Daily Diary screen to a Monthly Calendar screen.

When records of appointments or tasks need to be moved from a Daily Diary screen to another location, the DELETE command can be used with the INSERT command. The text to be moved is highlighted, deleted to the scrap, and inserted wherever necessary. Thus, you do not have to reenter the information.

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Table 11.9. DELETE and the Scrap Modes

MODE	RESULT
Append Scrap (Ap)	The selection is added to the existing scrap.
Blank Scrap	The selection replaces the contents of the scrap.
No Scrap (Ns)	The selection is removed and does <i>not</i> affect the contents of the scrap.

The DELETE command can be used to remove or move unwanted records. For more information on moving records to another application through the scrap, see Transferring Data between Applications in Chapter 3, "ZP-150 Applications."

Monthly Calendar Screen

In the Monthly Calendar screen, there are three commands available with the DELETE command submenu. To execute the DELETE command from the Monthly Calendar screen:

1. If necessary, press **ESC** to return the command line.
2. Select the day(s) containing the information to be removed.
3. Select the DELETE command. The DELETE command submenu appears:
DELETE: Appointments Day Tasks
4. Press **SPACE BAR** to select the appropriate submenu command (described in the following section).
5. Press **RETURN**.

The selection is removed. How the data is removed depends on the status of the scrap. Table 11.9 lists the scrap modes and how the selection is removed in each of the modes.

Once you have removed a selection to the scrap, you can:

- insert the selection in another day(s) on the same Monthly Calendar screen,
- insert the selection in a Daily Diary screen, or
- transfer the selection to another Monthly Calendar screen or application.

When records of appointments or tasks need to be moved, the DELETE command can be used with the INSERT command. The records to be moved are highlighted, copied to the scrap, and inserted wherever necessary. Thus, you do not have to reenter the information.

The DELETE command can be used to remove or move unwanted records. For more information on moving records to another application through the scrap, see Transferring Data between Applications in Chapter 3, "ZP-150 Applications."

SUBMENU COMMANDS

There are three submenu commands available with the DELETE command on the Monthly Calendar screen. Following is a description of each DELETE submenu command.

Appointments	Removes the appointments for the selected day(s).
Day	Removes all appointments and tasks for the selected day(s).
Tasks	Removes the tasks for the selected day(s).

Day is the default selection for the DELETE command submenu.

EDIT**PURPOSE**

Use the EDIT command to enter new records or to modify existing ones.

EXPLANATION

The EDIT command is available only on the Daily Diary screen. The EDIT command has the EDIT command prompt. To execute the EDIT command:

1. If necessary, press ESC to return the command line.
2. Select the first field of the NEW record (to add an appointment or task) or the field containing the entry to be modified.
3. Select the EDIT command. The EDIT command prompt appears:

EDIT:

3. Enter the information for this field and record (described in Table 11.10).
4. Press RETURN when you are finished entering or modifying records.

When you select an empty field and choose the EDIT command, the EDIT command prompt appears. What can be entered at the prompt depends upon the field that was selected. Table 11.10 lists the fields on the Calendar screen and the entries valid for each.

Table 11.10. Daily Diary Screen Field Entries

FIELD ENTRIES

START Beginning time (appointment) or date (task)

STOP Ending time or date

P * for urgent priority
 H for high priority
 M for medium priority
 L for low priority

R HH:MM:SS AM/PM (SS and AM/PM are optional)

NOTE Up to 200 numbers and/or characters.

When you first select a field that already contains an entry and choose the EDIT command, the entire field contents will be highlighted and appear at the prompt. To replace an entry, type any printable character and the contents at the prompt will be replaced by that character. To modify an existing entry, use the Edit function keys to move within the entry and make any necessary changes. (F7 and F8 move left or right, respectively, one word at a time; while F9 and F10 move left or right, respectively, one character at a time within any field.)

When you press any ARROW key or RETURN, the field entry is copied from the EDIT: prompt to the screen. Use the ARROW keys (UP, DOWN, LEFT, or RIGHT) to move from field to field while remaining in the EDIT command.

Note that for the START, STOP, and R fields, the entry format depends upon the formats specified in the OPTIONS command.

INSERT

PURPOSE

Use the INSERT command to move a copy of the scrap to the selected field(s), record(s), or day(s).

EXPLANATION

The INSERT command is available from both the Daily Diary screen and the Monthly Calendar screen. To facilitate your understanding, this explanation section is divided into two parts. The first part gives specific information for executing the INSERT command from the Daily Diary screen, and the second part gives specific information for executing the INSERT command from the Monthly Calendar screen.

Daily Diary Screen

In the Daily Diary screen, the INSERT command does not have associated submenus or command prompts. To execute the INSERT command from the Daily Diary screen:

1. Make sure the information to be inserted is contained in the scrap (use the COPY or DELETE commands to move information into the scrap).
2. If necessary, press ESC to return the command line.
3. Select the location where the scrap will be copied.
4. Select the INSERT command. The scrap is copied to the selected location.

Records in the scrap are sorted according to their types, times, and priorities. You can insert from one field of data up to the entire contents of the scrap to your Daily Diary screen. You vary the amount of data inserted by varying the number of fields selected. Therefore, if you select one field, only the first field of the scrap will be inserted; while if you select an entire record, then all of the data in scrap will be inserted into Calendar.

The INSERT command can move material from the scrap to a new location within the Daily Diary screen or to another Daily Diary screen. You can even move records from the Daily Diary screen to the Monthly Calendar screen, as long as they are entire records. INSERT can also be used in transferring material from another program into a Daily Diary screen. Refer to Transferring Data between Applications in Chapter 3, "ZP-150 Applications," for more information on this subject.

Monthly Calendar Screen

In the Monthly Calendar screen, the INSERT command does not have associated submenus or command prompts. To execute the INSERT command from the Monthly Calendar screen:

1. Make sure the information to be inserted is contained in the scrap (use the COPY or DELETE commands to move *entire records* into the scrap).
2. If necessary, press **ESC** to return the command line.
3. Select the day(s) where the scrap will be copied.
4. Select the INSERT command. The scrap is copied to the day(s) selected.

Records in the scrap are sorted according to their types, times, and priorities. You can insert records from the scrap into a given Daily Diary screen via the Monthly Calendar screen. The appointment or task will not be visible on the Monthly Calendar screen, but an alarm indicator () will be seen next to a date for which an activity has been scheduled.

If the information in the scrap is from the Calendar application, all the contents of scrap will be inserted on the specified day(s) provided the contents are *whole* records. If the scrap contains other than whole records and you attempt to insert on the Monthly Calendar screen, then the screen will display:

Invalid value

and/or

Value to be inserted does not match field type

Calendar Reference

JUMP

PURPOSE

Use the JUMP command to move to either a Daily Diary or a Monthly Calendar screen other than the current one.

EXPLANATION

The JUMP command is available from both the Daily Diary screen and the Monthly Calendar screen. To execute the JUMP command:

1. If necessary, press ESC to return the command line.
2. Select the JUMP command. The JUMP command prompts appear:
JUMP to month: day: year:
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are three JUMP command prompts. Following is a description of each JUMP command prompt, the message that appears when you use the prompt, and the possible responses.

Before you read these descriptions, understand that the JUMP command allows you to move from month to month and from day to day. Thus, you can move between:

- Daily Diary screens,
- Monthly Calendar screens, and
- between the two types of screens.

All three of the prompts do not need to contain entries; in fact, the prompts that contain entries determine what screen will appear. For example, to move to a Daily Diary screen you must include an entry at the day: prompt; whereas, for a Monthly Calendar screen this prompt must be left empty.

to month:

The Enter a month (MM) message appears in the message line. Enter the number of the month for the screen you want to appear. This number can be any number from 1 through 12. The default entry is the number of the month for the current screen.

day:

The Enter a day (DD) message appears in the message line. Leave this prompt blank to move to the Monthly Calendar screen specified in the to month: prompt or enter the number of day for the Daily Diary screen you want to view. This number can be any number from 1 through 31, depending on the month and if the specified year is a leap year. The default entry is blank on a Daily Diary screen. The default entry is the day in the upper left of the highlighted selection on the Monthly Calendar screen.

year:

The Enter a year (YYYY) message appears in the message line. Enter the year for the Daily Diary or Monthly Calendar screen you want to appear. This number can be any four-digit year (from 1980 through 2099), or a two-digit number (80–99) for 1980 through 1999.

OPTIONS

PURPOSE

Use the OPTIONS command to set the format for all times and dates in Calendar. Once the format is set, Calendar will require all times and dates to be entered in that format only. Times and dates are displayed in the fields of the Daily Diary screen in the format specified in this command.

EXPLANATION

The **OPTIONS** command is available only on the Daily Diary screen. To execute the **OPTIONS** command:

1. If necessary, press ESC to return the command line.
 2. Select the OPTIONS command. The OPTIONS command prompts appear:

OPTIONS time format: AM-PM 24-Hour day format: MM/DD/YY

3. Make the appropriate responses to the command prompts (described in the following section).
 4. Press **RETURN**.

After you execute the OPTIONS command, a message appears on the message line telling you the status of available memory.

If the message Free work space:*nnn* (where *nnn* is a number) appears, then you are running out of work space for the file that is open.

If the message line displays Free space in system memory:nnn (where nnn is a number), then you are running out of system memory.

In either case, nnn is the amount of space remaining, in bytes.

If program memory is low, it is time to make more room by erasing unneeded material from the Calendar work file. If system memory is low, return to the System Manager and decide what to delete from there as described in Increasing System Memory in Chapter 1 "System Manager."

NOTE: When either program or system memory is low, the Lo indicator will display on the status line.

COMMAND PROMPTS

There are two OPTIONS command prompts. Following is a description of each command prompt, the message that appears when you use the prompt, and the possible responses.

time format: AM-PM 24-Hour

The Select option message appears in the message line. Press SPACE BAR to select between the time formats. If you choose:

AM-PM 12-hour clock; enter 1:00:00 through 12:59:59, specifying AM or PM.
24-Hour Military clock time; enter 00:00:00 through 23:59:59.

AM-PM is the default selection at the time format: prompt. If AM-PM is the format and a time is entered without an AM or PM specification, the default is AM.

NOTE: Even with the format set to AM-PM, Calendar will still accept 24-hour entries and convert them to a 12-hour clock.

day format:

The Enter a date format. Up to 12 characters. Include day, month and year. message appears in the message line. MM/DD/YY is the default selection at the day format: prompt. You may change the day format by entering a month, day, and year (in any order) up to 12 characters.

The month can be represented by MM (two digits) or MMM (first three characters of month). The day can be represented by DD (two digit day from 1 to 31, depending on the month). The year can be represented by YY (last two digits of the year) or YYYY (four digit year).

Valid entries include:

MM-DD-YY
MMM DD, YYYY
DD/MM/YY
YY MM DD
YYYY-MMM-DD

The prompt will accept up to 12 characters; it must contain a month, day, and year. Valid delimiters include the standard hyphen (-), the slash (/), and a space.

Calendar Reference

PRINT

PURPOSE

Use the PRINT command to send the selected activities and/or tasks to the printer or to a text file. (A *text file* is a file that contains only ASCII characters, spaces, tabs, line feeds, and carriage returns.)

EXPLANATION

The PRINT command is available from both the Daily Diary screen and the Monthly Calendar screen. To facilitate your understanding, this explanation section is divided into two parts. The first part gives specific information for executing the PRINT command from the Daily Diary screen, and the second part gives specific information for executing the PRINT command from the Monthly Calendar screen.

Daily Diary Screen

To execute the PRINT command from the Daily Diary screen:

1. If necessary, press ESC to return the command line.
2. Select the PRINT command. The PRINT command prompt appears:
PRINT to: PRN:
3. Make the appropriate response to the command prompt (described in Command Prompts).
4. Press RETURN.

The PRINT command allows you to print material to a particular file or to the printer. If you use the PRINT command to print material to a file, it will create a text file. This file can be used in transferring material to another program or, via Telcom, to another system.

Monthly Calendar Screen

To execute the PRINT command from the Monthly Calendar screen:

1. If necessary, press ESC to return the command line.
2. Select the PRINT command. The PRINT command prompts appears:

PRINT to: PRN:
data: Appointments (Day) Tasks

3. Make the appropriate response to the command prompts (described in the following section).
4. Press RETURN.

The PRINT command allows you to print material to a particular file or to the printer. If you use the PRINT command to print material to a file, it will create a text file. This file can be used in transferring material to another program or, via Telcom, to another system.

COMMAND PROMPTS

The first command prompt applies to both the Daily Diary and the Monthly Calendar screens, and the second prompt applies only to the Monthly Calendar screen. Following is a description of the prompts, the message that appears when you use the prompt, and the possible responses.

PRINT to:

The Enter file name message appears in the message line. This prompt is asking for the destination of the printing. Enter PRN: to print a hard copy to a parallel printer, COM1: to print to a serial printer, CON: to print to the screen, or the name of a file to create a text file. The default is PRN:.

NOTE: Refer to Chapter 4, "External Devices," for information on configuring a serial printer.

If the to: prompt is active and you press any ARROW key, Calendar will display a full-page listing of existing files. If you choose to print to an existing file, Calendar will write over the data in that file.

data: Appointments Day Tasks

The Select option message appears in the message line. This prompt is asking how much of a day's activities you want to print. If you choose:

Appointments	Prints only the appointments for the selected day(s).
Day	Prints all appointments and tasks for the selected day(s).
Tasks	Prints only the tasks for the selected day(s).

Day is the default selection.

When the PRINT command is executed, Printing page: n (where n is a number) message appears in the message line. This message indicates the progress of the PRINT command.

To cancel printing, press BREAK (SHIFT-PAUSE). Calendar stops printing and displays the Operation cancelled message.

Calendar Reference

The Calendar Daily Diary screen occupies 80 characters of space. To ensure that the Daily Diary screen is printed on a single page, the print parameter established by the SET PRINTER command in the System Manager must allow for 80 full columns or more. Set the page width at 80 or wider and set the left and right margins to allow for 80 full print columns. If the print space is less than 80 columns, the Daily Diary screen will print out on two pages. The first page will print all the fields except the NOTE field, which will be printed on the second page.

NOTE: Even though you are allowed 200 characters of space for the NOTE field, only the first 43 will be printed with the PRINT command. You can view the remainder by using the EDIT command.

ERROR MESSAGES

Following are error messages that can display as you use Calendar. After each message is a brief description of the probable cause for the error and what you are to do to recover from it.

A value cannot be converted. Enter Y to continue:

EXPLANATION: The value displayed on the bottom of the screen cannot be converted to match the new form (and type) for this field. You can either choose to continue the conversion and lose this data or to stop the conversion and save your data by pressing ESC.

Cannot perform that command on current selection

EXPLANATION: This message is displayed if your selection is inappropriate for the command you are trying to perform (for example, trying to delete the NEW record). Change your selection and repeat the command.

Can only delete entire records

EXPLANATION: This message is displayed if you attempt to use the DELETE command on parts of records. The DELETE command in Calendar can delete only entire appointments or tasks. You must select one or more entire record(s).

Error accessing file

EXPLANATION: This message is displayed if there is some problem reading or writing a file. If you were reading or writing from a communications port or cassette, try to transfer the file again. Check your storage device for various problems. In addition, if you attempt to print to the PRN: or COM1: device when it is not connected, this message will appear. Check the connection and make sure the printer is turned on.

Invalid value

EXPLANATION: This message is displayed if you enter or attempt to insert a value that is out of range or inconsistent with other values entered in fields or at related command prompts. For example, this message is displayed if you enter text in the START field of the Daily Diary screen. Reenter the correct value(s).

No data records to select

EXPLANATION: This message is displayed if you pressed the SELECT ALL key and there were no data records in the file. No action is required.

Calendar Reference

No scrap

EXPLANATION: You have attempted to insert from the scrap, but there was nothing in the scrap. Reselect the data and try again.

Not enough free memory to complete insertion. Data file is unsorted.

EXPLANATION: This message is displayed if there was not enough free memory to complete the insertion. The data file has been left unsorted. Delete unneeded files and press the SORT key to complete the process.

Quit — Data file lacks fields required to run

EXPLANATION: This message is displayed if there is a problem with the Calendar application reading a file. You are trying to run Calendar on a file that is not a properly formed CALENDAR.CAL file. Or, the data that is in the file is not Calendar data. Try renaming the CALENDAR.CAL file and running it under File. Make any necessary changes, rename the file CALENDAR.CAL and run it under Calendar. If this procedure does not work, you may have to delete the Calendar file and start over.

Value to be inserted did not match field type

EXPLANATION: This message is displayed if you attempted to insert a value that is inconsistent with the destination. For example, this message is displayed if you attempt to insert a NOTE field entry from the scrap into the START field on the Daily Diary screen, or if you attempt to insert other than whole records on the Monthly Calendar screen. Check the contents of the scrap by using the Word application and then reattempt the insert operation.

CHAPTER 12

INTRODUCTION TO FILE

OVERVIEW

File allows you to create your own database management system for the ZP-150. It provides you with the same command line user interface used by the other applications included with your ZP-150. As you begin to use File, you will notice it is very similar to Calendar in the way it stores data.

Replace bulky paper filing systems with File. It can easily organize and update your information for quick access. The ZP-150 and your on-line File database allows information access no matter where you are.

File allows you to create, delete, and edit records. File has a feature that allows you to retrieve records that contain fields with specific values or ranges of values. Wildcard characters (symbols that can represent any value) are supported so that only parts of strings of data need be specified in a search or query.

FEATURES

- File meets the needs of the sales representative who wants to keep an address/phone list and a record of sales leads. File also meets the complex needs of the business or professional person who wants to keep track of inventory, client billing, and invoice mailing.
- File allows you to organize your data in any way you choose—once you have entered the information into the database. For example, you may want to sort a list of names into alphabetical order or sort inventory part numbers in descending order. With File you can even sort items in the database by date or time, or search your database for specific records.
- File can potentially hold a maximum of 4,096 records with 64 fields each, with each field holding up to 255 characters. The number of fields and records that can actually be created depends on the record/field combination. For example, the space used to store a database file cannot exceed 65,000 bytes, or 500 records with 5 fields of 25 characters.

RELATED APPLICATIONS

File can be used with many of the other programs in Works. The following list illustrates some of these.

BASIC—use BASIC to perform special functions with your File data-base; such as the printing of a special report containing information from File.

Plan or Word—File can exchange data with either of these applications.

Telcom—use with File to retrieve and autodial phone numbers and set line communication protocol.

TUTORIAL

The following exercise will give you a general idea of how easy and flexible File is to use. Any database you build is simply a grid of rows and columns. Each row contains one record of related items, or *fields*, of information. Each column contains one field per record in the database.

Starting File

When you turn on your computer, the System Manager screen is displayed (see Figure 12.1). The application in the upper left-hand corner of the screen is highlighted, that is, selected for you to work with. The RUN command, the one you use to start any application, is also highlighted and ready for you to use.

```
WORD
CALENDAR
FILE
TELCOM
PLAN
BASIC

Microsoft(R) Works V1.10, Copyright (1984, 1985) Microsoft Corp.
> Copy Delete List Name Options Print Run Set
Select option or type command letter
System Manager: WORD Bytes free: 124512 5/ 8/85 12:01:23 AM
```

Figure 12.1. The System Manager Screen

To create a new database:

1. Press the **DOWN ARROW** key twice to select **FILE** in the left-hand column of the screen.
 2. Press the **RETURN** key to select the **RUN** command. The following set of prompts replaces the command line:

RUN application: FILE file:

The default entry at the application: prompt is FILE.

3. Press the **TAB** key to move the selection highlight to the **file:** prompt.
 4. Enter **ADDRESS**. **ADDRESS** is the file name for your database.
 5. Press **RETURN**. Figure 12.2 will be displayed.

The control records ID, FORM, SORT, and FIND are listed in the upper left-hand corner as shown in Figure 12.2. These records enable you to name, format, arrange, and find fields.

The ID record is where you define the names of the fields occupying each column of the database.

Use the FORM record to define the size, type, and appearance of information in each field.

The SORT and FIND records are entered after the data records. Entries in the SORT record allow you to rearrange data records in a different order. Entries in the FIND record allow you to display only a particular group of data records.

For more details on types of data to enter in these control records, see Chapter 13, "File Reference."

ID	NEW
FORM	AAAAAAAAAA
SORT	
FIND	
NEW	

Figure 12.2. Building a New Database

12.4

Introduction to File

Also displayed is a NEW record. This is the point at which you will begin building your database. At the bottom of the screen you see the command, message, and status lines.

Choose commands from the command line to instruct File to perform the actions desired. As you work, the message line suggests what to do next or tells you of an error to correct before you proceed.

The status line contains the following information:

- FILE:, indicating that the File program is running;
- the name of the file with which you are currently working;
- the number of records in the current FIND set, followed by the total number of records in the database. If you have made no entries in a FIND record, both numbers will be the same;
- Ex indicator, present only if you have pressed the EXTEND SELECT key (F6);
- Ap or Ns indicator, present only if you have pressed the SCRAP key (F5);
- Lo indicator, present only if memory available to work with is low;
- ☀ indicator, present only if you have not yet acknowledged an alarm that you have previously set; and
- ♫ indicator, present only if the phone is ringing.

Now that you know the basic components of a File screen, you are ready to learn File.

You will set up a database to replace a conventional paper address book. It is similar to the brief example in the *ZP-150 User's Guide*.

The database will have typical entries for names, addresses, and telephone numbers. It will also contain two additional entries: a TYPE field to distinguish personal friends from business associates, and a BIRTH field for each record.

When you start File to create a new database, the first field of the NEW record is highlighted for you. The position of the highlight allows you to immediately begin to enter data, a feature you will find useful once you have become familiar with File.

For the purposes of this exercise, however, you will learn the basics of File more quickly by building your database in the following order of steps:

1. formating individual fields,
2. naming individual fields, and
3. entering data.

Formatting Data Fields

Typical field names in an address book are NAME, ADDRESS, and PHONE. You will also include a TYPE field and a BIRTH (for Birthday) field when creating the ADDRESS database.

Before naming the fields, you should format the fields you will enter in each column. You format a field by specifying its size and its type. You can also specify its appearance by using boilerplate characters, such as:

- \$ before dollar amounts, or
/ between parts of a date.

When you start File to create a new database, the first field of the NEW data record is highlighted. Press the UP ARROW key three times to highlight the FORM record. The FORM record contains a default entry of AAAAAAAA. The A indicates that all fields in this column will contain alphanumeric characters (text).

The number of A's present indicates the default size of the field—ten characters wide. Each new field you add to the FORM record initially contains this default.

You use the EDIT command to replace the default entry in the FORM record with a response of your own.

Before you format fields in any column, consider the following:

- How wide should each field be to contain the information you will enter?
- Do you want to include a blank character at the end of each field to avoid crowding the columns of the database?
- Will the name of the field fit in the space provided?

Any information that you enter later in a field can exceed the width you specify in the FORM record. However, only the specified number of characters will display in the field.

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Introduction to File

The first column of the database will be the NAME field. To format all fields in this column:

1. Select the EDIT command by pressing RETURN. The following replaces the command line:

EDIT:AAAAAAA

The default at the command prompt is the default entry in the FORM record.

2. Enter A (to indicate text) 15 times to define the width of the NAME field. (Fifteen characters is a reasonable width for a NAME field.)

You can type characters in either upper- or lowercase. Regardless, File will display your entry in the FORM record in uppercase.

Press the BACK SPACE key to erase any mistyped characters; then type the remainder of the response.

3. Press the RIGHT ARROW key. Notice the NEW column is moved to the right. It is replaced by C1.

The ID and FORM records now appear as shown in Figure 12.3.

Records are extended column by column with each new field that you fill in. The first field of the ID record is now labeled C1, indicating column 1. You will soon replace C1 with a more descriptive column name. Your entry, formatting all fields in column 1 for 15 characters of text, is now present in the first field of the FORM record.

The NEW column is now the second column on the screen. This column will contain all TYPE fields for the data records you will soon enter. The default is 10 characters of text. The response is highlighted in the NEW column, as well as at the EDIT: prompt, so you can now change the response if you want.

ID	C1	NEW
FORM	AAAAAAAAAAAAAA	AAAAAAA
SORT		
FIND		
NEW		

Figure 12.3. Formatting a Column of Text Fields

The EDIT command is still active, waiting for you to format the next field of your database file:

1. Enter AAAA (for text).
2. Press the **RIGHT ARROW** key to open the NEW column.

The purpose of the TYPE field in the ADDRESS database will be to distinguish personal friends from business associates. One simple way of making this distinction when you later fill in data records is to enter B for Business and P for Personal. Therefore, the column containing TYPE field can be formatted to contain a single character of text.

However, keep in mind that you will later name this column when you enter the fields of the ID record. Since you want the entire name, TYPE, to be visible at the top of the second column, format the field to contain four characters of text.

The second field of the ID record is now labeled c2, and the four-character text format you just entered is in the second field of the FORM record. The NEW record, where you will format the next field, now follows column 2. The next field you create will contain the ADDRESS field of the data records you will enter. Before formatting this column, consider the following:

- Most addresses consist of numbers and text. Because numbers are used in combination with text, format this column to contain text. File will accept only one information type (Text, Number or Date/Time) in each field of the FORM record. You cannot, for example, enter a combination of A's and #'s within a single FORM field. It is a good practice to assign a number format only to fields whose contents may change as the result of a calculation (for example, fields containing dollar amounts).
- Make the ADDRESS field wide enough to contain as much of the information as you want to display in this field.

The EDIT command is still active, waiting for you to format all fields in the third column of your database file:

1. Enter A 30 times. (Thirty characters is a reasonable width for an address field.)
2. Press the **RIGHT ARROW** key to enter this field and move the the NEW column to the right.

The next field you create will contain the PHONE field of the data records you will enter.

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To format all fields in the fourth column of your database file:

1. Enter (AAA) AAA-AAAA. Because phone numbers, like the number in addresses, are used descriptively rather than mathematically, format them as Text. Doing so also gives you the option of later entering phone numbers with alphabetic prefixes.

The parentheses around the area code and the dash between the first three and the last four digits of the phone number are *boilerplate characters*. File will automatically insert these characters into any phone number field you fill in later. File will also insert the space between the area code and the phone number.

2. Press the **RIGHT ARROW** key to enter this field and move the NEW column to the right. The ID and FORM records of the database now appear as shown in Figure 12.4.

SCROLLING COLUMNS

Notice that, after you formatted column 4, the screen display shifts left, moving column 1 off your screen. The NEW field is still on the right. Enter:

MM/DD

The slash (/) between the parts of the date format is considered a boilerplate character. Unlike other boilerplate characters, however, File will not automatically insert this character into any birthday field you fill in later. You must add the slash every time.

NOTE: Boilerplate characters are required when you format columns to contain dates. See Formating Data Fields in Chapter 13 for more details.

To redisplay column 1, press the **LEFT ARROW** key four times to return the highlight to the first column of the FORM record.

ID	<C2	C3		C4		NEW	
FORM	AAAA	AAAAAAAAAAAAA	AAAAA	(AAA)	AAA-AAAA	AAAAA	AAAAA
SORT							
FIND							
1							
NEW							

EDIT: AAAAAAAA
Edit field
File: ADDRESS

Records: 0/0

Figure 12.4. The ID and FORM Records

ID	C1 AAAAAAA	C2 AAAAA	C3 AAAAAAA	C4 (AAA)AAA-AAAA	C5 MM/DD	>
FORM						
SORT						
FIND						
NEW						

EDIT:
Edit field
File: ADDRESS

Records: 0/0

Figure 12.5. Restoring Column 1 to View

The ID and FORM records now appear as shown in Figure 12.5.

Column 1 is restored to the screen. The fifth field of the ID record now displays labeled c5, and the date specification you have entered displays in the fifth field of the FORM record. Column 5 now fits on the screen because you have shortened its width by five characters.

Notice that a right-pointing arrow () now forms the top right border of column 5, indicating that there are additional fields present beyond the right-hand border of the screen (in this case, the NEW column). Think of the last two columns of the database appearing as shown in Figure 12.6.

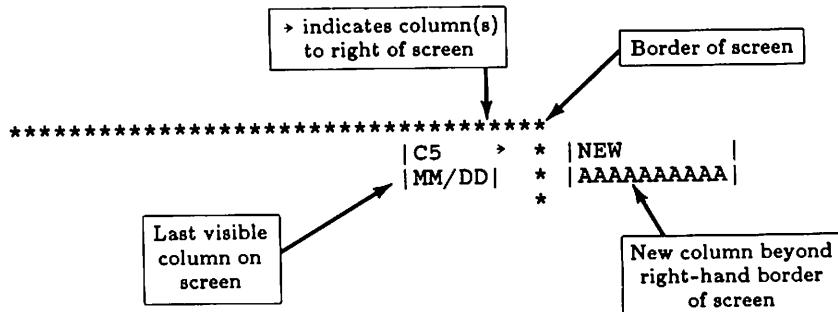


Figure 12.6. New Column beyond the Border of the Screen

Naming Data Fields

The next step in building your database is to provide column names in the ID record. By naming a column, you actually name the field that the column contains. Two fields cannot have the same name.

Upon naming a data field, you will notice that File considers upper- and lowercase characters to be identical. You can change the name of an ID field, for instance, from zds to ZDS simply by selecting the field and entering the change.

The selection highlight is currently positioned in column 1 of the FORM record. The EDIT command is still active, awaiting your next entry.

To begin filling in the ID record:

1. Press the **UP ARROW** key to select column 1 of the ID record.
2. Enter **NAME**, and press the **RIGHT ARROW** key to select column 2. Name replaces c1 as the name displayed in the first column.
3. Enter **TYPE**, and press the **RIGHT ARROW** key to select column 3. Type replaces c2 as the name displayed in the second column.
4. Enter **ADDRESS**, and press the **RIGHT ARROW** key to select column 4. Address replaces c3 as the name displayed in the third column.
5. Enter **PHONE**, and press the **RIGHT ARROW** key to select column 5. Phone replaces c4 as the name displayed in the fourth column.
6. Enter **BIRTH** (for Birthday) as the column name for column 5. Leave the highlight positioned on column 5. (The next time you press an ARROW key, BIRTH will replace c5 as the column name.)

At this point, the screen appears as shown in Figure 12.7.

ID	Name	Type	Address	Phone	C5
FORM	AAAAAAAAAAAAAA	AAAA	AAAAAAAAAAAAA	(AAA) AAA-AAAA	MM/DD
SORT					
FIND					
NEW					

EDIT: Birth
Edit field
File: ADDRESS

Records: 0/0

Figure 12.7. Naming Data Fields

Entering Data Records

Once you have named the fields, you are ready to begin entering records, field by field, into the database. Keep in mind that any information you enter in a data field must conform to the format you enter in the FORM record. For example, do not enter 11/15/84 in the DATE field of one record and May 31, 1984 in another record.

To begin entering data, move to the NEW record directly beneath the FIND record. Enter the following sample entry for the first record.

1. Press the LEFT ARROW key four times and the DOWN ARROW key four times to select the NAME field of the NEW record.
2. Enter MARSHALL, DENNIS at the EDIT: prompt. By typing the last name first, you allow yourself to later sort data records into alphabetical order.
3. Press the RIGHT ARROW key to select the next field in the record. Figure 12.8 shows how the upper portion of the screen appears.

Notice how the screen has changed:

- The NEW record has moved down one line.
- The record you are currently filling in has been labeled record 1 in the far left column of the screen.
- The name you typed at the EDIT: prompt now occupies the NAME field of record 1.

Notice that there is not enough room for your entire entry to display in the NAME field of record 1. Do not worry about this for now. Later, you will learn the options you have for displaying the information you enter in a database.

ID	Name	Type	Address	Phone	Birth
FORM	AAAAAAAAAAAAAA	AAAA	AAAAAAAAAAAAA	(AAA)AAA-AAAA	MM/DD
SORT					
FIND					
1	Marshall, Denni				
NEW					

EDIT:
Edit field
File: ADDRESS

Records: 0/0

Figure 12.8. Entering Data

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Introduction to File

Next, enter information in the TYPE field of record 1:

4. Enter P to indicate Personal.
5. Press the **RIGHT ARROW** key to select the next field in the record.
6. To fill in the ADDRESS field of record 1, enter 217 NE 151 Seattle WA 98123. To display as much of an address as possible within the 30 characters you have formatted this field to contain, omit the punctuation (periods and commas) you usually include when writing an address.
7. Press the **RIGHT ARROW** key to select the next field in the record.
8. To fill in the PHONE field of record 1, enter either 2067531234 or (206) 753-1234. You do not have to type the boilerplate characters you entered when filling in the FORM record; nor do you have to enter the space between the area code and the phone number. File will automatically insert the boilerplates and blank space for you in the PHONE field. However, you can type the boilerplate characters if you want.

For details on entering information in data fields formatted with boilerplate characters, see **Formatting Data** in Chapter 13.

9. Press the **RIGHT ARROW** key to select the next field in the record.
10. To fill in the BIRTH field of record 1, enter 3/12. Make sure you type the slash character (/) between the month and day. File will automatically insert a leading blank space in the data field before all days or months represented by a single digit. In this way, File ensures that your data is evenly lined up within the BIRTH field.
11. To continue building your database, press the **DOWN ARROW** key once and the **LEFT ARROW** key four times to reach the NAME field.
12. Continue entering the sample data listed at the end of this chapter. After entering nine records, you have filled every available row on the screen with a record of information.

SCROLLING DATA RECORDS

When you have filled in the first nine records of the database, the screen will appear as shown in Figure 12.9. You must press **RETURN** in order for the command, message, and status lines to appear on your screen.

ID	Name	Type	Address	Phone	Birth
FORM	AAAAA.....AAAAA	AAAA	AAAAAAAA.....AAAAAAA	(AAA)AAA-AAAA	MM/DD
FIND					
1	Marshall, Denni	P	217 NE 151 Seattle WA 98123	(206)753-1234	3/12
2	Johnson, Tom	B	14737 Emerald Blvd Seattle WA	(206)753-4321	11/14
3	Smith, Margaret	P	3275 Esther St Boise ID 83712	(308)972-6112	1/21
4	Williamson, Fre	B	721 Airport Rd Renton WA 98119	(206)752-3274	7/ 9
5	Sanford, Betty	P	45631 Palmdale Ave La Jolla CA	(216)639-3782	2/18
6	Johnson, Mike	P	9919 NE Spruce St Portland OR	(503)848-8888	10/ 4
7	Buford, Alice	P	152 WE 14 Apt B Seattle WS 981	(206)753-7112	4/15
8	Carter, Bill	P	2821 Olive St Sacramento CA 98	(916)487-0065	9/22
9	Peterson, Don	B	756 Fir St Lynnwood WA 98129	(206)564-7465	12/12
> Copy Delete Edit Find Insert Jump LookUp Move Options Print					
Select option or type command letter					
File: ADDRESS Records: 9/9					

Figure 12.9. The First Screenful of Data

To add a tenth record to the database, you first need to display the hidden NEW record. Press the DOWN ARROW key. Figure 12.10 shows what happens to the screen.

The NEW record now appears below record 9. However, in order to make room for the NEW record on the screen, File has scrolled the FORM record (in the top screen position) out of view.

Before entering any more records:

1. Select the NAME field of the NEW record.
2. Select the EDIT command.

Now complete the sample database by entering records 10–15. Notice that as you add additional records, the line at the top of the screen rolls off the display. This pattern repeats itself with each new record you add.

It is important to enter more than 12 data records in order to see what happens when you enter more than one screenful of data.

When you have finished entering the sample data records, press RETURN to execute the EDIT command.

ID	Name	Type	Address	Phone	Birth
SORT					
FIND					
1	Marshall, Denni	P	217 NE 151 Seattle WA 98123	(206) 753-1234	3/12
2	Johnson, Tom	B	14737 Emerald Blvd Seattle WA	(206) 753-4321	11/14
3	Smith, Margaret	P	3275 Esther St Boise ID 83712	(308) 972-6112	1/21
4	Williamson, Fre	B	721 Airport Rd Renton WA 98119	(206) 752-3274	7/ 8
5	Sanford, Betty	P	45631 Palmdale Ave La Jolla CA	(216) 639-3782	2/18
6	Johnson, Mike	P	9919 NE Spruce St Portland OR	(503) 848-8888	10/ 4
7	Buford, Alice	P	152 WE 14 Apt B Seattle WA 981	(206) 753-7112	4/15
8	Carter, Bill	P	2821 Olive St Sacramento CA 98	(916) 487-0065	9/22
9	Peterson, Don	B	756 Fir St Lynnwood WA 98129	(206) 564-7465	12/12
NEW					
> Copy Delete Edit Find Insert Jump LookUp Move Options Print					
Select option or type command letter					
File: ADDRESS Records: 9/9					

Figure 12.10. Scrolling to the Next NEW Record

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ID	Name	Type	Address	Phone	Birth
4	Williamson, Fre	B	721 Airport Rd Benton WA 98119	(206)752-3274	7/ 9
5	Sanford, Betty	P	45631 Palmdale Ave La Jolla CA	(216)639-3782	2/18
6	Johnson, Mike	P	9919 NE Spruce St Portland OR	(503)848-8888	10/ 4
7	Buford, Alice	P	152 WE 14 Apt B Seattle WS 981	(206)753-7112	4/15
8	Carter, Bill	P	2821 Olive St Sacramento CA 98	(916)487-0665	9/22
9	Peterson, Don	B	756 Fir St Lynnwood WA 98129	(206)564-7465	12/12
10	Jones, Timothy	P	524 SE Newport Rd Bremerton WA	(206)432-7788	10/24
11	Dalton, Peggy	P	835 NE 247 Seattle WA 98123	(206)753-4499	9/17
12	Warner, Dan	P	545 NW Grant St Corvallis OR 9	(503)947-6450	8/ 8
13	Kaiser, Jim	P	11789 Sunset Ave Irvine CA 915	(714)664-9966	11/10
14	Palmer, Kim	B	377 Hemlock Dr Bellevue WA 980	(206)757-8899	3/24
15	Cox, Jason	B	611 Jasper Rd Bellevue WA 9802	(206)757-7733	5/ 7

Figure 12.11. The Completed Database

Your database now should appear as shown in Figure 12.11.

To return to the beginning of your database file:

1. Press the **UP ARROW** key to move the selection highlight to the first visible record (record 4) on the screen.
 2. Press the **UP ARROW** key again. Record 15 scrolls out of view, and record 3 comes into view. As you continue to press the **UP ARROW** key, hidden records scroll down one by one.
 3. Continue to press the **UP ARROW** key until the FORM record appears.

Displaying Entire Data Fields

Some of the information you have entered is too wide to fit in the NAME and ADDRESS fields of the database. If you need to see the entire contents of a field, you have two options:

- select the EDIT command to display the field's contents at the EDIT: prompt, or
 - widen the field in the FORM record.

For example, suppose you need to see the zip code in the ADDRESS field of record 5. To do so:

1. Use the ARROW keys to select the ADDRESS field of record 5.
 2. Press RETURN to select the EDIT command. The EDIT: prompt replaces the command menu. The entire contents of the selected data field appear as the default response.

3. Because you do not want to change the contents of the selected field but rather widen it, press **ESC**. The command line reappears.

To see all of the zip codes in the fields, you need to widen the ADDRESS field by six characters. To do so:

1. Use the **ARROW** keys to select the ADDRESS field of the FORM record.
2. Press **RETURN** to select the **EDIT** command. The proposed response in the prompt is the current format of all ADDRESS fields in the database.
3. Press **F8**. The selection highlight moves to the first blank character to the right of the proposed response.
4. Enter **AAAAAA**. Your entry is added to the current response.
5. Press **RETURN** to execute the **EDIT** command. Now your database will appear as shown in Figure 12.12. All ADDRESS fields in the database are widened by six characters. The entire contents of each ADDRESS field is now visible.

Notice that by increasing the width of the ADDRESS fields, you have now scrolled the column containing the BIRTH fields off the screen. The right-pointing arrow (→), indicating one or more hidden columns to the right, now forms the right-hand border of the PHONE field.

For further details on editing fields, including special instructions for changing the information type (Text, Number, or Date/Time) in fields of the FORM record, see **Editing Fields, Columns, and Records** in Chapter 13.

ID	Name	Type	Address	Phone	→
FORM	AAAAAAAAAAAAAA	AAAA	AAAAAAAAAAAAAAAAAAAAA	(AAA)AAA-AAAA	
SORT					
FIND					
1	Marshall, Denni	P	217 NE 151 Seattle WA 98123	(206)753-1234	
2	Johnson, Tom	B	14737 Emerald Blvd Seattle WA 98122	(206)753-4321	
3	Smith, Margaret	P	3275 Esther St Boise ID 83712	(308)972-6112	
4	Williamson, Fre	B	721 Airport Rd Benton WA 98119	(206)752-3274	
5	Sanford, Betty	P	45631 Palmdale Ave La Jolla CA 94345	(216)639-3782	
6	Johnson, Mike	P	9919 NE Spruce St Portland OR 94333	(503)848-8888	
7	Buford, Alice	P	152 WE 14 Apt B Seattle WS 98123	(206)753-7112	
8	Carter, Bill	P	2821 Olive St Sacramento CA 98522	(916)487-0665	
9	Peterson, Don	B	756 Fir St Lynnwood WA 98129	(206)564-7465	
> Copy Delete Edit Find Insert Jump LookUp Move Options Print					
Select option or type command letter					
File: ADDRESS					
Records: 15/15					

Figure 12.12. Widening the Address Column

Sorting Data Records

Enter a specification in one or more fields of the SORT record to instruct File to arrange data records in the order you want. File can arrange records in either ascending or descending order. File considers lower- and uppercase characters to be the same; it makes no distinction between the two.

Any specification you enter consists of two standard parts. The first is a number indicating the priority of the specification—1 indicates a primary sort and 2 indicates a secondary sort. The second is either the word UP or DOWN. UP indicates that records are to be sorted in ascending order; DOWN indicates descending order.

For example, suppose that you want to sort your database to separate records on personal friends from those on business associates. To do this, you enter a primary sort specification in the TYPE field of the SORT record:

1. Use the ARROW keys to select the TYPE field of the SORT record.
2. Press RETURN to select the EDIT command.
3. Enter 1DOWN at the EDIT: prompt. Your entry tells File to (a) sort records first by type and (b) sort records in descending order (for example, to list Type P records before Type B records).
4. Press RETURN to execute the EDIT and SORT commands. While File sorts the database, the Finding... message appears on the message line.

When File has finished the primary sort, the first screenful of records will appear as shown in Figure 12.13.

File writes your entry as 1 Down and displays as much of the entry as will fit in the TYPE field of the SORT record. When sorting, the selection highlight remains at the 1 DOWN position.

ID	Name	Type	Address	Phone
FORM	AAAAAAA	AAA	AAAAA	(AAA) AAA-AAA
SORT		1 Do		
FIND				
1	Marshall, Denni	P	217 NE 151 Seattle WA 98123	(206) 753-1234
2	Smith, Margaret	P	3275 Ester St Boise ID 83712	(308) 972-6112
3	Sanford, Betty	P	45631 Palmdale Ave LaJolla CA 94345	(216) 639-3782
4	Johnson, Mike	P	9919 NE Spruce St Portland OR 94333	(503) 848-8888
5	Buford, Alice	P	152 NE 14 Apt B Seattle WA 98123	(206) 753-7112
6	Carter, Bill	P	2821 Olive St Sacramento CA 98522	(916) 487-0665
7	Jones, Timothy	P	524 SE Newport Rd Bremerton WA 98125	(206) 432-7788
8	Dalton, Peggy	P	835 NE 247 Seattle WA 98123	(206) 753-4499
9	Warner, Dan	P	545 NW Grant St Corvallis OR 97330	(503) 947-6450
> Copy Delete Edit Find Insert Jump LookUp Move Options Print				
Select option or type command letter				
File: ADDRESS				
Records: 15/15				

Figure 12.13. Sorting Data: Screen 1

ID	NAME	TYPE	ADDRESS	PHONE
10	Kaiser, Jim	P	11789 Sunset Ave Irvine CA 91555	(714) 664-9966
11	Johnson, Tom	B	14737 Emerald Blvd Seattle WA 98122	(206) 753-4321
12	Williamson, Fre	B	721 Airport Rd Renton WA 98199	(206) 752-8274
13	Peterson, Don	B	756 Fir St Lynnwood WA 98129	(206) 564-7456
14	Palmer, Kim	B	377 Hemlock Dr Bellevue WA 98025	(206) 757-8899
15	Cox, Jason	B	611 Jasper Rd Bellevue WA 98025	(206) 757-7733
NEW				

> Copy Delete Edit Find Insert Jump LookUp Move Options Print
Select option or type command letter

Figure 12.14. Sorting Data: Screen 2

5. Press **SHIFT-DOWN ARROW**. The next screenful of records will appear as shown in Figure 12.14.
 6. Press **SHIFT-UP ARROW** to return to the first screenful of records.

Having separated data records into two groups, suppose you now want to arrange records alphabetically within each group. To do so, you need to enter a secondary sort specification in the NAME field of the SORT record:

1. Select the NAME field of the SORT record.
 2. Press RETURN to select the EDIT command.
 3. Enter 2UP at the EDIT: prompt. Your entry tells File (a) having first sorted records by type, to sort them this second time by name, and (b) to sort records within each group in ascending order (in this case, from A to Z).
 4. Press RETURN to execute the EDIT command.

When File has finished sorting the database, the first screenful of records will appear as shown in Figure 12.15.

ID	NAME	TYPE	ADDRESS	PHONE (AAA)	AAA - AAAA
FORM	AAAAAAAAAAAAAA	AAAA	AAAAAAAAAAAAAAAAAAAAAA		
SORT	2 Up	1 Do			
FIND					
1	Buford, Alice	P	152 NE 14 Apt B Seattle WA 98123	(206)	753-7112
2	Carter, Bill	P	2821 Olive St Sacramento CA 98522	(916)	487-0665
3	Dalton, Peggy	P	835 NE 247 Seattle WA 98123	(206)	753-4499
4	Johnson, Mike	P	9919 NE Spruce St Portland OR 94333	(503)	848-8888
5	Jones, Timothy	P	524 SE Newport Rd Bremerton WA 98125	(206)	432-7788
6	Kaiser, Jim	P	11789 Sunset Ave Irvine CA 91555	(714)	664-9966
7	Marshall, Denni	P	217 NE 151 Seattle WA 98123	(206)	753-1234
8	Sanford, Betty	P	45631 Palmdale Ave LaJolla CA 94345	(216)	639-3782
9	Smith, Margaret	P	3275 Ester St Boise ID 83712	(308)	972-6112
> Copy Delete Edit Find Insert Jump LookUp Move Options Print					
Select option or type command letter					
File: ADDRESS			Records: 15/15		

Figure 12.15. Secondary Sort: Screen 1

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ID	NAME	TYPE	ADDRESS	PHONE
10	Warner, Dan	P	545 NW Grant St Corvallis OR 97330	(503) 947-6450
11	Cox, Jason	B	611 Jasper Rd Bellevue WA 98025	(206) 757-7733
12	Johnson, Tom	B	14737 Emerald Blvd Seattle WA 98122	(206) 753-4321
13	Palmer, Kim	B	377 Hemlock Dr Bellevue WA 98025	(206) 757-8899
14	Peterson, Don	B	756 Fir St Lynnwood WA 98129	(206) 564-7456
15	Williamson, Fre	B	721 Airport Rd Renton WA 98199	(206) 752-8274
NEW				

> Copy Delete Edit Find Insert Jump LookUp Move Options Print
Select option or type command letter
File: ADDRESS Records: 15/15

Figure 12.16. Secondary Sort: Screen 2

5. Press SHIFT-DOWN ARROW to see the next screenful of records (see Figure 12.16).
6. Press SHIFT-UP ARROW to return to the first screenful of records.

File will keep all records in the order you have specified until you change one or more of your current entries in the SORT record.

Finding Data Records

You instruct File to find a particular record or set of records by entering a specification in one or more fields of the FIND record. The specifications you enter are referred to as comparisons.

You specify which record or group of records you want File to find by including one or more of the following symbols in the comparisons you enter:

=	equal to
<>	not equal to
<	less than
<= (or =<)	less than or equal to
>	greater than
>= (or =>)	greater than or equal to

You can enter more than one comparison in a field of the FIND record; comparisons, however, must be separated by the ampersand (&). You can also use the asterisk wildcard character (*) in comparisons to represent one or more characters in any data field containing text. Use of both ampersand and asterisk is illustrated in the following examples.

Suppose you would like to find every personal friend in your database file whose birthday is in October. To do so:

1. Use the ARROW keys to select the TYPE field of the FIND record.
2. Press RETURN to select the EDIT command.
3. Type =P at the EDIT: prompt. You have told File to find all records with an entry equal to P in the TYPE fields of all data records. (An entry of <>B, instructing File to find all records with an entry not equal to B in the TYPE field of all data records, would work just as well.)
4. Use the ARROW keys to select the BIRTH field of the FIND record. The BIRTH field is hidden beyond the right-hand border of the screen, so you need to scroll the screen one column to the right.
5. Type >=10/1 & <=10/31 at the EDIT: prompt. This entry tells File to find all dates in the BIRTH field greater than or equal to October 1 and less than or equal to October 31.
6. Press RETURN to execute the EDIT command. While File searches the database for the records you have specified, the Finding... message displays on the message line.

When File has found the specified records, they will display as shown in Figure 12.17.

File displays as much of your last entry as will fit in the BIRTH field of the FIND record and moves the selection highlight to the first record—other than the ID record—on the screen.

To see the names corresponding to the birthdays displayed, scroll the screen one column to the left.

ID	<Type	Address	Phone	Birth	NEW
FORM	AAAA	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	(AAA) AAA-AAAA	MM/DD	AAAAAAA
SORT	1 Do				
FIND	=P				
4	P	9919 NE Spruce St Portland OR 94333	(503) 848-8888	>=10/	
5	P	524 SE Newport Rd Bremerton WA 98125	(206) 432-7788	10/ 4	
NEW				10/24	

```
> Copy Delete Edit Find Insert Jump LookUp Move Options Print
Select option or type command letter
File: ADDRESS
Records: 2/15
```

Figure 12.17. Finding Specific Records

Introduction to File

Notice that the notation on the status line has changed from 15/15 to 2/15. This tells you that, of the 15 records in your database, 2 records match the comparisons you have entered in the FIND record. Notice too that the NEW record follows the last data record displayed on the screen.

NOTE: Occasionally, you may want to restore a database to its original condition without deleting the comparisons you have entered in a FIND record. You can do so by choosing a response of **No** at the **find:** prompt of the OPTIONS command. A response of **No** causes File to ignore any comparisons in a FIND record.

To again see only the records specified by your comparisons, change the response at the **find:** prompt of the OPTIONS command back to **Yes**. For details, see discussion of the OPTIONS command in Chapter 13.

The records currently displayed remain on the screen until you change or delete the comparisons you have entered in the FIND record. To restore all records to the screen, delete the comparisons:

1. Use the ARROW keys to select the BIRTH field of the FIND record.
2. Press **D** to select the DELETE command. The comparison is deleted.
3. Use the ARROW keys to select the TYPE field of the FIND record.
4. Press **D** to select the DELETE command. The comparison is deleted.

Both comparisons are deleted from the FIND record. Your database file is restored to the condition illustrated by Figures 12.16 and 12.17.

Adding New FIND Records

Occasionally, you will need more than one FIND record to display the data records you want. For example, suppose you would like to see the records for everyone in your database file whose last name begins with J or P. An entry of =J* & P* in the NAME field of the FIND record will not work because no name begins with both J and P. In this case, you need to add another FIND record to your database file. To do so:

1. Press **F** to select the FIND command from the command line. File adds a new FIND record directly above the existing one. See Figure 12.18.

File adds the new FIND record to the database. To make room for the new FIND record, File has scrolled a control record out of view.

The selection highlight is still in the TYPE field of the original FIND record.

ID	NAME	TYPE	ADDRESS	PHONE
SORT	2 Up	1 Do		
FIND				
FIND				
1	Buford, Alice	P	152 NE 14 Apt B Seattle WA 98123	(206) 753-7112
2	Carter, Bill	P	2821 Olive St Sacramento CA 98522	(916) 487-0665
3	Dalton, Peggy	P	835 NE 247 Seattle WA 98123	(206) 753-4499
4	Johnson, Mike	P	9919 NE Spruce St Portland OR 94333	(503) 848-8888
5	Jones, Timothy	P	524 SE Newport Rd Bremerton WA 98125	(206) 432-7788
6	Kaiser, Jim	P	11789 Sunset Ave Irvine CA 91555	(714) 664-9966
7	Marshall, Denny	P	217 NE 151 Seattle WA 98123	(206) 753-1234
8	Sanford, Betty	P	45631 Palmdale Ave LaJolla CA 94345	(216) 639-3782
9	Smith, Margaret	P	3275 Ester St Boise ID 83712	(308) 972-6112
FIND:				

File: ADDRESS

Records: 15/15

Figure 12.18. Adding Another FIND Record

To fill in both FIND records:

2. Use the ARROW keys to select the NAME field of the first FIND record.
 3. Press RETURN to select the EDIT command.
 4. Type =J*.
 5. Use the ARROW keys to select the NAME field of the new or second FIND record.
 6. Type =P*.
 7. Press RETURN to execute the EDIT command. Your database file now appears as shown in Figure 12.19.

ID	NAME	TYPE	ADDRESS	PHONE
SORT	2 Up	1 Do		
FIND	=J*			
FIND	=P*			
4	Johnson, Mike	P	9919 NE Spruce St Portland OR 94333	(503) 848-8888
5	Jones, Timothy	P	524 SE Newport Rd Bremerton WA 98125	(206) 432-7788
12	Johnson, Tom	B	14737 Emerald Blvd Seattle WA 98122	(206) 753-4321
13	Palmer, Kim	B	377 Hemlock Dr Bellevue WA 98025	(206) 757-8899
14	Peterson, Don	B	756 Fir St Lynnwood WA 98129	(206) 564-7456
NEW				

> Copy Delete Edit Find Insert Jump LookUp Move Options Print
Select option or type command letter
File: ADDRESS Records: 5/15

Figure 12.19. Filling in Both FIND Records

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Take a moment to review how your last few entries in the control records of your database file determine what is now on the screen:

- Your entries in the NAME fields of both FIND records cause records for everyone with a last name beginning with either J or P to display.
- Your entry in the TYPE field of the SORT record causes all personal records to display before all business records.
- Your entry in the NAME field of the SORT record causes records to list alphabetically (by last name) within each group.

Saving File

When you quit File, your database is automatically saved in your computer's memory.

To quit File, press **CTRL-F10** (the QUIT key). You are returned to the System Manager screen.

Any database you create with File is stored in two files instead of one. The first is a work file with the hidden .FIL extension. This file contains formatting information on the database, such as number of records, width of columns, and location of the highlight at the time you last quit the program.

The second file is a data file with the .DAT extension. This file contains the actual data that you entered in the database (for example, names, addresses, phone numbers, and birthdays). Data is stored separately from formatting information so you easily retrieve the data for use with a BASIC program.

When copying files, copy only the file with the .DAT extension. When you run the newly copied file, it will create its own work file with the .FIL extension.

Each file is displayed in its appropriate location on the System Manager screen as shown in Figure 12.20.

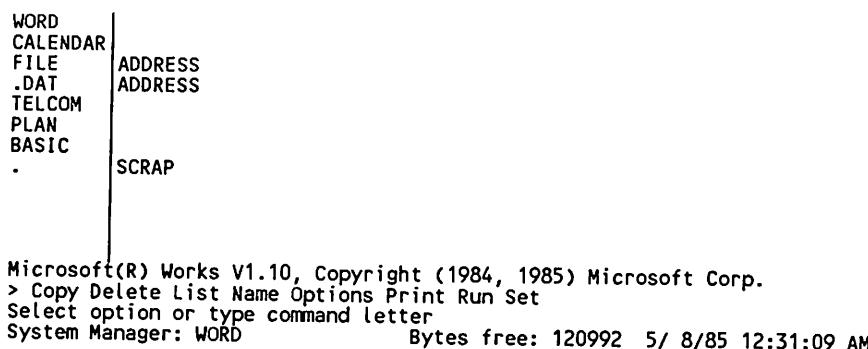


Figure 12.20. The .FIL and .DAT Files

Restarting File

The next time you want to work with the ADDRESS file (for example, to update records in the database):

1. Select the ADDRESS file listed to the right of the File program name (the .FIL file).
2. Press RETURN. Your computer automatically runs the File program, retrieves data from the .DAT file, and returns you to the data field that was highlighted when you last quit the ADDRESS file.

ADVANCED FEATURES

The following section describes using the LOOKUP command in File. You may want to explore this feature as you become more experienced with File.

Looking Up Information in Another Database

Using File's LOOKUP command, you can fill all or part of a column in one database with information stored in another database. This relational database function is similar to the joining of two databases. Doing so allows you to quickly and easily:

- add new information to a database and
- update records in a database.

To look up information in another database:

1. Select the column, or the part of a column, you want to receive new or updated data fields.
2. Select the LOOKUP command.
3. At the **in:** prompt, enter the name of the database from which you want to extract information.
4. At the **matching fields:** prompt, enter the name of the column or columns that File will use to find the data you want. If you enter a list of column names, separate them with commas.
5. Press RETURN.

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ID	Name	Type	Address	Phone	Birth
FORM	AAAAA AAAAA	AAA AAA	AAAAAAAA AAAAAAAA	(AAA)AAA -AAAA	MM/DD
SORT					
FIND					
1	Marshall, Denni	P	217 NE 151 Seattle WA 98123	(206)753-1234	3/12
2	Johnson, Tom	B	14737 Emerald Blvd Seattle WA	(206)753-4321	11/14
3	Smith, Margaret	P	3275 Esther St Boise ID 83712	(308)972-6112	1/21
4	Williamson, Fre	B	721 Airport Rd Benton WA 98119	(206)752-3274	7/ 9
5	Sanford, Betty	P	45631 Palmdale Ave La Jolla CA	(216)639-3782	2/18
6	Johnson, Mike	P	9919 NE Spruce St Portland OR	(503)848-8888	10/ 4
7	Buford, Alice	P	152 WE 14 Apt B Seattle WS 981	(206)753-7112	4/15
8	Carter, Bill	P	2821 Olive St Sacramento CA 98	(916)487-0665	9/22
9	Peterson, Don	B	756 Fir St Lynnwood WA 98129	(206)564-7465	12/12

> Copy Delete Edit Find Insert Jump LookUp Move Options Print
Select option or type command letter
File: ADDRESS Records: 9/9

Figure 12.21. The ADDRESS Database

The following example, based on the ADDRESS database you created earlier, illustrates the process of adding information to a database.

For reference, the first screenful of records you entered in the ADDRESS database is shown in Figure 12.21.

Suppose that the first thing you do at work in the morning is to create a small reminder database in which you list the telephone calls you need to make during the day. You name the new database, CALLS, and enter the names of the people you need to call and a short notation indicating your reason for calling. You also format a column to contain phone numbers. However, you do not look up and enter the phone numbers because you know you can get them directly from your ADDRESS database.

Once you have created the CALLS database, it might be displayed as shown in Figure 12.22.

ID	Name	Reason	Phone	NEW
FORM	AAAAA AAAAA	AAAAAAAA AAAAAAAA	(AAA) AAA -AAAA	AAAAA AAAAA
SORT				
FIND				
1	Marshall, Denni	Congratulations on promotion		
2	Johnson, Tom	Sales call		
3	Williamson, Fre	Renew car insurance		
4	Buford, Alice	Confirm Wednesday lunch		
5	Peterson, Don	Sales call		

> Copy Delete Edit Find Insert Jump LookUp Move Options Print
Select option or type command letter
File: CALLS Records: 5/5

Figure 12.22. The CALLS Database

To get the phone numbers you need from the ADDRESS database:

1. Use the ARROW keys to select the PHONE field of the CALLS database. To do so, position the highlight anywhere in the PHONE field and then press SHIFT-F8.
 2. Press L to select the LOOKUP command.
 3. Enter ADDRESS at the in: prompt.
 4. Press TAB to advance to the next prompt.
 5. Enter NAME at the matching fields: prompt.
 6. Press RETURN. If you have not previously sorted the ADDRESS database, File will display the message:

LookUp file will be sorted. Enter Y to continue:

If this message appears, press Y to execute the LOOKUP command. File must first sort the records in the ADDRESS database before copying the data you want to the CALLS database.

File compares the names in the NAME field of the CALLS database to the names in the NAME field of the ADDRESS database. Whenever File finds a pair of names that match, it copies the phone number for that name from the ADDRESS database to the PHONE field of the record containing the same name in the CALLS database. (See Figure 12.23.)

File's LOOKUP command is especially useful for updating large databases. Rather than scrolling through a large database to update individual data fields, you can create a database containing updated information only and then look up the information from the database you need to update. The following example illustrates the process of updating a large database.

ID	Name	Reason	Phone	NEW
FORM	AAAAAAAAAAAAAA	AAAAAAAAAAAAAA	(AAA) AAA-AAAA	AAAAAAAAAA
SORT				
FIND				
1	Marshall, Denni	Congratulations on promotion	(206) 753-1234	
2	Johnson, Tom	Sales call	(206) 753-4321	
3	Williamson, Fre	Renew car insurance	(206) 752-8274	
4	Buford, Alice	Confirm Wednesday lunch	(206) 753-7112	
5	Peterson, Don	Sales call	(206) 564-7465	
NEW				

Figure 12.23. Updated CALLS Database

Introduction to File

ID	Order No.	Item	Type	Cost per Unit	Item Price
FORM	AAAAAAAAAA	AAAAAAAAAAA	AAAAAAAAAAAAA	\$ ####.##	\$ ####.##
SORT					
FIND					
1	A-1007	bond pad	8 1/2" x 11" narrow	\$ 0.41	\$ 0.69
2	A-1008	bond pad	8 1/2" x 11" wide	\$ 0.41	\$ 0.69
3	A-1009	bond pad	8 1/2" x 14" legal	\$ 0.46	\$ 0.69
4	B-6123	memo pad	4" x 6" white	\$ 0.27	\$ 0.39
5	B-6124	memo pad	4" x 6" canary	\$ 0.29	\$ 0.45
6	C-3781	index cards	3" x 5" ruled	\$ 0.17	\$ 0.25
7	C-3782	index cards	3" x 5" plain	\$ 0.17	\$ 0.25
8	D-2763	ball pens	fine pt.	\$ 0.53	\$ 0.79
9	D-2764	ball pens	medium pt.	\$ 0.53	\$ 0.79

Figure 12.24. The STOCK Database

As the owner of a small office supply store, you maintain a database on the 350 individual items you offer for sale. The first screen of your database, which you have named STOCK, is shown in Figure 12.24.

Information on these items periodically changes. For example, you occasionally need to change the prices you charge for various items. You could, of course, update various entries in the ITEM PRICE field throughout the database. However, because the database contains 350 records, you would spend much time in scrolling, selecting, and editing. It would be much faster to create a database containing only updated information and then use the LOOKUP command to copy this information to your STOCK database.

To do so, you first create the new database. As usual, you give it an appropriate name, such as UPDATE. Once you have entered the necessary information, the first screen of the UPDATE database might be displayed as shown in Figure 12.25.

Your UPDATE database contains records for 25 items whose prices have changed. Your entries in the ORDER NO. field identify the specific items. Your entries in the ITEM PRICE field show the revised price for each item.

Figure 12.25. The UPDATE Database

To copy revised prices from the UPDATE database to the STOCK database:

1. In the STOCK database, use the ARROW keys to select the ITEM PRICE field.
2. Select the LOOKUP command.
3. Enter UPDATE at the in: prompt.
4. Press TAB.
5. Enter ORDER NO at the matching fields: prompt.
6. Press RETURN.
7. Press Y to sort the UPDATE database and execute the LOOKUP command.

File compares the numbers in the ORDER NO. field of both databases. Whenever File finds a matching pair of order numbers, it copies the price for the number from the UPDATE database to the ITEM PRICE field of the record containing the same number in the STOCK database. The revised prices from UPDATE overwrite the old prices in STOCK.

When File has carried out the LOOKUP command, all revised prices in UPDATE will have been copied to their respective records throughout the entire STOCK database. The first screen of STOCK, shown in Figure 12.26, illustrates the revised STOCK database.

The next time you run STOCK, select the ITEM PRICE field and choose the LOOKUP command. UPDATE and ORDER NO. will be the default selections at LOOKUP's command prompts. Therefore, you do not need to fill in LOOKUP's command prompts the next time you update pricing information in STOCKS with information you enter in UPDATE.

If you needed to look up a field on the basis of two matching fields at the matching fields: prompt, simply enter both fields. Separate the fields by a comma.

ID	Order No.	Item	Type	Cost per Unit	Item Price
FORM	AAAAAAA	AAAAAAA	AAAAA	\$ ####.##	\$ ####.##
SORT					
FIND					
1	A-1007	bond pad	8 1/2" x 11" narrow	\$ 0.41	\$ 0.69
2	A-1008	bond pad	8 1/2" x 11" wide	\$ 0.41	\$ 0.69
3	A-1009	bond pad	8 1/2" x 14" legal	\$ 0.46	\$ 0.79
4	B-6123	memo pad	4" x 6" white	\$ 0.27	\$ 0.39
5	B-6124	memo pad	4" x 6" canary	\$ 0.29	\$ 0.49
6	C-3781	index cards	3" x 5" ruled	\$ 0.17	\$ 0.29
7	C-3782	index cards	3" x 5" plain	\$ 0.17	\$ 0.25
8	D-2763	ball pens	fine pt.	\$ 0.53	\$ 0.79
9	D-2764	ball pens	medium pt.	\$ 0.53	\$ 0.79
> Copy Delete Edit Find Insert Jump LookUp Move Options Print					
Select option or type command letter					
File: STOCK Records: 350/350					

Figure 12.26. The Updated STOCK Database

Printing All or Part of a Database

Now you will learn about printing. The ZP-150 can be used with a serial or parallel printer. If you have a serial printer, your ZP-150 must be configured. Refer to Chapter 4, "External Devices," for information on configuring your ZP-150 for a serial printer.

If you do not know how to connect or operate your printer, read your printer manual before attempting to print File documents.

Check to see that the:

- printer is plugged in;
- printer cable is plugged into the printer and into the ZP-150 printer port located on the rear panel;
- printer is on and on-line (if it is a serial printer, it should be configured); and
- printer has paper and ribbon installed correctly. Paper must be lined up so that the top edge of each page is at the bottom of the print head.

Before printing a database, you first select the area of the database you want to print. You can print:

- any rectangular group of adjoining fields, including entire records and/or columns; or
- the entire database.

You also have the option of either printing a database on your printer or to a file. You print to a text file to store data for printing later, or as the first step in transferring data from a File database to a Word document. You print to a file in interchange format as the first step in transferring data from File to a variety of desktop computer database filing programs. For details on transferring data between application programs, see Chapter 3, "ZP-150 Applications."

When you print a database on your printer, File uses the margin, page size, and print size specifications set by responses in command prompts of the System Manager's SET PRINTER command. These specifications are set for printing on standard 8-1/2 by 11-inch printer paper. If you are printing on a different size of paper, change the specifications in the System Manager's SET PRINTER command before using File's PRINT command.

File prints as many records and columns on a page as will fit on the paper you print on. Any remaining records and/or columns print on successive pages. If the data you print is wider than the paper you print on, you can paste pages together later.

You can cancel the printing of a database at any time by pressing the BREAK key.

To print all or part of a database on your printer:

1. Select the area of the database that you want to print.
2. Select the PRINT command.
3. Accept the default entry of PRN: at the to: prompt.
4. Accept the proposed response of Text at the style: prompt.
5. Press RETURN.

To print all or part of a database to a text file:

1. Select the area of the database that you want to print.
2. Select the PRINT command.
3. Type a name for the text file at the to: prompt.
4. Select either Text OR Interchange at the style: prompt.
5. Press RETURN.

NOTE: When the to: prompt is active, you can press any ARROW key to display a list of all files stored in your computer's memory. Use this list to make sure that you do not give the file that you want to print the same name as a file that you have previously saved. Your computer does not permit you to store two files with the same name.

If you do give the text file that you want to print the same name as another file, File will display the Enter Y to overwrite file y/n? message. If you press Y for Yes, File overwrites the file in memory with the database you are currently printing.

Saving a Database in Your Computer's Memory

When you quit File, your database is automatically saved in your computer's memory. To quit File, press CTRL-F10 (QUIT).

You are returned to the System Manager screen.

NOTE: Pressing RUN PREVIOUS (CTRL-F9) also saves your database in memory. When you press CTRL-F9, you are returned to the last application you used before your current session with File.

Unlike the work you create with other applications, any database you create with File is stored in two files instead of one. The first is a work file with the hidden .FIL extension. This file contains formatting information on the database, such as number of records, width of columns, and location of the selection highlight at the time you last quit the program.

Introduction to File

The second file is a data file with the .DAT extension. This file contains the actual data that you entered in the database (for example, names, addresses, phone numbers, birthdays). Data is stored separately from formatting information so you easily retrieve the data for use with a BASIC program.

Each file is saved under the file name you gave the database when you started File. The file with the .FIL extension is listed to the right of the FILE application name on the System Manager screen. The file with the .DAT extension is listed to the right of .DAT on the System Manager screen.

Before you proceed to Chapter 13, "File Reference," or another application, delete all the files that you have created during this chapter. Use the DELETE command from the System Manager screen. For further information on the System Manager DELETE command, refer to Chapter 2, "System Manager Reference."

Sample Data

Following is sample data. Enter the data in the order that it is listed. This will help you to follow along with the tutorial.

RECORD #	SAMPLE DATA
1	Dennis Marshall (Personal) 217 NE 151, Seattle, WA 98123 (206) 753-1234 Birthday: 3/12
2	Tom Johnson (Business) 14737 Emerald Blvd., Seattle, WA 98122 (206) 753-4321 Birthday: 11/14
3	Margaret Smith (Personal) 3275 Esther St., Boise, ID 83712 (308) 972-6112 Birthday: 1/21
4	Fred Williamson (Business) 721 Airport Rd., Renton, WA 98119 (206) 752-8274 Birthday: 7/9
5	Betty Sanford (Personal) 45631 Palmdale Ave., La Jolla, CA 94345 (216) 639-3782 Birthday: 2/18

RECORD #	SAMPLE DATA
6	Mike Johnson (Personal) 9919 NE Spruce St., Portland, OR 94333 (503) 848-8888 Birthday: 10/4
7	Alice Buford (Personal) 152 NE 14 Apt. B, Seattle, WA 98123 (206) 753-7112 Birthday: 4/15
8	Bill Carter (Personal) 2821 Olive St., Sacramento, CA 98522 (916) 487-0665 Birthday: 9/22
9	Don Peterson (Business) 756 Fir St., Lynnwood, WA 98129 (206) 564-7456 Birthday: 12/12
10	Timothy Jones (Personal) 524 SE Newport Rd., Bremerton, WA 98125 (206) 432-7788 Birthday: 10/24
11	Peggy Dalton (Personal) 835 NE 247, Seattle, WA 98123 (206) 753-4499 Birthday: 9/17
12	Dan Warner (Personal) 545 NW Grant St., Corvallis, OR 97330 (503) 947-6450 Birthday: 8/8
13	Jim Kaiser (Personal) 11789 Sunset Ave., Irvine, CA 91555 (714) 664-9966 Birthday: 11/10
14	Kim Palmer (Business) 377 Hemlock Dr., Bellevue, WA 98025 (206) 757-8899 Birthday: 3/24
15	Jason Cox (Business) 611 Jasper Rd., Bellevue, WA 98025 (206) 757-7733 Birthday: 5/7



CHAPTER 13

FILE REFERENCE

In this chapter you will find the operating details specific to your ZP-150 File application. This chapter includes a description of the function keys that implement File's features, File editing information, an alphabetical list of File's commands, and a list of error messages you may encounter while using File.

FUNCTION KEYS

In addition to the system function keys described in Chapter 1, "System Manager," File makes use of the following sets of keys:

- Selection Keys
- Scrolling Keys
- Program Function Keys

Selection Keys

You must select an area of a database, ranging from a single field to the entire database, before choosing a command to operate on the selected data. You use the ARROW keys (UP, DOWN, LEFT, or RIGHT) to move the selection highlight to any field on the screen. Table 13.1 describes the movement of the highlight when you use these keys.

Table 13.1. ARROW Key Functions

KEY	ACTION
UP ARROW	Selects the field directly above the currently selected field.
DOWN ARROW	Selects the field directly below the currently selected field.
LEFT ARROW	Selects the field directly to the left of the currently selected field.
RIGHT ARROW	Selects the field directly to the right of the currently selected field.

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Once you have selected a particular field, you can use the EXTEND SELECT key and the ARROW keys to extend the selection to include:

- any rectangular grouping of fields.
- one or more entire record(s).
- one or more entire column(s).
- the entire database.

For details, see Program Function Keys in this chapter.

Scrolling Keys

You can also use the ARROW keys to scroll the display. When used alone the ARROW keys can scroll the display one record or column at a time. That is:

- When the selection highlight is in the last visible data record on the screen, press DOWN ARROW to scroll the display forward (up) one record at a time.
- When the selection highlight is in the first visible data record on the screen, press UP ARROW to scroll the display backward (down) one record at a time.
- When the selection highlight is in the rightmost column of the screen, press RIGHT ARROW to scroll the display left one or more columns at a time. Each time you press RIGHT ARROW, at least one column that was hidden from view beyond the right-hand border of the screen will be displayed and at least one column will be removed from the left-hand side of the screen.
- When the selection highlight is in the leftmost column of the screen, press LEFT ARROW to scroll the display right one or more columns at a time. Each time you press LEFT ARROW, at least one column that was hidden from view beyond the left-hand border of the screen will be displayed and at least one column will be removed from the right-hand side of the screen.

NOTE: When scrolling to expose hidden columns, File always displays as many complete columns as will fit on the screen. The number of columns that display depends upon the widths specified in the FORM record.

You can also use the ARROW keys with the SHIFT or CTRL key to scroll more quickly through a File database. Using SHIFT- or CTRL-modified ARROW keys is described in the paragraphs that follow.

Table 13.2. SHIFT-Modified ARROW Keys

KEY	ACTION
SHIFT-UP ARROW	Displays the screen of records prior to the record in which the selection highlight is located. If the selection highlight is in the screen containing the first record in the database, this key will have no effect.
SHIFT-DOWN ARROW	Displays the screen of records following the record in which the selection highlight is located. If the selection highlight is in the screen containing the last record in the database, this key will have no effect.
SHIFT-LEFT ARROW	Displays the screen of columns to the left of the column in which the selection highlight is located. If the selection highlight is in the screen containing the first column in the database, this key will have no effect.
SHIFT-RIGHT ARROW	Displays the screen of columns to the right of the column in which the selection highlight is located. If the selection highlight is in the screen containing the last column in the database, this key will have no effect.

USING THE ARROW KEYS WITH THE SHIFT KEY

By holding down the SHIFT key and pressing an ARROW key, you can scroll through your database one screen of data at a time. Depending upon the ARROW key you use, you can see the previous screen of records, the next screen of records, or shift the displayed fields left or right. Table 13.2 describes how the SHIFT-modified ARROW keys operate in File.

USING THE ARROW KEYS WITH THE CTRL KEY

By holding down the CTRL key and pressing the appropriate ARROW key, you display the screen containing the first or last record of the database, or the first or last column of the database.

CTRL-modified ARROW keys operate as shown in Table 13.3.

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Table 13.3. CTRL-Modified ARROW Keys

KEY	ACTION
CTRL-UP ARROW	Moves the selection highlight from the currently selected field to the corresponding field in the first record of the database.
CTRL-DOWN ARROW	Moves the selection highlight from the currently selected field to the corresponding field in the last record of the database.
CTRL-LEFT ARROW	Moves the selection highlight from the currently selected field to the first column of the current record.
CTRL-RIGHT ARROW	Moves the selection highlight from the currently selected field to the last column of the current record.

NOTE: In a large database file, the JUMP command will allow you to move the selection highlight to another screen more quickly than the CTRL-modified ARROW keys. For details, see the JUMP command in this chapter.

Program Function Keys

File contains two sets of program function keys. The first set consists of function keys F4, F5, and F6, as described in Table 13.4. The second set employs the SHIFT key and is shown in Table 13.5.

Table 13.4. Program Function Keys

FUNCTION	KEY	ACTION
SORT	F4	When low memory prevents File from inserting the entire contents of the scrap, File's sorting capability is automatically turned off. After you have recovered enough memory and inserted all data from the scrap, press F4 to turn File's sorting capability back on.
SCRAP	F5	<p>Instructs File when and how to copy or delete selected data to the scrap.</p> <ul style="list-style-type: none"> ■ To delete data without placing it in the scrap, press F5 until Ns (for No Scrap) appears on the status line; then carry out the DELETE command. ■ To append data to the current contents of the scrap, press F5 until Ap (for Append Scrap) appears on the status line; then carry out the COPY or DELETE command. ■ To replace the current contents of the scrap, press F5 until neither Ns nor Ap appears on the status line; then carry out the COPY or DELETE command.
EXTEND SELECT ¹	F6	<p>Turns the Extend Selection feature on and off. Once pressed, this key allows you to use the ARROW keys to expand the current field selection to any rectangular grouping of fields. Press F6 again to erase the extended selection and cause ARROW keys to again select individual fields. When the Extend Selection feature is on, Ex appears on the status line.</p> <p>Execution of any command other than OPTIONS or JUMP turns EXTEND SELECT off.</p>

¹ You can select large portions of a database file by pressing the EXTEND SELECT key and then using the CTRL- or SHIFT-modified ARROW keys or the JUMP command to scroll the display. When you scroll the display after pressing EXTEND SELECT, File extends the selection highlight from the starting point to the ending point of the scrolling action.

USING THE PROGRAM FUNCTION KEYS WITH THE SHIFT KEY

File's SHIFT-modified program function keys are used by holding down the SHIFT key and pressing F8, F9, or F10. Table 13.5 describes the actions performed by each of the keys.

When you select some portion of the database or the entire database, you can choose a command from the command menu to operate on the selected data. For example, you could select one or more column(s) or one or more record(s) before moving them to another location within the database with the MOVE command. You would select all the data records in the database before printing it with the PRINT command. For details on the use of each File command on the File command menu, see File Commands in this chapter.

Table 13.5. SHIFT-Modified Program Function Keys

FUNCTION	KEY	ACTION
SELECT COLUMN	SHIFT-F8	<p>Expands the current field selection to all fields in the same column. Press an ARROW key to erase the column selection and return to field-by-field selecting.</p> <p>To select a group of columns, you can press SELECT COLUMN, press EXTEND SELECT to turn the Extend Selection feature on, then use LEFT ARROW or RIGHT ARROW to select additional columns.</p>
SELECT RECORD	SHIFT-F9	<p>Expands the current field selection to all fields in the same record. Press an ARROW key to erase the record selection and return to field-by-field selecting.</p> <p>To select a group of records, you can press SELECT RECORD, press EXTEND SELECT to turn the Extend Selection feature on, then use UP ARROW or DOWN ARROW to select additional records.</p>
SELECT ALL	SHIFT-F10	Selects all the data records in the database. Press an ARROW key to erase extended selection and return to field-by-field selecting.

ENTERING AND EDITING DATA IN A DATABASE

Setting Up a Database

You build a new database by first selecting, then filling in, individual fields of control records and data records.

Once you have entered data, select an area of the database on which to work, then choose a command to manipulate the selected data. You select data by highlighting it on the screen. Use the keys described below to select any area, ranging from a single field to the entire database.

To select a single field:

Press the ARROW keys (UP, DOWN, LEFT, or RIGHT).

To select a group of adjoining fields:

1. Press F6.
2. Press the ARROW keys to extend field selection in any direction. Press F6 again to erase the extended selection and return to single field selection.

To select one entire column:

1. Press the ARROW keys to position the selection highlight on any field in the column you want to select.
2. Press SHIFT-F8. Press any ARROW key to erase the extended selection and return to single field selection.

Once you have selected an entire column, you can extend the selection to several adjoining columns:

1. Press F6.
2. Depending on the number of fields you want to select, use the ARROW keys, the SHIFT- or CTRL-modified ARROW keys, or the JUMP command to add more columns to the current selection.

To select one entire record:

1. Press the ARROW keys to position the selection highlight on any field in the record you want to select.
2. Press SHIFT-F9. Press any ARROW key to erase the extended selection and return to using single field selection.

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Once you have selected an entire record, you can extend the selection to several adjoining records:

1. Press F6.
2. Depending on the number of records you want to select, use the ARROW keys, the SHIFT- or CTRL-modified ARROW keys, or the JUMP command to add more records to the current selection.

To select the entire database:

1. Press SHIFT-F10.
2. Press any ARROW key to erase the extended selection and return to single field selection.

Editing Fields, Columns, and Records

Once you start File to build a new database, you can immediately begin to enter information in data fields. If you wish, however, you can first name and format the columns containing individual sets of data fields. You name columns of data by filling in the ID record; you format them by filling in the FORM record.

File stores up to 232 characters in each data field. Keep in mind, however, that each column of the database is initially formatted to contain 10 characters. Therefore, if you want data more than 10 characters long to display on the screen, edit the FORM record to increase the width of the column that will contain the data. You can widen a column to display up to 74 characters of a field's data on the screen at one time. (Once you have begun to enter data, you can only display a field's entire contents by first selecting the field, and then choosing the EDIT command. The field's entire contents will appear in the EDIT: prompt, near the bottom of the screen.) The PRINT command will only print the number of characters indicated in the column width.

Initially, File presents you with a single NEW column, the first in your new database file. After you have typed your first entry in the NEW column and have pressed either the RETURN key or an ARROW key, File will automatically open the next NEW column for you.

Formatting Data

You fill in fields of the FORM record to define the type, width, and appearance of fields in individual columns of a database. Fields can be any one of three types: Text, Number, or Date/Time.

You cannot mix types in a field of the FORM record. For example, when formatting a column of address fields consisting of numbers and text, you

must format the column as either Text or Number. Text is the logical choice because it accepts alphabetical and numeric data. Number will not accept both types.

To format one or more columns of data fields:

1. Select the field of the FORM record in the same column as the data fields you want to format.
2. Select the EDIT command.
3. Type a Text, Number, or Date/Time format in the EDIT: prompt.
4. Select the next field of the FORM record in which you want to enter a format. When beginning a new database, press the **RIGHT ARROW** key to open the next NEW column.
5. Repeat steps 3 and 4 above until you have formatted all the columns you want.
6. Press RETURN.

Immediately following is information on entering Text, Number, or Date/Time format character.

TEXT FIELDS

You format a column of Text fields with the letter A. Your entry in the FORM record can be either upper- or lowercase characters. However, File will display the entry in uppercase only.

The number of A's (plus any boilerplate characters) you enter in a column of the FORM record determines the width of all data fields in the column. The minimum column width is one character. Any entry in a data field can exceed the width you have specified in the FORM record. However, File will display only the number of characters specified in the FORM record.

File interprets any character other than A entered in a text field of the FORM record as a boilerplate character. For example, if you are specifying a column of phone numbers, enter (AAA) AAA-AAAA. When later filling in data fields in the column, you need to enter only the ten digits of the number. File will automatically insert the parentheses around the area code, the space between the area code and the number, and the dash between the first three digits of the number and the last four.

If you wish, however, you can also enter the boilerplate characters when filling in data fields. For details, see Boilerplate Characters in this chapter.

NUMBER FIELDS

You format a column of number fields with the number sign (#).

The number of #'s (plus any boilerplate characters and/or decimal point) you enter in a field of the FORM record determines the width of all data fields in the column. The minimum column width is one digit.

Enter no more than one decimal point in a number field of the FORM record. When later filling in data fields in the same column, you must again include the decimal point. A decimal point in the FORM record is not a boilerplate character and is, therefore, not automatically inserted when you fill in data fields.

The following table shows how numbers are displayed when you specify a format of #####.### in a number field of the FORM record.

NUMBER ENTERED IN DATA FIELD	NUMBER DISPLAYED IN DATA FIELD
23.45	23.450
-23.45	-23.450
23.4	23.400
120	120.000
.12	0.120
456.128	456.130
1456	1456.000

File interprets any character other than a number sign (#) or a period (.) that you enter in a number field of the FORM record as a boilerplate character. The position of any boilerplate character to the left of a number sign in the FORM record is fixed. For example, if you specify a format of \$ ####,###,###.## in the FORM record, and enter 112399.98 in a data field, the entry will display as \$ 112,399.98.

If you embed a boilerplate comma (,) anywhere within number signs in an entry in the FORM record, File will automatically insert commas to separate into thousands the numbers you later enter in data fields of the same column. This will occur only if a decimal is present in the FORM field.

Enter \$ ###,###. with a decimal at the end and no trailing number signs to retain the comma insertion feature without displaying decimal positions. If the number you enter is larger than the number of characters that were formatted, an * will appear across the field's location.

Never enter a minus sign (-) when you are formatting a number field. To display negative values in data fields, you must type the minus sign when filling in the data field.

When formatting a set of fields to contain numbers in scientific notation, you do not need to indicate positive or negative values. You must include an

additional number before the E if you intend to enter negative numbers in data fields. For example, enter ##.###E# to get -6.667E+04. The additional number sign reserves a space for the minus sign in data fields.

Also, you need to type only one number sign after the E. File will automatically insert two additional number signs for you. The first number sign (the one you type) is reserved for a plus or minus sign in data fields. The additional two number signs are reserved for a two-digit exponential value. When you later enter a value in a data field, File will indicate positive and negative values. The following table illustrates how File displays numbers in data fields formatted to contain scientific notation.

ENTRY IN FORM RECORD	NUMBER DISPLAYED IN FORM RECORD	ENTRY IN DATA FIELD	NUMBER DISPLAYED IN DATA FIELD
##.###E#	##.###E##	12345678	1.235E+07
		-12345678	-1.235E+07
		-1.235E-7	-1.235E-07

For more information about scientific notation, see Entering Data in this chapter.

DATE/TIME FIELDS

You format a column of date or time fields with the character sequences in the following list. File interprets any characters other than those in the following list as boilerplate characters.

YY	Two-digit representation for year.
YYYY	Four-digit representation for year.
MM	Two-digit representation for month or minutes. If the value in a data field is less than 10, File automatically inserts a blank space before the first digit. Any MM sequences you enter before an HH sequence represents "month." The first MM sequence you enter after an HH sequence represents "minutes."
MMM	Three-letter abbreviation for month name.
MONTHNAME	Full month name.
DD	Two-digit representation for day. If the value in a data field is less than 10, File automatically inserts a blank space before the first digit.

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HH	Two-digit representation for hour. If the value in a data field is less than 10, File automatically inserts a blank space before the first digit.
SS	Two-digit representation for seconds. If the value in a data field is less than 10, File automatically represents the first digit as 0.
AM/PM	Indicates use of a 12-hour clock. No entry of either AM or PM indicates use of a 24-hour clock.

You can combine these character sequences in various order. However, you must separate combined character sequences with boilerplate characters. Also, any boilerplate characters you enter in a field of the FORM record must be included in all data fields of the same column. For example, if you format a column of fields as MM/DD/YY and type 10284 in a data field of the same column, File cannot tell if you intend an entry of 1/2/84 or 10/2/84. Therefore, you must clearly indicate your entry by including boilerplates.

Also, you may want to include AM and PM notations in data fields. The basic purpose of these notations in the FORM record is to indicate use of a 12-hour, rather than a 24-hour, clock. If you include PM in the FORM record, but enter 9:00 (with neither AM or PM), File will know that you mean to indicate use of a 12-hour clock. However, File cannot tell whether you intended to indicate 9:00 AM or 9:00 PM. By default, File will display 9:00 AM in the data field.

The following shows some sample entries for date/time fields in a database:

ENTRY IN FORM RECORD	SAMPLE ENTRY IN DATA FIELD
MM/DD/YY HH:MM PM	11/17/83 12:45 PM
HH:MM AM, DD-MM-YY	14:30 AM, 02-10-83
MONTHNAME DD, YYYY	January 11, 1983
MM/DD, HH:MM PM, YYYY	02/25, 5:35 PM, 1984
HH:MM	19:25 (24-hour clock)

BOILERPLATE CHARACTERS

Boilerplates are any printable character other than A, #, or any of the Date/Time formats listed previously. Also, File interprets any blank spaces you enter in a field of the FORM record as boilerplate characters.

You can use boilerplate characters to more clearly identify the meaning of your data. (Following is an example of data with boilerplate characters; the boilerplate characters used are listed beneath the example. Do not use a period if numeric format is used. It will be interpreted as a decimal).

\$ 100,000 51.5% 34 oz. 27 cm. 555-55-5555 (555) 555-5555 32 F.
 \$ % oz. cm. - - () - F.

Boilerplates also help you to enter data more quickly. Once you include boilerplate characters in a field of the FORM record, File will automatically insert the characters in all data fields in the same column. You need to type only the data; File will supply the boilerplates for you.

Keep in mind that the presence or absence of boilerplate characters in the FORM record affects the way you later fill in data fields. For example, if you format a column of phone numbers as (AAA) AAA-AAAA (area code included), you must include the area code in all phone numbers you later enter in data fields of the same column. File will accept an entry of either (123) 456-7890 or 1234567890 and display (123) 456-7890 in the field.

However, if you omit the area code, File will still display boilerplates in data fields. As a result, you can inadvertently display a phone number such as (456) 789-0. Therefore, do not use boilerplates in a field of the FORM record if, for example, you do not want to enter area codes for local numbers in data fields of the same column.

Entering Numbers

You can enter numbers in three different ways.

- Integers (for example, 123 or 4207 or -7)
- Decimal fractions (for example, 123.45 or 0.9876)
- Scientific notation (for example, 12.1E2 or 5E-10)

Numbers can include only the following characters:

1 2 3 4 5 6 7 8 9 0 - + . , E e

File assumes a positive value if a number does not begin with a minus sign (-).

The letter E identifies the numbers that follow it as the exponent of the number.

If you want to enter dollar amounts or percentages, do not enter dollar signs (\$) or percent signs (%). Instead, include them as boilerplate characters in the field of the FORM record in the same column as the set of data fields in which you enter dollar amounts or percentages (see Formatting Data earlier in this chapter).

To enter a number in a data field:

1. Move the highlight to the field where you want to enter the number.
2. Select the EDIT command.

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3. Type the number you want to enter in the field.
4. Press RETURN.

If your entry in a data field exceeds the number of digits you have specified in the FORM record, then File attempts to shorten the number according to the following:

- If the number you entered is an integer, File attempts to convert the number to scientific notation. If the scientific notation is still too long for the field, File fills the field with asterisks (*).
- If the number you entered is a decimal fraction, File will round the fraction to fit in the field as long as the part of the fraction preceding the decimal point is not too long to fit in the field. Otherwise, File will attempt to convert the fraction to scientific notation. If the scientific notation is still too long for the field, File will fill the field with asterisks.

Scientific Notation

Scientific notation can represent very large or very small numbers. As shown in Figure 13.1, a number has three parts in scientific notation.

The number is read as mantissa times 10 to the exponent power. For example, 12.1E2 is read as 12.1 times 10 to the second power, or 1,210.

Editing Data

Edit the contents of fields in the same way that you entered them, by using the EDIT command. By editing data fields, you change the contents of a database. By editing fields in the SORT or FIND record, you change the structure of your database. Special instructions for editing fields of the FORM record follow the general procedure outlined in the next list.

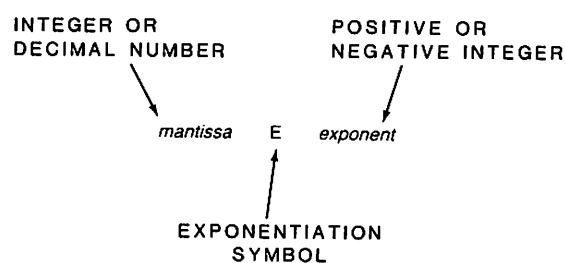


Figure 13.1. Scientific Notation Example

To edit one or more fields:

1. Select the field that you want to edit.
2. Select the EDIT command.
3. Enter the new entry for the field.
4. If you want to edit another field, select the field.
5. Repeat steps 3 and 4 until you have edited as many fields as you want.
6. Press RETURN.

For details on the special editing keys that can be used in the EDIT command, see Program Function Keys in this chapter.

EDITING THE FORM RECORD

Edit fields of the FORM record to make one or more of the following changes to all data fields in a particular column. You can change the:

- width of all fields in a column. Simply increase or decrease the number of formatting characters in the corresponding field of the FORM record;
- appearance of data in a column. For example, you can change the format of a column of dates from MM/DD/YY to MMM DD, YYYY. Notice that by doing so, you would also change the width of all fields in the column; or
- type of data entered in a column of data fields. For example, you can reformat a field to contain text instead of numbers.

The type of data (Text, Number, or Date/Time) refers to the structure of the data stored by your computer. Data type is especially important when you transfer data between applications.

For example, if you transfer a column of numbers from File to Plan, Plan will first check that you have previously formatted the column to contain numbers. If you have not, Plan will attempt to convert the column's format for you. It is more efficient, however, to simply make sure that you have properly formatted data in File before you transfer the data to another application.

The following summarizes File's ability to convert the type of data you have previously formatted a field to contain.

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FROM	TO	CONVERSION
Text	Number	Yes
Text	Date/Time	Yes
Number	Text	Yes
Number	Date/Time	No
Date/Time	Text	Yes
Date/Time	Number	No

Notice that either of the other two formats can be converted to Text. Conversion to Text simply means that File now recognizes a number, for example, as the printed image of a numeric value. You would convert a column of numbers to Text in File before transferring the column to a Word document, because Word treats all data as a printed image; that is, Word sees no difference between "4" and "four." However, you would not convert the format of a column of numbers that you intend to transfer to Plan, because Plan treats numbers as genuine numeric values; that is, unlike Word, Plan can perform calculations with numbers.

Notice, too, that File cannot convert a data type from Number to Date/Time, or from Date/Time to Number. The reason for this is that there is no logical numeric value for a date represented by numbers (such as 11/15/84). Similarly, there is no logical equivalent as a date for a numeric value (such as 27,000).

When you do edit a field of the FORM record to change the type of data in a column, File will display the Checking... message. Once File has confirmed that it can convert data types, it will display the Changing... message.

If, while checking, File cannot convert the format of a particular field, it will display the Value cannot be converted. Enter Y to continue. message. If you do not want to continue the operation, press the ESC key. File will cancel the current edit and return you to the main command menu. If you press Y for Yes, File will erase the contents of the field after concluding its check of the entire database. If you press ESC before checking each record, the records will not be changed. File will proceed to check if it can convert the format of the next field. File continues this process until it has finished checking each data field in the column whose format you are changing.

NOTE: Conversion of data types requires additional use of your computer's remaining memory. If there is not enough memory left to perform the conversion, File will display the Insufficient free memory message and automatically cancel the edit.

DISPLAYING DATA

In File, you can enter up to 232 characters in a field—much more than you will probably ever need. Frequently, however, you may enter more data in a field than will display within the field's width.

To display the entire contents of a field:

1. Use the ARROW keys to select the field.
2. Select the EDIT command. The entire contents of the field appear in the EDIT: prompt.

NOTE: You can also edit the FORM record to increase the width of any column. The maximum number of a field's characters that can display on the screen at one time is 74.

FINDING DATA RECORDS

To instruct File to find a particular record or set of records, enter a specification in one or more key fields of the FIND record. A key field is the field of the FIND record in the same column as the set of fields containing the data you want to find.

File compares each record in the database to your entries in key fields of the FIND record and then redraws the screen to display only those records that meet your specifications. Therefore, the specifications you enter in key fields of the FIND record are referred to as *comparisons*.

A comparison consists of two standard parts. The first is an operator that indicates a value or range of values. The second is the specification you have entered in the key field. File recognizes the following operators:

=	equal to
<>	not equal to
<	less than
<= (or =<)	less than or equal to
>	greater than
>= (or =>)	greater than or equal to

To find and display only those records that you specify:

1. Select the key field.
2. Select the EDIT command.
3. Enter the comparison in the EDIT: prompt.
4. Press RETURN.

At any time before pressing RETURN, you can cancel the EDIT command by pressing ESC. If you cancel the EDIT command while filling in the FIND record, File will search the database according to all key fields except the one you were in when you pressed ESC.

While File searches the database, the Finding . . . message appears on the message line. When finished, File redraws the screen to display the records you have specified.

GENERAL RULES

The following rules apply to any comparison you enter in a key field.

- You can enter more than one comparison in a key field of the FIND record. Each comparison must be separated by the ampersand (&). For example, suppose you wanted to find all records containing fields with dates in June and July of 1984. The following paragraphs discuss two samples.

If dates in the fields are formatted MMM DD YYYY in the FORM record, you can enter either of the following in the FIND record:

>=JUN 01 1984 & <=JUL 31 1984

>=jun 1 1984 & <=jul 31 1984

If dates in the fields are formatted MM/DD/YY in the FORM record, you can enter either of the following in the FIND record:

>=06/01/84 & <=07/31/84

>=6/1/84 & <=7/31/84

Notice that you can type in either upper- or lowercase characters and that you can compress an entire entry or include blank spaces between its individual parts. Also, you do not need to type leading zeros in parts of a date.

- You can also enter comparisons in more than one key field of the FIND record. For example, suppose you have created a database that includes monthly sales figures. Each record in the database contains a MONTH field (formatted MMM) and a SALES field (formatted #####.###.##). You would like to see all records showing over \$100,000.00 in sales in the first quarter (January 1–March 31). The following sample entries demonstrate how to find these records:

In the key field of the FIND record that falls within the MONTH field, enter:

>=Jan & <=Mar

In the key field of the FIND record that falls within the SALES field, enter:

>\$ 100,000.00

- As this example illustrates, if you have formatted fields to contain boilerplate characters (such as \$), you must include the boilerplate characters in the comparisons you enter in the FIND record.

SPECIFYING TEXT IN KEY FIELDS

When entering comparisons in the FIND record that are keyed to fields containing text, you have the following two options:

- You can use wildcard characters in key fields. *Wildcards* represent one or more characters in a field containing text. File uses the asterisk (*) and the question mark (?) as wildcards. Each operates differently:

The asterisk (*) represents any number of characters within a field of text. For example, suppose you want to find all records with fields in a Name column containing names that begin with the letter S. To do so, enter = S* in the key field of the FIND record that falls within the NAME field. An entry of = *SON would find records containing such names as JACKSON, LARSON, or THOMPSON. An entry of = J*SON would find records containing such names as JACKSON, JOHNSON, or JOSEPHSON.

The question mark represents a single character within a field of text. An entry of = ????SON would find records containing any name that is seven characters long and ends in SON. An entry of = J???SON would find records containing any name (such as JACKSON or JOHNSON) that is seven characters long and begins with J and ends with SON. The entry would not, however, find JOSEPHSON because the name consists of more than seven characters.

- You can use quotation marks within comparisons to match data fields on an exact, character-for-character basis.

For example, suppose you want to find a record containing a company name of JOHNSON & PALMER INC. If you enter a comparison of = JOHNSON & PALMER INC. (without quotation marks), File will look for another comparison operator before PALMER INC. Because File assumes that you have omitted a necessary operator, it will not find the record you want. File will only find the record you want if you enclose the company name within quotation marks: = "JOHNSON & PALMER INC."

When using quotation marks within comparisons, keep the following in mind:

- Exact matching of upper- and lowercase characters is necessary. For example, File will not find records containing Johnson & Palmer Inc. if you enter a comparison of = "johnson & palmer inc."
- Exact matching of blank spaces is necessary.
- Wildcard characters do not operate as usual when contained within quotation marks. For example, you want to find all records in your database that begin with the letter P in the NAME field. A comparison entry of ="P*" in the key field will *not* find all names

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beginning with P. Instead, File will look for records in which the NAME field contains a literal entry of "P*".

ENTERING FIELD NAMES IN KEY FIELDS

You can use the FIND record to compare the contents of two or more fields.

For example, suppose you have created a database whose records include projected expenses. These entries fall within a field you have named PROJECTED in the ID record. You later add an ACTUAL field containing entries of actual expenses. You now want to see all data records in which actual expenses were less than or equal to those you projected. To do so, simply enter <= PROJECTED in the key field of the FIND record that falls within the ACTUAL field.

Even though the field name PROJECTED is text, do not enclose it within quotation marks. If you do, File will not compare expense figures in the two fields. Instead, File will interpret the quotation marks as part of the field's name and will, therefore, not find the records you want.

If you have two FIND key fields, the top field is considered the primary FIND field. If, for example, you have two FIND fields and you just fill the secondary field, the entry will be ignored until you enter data in the primary field. See Adding New FIND Records in Chapter 12, "Introduction to File."

ADDING FIND RECORDS TO A DATABASE

Whenever you fill in more than one field of a FIND record, individual comparisons have an *and* relationship between them. For example, to find all records showing over \$100,000.00 in sales during the first quarter (as illustrated in General Rules in this chapter), you tell File to find a dollar range *and* a date range.

At times you may find it necessary to indicate an *or* relationship between comparisons; that is, rather than telling File to find one set of records and another set of records, you need to tell File to find either one set of records *or* another set of records. To do so, you first need to add a new FIND record to the database.

To add another FIND record, select the FIND command.

File adds a new FIND record directly above the existing one.

REDISPLAYING ALL RECORDS

You can use either of the following two methods to redisplay all records in the database.

- Deleting all comparisons in FIND records; or
- Selecting No at the Find: prompt of the OPTIONS command. File will ignore all comparisons in any FIND record until you return the response to Yes.

To delete a comparison:

1. Select the comparison in the FIND record.
2. Press the D key.

To tell File to ignore all comparisons in FIND records:

1. Select the OPTIONS command.
2. Select No at the Find: prompt.
3. Press RETURN.

Rearranging Data

You rearrange the data you have entered into a database by:

- sorting records;
- moving entire records or columns; or
- deleting any rectangular group of fields, including records or columns.

SORTING RECORDS

You use the SORT record to rearrange the order of data records. You specify the order you want with entries in one or more key fields in the SORT record. A *key field* is the field of the SORT record in the same column as the set of data fields you want to use to sort the database. File uses your entries in key fields to arrange records in either ascending or descending order.

Any specification you enter in a key field of the SORT record consists of two parts. The first is a number indicating the priority of the specification: 1 tells File to sort the database first by all data fields in the same column as that containing the key field; 2 tells File to sort the database a second time by all data fields in the same column as that containing the key field. You can enter as many specifications, each with a different priority, as there are fields per record.

The second part of any entry in a key field of the SORT record is either the word UP or DOWN. UP tells File to sort data records in ascending order. DOWN tells File to sort data records in descending order. For example, an entry of 1UP tells File to first sort records by the key field containing the entry—and to sort them in ascending order. You might use this entry to

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alphabetize a set of fields containing names. In this case, UP would indicate an ascending order from A to Z.

To enter a specification in a key field of the SORT record:

1. Select the key field.
2. Select the EDIT command.
3. Type the sort specification at the EDIT: prompt.
4. Press RETURN.

At any time before pressing RETURN, you can cancel the EDIT command by pressing the ESC key. If you cancel the EDIT command while filling in the SORT record, File will sort the database according to all key fields except the one you were in when you pressed ESC.

While File sorts the database, the **Sorting . . .** message appears on the message line. When finished, File redraws the screen to show data records in their new order.

Whenever you sort data records, the entire database is sorted—even if only a particular group of records, determined by an entry in the FIND record, displays on the screen.

MOVING RECORDS

To move records or columns:

1. Select the record(s) or column(s) you want to move.
2. Select the MOVE command.
3. At the **to before:** prompt, type the ID name of the record you want the selected record(s) moved before or type the name of the column you want the selected column(s) moved before. File will not allow you to duplicate an ID name.

Enter NEW to make the selected record or column the last one in the database.

4. Press RETURN.

NOTE: Records will not be moved to the specified location if you also have a SORT field indicated. When you press RETURN to move the record, the record will also be sorted.

You cannot move a single field within a row or column. The entire row or column must be moved.

DELETING DATA

When you delete any group of fields not forming an entire record or column, the contents of the selected fields are erased. Entire records or columns are removed from the database. When you delete one or more entire records, remaining records are automatically renumbered.

To delete data:

1. Select the group of cells, record(s), or column(s) you want to delete.
2. Press the SCRAP key (**F5**) until **Ns** appears on the status line. **Ns** indicates that selected data will not be placed in the scrap.
3. Select the DELETE command.

You can also use the DELETE command to place data in the scrap before transferring it to another application program. For details, see Chapter 3, "ZP-150 Applications."

FILE COMMANDS

Table 13.6 lists each File command with a brief description. Following the table is an explanation of each command. This explanation includes:

- the command submenu or command prompts that appear when you choose the command, and
- a description of each command prompt.

Using Commands

In File, you enter, revise, format, and print your database by using commands from the command menu. Specifically:

- before you choose a command, in many instances you must select the data you want the command to act on.
- after choosing a command, you sometimes must supply additional information at command prompts.

Choose a command either by typing the initial letter of the command name or by pressing TAB or SPACE BAR to position the selection highlight over the command and pressing RETURN. For example, if you wanted to choose the PRINT command, you would either press P, or you could press SPACE BAR until the selection highlight is positioned over PRINT in the command menu and then press RETURN. (You may need to press ESC to enter Command mode first.)

Table 13.6. File Command Summary

COMMAND	DESCRIPTION
COPY	Copies selected data into scrap.
DELETE	Deletes selected data.
EDIT	Enters or changes data in selected field.
FIND	Adds another FIND record to a database file.
INSERT	Inserts data from the scrap or retrieves data copied to the scrap from another program.
JUMP	Moves the selection highlight to the record and column you specify.
LOOKUP	Fills a selected column or partially selected column with information from another database.
MOVE	Moves selected records or columns to another location in a database file.
OPTIONS	Sets an option for File's use of FIND record entries.
PRINT	Prints selected records, columns, or fields on a printer or to a file.

For commands with command prompts, you must select responses or make entries (assuming that the defaults do not suit you) before File can execute the command. If commands do not have command prompts, File executes the command as soon as you choose it.

At command prompts you must either make an entry or make a selection from a list of valid responses. The responses in command prompts reflect the choice you made (in a menu), the response you filled in the last time you used the command, or the built-in responses File will use if you do not specify one. Either way, they are called *default selections* or *entries*. If all the responses are acceptable, you simply press RETURN.

If a response is unacceptable, either make a new selection or enter a different response.

To make a selection at a command prompt, either:

- press the initial letter of the option, or
- press SPACE BAR to highlight your choice.

NOTE: Use SPACE BAR to move from option to option within a command prompt. Do not press TAB—within command prompt listings, TAB moves you from prompt to prompt and SPACE BAR moves you from option to option.

To enter a different response, either type a new entry or change the existing entry by using the keys shown in Table 13.7.

Table 13.7. Key Entries in Command Prompts

KEY	ACTION PERFORMED IN COMMAND PROMPTS
F7	Moves highlight one word to the left.
F8	Moves highlight one word to the right.
F9	Moves highlight one character to the left.
F10	Moves highlight one character to the right.
INS	Erases the highlighted character(s).
BACK SPACE	Erases one character to the left of the highlight.

Once you have completed answering the command prompts, you are ready to tell File to execute the command or to cancel it. To execute commands, press RETURN. To cancel a command before you have pressed RETURN, simply press ESC. To cancel a command, such as PRINT, after RETURN has been pressed, simply press SHIFT-PAUSE (the BREAK key).

COPY

PURPOSE

Use the COPY command to duplicate the contents of the currently selected field(s), or record(s) into the scrap.

EXPLANATION

The COPY command does not have an associated submenu or command prompts. To execute the COPY command:

1. If necessary, press **ESC** to display the File command menu.
2. Select the field(s) or record(s) that you want to copy to the scrap.
3. Select the COPY command and press **RETURN**, or press **C**.

The data you selected is copied to the scrap. The way in which the data is copied to the scrap depends upon the current setting of the scrap. You can either append the selected data to the current contents of the scrap, or you can replace the current contents of the scrap with the data you copy.

To append copied data to the current contents of the scrap, press the SCRAP key until **Ap** (for Append Scrap mode) appears on the status line. Then carry out the COPY command.

NOTE: You cannot append columns (control and data records) to the scrap. If you do so, you will get the message **Cannot append columns to scrap.**

To replace the current contents of the scrap with copied data, press the SCRAP key until either **Ns** (for No Scrap mode) or no notation (Blank Scrap mode) appears on the status line. The COPY command ignores the **Ns** scrap setting. The contents of the scrap will be replaced with copied data as long as **Ap** does not appear on the status line. Carry out the COPY command once you have erased **Ap** from the status line.

Once you have copied data to the scrap, you can:

- insert the copied data to another area of your database file and/or
- transfer the data to another application.

For more information about transferring selections from one database to another database or program, refer to Transferring Data between Applications in Chapter 3, "ZP-150 Applications."

DELETE

PURPOSE

Use the DELETE command to remove the contents of the currently selected field(s) or to remove entire records or columns.

EXPLANATION

The DELETE command does not have an associated submenu or command prompts. To execute the DELETE command:

1. If necessary, press ESC to display the File command menu.
2. Select the field(s), column(s), or record(s) that you want to delete.
3. Select the DELETE command and press RETURN, or press D. The selected data is deleted.

The way in which the data is deleted depends upon the current setting of the scrap, as determined by the SCRAP key.

To delete data without placing it in the scrap, press SCRAP until N_s (for No Scrap mode) appears on the status line. Then carry out the DELETE command. The selected data will be irretrievably erased.

To append deleted data to the current contents of the scrap, press SCRAP until A_p (for Append Scrap mode) appears on the status line. Then carry out the DELETE command.

NOTE: A column can be deleted, but it will not be saved in the scrap. If you try to do so, you will get the message Cannot append columns to scrap.

To replace the current contents of the scrap with deleted data, press SCRAP until neither N_s nor A_p appears on the status line (Blank Scrap mode is in effect). Then carry out the DELETE command.

If the data you selected is a complete record or column, the entire record or column will be deleted from your database. If the data you selected does *not* form a complete record or column, then the field(s) are blanked rather than removed from the database file. Fields in the FORM and SORT records are always blanked, even if the entire record is selected. DELETE will remove a FIND record from the database if you have more than one FIND record and if you select an entire record. If you have only one FIND record and select it before you invoke DELETE, then all fields in the record will be blanked.

If you have deleted data to the scrap, you can:

- insert the data in another area of your database file and/or
- transfer the data to another application.

File Reference

For more information about transferring selections from one database to another database or program, refer to Transferring Data between Applications in Chapter 3, "ZP-150 Applications."

EDIT

PURPOSE

Use the EDIT command to enter or change data in the currently selected field.

EXPLANATION

The EDIT command has one command prompt. To execute the EDIT command:

1. If necessary, press **ESC** to display the File command menu.
2. Press the **ARROW** keys to select the field that you want to edit.
3. Select the EDIT command and press **RETURN**, or press **E**. The EDIT command prompt appears:

EDIT:

4. Enter the data for the field, or modify the existing data using the editing keys described in Table 13.7.
5. If you wish to enter or edit data in other fields, press the **ARROW** keys to select the next field and repeat step 4.
6. When you are finished entering or modifying data, press **RETURN**.

When you select an empty (blank) field and invoke EDIT (or when you are already in Edit mode), the entry you can make at the EDIT: prompt for a given field depends upon the format of the field as defined in the FORM record.

When you select a field that already contains data and invoke EDIT (or when you are already in Edit mode), the current contents of the field are displayed at the EDIT: prompt. That is, the default entry at the EDIT command prompt is the current contents of the selected field. If you have used the Extend Selection feature to select a rectangular group of fields, then the default entry at the EDIT: prompt is the current contents of the field in the upper left-hand corner. (Also, note that if you make a new entry at the prompt, the field in the upper left-hand corner is the field into which the new data will be inserted.)

When you use the EDIT command, remember that it is not necessary to press RETURN until you are finished entering data. In fact, your work will go more quickly and smoothly if you do *not* press RETURN after editing each field. Simply use the ARROW keys to select the next field in which you wish to make or modify an entry.

COMMAND PROMPT

The EDIT command has one command prompt. Following is a description of the EDIT command prompt, the message that appears when the prompt is active, and the entries you can make.

EDIT:

When this prompt appears, the message line displays Edit field. At this prompt, you can enter new data or edit the default entry displayed for the selected field. The type of entry you make (alphabetic or numeric) and the format in which it must be entered are determined by the FORM record for that field.

For details on the editing keys that can be used once you have chosen the EDIT command, see Table 13.7 or the description of system function keys provided in Chapter 1, "System Manager."

FIND

PURPOSE

Use the FIND command to display selected data in the currently selected field or to add another FIND record to the database file.

EXPLANATION

You instruct File to find a particular record or set of records by entering a specification in one or more fields of the FIND record. The specifications you enter are referred to as *comparisons*. For a more detailed explanation of comparisons, see General Rules in this chapter.

The FIND command does not have an associated submenu nor any command prompts. To execute the FIND command:

1. If necessary, press **ESC** to display the File command menu.
2. Select the FIND command and press **RETURN**, or enter **F**.
3. An additional FIND record is inserted directly above the last FIND record in the database file.

INSERT

PURPOSE

Use the INSERT command to insert data from the scrap into the database file or to retrieve data that has been transferred to the scrap from another application.

EXPLANATION

The INSERT command has no associated submenu or command prompt. To execute the INSERT command:

1. If necessary, press ESC to display the File command menu.
2. Select an area of the screen to mark the point of insertion.
3. Select the INSERT command and press RETURN, or press I.
4. The data from the scrap is inserted into the database file. While the data is being inserted, the command and message lines display:

INSERT:
Inserting value: nn

where *nn* is a number representing the data that is being inserted. The number is incremented for each unit of data that is inserted.

The way that the data is inserted into the database file is dependent upon which of the following you selected to mark the point of insertion:

- one field or a rectangular group of fields that does not form an entire record or column,
- one or more entire record(s), or
- one or more entire column(s).

If you have selected *one field or a rectangular grouping of fields*, File replaces (overwrites) the contents of these fields with the data in the scrap. Fields are replaced with data in the scrap beginning with the field in the upper left-hand corner of the selection. File inserts only as many fields of data from the scrap as there are fields selected to receive them. Suppose, for example, that your current selection is three horizontally arranged fields by three vertically arranged fields. If data in the scrap is four horizontal fields by four vertical fields, then only the first three fields in either direction will be inserted from the scrap.

If you have selected *one or more entire records*, File inserts data records from the scrap immediately before the first selected record. When you insert entire records, File sequentially renames all records and re-sorts the

database file according to any specifications you have previously entered in the SORT record.

If you have selected *one or more entire columns*, File inserts columns from the scrap immediately before the first selected column. When you insert entire columns of data from the scrap, File attempts to provide a format for all fields in the inserted column. Depending on the type of data inserted, File places one of the following entries in the field of the FORM record corresponding to the inserted column:

DATA TYPE	FORM RECORD ENTRY
Text	AAAAAAAAAA
Number	#####
Date/Time	MM/DD/YY HH:MM

Occasionally, you might attempt to insert data from the scrap into fields that have been formatted to contain a different type of data. For example, you might want to transfer a list of numbers from a Word document into fields in a database file formatted to contain numbers. However, your computer treats any numeral printed in a Word document as text. Therefore, the type of data (text) you are transferring is incompatible with the format of the fields you have selected to receive the data.

Nonetheless, File will attempt to convert the format of the data in the scrap to the format of the fields selected to receive the data. Table 13.8 shows File's capability of converting data from one format to another.

Notice that File cannot convert a number used to represent a date or time to a number used to represent an arithmetic value. Nor can it convert an arithmetic value to a date or time. Because it cannot convert the format of one to the format of the other, File simply leaves a data field blank if you attempt to insert a number from the scrap into a Date/Time field, or a Date/Time field from the scrap into a Number field.

Table 13.8. Data Format Conversion Table

SCRAP FIELD	DATABASE FIELD	CONVERSION
Text	Number	Yes
Text	Date/Time	Yes
Number	Text	Yes
Number	Date/Time	No
Date/Time	Text	Yes
Date/Time	Number	No

JUMP

PURPOSE

Use the JUMP command to move the selection highlight to a specified record and column.

EXPLANATION

To execute the JUMP command:

1. If necessary, press ESC to display the File command menu.
2. Select the JUMP command and press RETURN, or press J. The JUMP command prompts appear:
JUMP to record: column:
3. Make the appropriate entries at the command prompts (described in the following section).
4. Press RETURN to execute the command. The selection highlight is moved to the record and column you specified.

With the JUMP command, you can move to any point in your database file quickly and easily by specifying record and column coordinates.

You can select large portions of a database file by pressing the EXTEND SELECT key and then using the JUMP command to scroll the display. When you scroll the display after pressing EXTEND SELECT, File extends the selection highlight from the starting point to the ending point of the scrolling action. For information about using the EXTEND SELECT key, see Program Function Keys in this chapter.

COMMAND PROMPTS

There are two JUMP command prompts. Following is a description of each JUMP command prompt, the message that appears when the prompt is active, and the entries you can make.

to record:

When this prompt is active, the message line displays the message Enter record number or name. Enter the number of the record you want to select or the name of the record (for example, SORT, FIND, or ID). If you enter a record number, you can enter any valid number for a record in your database file. If you enter the number of a record that does not exist, an error message will be displayed when you press RETURN to execute the JUMP command.

Enter NEW to move the selection highlight to the NEW record at the end of your database records.

If you have an active entry in a FIND field and you enter the ID number of a record not covered by an entry in the FIND record, then File will position the selection highlight on the record with the next highest ID number that is covered by your entry in the FIND record.

The default entry at this prompt is the name or number of the record in which the selection highlight is located when you invoke the command.

column:

When this prompt is active, the message line displays the message Enter column name. Enter the name of the field you want to select. If you enter a name for a field that does not exist, an error message will be displayed when you press RETURN to execute the JUMP command. Enter NEW to move the highlight to the end of the current set of columns.

The default entry at this prompt is the name of the currently selected field.

If you wish to select an entire record (the record name or number specified at the to record: prompt), enter ID (for the ID field) at the column: prompt.

LOOKUP

PURPOSE

Use the LOOKUP command to fill a selected field, or partially selected column, with information from another database. This "relational" database function is similar to joining two databases.

EXPLANATION

To execute the LOOKUP command:

1. If necessary, press ESC to display the File command menu.
2. Select the column or fields into which you want to insert information from the other database.
3. Select the LOOKUP command and press RETURN, or press L. The LOOKUP command prompts appear:

LOOKUP in: matching fields:

4. Make the appropriate entries at the command prompts (described in the following section).
5. Press RETURN to execute the command.

The file from which you copy information is the *source database*; the file to which information is copied to is the *destination database*.

The source and destination databases must have at least two sets of fields with the same name and format. The first set consists of:

- the field in the source database from which you want to copy information, and
- the field in the destination database to which you want to copy information.

You must select the field or set of data fields within a column to receive information in the destination database before you invoke LOOKUP.

The second set of fields consists of one or more field(s) in each database that have the same name(s) and formats. You enter the name(s) of these fields at the LOOKUP command matching fields: prompt.

Figure 13.2 illustrates how File carries out the LOOKUP command.

Account	Name	Phone

Source Database

Name	Account	Phone
		/ / / / / / / /
		/ / / / / / / /
		/ / / / / / / /
		/ / / / / / / /
		/ / / / / / / /
		/ / / / / / / /

Destination Database

Figure 13.2. LOOKUP Example for ACCOUNT and NAME Fields

In the destination database:

- In Figure 13.2, a part of the PHONE field has been selected to receive information from the PHONE field in the source database. By using the LOOKUP command, you can transfer data that already exists elsewhere and avoid repetitive data entry.
- After entering the LOOKUP command, you would enter the name of the source database at the `in:` prompt. In Figure 13.2, the fields are intentionally left blank. The type of data being exchanged is unimportant here. The important concept is transferring information from the source to the destination.
- The names ACCOUNT and NAME are entered at the LOOKUP command `matching fields:` prompt. This will enable you to look up two fields at the same time.

When copying information from the source to the destination, File compares the contents of the ACCOUNT and NAME fields in each database. File

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finds all ACCOUNT and NAME data fields of the source database that match data fields in ACCOUNT and NAME of the destination database.

For each matching pair of ACCOUNTS and NAMES in the two databases, File copies the PHONE fields of the source database to the PHONE column of the destination database. Thus, the phone number of the source database is duplicated in the destination database.

If the PHONE field of the destination database already contains data, that data is overwritten with the PHONE field data in the source database. Destination database phone numbers that do not correspond to names and accounts in the source database will not be overwritten.

The next time you work with the destination database, the responses you have previously entered will be the default entries at the LOOKUP command prompts. Therefore, if you have updated the data in the PHONE column of the source database and want to copy the updated data to the PHONE column of the destination database, File remembers the LOOKUP formula for you; you do not need to make new entries at the prompts.

File will not carry out the LOOKUP command until the source database has been sorted. If you have not previously sorted the source database, File will display the following message when you press the RETURN key to carry out the LOOKUP command:

LookUp file will be sorted. Enter Y to continue:

When you press Y, File will sort the database into the order it needs to carry out the LOOKUP command.

LOOKUP Step-by-Step

A similar example of LOOKUP would be:

A MASTER database contains ORDER#, ACCOUNT#, ADDRESS, PHONE, and many other fields pertaining to account billing information. There is also an ORDER database that contains ORDER#, ACCOUNT#, QUANTITY, and PART# fields.

You want to copy the new orders that have been entered in the MASTER database to the ORDER database so they can be processed. To do so, proceed with the following step-by-step instructions.

1. From the ORDER database, select the ORDER# field. This is the information you want to transfer from the MASTER database (the source database). To do this, position the cursor in the ORDER# column. Press F6 and the DOWN ARROW key to highlight the entire column. (Alternatively, you can press SHIFT-F8.)

2. After selecting the column, press **L** to select the LOOKUP command.
3. At the **in:** prompt, enter **MASTER** and press **TAB** to advance to the next prompt.
4. Enter **ACCOUNT#** at the **matching fields:** prompt.
5. Press **RETURN** to execute the LOOKUP command. The **Looking...** message will be displayed briefly while the source database is located. When this initial step has been completed, the message line will display:
LookUp file will be sorted. Enter Y to continue:
6. Press **Y**. File will sort the database into the order it needs to process the LOOKUP command.
7. When this process is complete, you should have the new ORDER#(s) in the ORDER database for any ACCOUNT# that matched a MASTER entry.

NOTE: For a working example of using the LOOKUP command, see Looking Up Information in Another Database in Chapter 12, "Introduction to File."

COMMAND PROMPTS

There are two LOOKUP command prompts. Following is a description of each LOOKUP command prompt, the message that appears when the prompt is active, and the entries you can make.

in:

When this prompt is active, the message line displays **Enter file name.** Enter the primary file name of the source database. Because File copies information from .DAT source files only, you do not need to specify a file name extension when making an entry at the **in:** prompt for the destination database. The .DAT extension is assumed. (If the source database has a file name extension other than .DAT, you must use the System Manager NAME command to rename it before File will access it for execution of the LOOKUP command.)

If you have previously executed the LOOKUP command, the default entry at this prompt is the last source file you specified.

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matching fields:

When this prompt is active, the message line displays Enter a list of field names, separated by commas. Enter the name(s) of the columns whose data fields File is to compare when copying information from the source database to the destination database. If you enter more than one column name, separate the names with a comma.

If you have previously executed the LOOKUP command, the default entry at this prompt is the last field name(s) you specified.

MOVE

PURPOSE

Use the MOVE command to move the selected record(s) or column(s) to another location in a database file. This command operates *only* on entire records or columns.

EXPLANATION

To execute the MOVE command:

1. If necessary, press ESC to display the File command menu.
2. Select the record(s) or column(s) that you want to move.
3. Select the MOVE command and press RETURN, or press M. The MOVE command prompt appears:

MOVE to before:

4. Make the appropriate entry at the prompt (described in the following section).
5. Press RETURN to execute the command.

NOTE: If you have previously made an entry in the SORT record, it may be necessary to re-sort your database after moving data with the MOVE command.

COMMAND PROMPT

The MOVE command has one command prompt. Following is a description of the MOVE command prompt, the message that appears when the prompt is active, and the entries you can make.

to before:

The default entry at this prompt is the currently selected record or column.

To move one or more records, enter the ID number of the record you want the selected record(s) to precede. Enter NEW if you want the selected record(s) to be the last record(s) in the database file.

After execution of the MOVE command, File will sequentially renumber all records in the database file.

File Reference

To move one or more columns, enter the name of the column you want the selected column(s) to precede. Enter NEW if you want the selected column(s) to be the last column(s) in the database file.

OPTIONS

PURPOSE

Use the OPTIONS command to set an option for using the FIND record when you operate the File program.

EXPLANATION

To execute the OPTIONS command:

1. If necessary, press ESC to display the File command menu.
2. Select the OPTIONS command and press RETURN, or press O. The OPTIONS command prompt appears:
OPTIONS find: (Yes) No
3. Select the response you want.
4. Press RETURN to execute the command.

Use of the OPTIONS command assumes that you have filled in one or more key fields of a FIND record. The selection you make at the OPTIONS command prompt specifies whether File will display only those records specified by entries in a FIND record or all records. In essence, the OPTIONS command enables you to temporarily cause File to disregard any entries in a FIND record. When you want your entries in FIND records used again, you can change the selection you made at the OPTIONS command.

COMMAND PROMPT

The OPTIONS command has one command prompt. Following is a description of the OPTIONS command prompt, the message that appears when the prompt is active, and the entries you can make.

find:

When this prompt appears, the message line displays Select option. At this prompt, you can select either Yes or No. To make your selection, either press SPACE BAR to move the selection highlight to the desired response, or enter the first letter of your selection. (That is, enter Y for Yes or N for No.)

If you want File to display *only* those records specified by your entry (or entries) in a FIND record, select Yes.

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If you want File to display all data records regardless of any entries you have made in a FIND record, select No. Selecting No allows you to display all data records without deleting any entries from your FIND record(s).

The selection you make at the OPTIONS command remains in effect for your work file until you change it by executing the OPTIONS command again.

PRINT

PURPOSE

Use the PRINT command to print selected records, columns, or fields to a printer, to a data file, or to the LCD screen.

EXPLANATION

File's PRINT command uses the page size and print format parameters specified by the System Manager SET PRINTER command. Until you change them, these specifications are set for printing on standard 8-1/2 by 11-inch printer paper. (Refer to SET PRINTER in Chapter 2, "System Manager Reference.")

File will print as many of the selected records and/or columns on a page as will fit. Remaining records and/or columns will print on successive pages. If the data you print is wider than the paper in your printer, you must paste pages together after printing.

Print selected data to a text file to store data for printing later or as the first step in transferring data from File to a Word document. For detailed instructions on printing to a text file, see Printing All or Part of a Database in Chapter 12, "Introduction to File."

Print selected data to a file in Interchange format as the first step in transferring data from File to a variety of desktop computer database filing programs. For details on transferring data between applications, see Chapter 3, "ZP-150 Applications."

Print selected data to the LCD screen to review it without actually printing it or writing it to a data file.

To execute the PRINT command:

1. If necessary, press ESC to display the File command menu.
2. Press F6 and the ARROW keys, the program function keys, or the program function keys and F6 to select all or part of your database file for printing. (You can print as little as one field and as much as the entire database.)
3. Select the PRINT command and press RETURN, or press P. The PRINT command prompts are displayed:

PRINT to:

style: (Text) Interchange

File Reference

4. Make the appropriate entry and selection at the prompts (described in the following section).
5. Press RETURN to execute the command.

You can press SHIFT-PAUSE (BREAK) at any time to cancel printing. If you cancel printing, the message line momentarily displays:

Operation cancelled

COMMAND PROMPTS

There are two PRINT command prompts. Following is a description of each PRINT command prompt, the message that appears when the prompt is active, and the entries you can make.

to:

When this prompt is active, the message line displays Enter file name. Enter the name of the device on which you want the selected data printed or the name of the file to which you want the selected data printed.

To print data to a parallel printer, enter PRN: at this prompt. Make sure that a parallel printer is properly connected to your system and ready for use.

To print data to a serial printer, enter COM1:. Make sure a serial printer is properly connected to your system and ready for use.

NOTE: Before you can use a serial printer, you must have used Telcom to configure Works for the printer you will be using. Refer to Chapter 4 for instructions on configuring your printer.

To display the selected data on the LCD screen, enter CON:. When PRINT is executed, the data will be displayed on the screen in the same format as would be used if it were actually printed. The format is determined by the parameters specified with the System Manager SET PRINTER command and the selection you make at the PRINT command style: prompt.

To print selected data to a text or interchange file, enter any valid file name. If you are writing the data to a file on an external device (such as a data cassette recorder), you must precede the file name with the appropriate device name. You should, in any case, enter a unique file name. If you enter the name of a file that already exists, the message line will display the following error message when you press RETURN to execute the PRINT command:

File exists, overwrite (y/n)?

Enter Y to overwrite the existing file—its previous contents will be lost. Enter N if you do *not* want to overwrite the file. The PRINT command will be aborted.

The default entry at this prompt is always PRN: for printing selected data to a parallel printer.

When you have made a valid entry at this prompt (or verified that you want to use the default entry), press TAB to advance to the next prompt.

style:

When this prompt is active, the message line displays Select option. You have two options from which to choose: Text and Interchange. The default selection is always Text. Press SPACE BAR to move the selection highlight to the option you want, or enter the first letter of the option. (That is, enter T for Text or I for Interchange.)

If you are going to print the data to a printer or to the screen for review, you should select Text. You should also select this option if you are going to print the data to a text file for later printing (with the System Manager PRINT command) or for use with another application that can use ASCII data files.

NOTE: When you select Text, File will not print more than 74 characters in a column, even if one of its fields contains more characters that are visible when you are using the EDIT command.

If you are going to write the data to a file that will be transferred to another database program (such as a desktop computer database filing system), select Interchange. When PRINT is executed, the data will be saved to the specified (at the to: prompt) file in a proper interchange file comma-delimited format. That is, each field will end with a comma designating the end of the field. No data will be truncated.

ERROR MESSAGES

Following are explanations of error messages that can occur as you use File. After each message is a brief description of the probable cause and what you are to do to recover from it.

A value cannot be converted. Enter Y to continue:

EXPLANATION: The value displayed on the bottom of the screen cannot be converted to match the new form (and type) for this field. If you enter Y, the value that cannot be converted is skipped and the next entry is displayed. The field with the entry that could not be converted will be left blank when all other conversions are completed. If you enter N, the operation is aborted, and the command menu is displayed. The preexisting form for the column will be retained, and no data will be lost.

Be sure to change the query for this column as well

EXPLANATION: You have converted the form for this field. One of the fields in this column did not convert correctly. Find the field or fields that did not convert and edit them to match the current form.

Cannot change dates to numbers

EXPLANATION: You have attempted to convert a date into a number. No meaningful conversion is possible. If you were trying to convert a year into an integer, convert it to text first.

Cannot change numbers to dates

EXPLANATION: You have attempted to convert a number into a date. No meaningful conversion is possible. If you were trying to convert an integer into a year, convert it into AAAA and then into YYYY.

Cannot perform that command on current selection

EXPLANATION: Your selection is inappropriate for the command you are trying to perform (for example, trying to delete the NEW record). Change your selection and repeat the command.

Error accessing file

EXPLANATION: There was some problem reading or writing a file. If you are trying to access a file on an external device or trying to print a file, make sure that the peripheral is properly connected to your ZP-150 and is ready for use.

Fields have different types

EXPLANATION: You have attempted to use a LOOKUP command—either of the fields you tried to match, or the source and destination fields, are of

different types (date and text, text and number) and cannot be compared. Change the type of one of the fields.

Form too long

EXPLANATION: The value you entered is longer than the maximum field size. Devise a shorter value that conveys the same information.

Insufficient free memory

EXPLANATION: Conversion of data types requires additional use of your computer's remaining memory. There is not enough memory available to perform the conversion. Delete any unnecessary files and attempt the conversion again.

Internal Error -- Error in database routine

EXPLANATION: File has encountered an error condition it is not prepared to handle. The error condition should resolve itself. If not, call your distributor and explain what you did.

LookUp file has no field: fieldname

EXPLANATION: The lookup file does not have a field with the same name (fieldname in the error message) as the selected field of the destination file. Compare the field names in both files. Perhaps one has been misnamed, or perhaps you specified the wrong lookup file.

LookUp file lacks fields

EXPLANATION: The fields you tried to match only exist in one of the database files. No match can be made. Look at the field names in both files. Perhaps one has been misnamed, or perhaps you specified the wrong lookup file.

LookUp file will be sorted. Enter Y to continue:

EXPLANATION: In order to perform a LOOKUP, a sort must be performed on the file. If you do not want the lookup file to be sorted, cancel the command by pressing ESC or N. Otherwise, just press Y.

No database file with that name

EXPLANATION: You tried to use the LOOKUP command in a nonexistent database file. Exit to the System Manager and check the name of the file. Remember that the file you specify as the source database must be a valid database file and must have the extension .DAT. Enter a valid file name and try again.

NoRecs; No data records to select

EXPLANATION: You pressed the SELECT ALL DATA key and there are no data records in the file. No action is required.

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No scrap

EXPLANATION: You attempted to insert from the scrap, but there was no accessible data in the scrap. Reselect the data and try again, or enter the data normally.

Not enough free memory to complete insertion. Data file is unsorted.

EXPLANATION: There was not enough free memory to complete the insertion. The data file has been left unsorted. Delete unneeded files and press the SORT key to complete the process. For more information, refer to Working with Limited Memory in Chapter 1, "System Manager."

Quit -- cannot create database file required to run.

EXPLANATION: There is no existing database file, and File has tried to create it. If there is a file with that name in the system already, the work file will make erroneous assumptions about it. If you were starting File from a text file, make sure there is *not* a database file with the same primary name as the file. If you selected a work file for which there was no matching database file, notice that File has removed the orphaned work file.

Too many fields

EXPLANATION: You tried to create more than the maximum 64 fields allowed in the database. Either delete one of the fields or stop trying to add new ones.

Too many records in database

EXPLANATION: You tried to insert too many records into the database. Delete any unnecessary records or create a new file for additional records. For more information, refer to Working with Limited Memory in Chapter 1, "System Manager."

Too much data to fit in one record

EXPLANATION: You tried to insert too much data into a record. Attempt to compress some of the data in the text fields; delete unnecessary data.

Value to be inserted did not match field type

EXPLANATION: The value in the current field of the scrap was not of the same type as the field into which you were trying to insert it.

CHAPTER 14

INTRODUCTION TO PLAN

OVERVIEW

Plan is an electronic worksheet—a tool for organizing information, performing calculations, and analyzing data.

This chapter explains what a worksheet, often called a spreadsheet, is and how it can help you analyze data and plan for the future. It also introduces you to the basics of operating Plan, discussing such topics as choosing commands, scrolling to parts of a worksheet not currently visible on the screen, and quitting Plan when you've finished a session.

This chapter includes a tutorial that teaches you how to construct a simple worksheet. If you have never used a computer worksheet program before, and especially if you are new to the concept of a worksheet, this is a good place to start. By the time you are finished working through this step-by-step tutorial, you will have a good grasp of some basic worksheet concepts and a working knowledge of Plan's powerful features. In fact, here is a list of just some of the tasks you will perform:

- selecting options from the Plan menus,
- entering text and numbers in cells and changing cell contents,
- changing the width of a column,
- formatting numbers in cells,
- building formulas,
- naming groups of cells,
- using names and functions in formulas,
- inserting a row,
- centering the contents of cells,
- using the PRINT command to print your worksheet, and
- saving your worksheet and quitting Plan.

Chapter 15, "Plan Reference," contains information you may need to refer to repeatedly:

- a complete description of the keys you use to operate Plan,
- a detailed alphabetical directory of all Plan commands,
- an explanation of all of the built-in mathematical and financial functions available with Plan, and
- a guide to all the error messages you may see on the screen while using Plan.

FEATURES

Plan is a powerful tool for planning and analysis. With Plan, you will be able to do complex calculations, make long-range projections, and print the results in a variety of formats.

Plan's power comes from its capacity to perform many calculations on large quantities of data quickly and easily. You will be able to look at the relationships between numbers in a new way. You also will be able to forecast, plan, and answer all those critical "what if?" questions that go into preparing a budget, projecting inventory requirements, planning investments, and making many other business and personal financial decisions.

Some of Plan's key features include:

- "What if?" analysis—you can alter one number and watch the numbers change across your worksheet. For example, observe how higher utility bills, a projected decline in product demand, or a change in interest rates could affect next year's profits.
- Large calculating area—with Plan you will be free of the constraints of pencil and calculator. The Plan worksheet is large enough for almost any calculations: 255 rows long and 63 columns wide.
- Cellular structure—each row and column is composed of *cells*, the basic unit of information on a worksheet. You can fill the cells with any combination of words, numbers, and mathematical formulas.
- The flexibility to move, insert, copy, or erase data instantly—or restructure the entire worksheet by adding, changing, or deleting whole areas at a time.
- The ability to transfer information from other applications to your Plan worksheets or move worksheet information to other applications is available.
- The power to complete any task that requires you to store, display, or print numbers and text in columnar form and perform multiple calculations quickly. There is no end to the possible uses of a worksheet. Worksheets become especially powerful whenever you need to:
 - project values in the future based on current information,
 - use a complex statistical or financial formula repeatedly, or
 - establish complex relationships between data from multiple sources.

Typically, worksheets are good for answering "what if?" questions, like "What will my profits be if costs rise 2 percent a month over the next year?" Some things you might do with a worksheet include calculating mortgage or other loan payments, preparing a budget, or keeping track of profits and losses.

The best way to learn Plan is to use it. Because the Plan command menus are easy to learn and use, you will be able to construct worksheets in no time.

RELATED APPLICATIONS

You may want to use Plan with some of the other applications available on your ZP-150. For instance, you may want to read data from your worksheet into a memo you created in Word and send the memo, via Telcom, to your office. You can also transfer data between desktop Multiplan and Plan in your ZP-150.

File—Plan can load File files and can be used extensively to manipulate data from the database.

Telcom—Plan files can be transferred to another system using Telcom. Multiplan files created on another microcomputer system may be downloaded to the ZP-150 to take with you on a business trip.

Word—Plan files can be inserted into documents. After a file has been inserted into a document, it can be edited and formatted.

TUTORIAL

In order for you to become familiar with Plan's features, several tutorial sessions are included. If you have used other applications on your ZP-150 before, you will find that using Plan is very similar. In the next few pages you will learn:

- what is on the Plan screen,
- how to move around the worksheet,
- how to use Plan commands, and
- how to get help when you need it.

14.4

Introduction to Plan

Starting Plan

When you first start your computer, the System Manager screen appears. If you are working with another program, press CTRL-F10 to return to the System Manager.

The applications are listed along the left-hand side of the screen. Word should be the application highlighted. In addition, the RUN command will be highlighted in the command line at the bottom of the screen.

To create a file with Plan:

1. Use the ARROW keys to select the PLAN application and press RETURN. The RUN command line appears:

RUN application: PLAN file:

The RUN application: prompt contains the program to be run, Plan. The next prompt, file:, is asking for a file name.

2. Press TAB to move to the file: prompt.
3. Enter PROFIT and press RETURN.

If you do not type in a file name, Plan will automatically name your file WORK. If you already have a Plan file named WORK, Plan will automatically load the existing file.

The Plan screen appears as shown in Figure 14.1. It consists of a worksheet and the command, message, and status lines.

The columns of the worksheet are numbered across the top. When you first load Plan, you see 7 columns. There are actually 63 worksheet columns available.

Row numbers appear at the left side of the screen. You can see 11 rows at a time, but there are actually 255 worksheet rows available.

Each box on the worksheet is called a *cell*. The cell is the basic unit of the worksheet. As you work, you fill the cells with text, numbers, or other information you need to build the worksheet.

You refer to a cell on the worksheet by its location. The cell in the fifth row of the second column, for example, is called R5C2 (Row 5, Column 2). A cell always has the same location, although the information it contains may change as you work. Thus, you can use R5C2 to mean "whatever information is in R5C2."

#1	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
 Copyright (1982, 1983, 1984, 1985) Microsoft Corp.
 Plan: PROFIT R1C1

Figure 14.1. The Plan Worksheet

The cell that you are currently working with—the one to which your next action will apply—appears highlighted on the screen. This is the *active cell*. You can move to a new active cell any time you need to enter or change information.

The three lines at the bottom of the screen are the command, message, and status lines. The command line contains a menu of available Plan commands. (Refer to Plan Commands in Chapter 15, "Plan Reference," for more information on the individual commands.) The message line initially contains copyright information, but once you begin using the application, this line displays prompts and error messages. The status line contains the name of the application running, the file name, the cell reference (row and column of the currently selected cell), and any status line indicators. (Refer to Table 1.1 in Chapter 1 for a complete list of possible status line indicators.)

Selecting a Cell

Find the ARROW keys (UP, DOWN, LEFT, and RIGHT) on your keyboard. You use the ARROW keys to move the highlight to a new active cell. The status line always displays the current active cell. If the cell you need to move to is not currently visible, press the ARROW keys until the row or column containing the cell appears on the screen. Move to R4C3 using the ARROW keys.

1. Press the **DOWN ARROW** key three times.
2. Press the **RIGHT ARROW** key twice. The highlight (or cell pointer) should be in the third column of the fourth row and R4C3 should be displayed in the status line.

You can also select a specific cell anywhere on the worksheet by using the JUMP command. The JUMP command is especially convenient for selecting a

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cell located several rows or columns from the currently selected cell. Move to R32C41 using the JUMP command as described in the following paragraphs.

You select commands from the command menu to tell Plan what to do. On the command menu, the EDIT command is always initially highlighted; that is, chosen for you. Plan has the EDIT command as the default because it is the command you use most frequently while building a worksheet. You can either accept Plan's choice of the EDIT command by simply pressing the RETURN key, or you can choose a different command from the menu.

3. Press J to select the JUMP command. The JUMP subcommand menu appears:

JUMP: Name Row-col Window

The Select option or type command letter message appears in the message line. Most commands have associated subcommands and command prompts.

4. Press R to select the Row-col command. The JUMP row: prompt contains, 4, the row number of the active cell. The next prompt, column:, displays 3, the column number of the active cell.
5. Enter 32 in the row: prompt and press TAB.
6. Enter 41 in the column: prompt and press RETURN. The screen automatically moves to the point in the worksheet where R32C41 is the cell in the second column of the third row.

Scrolling Through the Worksheet

Your screen displays only a small portion of the worksheet available to you. Think of the screen as a window that you can move to any part of the worksheet as shown in Figure 14.2.

Moving the window to another part of the worksheet is called *scrolling*. You use the direction keys in combination with the SHIFT or CTRL key to scroll through the worksheet. As you scroll, the selection highlight moves with the window. Scroll back to R1C1:

1. Press SHIFT-UP ARROW, and the previous screen of rows appears. The active cell, R21C41, is in the same relative position as R32C41 from the last screen viewed.
2. Press SHIFT-UP ARROW again, and the active cell becomes R10C41.
3. Press CTRL-UP ARROW, and the selection highlight appears in the R1C1 cell (the HOME position). CTRL-UP ARROW will bring you to R1C1 from anywhere on the worksheet.

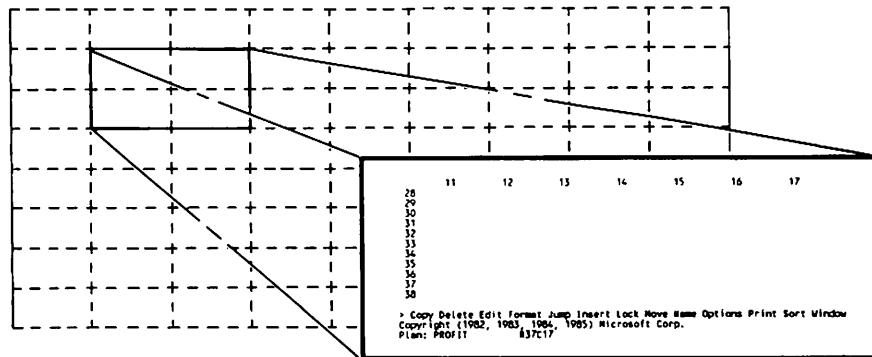


Figure 14.2. Window on the Worksheet

Refer to Function Keys in Chapter 15, "Plan Reference," for a detailed description of the scrolling keys.

Using Windows

If you have a worksheet that does not fit on the screen, you can use windows to view different parts of the worksheet at once. You will not spend your time scrolling from one screenful of data to another, and you will be able to bring related parts of a worksheet together to make comparisons and view the results of calculations affecting different areas.

Plan lets you open up to eight windows simultaneously, each displaying a different part of the worksheet. If you want, you can specify that windows scroll together or independently, or have distinctive borders. You can even split windows both vertically and horizontally at once so that worksheet titles are displayed in a separate window.

Figure 14.3 shows windows split to display the beginning, middle, and ending parts of a worksheet.

OPENING WINDOWS

You can use the WINDOW SPLIT command to open either horizontal or vertical windows. These windows can be scrolled independently, or you can link two windows so that they scroll together. Horizontally split windows scroll together horizontally. Vertically split windows scroll together vertically. Open a horizontal window.

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#1	1	2	3	4	5	6	7	
1								
2								
3								
4								
#2	35	36	37	#3	60	61	62	63
137				250				
138				251				
139				252				
140				253				
141				254				
142				255				

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: PROFIT R137C35

Figure 14.3. Displaying More Than One Window

1. Press **W** to select the WINDOW command.
2. Press **S** to select the SPLIT command.
3. Press **H** to select the HORIZONTAL command. The WINDOW SPLIT HORIZONTAL command line appears.
4. Enter **5** in the **at row:** prompt to indicate the number of the row where you want to split a new window.

NOTE: This command will only split the screen at a row that appears on the screen. If the row where you want to split the window is not currently on the screen, scroll or use the JUMP command to make the row visible.

5. Press **TAB** to advance to the **linked:** prompt.
6. Press **SPACE BAR** to choose **Yes** in the **linked:** prompt so the two windows will scroll together. You would choose **No** if you wanted the two windows to scroll independently.
7. Press **RETURN** to execute the WINDOW SPLIT HORIZONTAL command. The number of each window appears in the upper left-hand corner of the window.

The active cell is in window number 2. The window containing the active cell is called the *active window*.

The WINDOW SPLIT VERTICAL command allows you to open a vertical window. Plan also lets you split one window into four windows by using the WINDOW SPLIT TITLES command, making it easy for you to view the titles of rows and columns in each of the four windows. Windows created with WINDOW SPLIT TITLES are linked in pairs; that is, the horizontal windows scroll together horizontally, and the vertical windows scroll together vertically. For further information on the WINDOW commands, refer to the WINDOW command in Chapter 15, "Plan Reference."

Once you have split the screen into two or more windows, you can use the NEXT WINDOW (F2) and PREVIOUS WINDOW (SHIFT-F2) keys to move the selection highlight from window to window. Move from window to window.

8. Press F2 and window number 1 becomes the active window.
9. Press SHIFT-F2 and window number 2 again becomes the active window.

SCROLLING MULTIPLE WINDOWS

Since you specified Yes in the linked: prompt when you first created the window, the windows will scroll together.

1. Press the RIGHT ARROW key seven times. Be sure to pay attention to the column number headings.
2. Press the RIGHT ARROW key again. Notice that the two windows both scrolled to the right together.

If you had not specified the windows to be linked when they were first created, you could still link them by using the WINDOW LINK command. Once you have created windows, you can use the WINDOW LINK command to:

- link windows that previously scrolled independently,
- unlink windows that previously scrolled together, or
- change which windows are linked.

Use the WINDOW LINK command to unlink the two windows:

1. Press W to select the WINDOW command.
2. Press L to select the LINK command.
3. Press TAB twice to advance to the linked: prompt.
4. Press SPACE BAR to select No.
5. Press RETURN. Since the windows are no longer linked, a column heading appears for window number 2.
6. Press the LEFT ARROW key eight times. Notice how only window number 2 scrolls left.

For further information on the WINDOW LINK command, refer to the Plan Commands section of Chapter 15, "Plan Reference."

CREATING WINDOW BORDERS

You may find it easier to see what is in each window on the screen if you add window borders around one or more of the windows. If you split a window that has borders, the two resulting windows will also have borders.

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Because the border takes up one character position on each side of the window, you may see less information on the screen.

Borders are added and removed with the WINDOW BORDER command. If a window does not have a border, using the WINDOW BORDER command adds a border. If you specify a window that already has a border, the WINDOW BORDER command will remove the border.

Add a window border to window number 2.

1. Press W to select the WINDOW command.
2. Press B to select the BORDER command.
3. Enter 2 in the change border in window number: prompt to indicate the number of the window to receive the border.
4. Press RETURN to execute the WINDOW BORDER command.

CLOSING WINDOWS

You may close any window you have created by using the WINDOW CLOSE command. Closing windows does not affect the contents of cells. Close window number 2.

1. Press W to select the WINDOW command.
2. Press C to select the CLOSE command. The WINDOW CLOSE command line appears.
3. Enter 2 in the window number: prompt to indicate the number of the window you want to close.
4. Press RETURN to execute the WINDOW CLOSE command. The remaining window automatically increases in size to fill the rest of the screen.

NOTE: If you had three or more windows open and closed a window other than the window with the largest number, the remaining windows would be renumbered.

Saving a Plan File

One more thing before you learn the fundamentals of entering data in the worksheet: how to quit Plan. You may leave Plan at any time—either to use another application or to end your work session. Plan automatically saves your file and quits the Plan session simultaneously. This means that whenever you end a Plan session, the open file is saved; and whenever you save a Plan file, the Plan session ends. Save the PROFIT file you just created.

Press **CTRL-F10** (the QUIT key). Your PROFIT worksheet will be saved and you will be returned to the System Manager.

You are now familiar with opening and closing a worksheet, and moving around the worksheet. It is time to learn about entering data and to gain some hands-on experience with Plan. The next lesson takes you through the step-by-step process of building a simple profit statement. After you work through this lesson, you will have gained practical experience with most of the basic features of Plan.

If you are not already familiar with the basic concepts of using your portable ZP-150, read Chapter 1, "System Manager," before continuing.

Types of Cell Entries

Plan's ability to give you the answers to your questions depends on the information you enter on the worksheet. There are many kinds of information in a typical worksheet:

- text describing the contents of areas on a worksheet,
- numeric data,
- formulas used to perform calculations, and
- values calculated from the formulas.

Plan stores this information with the worksheet, whether or not it is visible on the portion of the sheet you see on the screen.

You begin to build a new worksheet by entering the numeric data you plan to work with, as well as entering text labels to identify the numeric data. You use the EDIT command to enter numbers or text within individual cells of the worksheet.

ENTERING TEXT

You use text to label the information on a worksheet—for example, to provide headings for the rows and columns that make up the worksheet.

If the text does not fit in the column, only the part that fits will appear on the screen. The remaining text is still stored in the cell. To display all the text in a cell, you can widen the column or use the **Cont** option in the FORMAT CELLS command to continue displaying text in the adjoining blank cell.

NOTE: To Plan, text is any combination of letters or numbers that is not intended as an amount for calculation. Any text you enter must be enclosed in quotation marks ("").

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There are basically four steps to entering text in a cell:

1. Move the highlight to the cell where you want to enter the text.
2. Choose the EDIT command.
3. Type the text you want to enter in the cell. Remember to enclose the text in quotation marks.
4. Press the RETURN key.

Enter text into your PROFIT statement following these four basic steps.

A profit statement has the basic ingredients of financial analysis: different categories of revenue and costs spread over a period of time. When you work out a profit statement on paper, you first write down the names of categories, such as "revenue" and "costs." You do this in a Plan worksheet by entering text in a cell.

If you make a mistake while typing, press BACK SPACE to move the highlight back over it and then retype. Or, if you have already pressed the RETURN key, reselect the cell by highlighting it, press E to choose the EDIT command, and type the correct entry.

1. Use the ARROW keys to select the PROFIT file in the Plan application row of the System Manager screen.
2. Press R to run the file. The PROFIT worksheet file appears on the screen.
3. Use the ARROW keys to select the cell, R1C1. This is the cell where you want to begin entering text.
4. Press E to select the EDIT command. (You could also press RETURN, since EDIT is the default response.) The EDIT: command prompt appears, and the Enter formula message appears in the message line.
5. Enter "REVENUE".



Remember, any text you enter must be enclosed in quotation marks. The quotation marks will not appear when your entry is inserted into a cell. If you do not enter quotation marks, then the #NAME? error value appears in the cell—if this happens, select the cell, press E to select the EDIT command, and reenter the text with quotation marks.

6. Press the DOWN ARROW key twice.

REVENUE appears in R1C1, and R3C1 is the selected (or active) cell. You pressed the DOWN ARROW key twice to skip a cell.



Pressing any ARROW key while in the EDIT command will enter the text or data you typed in the active cell and move in the direction of the ARROW key—all this while remaining in the EDIT command.

7. Enter "OVERHEAD" and press the DOWN ARROW key.
8. Enter "MATERIALS" and press the DOWN ARROW key.
9. Enter "ADVERTISING" and press the DOWN ARROW key twice. The G in ADVERTISING does not appear on the screen, but it is stored as part of the cell's contents.
10. Enter "COSTS" and press the DOWN ARROW key twice.
11. Enter "PROFIT" and press the RETURN key to leave the EDIT command and return to the Plan command menu.

Your worksheet now looks like Figure 14.4.

CHANGING COLUMN WIDTHS

Notice how column 1 is too narrow to contain your entire ADVERTISING entry. Plan gives you the flexibility to decide how wide each column should be. If, for example, you have many columns of data and you want to be able to view as many columns at once on the screen as possible, you can make the columns narrow. On the other hand, if you have long pieces of text or large numbers to display, you may want to widen some or all columns so that entire cell contents can be displayed on the screen.

You can set the width of individual columns or groups of columns with the FORMAT WIDTH command, or you can set the column width for all the columns on the worksheet with the FORMAT DEFAULT WIDTH command. Display the entire ADVERTISING entry by using the FORMAT DEFAULT WIDTH command to widen your columns.

	1	2	3	4	5	6	7
#1	REVENUE						
2							
3	OVERHEAD						
4	MATERIALS						
5	ADVERTISING						
6							
7	COSTS						
8							
9	PROFIT						
10							
11							

```
> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: PROFIT      R9C1      "PROFIT"
```

Figure 14.4. PROFIT Worksheet with Categories

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1. Press **F** to select the FORMAT command.
2. Press **D** to select the DEFAULT command.
3. Press **W** to select the WIDTH command. The following prompt appears in the command line:

FORMAT DEFAULT width in chars: 10

The default response in the command prompt is 10. 10 is the default width for all columns on your worksheet. (A *default* is a response Plan enters for you if you do not enter one yourself.) In this command prompt, you can either accept the default response or type a number to either narrow or widen a column.

Widen the columns on your worksheet by three characters. This will avoid crowding the titles you have entered in column 1 with the data you will soon enter in column 2.

4. Enter **13** and press RETURN to execute the FORMAT DEFAULT WIDTH command.

Plan changes the width of all columns from 10 characters to 13 characters.

Notice that increasing the width of the columns has scrolled columns 6 and 7 off the screen. To see columns not currently visible on the screen, use the ARROW keys as described in Chapter 15, "Plan Reference." For more information on changing column widths for the entire worksheet, refer to the FORMAT DEFAULT WIDTH command in Chapter 15. For information on setting the column width for a specific column or group of columns, refer to the FORMAT WIDTH command in Chapter 15.

You have completed entering titles for the categories in your profit statement. After entering titles on the worksheet, you next enter the amounts for each category.

ENTERING NUMBERS

You enter numbers the same way you enter text, except you do not use quotation marks. Numbers can be:

- integers (for example, 123 or 4207 or -7);
- decimal fractions (for example, 123.45 or 0.9876); or
- scientific notation (for example, 12.1E2 or 5E-10);

and can include only the following characters:

1 2 3 4 5 6 7 8 9 0 - + . E e

The letter E identifies the numbers that follow it as the exponent of the number.

You cannot use dollar signs, commas, or other nonnumeric characters when you enter numbers. You can, however, display numbers with dollar signs, percent signs, or commas; see the FORMAT commands in Chapter 15, "Plan Reference."

Enter the revenue and costs amounts for each category in column 2.

1. Use the ARROW keys to select cell R1C2.
2. Press E to select the EDIT command.
3. Enter 24680 then press the DOWN ARROW key twice. The entry appears in R1C2, and R3C2 becomes the active cell.
4. Enter 5600 and press the DOWN ARROW key.
5. Enter 5700 and press the DOWN ARROW key.
6. Enter 4850 and press RETURN.

FORMATTING CELL CONTENTS

With Plan, you will be able to control how text and numbers look in cells. Typically, most areas of a worksheet contain numeric values. These values may be dollar amounts, percentages of other values, or numbers so large that they must be represented with scientific notation. You may want to round some values. In some cases, you may want Plan to display as many digits of a number as will fit in the width of a cell and use scientific notation only if necessary. Plan normally displays numbers as precisely as possible in the available cell width.

Plan normally aligns text to the left and numbers to the right within a cell, unless you change the alignment with the FORMAT command. You may want to change cell alignment to display columns of information more efficiently.

There are two ways to change the alignment and/or format of cell contents. Either you can use the FORMAT CELLS command to format a cell or group of cells on the worksheet, or you can use the FORMAT DEFAULT CELLS command to set the format for all the cells on the worksheet.

Display the amounts you have entered in the PROFIT worksheet as dollars, with commas at the appropriate places. Use the FORMAT command to change the way numbers are displayed on the worksheet.

1. Press F to select the FORMAT command.
2. Press D to select the DEFAULT command.

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3. Press **C** to select the CELLS command. The following set of prompts replaces the command line:

**FORMAT DEFAULT CELLS alignment: Ctr Gen Left Right
format code: Cont Exp Fix(Gen)Int \$ * % # of decimals: 0**

Refer to the FORMAT DEFAULT CELLS command in Chapter 15, "Plan Reference," for a complete description of the available types of alignment and formats.

4. Press **TAB** once to move to the **format code:** prompt.
5. Press **SPACE BAR** twice or until the **\$** option is selected.
6. Press **RETURN**. Plan redraws the screen to display all numbers with a dollar sign and two decimal places. From now on, all numbers you enter will appear as dollars.

Commas in Numbers

If values in cells are formatted as Fix, Int, \$, or %, you can use commas to group thousands. For example, if you have the value \$1129.29, you might want to display \$1,129.29 to make it easier to read. Use the FORMAT OPTIONS command to display all numbers on the worksheet with commas.

1. Press **F** to select the FORMAT command.
 2. Press **O** to select the OPTIONS command. The following set of prompts replaces the command line:
- FORMAT OPTIONS commas: Yes No formulas: Yes(No)**
3. Press **Y** to select the **Yes** option in the **the commas:** prompt.
 4. Press **RETURN**. Plan redraws the screen to display all numbers with commas. Your worksheet will look like Figure 14.5.

#1	1	2	3	4	5
1 REVENUE		\$24,680.00			
2					
3 OVERHEAD		\$5,600.00			
4 MATERIALS		\$2,700.00			
5 ADVERTISING		\$4,850.00			
6					
7 COSTS					
8					
9 PROFIT					
10					
11					

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: PROFIT R5C2 4850

Figure 14.5. Displaying Numbers in Dollars with Commas

The FORMAT commands used in this example affect only numbers, not cells containing text. But, if you later replace the text with a number, Plan will display the number in the format you choose. For further information on the FORMAT commands, refer to Plan Commands in Chapter 15, "Plan Reference."

ENTERING FORMULAS

You have not entered amounts for COSTS or PROFIT yet. These amounts should be calculated from the amounts for REVENUE and the three cost categories, which are already on the worksheet. You can write formulas to tell Plan to do the calculations for you.

A *formula* calculates a new value from existing values. Before you begin to use formulas, you need to know:

- how to refer to individual cells and
- how to use arithmetic operators.

About References

A cell reference is simply the location of a cell. There are two kinds of cell references: absolute and relative.

An *absolute reference* identifies a cell by its row and column numbers. For example, R1C1 is the cell in row 1, column 1. You can use absolute references to perform calculations involving two or more cells. For example, you can add the contents of R1C1 and R2C1 with the formula R1C1+R2C1. Plan will enter the result of the calculation in the active cell, the one containing the formula.

A *relative reference* describes the location of one cell relative to another cell. For example, RC[-3] is the cell three columns to the left of the active cell. As with absolute references, you can use relative references to perform calculations. The formula RC[-2]+RC[+3] tells Plan to fill the active cell with the sum of the values two columns to the left and three columns to the right of the active cell.

Relative references can be converted to absolute references when the formula is first created. For example, when you use the ARROW keys to select a cell, such as RC[-3], you can press F3 to change the relative reference to an absolute reference, such as R7C4.

In Figure 14.6, a section of a worksheet shows that both the columns in the third row contain formulas to calculate the sum of the values in the cells immediately above them. The formula in R3C1 is built with relative references; the one in R3C2 with absolute references.

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#1	1	2	3
1 20		20	
2 30		30	
3 R[-2]C+R[-1]C		R1C2+R2C2	
4			
5			
6			
7			
8			
9			
10			
11			

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: TEST R3C2 R1C2+R2C2

Figure 14.6. Cell References in Formulas

NOTE: A formula may contain both relative and absolute cell references concurrently.

If you later change the values for the cells in either formula, the sum of the two values is recalculated and the new value appears in the cell where you have entered the formula.

About Operators

An operator is an instruction to perform a calculation. In Plan, operators are used in formulas to express the relationship between the contents of cells. When building a formula using references to individual cells, you can use any of the following arithmetic operators:

+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Percent
^	Exponentiation

For further information on operators (arithmetic, comparison, or text), refer to the EDIT command in Chapter 15, "Plan Reference."

Adding Up Costs

Formulas can be entered by typing in all the cell references or by using the ARROW keys to enter the references to the formula. You are going to enter the formula by using the ARROW keys. But for your information, you can also enter a formula in a cell by typing it in:

1. Move the highlight to the cell where you want to enter the formula.
2. Select the EDIT command.

3. Type the formula, including each cell reference. Separate cell references with the arithmetic operators you want to use.
4. Press the RETURN key to enter the formula in the cell.

The result of the calculation performed by the formula appears in the cell you selected in step 1. The formula you entered appears on the status line.

A formula is like a problem on paper. COSTS is the sum of OVERHEAD + MATERIALS + ADVERTISING. Think for a moment about how you might work this problem on paper:

$$\begin{array}{r}
 \$5,600.00 \text{ (OVERHEAD)} \\
 + \$5,700.00 \text{ (MATERIALS)} \\
 + \$4,850.00 \text{ (ADVERTISING)} \\
 \hline
 = ? \quad (\text{COSTS})
 \end{array}$$

You build a formula by first selecting the cell to receive the answer to the calculation. You then select the other cells to be included in the formula. Each time you select a cell, you enter an arithmetic operator, such as +, to indicate that you are adding the contents of the cells you select.

To build the formula COSTS=OVERHEAD+MATERIALS+ADVERTISING in your worksheet:

1. Use the ARROW keys to select the cell at R7C2.
2. Press E to select the EDIT command.
3. Enter = (an equal sign). The equal sign indicates you are building a formula.

The equal sign does not appear in the EDIT command prompt when you enter it. However, if you do not enter the equal sign, the next time you press an ARROW key Plan will simply select another cell rather than add the contents of that cell to the formula you are building.

4. Use the ARROW keys to select R3C2, the cell containing \$5,600.00. The relative reference R[-4]C appears in the EDIT command prompt.

Notice that as you select cells in the formula and enter your entries, you can watch the formula develop in the EDIT command prompt.

5. Enter + (an addition sign). The highlight returns to R7C2, and the plus sign is added to the formula in the EDIT command prompt.

This pattern of the selection highlight returning to the cell where the formula is stored repeats itself as you continue to build the formula.

6. Use the ARROW keys to select R4C2, the cell containing \$5,700.00.

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7. Enter +.
8. Use the ARROW keys to select R5C2, the cell containing \$4,850.00. The formula should now look like this:
R[-4]C+R[-3]C+R[-2]C
9. Press RETURN. When Plan has calculated the formula, your worksheet looks like Figure 14.7. The result of the calculation performed by the formula, \$16,150.00, appears in R7C2 (the cell you selected in step 1). The formula you entered appears on the status line.

Take a close look at the formula to determine what its parts mean. Figure 14.8 dissects the formula. The formula represents the last three cells you selected. Each is separated by a plus sign. The numbers in brackets indicate the position of a cell relative to the position of R7C2.

Refer to Shortcuts to Formulas later in this chapter for more information about formulas.

REVENUE Minus COSTS Equals PROFIT

You do not have to use cell references in formulas—you can use names. For example, it is easier to work with the formula REVENUE-COSTS than the formula R1C2-R7C2. You can use meaningful, easy-to-remember names for groups of cells. Once you have named a group of cells, Plan recognizes the name wherever it occurs in a formula.

#	1	2	3	4	5
1	REVENUE	\$24,680.00			
2					
3	OVERHEAD	\$5,600.00			
4	MATERIALS	\$5,700.00			
5	ADVERTISING	\$4,850.00			
6					
7	COSTS	\$16,150.00			
8					
9	PROFIT				
10					
11					

```
> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: PROFIT      R7C2      R[-4]C+R[-3]C+R[-2]C
```

Figure 14.7. Plan Calculates the Formula

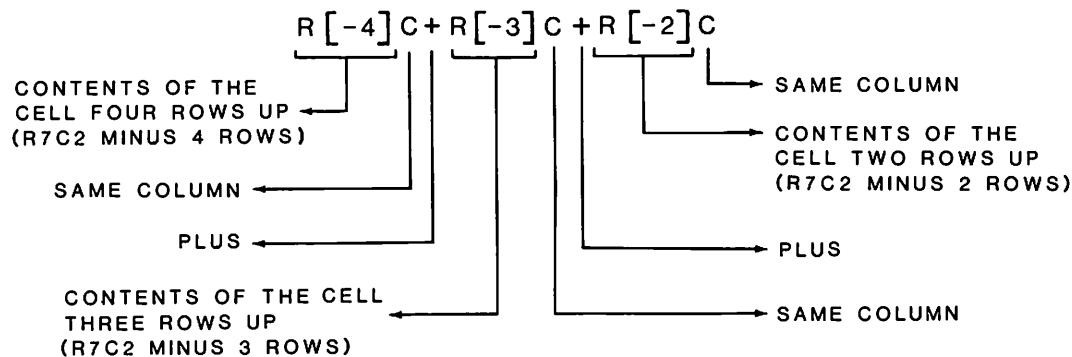


Figure 14.8. Parts of a Formula

Follow the steps below to define two names. In the next section, you will use the names in a formula.

1. Press N to select the NAME command. The NAME command line appears:

NAME define name: to refer to:

2. Enter REVENUE in the define name: prompt.
3. Press TAB to advance to the to refer to: prompt.
4. Enter R1 (indicating row 1). Your entry replaces the default response of R7C2.
5. Press RETURN. Plan now regards REVENUE as equivalent to row 1.

NOTE: When you name a cell or group of cells, the name must be one word. Do not enter spaces or hyphens. Plan cannot use these in a name. Also, because you do not actually enter names on the worksheet itself, do not enclose them in quotation marks. For further information on naming cells, refer to the NAME command in Chapter 15, "Plan Reference."

Assign the name COSTS to row 7.

1. Press N to select the NAME command.
2. Enter COSTS in the define name: prompt.
3. Press TAB to advance to the to refer to: prompt.
4. Enter R7 (indicating row 7).
5. Press RETURN.

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The formula for calculating your profit is PROFIT=REVENUE-COSTS. You can now use the names you have just entered, instead of cell references, to calculate your profit.

1. Use the ARROW keys to select the cell at R9C2.
2. Press E to select the EDIT command.
3. Enter REVENUE-COSTS (do not include any spaces).
4. Press RETURN. Plan calculates the amount left over after costs and places the result (\$8,530.00) in cell R9C2 as shown in Figure 14.9.

DRAWING LINES

Often, you will want to draw lines across parts of a worksheet to make it easier to read. For example, you might want to separate a group of rows containing items that make up a subtotal. Enter a line between ADVERTISING and COSTS.

1. Use the ARROW keys to select R6C2, the cell you want to contain the line.
2. Press E to select the EDIT command.
3. Enter "-----" (thirteen dashes) to fill the cell. Because Plan considers the dash as text, you must enclose the dashes you type in quotation marks.
4. Press RETURN to execute the EDIT command.

If you want to draw a line across an entire row or a partial row, you do not need to draw the line one cell at a time. Instead, draw a line in the first cell and then use the COPY RIGHT command to extend the line across the remaining cells.

#	1	2	3	4	5
1	REVENUE	\$24,680.00			
2					
3	OVERHEAD	\$5,600.00			
4	MATERIALS	\$5,700.00			
5	ADVERTISING	\$4,850.00			
6					
7	COSTS	\$16,150.00			
8					
9	PROFIT	\$8,530.00			
10					
11					

```
> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: PROFIT      R9C2      REVENUE-COSTS
```

Figure 14.9. Plan Calculates the Profit

Changing the Appearance of the Worksheet

Plan lets you decide how you want your worksheet to look on the screen. You will be able to control:

- how text, formulas, and numbers are aligned within cells;
- how numbers look—whether they have decimal points, commas, dollar signs, percent signs—or even whether they will be rounded or displayed in scientific notation;
- whether values, or the formulas that produced them, will be displayed in the cells; and
- how wide worksheet columns will be.

Of the four areas of control mentioned, you have already worked in three.

NOTE: The alignments, formats, and column widths you see on your screen will also be used when you print your worksheet. However, you may also want to specify margins or suppress the printing of row and column numbers on the printed sheet. Refer to *Printing Worksheets* in this chapter for more information about how to prepare a printed worksheet.

DISPLAYING FORMULAS INSTEAD OF VALUES

Normally, you see the values that result from Plan's calculations in worksheet cells. However, you might want to look at the formulas that created the values in the worksheet. This is useful if you want to reconstruct or audit the logic of your worksheet. You might, for example, want to print one copy of the worksheet with the values displayed on it and print another copy of the worksheet that shows how Plan arrived at these results.

If you only need to see the formula that created the value in a particular cell, simply move the highlight to the cell with one of the ARROW keys. The formula that applies to it will be displayed on the status line.

To display all formulas instead of values on the worksheet:

1. Press **F** to select the **FORMAT** command.
2. Press **O** to select the **OPTIONS** command.
3. Press **TAB** to advance to the **formulas:** prompt.

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4. Press Y to select Yes.
5. Press RETURN to execute the FORMAT OPTIONS command. The result is shown in Figure 14.10. Both formulas appear in the cells in which you created them. In addition, all text is displayed in quotation marks.

NOTE: Formulas are displayed with double-width columns.

To change the worksheet back to displaying values:

1. Press F to select the FORMAT command.
2. Press O to select the OPTIONS command.
3. Press TAB to advance to the formulas: prompt.
4. Press N to select No.
5. Press RETURN to execute the FORMAT OPTIONS command. The worksheet returns to displaying values rather than formulas.

Editing Worksheets

Once you have entered data on a worksheet, you may find that you want to change the contents of a cell, rearrange information on the sheet, or even expand the contents of the worksheet. Plan gives you the flexibility to:

- change the worksheet by editing, erasing, or copying the contents of individual cells or groups of cells and
- rearrange the entire worksheet by inserting, deleting, moving, and sorting groups of cells.

```
#1           1           2
1 "REVENUE"      24680
2
3 "OVERHEAD"     5600
4 "MATERIALS"    5700
5 "ADVERTISING"  4850
6
7 "COSTS"        R[-4]C+R[-3]C+R[-2]C
8
9 "PROFIT"       REVENUE-COSTS
10
11

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: PROFIT      R6C2      "-----"
```

Figure 14.10. Plan Sheet Displaying Formulas

When you rearrange part of a worksheet, keep in mind that:

- all references will be adjusted to the new arrangement;
- automatic recalculation will take place (this feature can be turned off with the OPTIONS command);
- references to deleted cells will cause #REF! error values (you will need to change these references);
- names remain the same, even if rearrangement of the worksheet makes the named area irregular in shape; and
- cells inserted adjacent to a group are not included in the group. If you want to insert more cells in a group, place them in the interior of the named cell area.

INSERTING NEW CELLS

You might want to add a new column or row of values in a worksheet or add a row or column of titles for an area on the worksheet. You might even want to add a blank row or column to make the worksheet more readable.

Plan allows you to insert new rows or columns any place in the worksheet and adjusts all references that are affected by inserting new cells. You cannot insert rows or columns if they would cause the existing worksheet to extend beyond the 255-row and 63-column limit.

Since profit statements usually extend over a period of time longer than one month, by adding titles and copying the work you have already done, you can easily extend the profit statement for any number of months.

First, insert a row at the top to label columns for different months:

1. Press F5 until N₈ appears in the status line; when you insert the row, you do not want to insert what is currently in the scrap.
2. Press I to select the INSERT command.
3. Press R to select the ROW command.
4. Press TAB to accept the default response of 1 in the # of rows: prompt and advance to the before row: prompt.
5. Enter 1 in the before row: prompt.
6. Press RETURN to execute the command.
7. Press F5 until no indicator appears on the status line. The scrap setting is returned to Blank Scrap mode.

Plan inserts a row and then renames all of the rows. Plan also adjusts your names and formulas so that you get the results you want without changing the work you have already done. For further information on inserting a row or a column, refer to the INSERT ROW and INSERT COLUMN commands in Chapter 15, "Plan Reference."

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#1	1	2	3	4	5
1		JANUARY	FEBRUARY	MARCH	TOTAL
2 REVENUE		\$24,680.00			
3					
4 OVERHEAD		\$5,600.00			
5 MATERIALS		\$5,700.00			
6 ADVERTISING		\$4,850.00			
7		-----			
8 COSTS		\$16,150.00			
9					
10 PROFIT		\$8,530.00			
11					

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
 Select option or type command letter
 Plan: PROFIT R1C5 "TOTAL"

Figure 14.11. Adding Column Titles

Now add titles for the months:

1. Use the ARROW keys to select R1C2.
2. Press E to select the EDIT command.
3. Enter "JANUARY" and press the RIGHT ARROW key. This enters the text into R1C2 and selects R1C3.
4. Enter "FEBRUARY" and press the RIGHT ARROW key.
5. Enter "MARCH" and press the RIGHT ARROW key.
6. Enter "TOTAL" and press RETURN. Your worksheet should look like Figure 14.11.

Notice that all the text on the worksheet is aligned on the left edge of the cells; all the numbers are aligned to the right. As mentioned earlier, this is the way Plan lines up cell contents unless you specify otherwise with either the FORMAT CELLS or FORMAT DEFAULT CELLS command.

The titles in row 1 would look better centered. Center the titles using the FORMAT CELLS command.

1. Press F to select the FORMAT command.
2. Press C to select the CELLS command.
3. Enter R1 in the cells: prompt.
4. Press TAB to advance to the alignment: prompt.
5. Press SPACE BAR until Ctr is selected.
6. Press RETURN to execute the command. Your worksheet should look like Figure 14.12.

COPYING CELL CONTENTS

If you have text or values that are repeated on the worksheet, you can speed up your work by copying the contents of a cell to other cells. For example, if you have a value that remains constant, such as monthly rent over the next twelve months, you can easily copy this number to the row containing monthly rent instead of entering the same number eleven times.

#1	1	2	3	4	5
		JANUARY	FEBRUARY	MARCH	TOTAL
2	REVENUE	\$24,680.00			
3					
4	OVERHEAD	\$5,600.00			
5	MATERIALS	\$5,700.00			
6	ADVERTISING	\$4,850.00			
7		-----			
8	COSTS	\$16,150.00			
9					
10	PROFIT	\$8,530.00			
11					

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
 Select option or type command letter
 Plan: PROFIT R1C5 "TOTAL"

Figure 14.12. Centering Titles in Columns

Plan lets you copy a value across a group of columns, down a group of rows, or from one area of cells to another. The cells you are copying to must be empty and not protected. (For information on protecting cell content, refer to Protecting Information on the Worksheet in this chapter.)

In addition, if you are copying one area of cells to another area, the source and destination areas must be the same shape. If you copy from a single cell to an area of cells, the contents of the cell are copied throughout the entire destination area.

Use the COPY command to create profit statements for a quarter on your PROFIT worksheet. Entries for February and March will be similar to those for January. Although some of the amounts may differ, the formulas for calculating COSTS and PROFIT will be identical.

You can copy the numbers and formulas for January into the February and March columns; afterward, you can make any necessary changes to the amounts.

To copy the January data into columns 3 and 4:

1. Press C to select the COPY command.
2. Press R to select the RIGHT command.
3. Enter 2 in the number of cells: prompt.
4. Press TAB to advance to the starting at: prompt.

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5. Enter R2:10C2.

Notice that the colon (:) you entered in the above entry indicates a range of rows to be copied. Together, your entries in both prompts tell Plan to copy the cells in rows 2 through 10 in column 2 to the corresponding cells in the two columns to the right of column 2.

6. Press RETURN. Your worksheet should look like Figure 14.13.

For details on copying cell contents, refer to the COPY commands:

COPY DOWN to copy text or a value down a column,
 COPY FROM to copy an area of cells to another area of cells, and
 COPY RIGHT to copy text or a value across a row

in the Plan Commands section of Chapter 15, "Plan Reference."

NOTE: You can use the COPY FROM command to insert data in or retrieve data from the scrap when transferring data between Plan and other applications. For details, see Transferring Data between Applications in Chapter 3, "ZP-150 Applications."

The REVENUE-COSTS formula is now in three cells: R10C2, R10C3, and R10C4.

Since REVENUE refers to all of row 2 and CCSTS refers to all of row 8, you might think REVENUE-COSTS would mean subtract all of row 8 from all of row 2. But Plan calculates one cell at a time. Even though you specified the names of two rows in the formula, Plan uses only values from cells in the column (or row) the formula is in. The formula in the January column subtracts January COSTS from January REVENUE, the one in the February column subtracts February COSTS from February REVENUE, and so on, just as you would expect.

#1	1	2	3	4	5
1		JANUARY	FEBRUARY	MARCH	TOTAL
2 REVENUE		\$24,680.00	\$24,680.00	\$24,680.00	
3					
4 OVERHEAD		\$5,600.00	\$5,600.00	\$5,600.00	
5 MATERIALS		\$5,700.00	\$5,700.00	\$5,700.00	
6 ADVERTISING		\$4,850.00	\$4,850.00	\$4,850.00	
7					
8 COSTS		\$16,150.00			
9					
10 PROFIT		\$8,530.00			
11					

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
 Select option or type command letter
 Plan: PROFIT R1C5 "TOTAL"

Figure 14.13. Using COPY RIGHT

CHANGING CELL CONTENTS

The profit statement now shows the same numbers for each month. However, revenue and costs will vary from month to month. You can change the numbers in columns 3 and 4 by selecting individual cells and typing new entries in them.

To edit cell contents, highlight the cell you want to change, select the EDIT command, enter the new cell contents in the EDIT: prompt, and press RETURN. As soon as you begin typing, the old entry disappears. Change the numbers in column 3 by this means.

NOTE: Sometimes Plan will not let you change the contents of a cell. A cell may be *locked*, that is, protected so that you cannot change it. Or, as in the case of desktop Multiplan files that you download, the contents of the cell may be linked to the contents of a cell on another worksheet. (For more information on locked cells, refer to Protecting Information on the Worksheet in this chapter.)

1. Use the ARROW keys to select cell R2C3.
2. Press E to select the EDIT command.
3. Enter 27540 and press the DOWN ARROW key twice. Plan puts \$27,540.00 in cell R2C3 and then recalculates the Profit for February. Each time you select the next cell after making an entry, Plan recalculates COSTS and PROFIT.
4. Enter 5200 in R4C3 and press the DOWN ARROW key.
5. Enter 6590 in R5C3 and press the DOWN ARROW key.
6. Enter 4030 in R6C3 and press RETURN. The PROFIT worksheet looks like Figure 14.14.

#1	1	2	3	4	5
1		JANUARY	FEBRUARY	MARCH	TOTAL
2 REVENUE		\$24,680.00	\$27,540.00	\$24,680.00	
3					
4 OVERHEAD		\$5,600.00	\$5,200.00	\$5,600.00	
5 MATERIALS		\$5,700.00	\$6,590.00	\$5,700.00	
6 ADVERTISING		\$4,850.00	\$4,030.00	\$4,850.00	
7					
8 COSTS		\$16,150.00	\$15,820.00	\$16,150.00	
9					
10 PROFIT		\$8,530.00	\$11,720.00	\$8,530.00	
11					

```
> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: PROFIT      R6C3      4030
```

Figure 14.14. Changes and Recalculation

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If the contents of a cell that you are editing are lengthy (for example, if the cell contains a long text entry), you may want to use the special editing keys F7 through F10. For use of these keys, refer to Program Function Keys in Chapter 15, "Plan Reference."

Another way of changing cell contents involves erasing cells and then reentering data. Change the numbers in column 4 by this means.

ERASING CELLS

You may want to erase parts of worksheets that contain information or calculations you no longer need. It is also a good idea to erase empty areas to make your worksheet more compact.

First, consider the contents of the cells you are about to erase: Do you need any of the information stored here? How will erasing this information affect references in formulas? Plan does not ask for confirmation before erasing cells. Once the cells are erased, all references are recalculated.

To erase the contents of the cells in column 4:

1. Use the **ARROW** keys to select cell R2C4.
2. Press **E** to select the **EDIT** command. The contents of cell R2C4 appear at the **EDIT** command prompt.
3. Press **DEL** to delete the contents.
4. Press **RETURN**. Plan erases the contents of R2C4.

Now erase the rest of column 4 by copying the contents of R2C4 to the adjoining cells.

5. Press **C** to select the **COPY** command.
6. Press **D** to select the **DOWN** command.
7. Enter **4** at the **number of cells:** prompt. You do not want to erase the formulas stored in COSTS and PROFIT.
8. Press **RETURN**. Notice how the values in COSTS and PROFIT automatically became \$0.00.

You can use the **DELETE** command to remove entire rows or columns from the worksheet. Keep in mind, however, that the **DELETE** command does not merely erase cell contents. Rather, it physically removes rows or columns of cells from the worksheet and rennumbers remaining rows and columns. For information on how to delete a column or row of cells, refer to the **DELETE COLUMN** and **DELETE ROW** commands in Chapter 15, "Plan Reference."

What Plan does with deleted rows or columns is determined by the status of the SCRAP key (F5). To simply remove data from a worksheet with the DELETE command, press F5 until **Ns** appears on the status line. **Ns** indicates that deleted data will not be placed in the scrap. To place data in the scrap in order to transfer it to another application, see discussion of the SCRAP key in Program Function Keys in Chapter 15, "Plan Reference." Also, refer to Transferring Data between Applications in Chapter 3, "ZP-150 Applications."

To enter the new values for the month of MARCH:

1. Use the ARROW keys to select cell R2C4.
2. Press E to select the EDIT command.
3. Enter 29760 in R2C4 and press the DOWN ARROW key twice.
4. Enter 6100 in R4C4 and press the DOWN ARROW key.
5. Enter 7480 in R5C4 and press the DOWN ARROW key.
6. Enter 4390 in R6C4 and press RETURN. The PROFIT worksheet should look like Figure 14.15.

MOVING CELLS

You can move one or more rows or columns of cells from one area of a worksheet to another. References affecting the moved areas will be adjusted after the cells are moved.

For information on moving one or more columns or rows, refer to the MOVE COLUMN and MOVE ROW commands in Chapter 15, "Plan Reference."

#	1	2	3	4	5
1		JANUARY	FEBRUARY	MARCH	TOTAL
2	REVENUE	\$24,680.00	\$27,540.00	\$29,760.00	
3					
4	OVERHEAD	\$5,600.00	\$5,200.00	\$6,100.00	
5	MATERIALS	\$5,700.00	\$6,590.00	\$7,480.00	
6	ADVERTISING	\$4,850.00	\$4,030.00	\$4,390.00	
7		-----	-----	-----	
8	COSTS	\$16,150.00	\$15,820.00	\$17,970.00	
9					
10	PROFIT	\$8,530.00	\$11,720.00	\$11,790.00	
11					

EDIT: 4390
 Plan: PROFIT R6C4 4390

Figure 14.15. Quarterly Profit Statement

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SORTING DATA ON THE WORKSHEET

Plan even lets you rearrange the rows of a worksheet in alphabetical or numerical order. Entire rows are sorted by the column containing the items you want to sort. You can sort in either ascending or descending order. The following rules apply.

The categories of data are sorted in this order:

- Numbers
- Text
- Logical and error values
- Blank cells

Text is sorted according to the standard ASCII character sequence. In ascending order, this is:

! " # \$ % & ' () * + , - . / 0-9 : ; < = > ? @ A-Z [] ^ ' a-z { ! }

Equal values are left in the order they appear.

To sort multiple columns of information, sort the least significant column first. Then, sort one column at a time, from the least significant to most significant.

For example, to sort a list of orders by customer and size of order, first sort by the customer's name, then the size of the order. Plan will leave all the entries for a single customer in the order it finds them when it sorts the values of the orders.

For more information on sorting the rows on your worksheet, refer to the SORT command in Chapter 15, "Plan Reference."

Shortcuts to Formulas

So far, you have done two of the four types of arithmetic in formulas: You have used + to add and - to subtract. The other two types of arithmetic are multiplication and division, which use * to multiply and / to divide. There are also percentage (%) and exponentiation (^) operators. Often, formulas can be quite complex. To make your work easier, you can use one of Plan's built-in functions to perform complex calculations within formulas. Functions are formulas built into Plan that know how to do special arithmetic calculations.

For example, you can use the **SUM(List)** function to calculate the three-month sum for REVENUE.

1. Use the ARROW keys to select cell R2C5, the TOTAL cell for REVENUE.
2. Press E to select the EDIT command.
3. Enter **SUM(**.

Since you want the sum of cells R2C2 through R2C4, next enter that range of cells by selecting the first cell.

4. Use the ARROW keys to select cell R2C2.
5. Enter : (a colon).
6. Use the ARROW keys to select cell R2C4.
7. Enter) to close the parentheses you opened in step 2. The formula in the EDIT: prompt looks like this:

SUM(RC[-3]:RC[-1])

8. Press RETURN. The sum of REVENUE for JANUARY through MARCH appears in the cell.

SUM(List) is just one of many Plan functions for mathematical, statistical, and financial calculation. See Plan Functions in Chapter 15, "Plan Reference," for information on all the functions that are available.

You can use the same formula to calculate the three-month sum for OVERHEAD, MATERIALS, ADVERTISING, COSTS, and PROFIT.

1. Press C to select the COPY command.
2. Press D to select the DOWN command.
3. Enter 8 in the number of cells: prompt.
4. Since the default response of R2C5 in the starting at: prompt is acceptable, press RETURN.

Plan fills all other selected cells with the formula from R2C5 and calculates the results for each formula as shown in Figure 14.16.

As you can see in Figure 14.16, cells R3C5, R7C5, and R9C5 contain a value of \$0.00. The formula was also copied into these cells. To fix your worksheet:

1. Use the ARROW keys to select cell R3C5.
2. Press E to select the EDIT command.
3. Press DEL to delete the contents.
4. Press RETURN. Plan erases the contents of R3C5.

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#1	1	2	3	4	5
1		JANUARY	FEBRUARY	MARCH	TOTAL
2 REVENUE		\$24,680.00	\$27,540.00	\$29,760.00	\$81,980.00
3					\$0.00
4 OVERHEAD		\$5,600.00	\$5,200.00	\$6,100.00	\$16,900.00
5 MATERIALS		\$5,700.00	\$6,590.00	\$7,480.00	\$19,770.00
6 ADVERTISING		\$4,850.00	\$4,030.00	\$4,390.00	\$13,270.00
7					\$0.00
8 COSTS		\$16,150.00	\$15,820.00	\$17,970.00	\$49,940.00
9					\$0.00
10 PROFIT		\$8,530.00	\$11,720.00	\$11,790.00	\$32,040.00
11					

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
 Select option or type command letter
 Plan: PROFIT R2C5 SUM(RC[-3]:RC[-1])

Figure 14.16. Copying a Formula

5. Press C to select the COPY command.
6. Press F to select the FROM command.
7. Press TAB to advance to the to cells: prompt.
8. Enter R9C5 and press RETURN.
9. Use the ARROW keys to select cell R7C4.
10. Press C to select the COPY command.
11. Press R to select the RIGHT command.
12. Enter 1 and press RETURN. The PROFIT worksheet should look like Figure 14.17.

Printing Worksheets

Plan lets you control how your worksheets will look when they are printed. You will be able to decide:

- whether to print all or part of the worksheet;
- whether to print the values in cells or the formulas that generated them; and
- whether or not to print the row and column numbers on the worksheet.

Before you begin to print, make sure that your worksheet looks exactly as you want it. Check the format and the alignment of cell contents and the width of columns. See the FORMAT command in Chapter 15, "Plan Reference," for more information about controlling the appearance of worksheets.

Of course, sometimes you may want to print several versions of the same worksheet. For example, you might want to print one version of a worksheet displaying values and another version that displays formulas.

#1	1	2	3	4	5
1		JANUARY	FEBRUARY	MARCH	TOTAL
2 REVENUE		\$24,680.00	\$27,540.00	\$29,760.00	\$81,980.00
3					
4 OVERHEAD		\$5,600.00	\$5,200.00	\$6,100.00	\$16,900.00
5 MATERIALS		\$5,700.00	\$6,590.00	\$7,480.00	\$19,770.00
6 ADVERTISING		\$4,850.00	\$4,030.00	\$4,390.00	\$13,270.00
7					
8 COSTS		\$16,150.00	\$15,820.00	\$17,970.00	\$49,940.00
9					
10 PROFIT		\$8,530.00	\$11,720.00	\$11,790.00	\$32,040.00
11					

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
 Select option or type command letter
 Plan: PROFIT R7C4 "-----"

Figure 14.17. Final PROFIT Worksheet

PRINTING A WORKSHEET ON A PRINTER

The ZP-150 can be used with a serial or parallel printer. If you have a serial printer, your ZP-150 must be configured. Refer to Chapter 4, "External Devices," for information on configuring your ZP-150 for a serial printer.

Before you print a worksheet, make sure your printer is connected properly, turned on, and ready to print. Be sure to power down your ZP-150 before connecting the printer to it. After all connections are made, turn on your printer first and then your ZP-150. If you do not know how to connect or operate your printer, read your printer manual before attempting to print a Plan worksheet.

If you own a printer, check to see that the printer:

- is plugged in,
- cable is plugged into the printer and into the ZP-150 printer port located on the rear panel,
- is turned on and ready (or on-line), and
- paper and ribbon are installed correctly.

Plan uses the margin, page length and width, and print length and width specifications entered in command prompts of the System Manager SET PRINTER command. Plan will print as many columns across the page as will fit within these specifications. Any columns left over will be printed on a second page, with row and column numbers continued. For now, do not change any of the responses in the SET PRINTER command prompts.

If you have a printer, print your worksheet:

1. Press P to select the the PRINT command.
2. For a parallel printer, press TAB to accept the default response of PRN: in the file: prompt and to advance to the area: prompt. For a serial printer, enter COM1: and press TAB.

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3. To print the entire worksheet, simply accept the proposed response of R1:255 in the area: prompt. It does not matter if your worksheet is less than 255 rows. Plan will stop printing after printing the last row containing data.
4. Press RETURN to execute the PRINT command. Your printer begins printing the worksheet.

You can print part of your worksheet by specifying the area you want printed. Type the cell, range of cells, or name of the cell in the area: prompt.

PRINTING FORMULAS OR ROW AND COLUMN NUMBERS

You have some choices about how to display information on the worksheet. For example, you can decide whether to print the row and column numbers on the sheet. You can also print the formulas that affect cells instead of the actual values in the cells. You may find this useful if you want to keep a record of how you arrived at the results on your worksheet.

To omit row and column numbers from the printed worksheet, you would:

1. Select the PRINT command.
2. Select No in the row-col numbers: prompt.
3. Press RETURN to execute the command.

To print formulas instead of values on the worksheet, you would:

1. Select the FORMAT OPTIONS command.
2. Select Yes in the formulas: prompt.
3. Press RETURN to execute the FORMAT OPTIONS command.
4. Select the PRINT command.
5. Type the cell, range of cells, or name of the cell area in the area: prompt.
6. Press RETURN to execute the PRINT command.

PRINTING A WORKSHEET TO A FILE

You may find it useful to send a printable copy of your worksheet to a file so that you can print it later or insert it into a Word document or transmit it with Telcom. Print your PROFIT worksheet to a file:

1. Press P to select the PRINT command.
2. Enter PROFIT.PRN in the to: prompt. PROFIT.PRN will be the name of the text file.

3. Accept the default response of **Text** in the **style:** prompt.

4. Press **RETURN** to execute the **PRINT** command.

While at the **file:** prompt, you can press any **ARROW** key to display a list of all files stored in your computer's memory. Use the list to make sure that you do not give the file you want to print the same name as a file you have previously saved. Your computer does not permit you to store two files with the same name.

If you do give the file you want to print the name of an existing file, Plan will display the **Enter Y to overwrite file** message. If you enter **Y** (for Yes), Plan overwrites the file in memory with the worksheet you are currently printing. If you enter **N** or press **ESC**, the **PRINT** command is cancelled.

For more information on printing worksheets, see the **PRINT** command in Chapter 15, "Plan Reference."

ADVANCED FEATURES

The following sections describe protecting information on your worksheet, entering complex formulas, and using iteration in formulas. You may want to explore these features as you become more experienced with Plan.

Protecting Information on the Worksheet

If you have spent a lot of time building a complex model in a worksheet, you can use the **LOCK** commands to protect all or part of the worksheet from accidental changes.

After you have locked a cell or group of cells, you will not be able to change cell contents with the **COPY** or **EDIT** commands. However, you will still be able to format, move, sort, or even delete the cells whose contents are locked.

Once you have locked cells or formulas with the **LOCK** commands, you can use the **LOCK CELLS** command to unlock them again so that you can continue to make changes in the worksheet.

LOCKING AND UNLOCKING CELLS

To protect a cell or group of cells, use the **LOCK CELLS** command. Because the default response in this command is the active cell and its current status,

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you can also use the LOCK CELLS command to check whether the active cell is currently locked or unlocked.

To lock a cell or group of cells:

1. Select the LOCK CELLS command.
2. Enter the reference to the cell or group of cells or move the highlight until the cell you want to lock is highlighted.
3. Select Locked in the status: prompt.
4. Press RETURN to execute the command.

To unlock a cell or group of cells:

1. Select the LOCK CELLS command.
2. Enter the reference to the cell or group of cells or move the highlight until the cell you want to unlock is highlighted.
3. Select Unlocked in the status: prompt.
4. Press RETURN to execute the command.

LOCKING FORMULAS

You can also use the LOCK FORMULAS command to protect all cells that contain text or formulas. All formulas and their resulting values in the worksheet will be locked, except for formulas entered after you have used the LOCK command.

To lock formulas:

1. Select the LOCK FORMULAS command.
2. Press Y for Yes to confirm that you want to lock the formulas.

Once you have used the LOCK FORMULAS command, you can unlock some or all of the cells affected by the formulas by using the LOCK CELLS command to unlock them.

Entering Complex Formulas

Often, a formula can be quite complex. To make your work easier, you can use one of Plan's built-in functions to perform complex calculations within formulas. You can further simplify such calculations by either referencing or naming groups of cells on the worksheet.

USING FUNCTIONS

Plan provides some built-in functions for performing some common mathematical, statistical, and financial calculations on worksheets. Functions are instructions for Plan to make a calculation involving several variables,

convert one type of value to another, or limit the number of times a value will be recalculated. You can use a function to replace all or part of a Plan formula.

The following types of functions are available:

- Algebraic and trigonometric functions

For example, SQRT(N) calculates the square root of N.

- Logical functions

For example, TRUE() returns the test value true in an expression requiring a true or false response.

- Conversion functions

For example, DOLLAR(N) converts N from a value to text displaying a dollar format.

- Statistical functions

For example, STDEV(L,M,N) calculates the sample standard deviation of the values L, M, and N.

- Financial functions

For example, NPV(RATE,L,M,N) calculates Net Present Value, that is, the amount of money required now to produce the cash flows L, M, and N in the future, given a specific interest rate.

- Control functions

For example, the value returned by ITCRCNT() is the number of times recalculation has taken place.

NOTE: For a complete description of Plan functions, see Plan Functions in Chapter 15, "Plan Reference."

CELL GROUPS

Formulas can apply both to the relationships between single cells and to the relationships between groups of cells and even large areas on the worksheet. The simplest cell group is a row or column. For example, a typical formula might be: Add all the values in each column of row 3 to all the values in each column of row 4 to get the values in row 5. Cell references can also describe any combination of rows and columns that form rectangular areas of the worksheet. These areas form a range, union, or intersection of cell references, as described in the following paragraphs.

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A *range* of cells is any single rectangular grouping of cells on the worksheet. To describe a range of cells, you reference the cells in the upper left-hand and lower right-hand corners of the rectangular area. You separate the two cell references with the colon (:) operator.

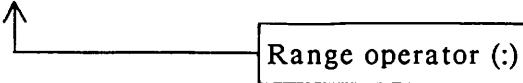
A *union* of cells is composed of two or more ranges of cell references. The operator used to describe a union is the comma (,).

An *intersection* of cells is any area of the worksheet where one range of cells overlaps another range of cells. The operator used to describe an intersection is a blank space.

Figure 14.18 gives examples of these cell groups. The shaded portion of the worksheet is the intersection formed by the union of two ranges of cells.

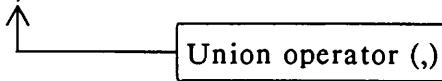
In Figure 14.18 there are two ranges of cells:

R1C1:R7C5
R4C3:R10C7



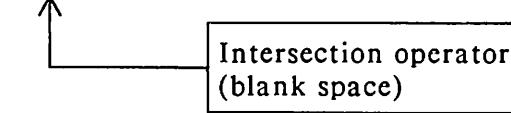
The union of the two ranges is:

R1C1:R7C5,R4C3:R10C7



The intersection of the two ranges is:

R1C1:R7C5 R4C3:R10C7



#1	1	2	3	4	5	6	7
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Copyright (1982, 1983, 1984, 1985) Microsoft Corp.
Plan: WORK R1C1

Figure 14.18. Cell Groups

USING CELL GROUPS IN FUNCTIONS

Using references to groups of cells to define a function is similar to using references to individual cells to build a formula.

For example, suppose you would like to add the values in the two ranges (the union) of cells shown in Figure 14.18. Notice, however, that such a calculation would count the values of the cells in the intersection twice. Therefore, in order to arrive at an accurate figure, you would need to subtract the values in the intersection from the sum of the values in the union. The following function would produce an accurate result:

`SUM(R1C1:R7C5,R4C3:R10C7)-SUM(R1C1:R7C5 R4C3:R10C7)`

This function tells Plan to first add the values of all cells in the union described by the two ranges of cell references and then subtract the values of all cells in the intersection described by the two ranges of cell references.

The procedure for performing a calculation with a function is as follows.

1. Move the highlight to the cell where you want to enter the result of the calculation performed by the function.
2. Select the EDIT command.
3. Type the function, including cell references and operators, in the EDIT: prompt.
4. Press RETURN to enter the results of the calculation in the cell you selected in step 1.

You can simplify the process of using formulas and functions even more by naming areas of a worksheet as described in the following section.

USING NAMES

To make it easier to perform calculations, Plan lets you name a cell or cell group. You can then use the name of the cell area instead of its reference in a formula or function.

For example, consider the worksheet in Figure 14.19, showing the costs of rent and utilities for the first six months of the year.

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#1	1	2	3	4	5	6	7
1		JAN	FEB	MAR	APR	MAY	JUN
2 GAS		\$75.00	\$73.00	\$68.00	\$59.00	\$52.00	\$50.00
3 ELECTRIC		\$110.00	\$105.00	\$100.00	\$90.00	\$85.00	\$79.00
4 PHONE		\$45.00	\$57.00	\$62.00	\$39.00	\$50.00	\$60.00
5 RENT		\$450.00	\$450.00	\$450.00	\$450.00	\$450.00	\$450.00
6							
7 UTILITIES:							
8							
9 TOTAL:							
10							
11							

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: COSTS R7C2

Figure 14.19. COSTS Worksheet

Each row on the worksheet has a text label in column 1 identifying its contents. Suppose you want to enter the six-month totals for gas, electric, and phone in the cell to the right of the cell labeled Utilities:. You could do so by entering the function:

SUM(R2C1:R4C7)

in the cell to the right of Utilities:. When you perform the above calculation, Plan will enter the results in the cell you have specified:

7 Utilities: \$1259.00

However, you do not need to depend on the standard row-and-column references to cells when entering formulas or functions. Plan offers you the option of naming individual cells or groups of cells and using these names in the calculations you perform.

For example, because costs for gas, electric, and phone represent a subtotal of all costs for the six-month period shown on the worksheet, you can name rows 2 through 4 "Subtotal." You can then use the name "Subtotal" to calculate the figure you want to enter in the cell to the right of the cell labeled Utilities:.

SUM(Subtotal)

Now, suppose you would like to enter totals for rent and utilities in the cell to the right of the cell labeled Totals:, thereby showing total costs for the entire six-month period. To do so, you can enter the function:

SUM(R5C1:7,R7C2)

or, because Plan can include empty rows and cells in any rectangular area of the worksheet you refer to,

SUM(R5:7)

or you can name row 5 "Rent" and row 7 "Utilities" and enter the function:

SUM(Rent,Utilities)

Any form of the function will instruct Plan to enter the results of the calculation:

9 Total: \$3959.00

Naming groups of cells allows you to identify their contents in the functions you enter, rather than simply their locations on the worksheet.

There are a few rules for naming cell groups:

- The first character in the name must be either a lowercase or uppercase letter (a–z).
- The other characters in the name can be lowercase or uppercase letters, numbers (0–9), periods (.), or underlines (_). Names cannot contain spaces or dashes.
- The name must be less than 32 characters long.
- The name cannot look like an absolute or relative cell reference.

Once you have defined a name, you can use it anywhere you would use a cell reference. It does not matter whether you type it in uppercase or lowercase letters.

To define a name for an area:

1. Choose the NAME command. The NAME command prompts replace the command menu:

define name: to refer to:

If the highlighted cell contains text, the text appears as the proposed response in the define name: prompt. If the highlighted cell does not contain text, the prompt has no proposed response. The proposed response in the to refer to: prompt is the contents of the cell that is highlighted on the worksheet.

2. Type the name you want to define in the define name: prompt or accept the proposed response.
3. Press TAB.
4. Type a reference to a cell or to a group of cells in the to refer to: prompt.
5. Press RETURN.

Performing Calculations Using Iteration

Occasionally, you may need to perform a calculation containing a circular reference, wherein the result of the calculation is dependent upon an unknown quantity. You solve such problems on paper with complex algebraic formulas. With Plan, however, you can resolve circular references with a process known as *iteration*.

When working with Plan, you may see a message that says Circular reference unresolved. This means that formulas in cells refer to each other in a circular manner. Plan cannot calculate these formulas using normal calculation.

Circular references can be accidental or intentional. If you did not want to use circular references, check the logic of your formulas. You may have to rearrange formulas on the worksheet or redesign the formulas to break the circle.

If you want to build formulas that depend on each other for answers, you can use iteration to solve them.

Iteration makes Plan an exceptionally powerful tool for analysis. Iteration allows you to create models for target-seeking analysis, to solve simultaneous equations, to perform numerical analysis, and other complex tasks.

WHAT HAPPENS WHEN PLAN ITERATES

When Plan iterates, it calculates the worksheet over and over until some condition is satisfied. For each calculation, Plan uses the results of the previous calculation. The previous results do not solve the problem exactly, but each iteration yields results that fit better.

Plan follows these steps when it iterates:

1. Plan calculates the worksheet in the normal order.
2. If there are any circular references, Plan checks whether you have chosen Yes in the iteration: prompt of the OPTIONS command.
3. If the response in the iteration: prompt of the OPTIONS command is No, Plan displays the Circular references unresolved message on the message line.
4. If you have chosen Yes in the iteration: prompt of the OPTIONS command, Plan evaluates the completion test (the default test is $\text{DELTA}(<0.001)$ if you do not set a different one).

```

#1          1
1 "GROSS PROFIT"      1000
2 "BONUS"           NET PROFIT*10%
3 "NET PROFIT"       GROSS_PROFIT-BONUS
4
5
6
7
8
9
10
11

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Circular reference unresolved
Plan: MODEL          R3C2    GROSS_PROFIT-BONUS

```

Figure 14.20. A Simple Model with Circular References

5. If the completion test is FALSE, Plan increments the iteration count by one, then begins an iteration. Plan then evaluates the completion test again.
6. When the completion test is TRUE, Plan stops iteration.

USING ITERATION: AN EXAMPLE

The following model shows how to use iteration to solve a simple circular reference. If you want to try this example on your ZP-150, be sure to select Yes in the iteration: prompt of the OPTIONS command before beginning. This model is designed to calculate a bonus that is 10 percent of net profit.

Gross profit is \$1,000.00. Net profit is gross profit minus bonus, so you need to know the bonus before you can calculate net profit. However, bonus is 10 percent of net profit, so you need to know net profit before you can calculate the bonus. The formulas for bonus and net profit depend on each other for answers: they are circular references. Figure 14.20 shows the formulas as they should be entered on the worksheet. After Plan calculates the worksheet, it shows the values in Figure 14.21.

```

#1          1
1 GROSS PROFIT      2          3          4          5
2 BONUS            $1000.00   $90.00
3 NET PROFIT       $900.00
4
5
6
7
8
9
10
11

> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: MODEL          R3C2    900

```

Figure 14.21. Results of the First Iteration

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Here is what happens in the model. Since the references are circular and the iteration: prompt of the OPTIONS command contains a response of Yes, Plan calculates the formulas again, using the values of \$90.00 for bonus and \$900.00 for net profit. The results of each iteration are:

Bonus	\$90.00
Net Profit	\$900.00
Bonus	\$900.00*.10=\$90.00
Net Profit	\$1000-\$90.00=\$910.00
Bonus	\$910.00*.10=\$91.00
Net Profit	\$1000-\$91.00=\$909.00
Bonus	\$909.00*.10=\$90.90
Net Profit	\$1000-\$90.90=\$909.10
Bonus	\$909.10*.10=\$90.91
Net profit	\$1000-\$90.91=\$909.09

\$90.91 is 10 percent of the \$909.09, and \$909.09 equals \$1000.00 minus \$90.91. The model is solved.

If you change the gross profit to \$1100, Plan will quickly recalculate the new bonus as \$100 and the net profit as \$1000, and the message Circular references unresolved will not appear. Again, the bonus is 10 percent of the net profit, and net profit equals gross profit minus bonus.

In this model, the values became more precise with each iteration. This is called *convergence*. As the model converges, the values change less and less between iterations.

During iteration, the difference in values between one iteration and the next sometimes will become larger instead of smaller. This is called *divergence*.

Unless you specify otherwise, Plan stops iterating when all values on the model change by less than 0.001. This ensures that the results are precise at least to one-tenth of a penny or a percent.

ORDER OF CALCULATION DURING ITERATION

During iteration, Plan calculates the values of the cells in a different order than when not performing iteration. The order of calculation during iteration is downward and progressive. Thus, iteration begins at the top of column 1 and works downward until all calculations in this column are complete, then moves to the top of column 2 and works downward until all calculations in this column are complete, and so on until the last column containing calculations has been completed.

As a general guideline, you should put all circular references in a single column. This makes it easier to keep track of the order of calculation.

In some situations, the order of calculation determines whether the model converges or diverges. If your model does not converge, try rearranging the formulas.

The normal order of calculation is described under the Entering Formulas section of the EDIT command in Chapter 15, "Plan Reference."

Limiting Iteration

Plan stops iterating when one of three things occurs:

- The difference between answers from the last iteration and the current iteration is less than the default, 0.001, unless you have set your own completion test.
- The conditions of a completion test you have designed are met.
- You press BREAK.

Both the starting values and the way the model is created affect whether it converges or diverges.

Figure 14.22 shows two two similar models.

The solution for model 1 is R1C1 = #NUM! and R2C2 = #NUM!; or infinity. The solution for model 2 is R1C1 = 1 and R2C2 = 1 converged to 1.

These values are both sets of formulas. But even though there is a correct solution for Model 1, it will diverge. If you enter this model to try it, you will have to press the BREAK key to stop iteration. Model 2 arrives at the values .9997559 and 1.0001221, which are within .001 of the solutions.

MODEL 1	MODEL 2
#1	1
1 R2C1	1 R2C1
2 -2*R1C1+3	2 (3-R1C1)/2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10
11	11

Figure 14.22. Two Models: Diverging and Converging

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If your answers diverge during iteration, try reordering your formulas on the worksheet, then use iteration again.

COMPLETION TESTS

To keep Plan from iterating endlessly when a model diverges, or to change the degree of accuracy from .001 to some other value, you can set a completion test.

A completion test is a logical expression that returns the value TRUE or FALSE. Plan checks the expression before beginning an iteration. If the expression is TRUE, Plan stops iteration. If the expression is FALSE, Plan iterates again.

Plan has a built-in completion test. It is the expression:

`DELTA()<0.001`

This expression is FALSE if any cell changes by more than 0.001 between iterations. It is TRUE when no cell changes by more than 0.001. Plan compares all values on the worksheet before an iteration with the values immediately after iteration. If any value changes by 0.001 or more, the expression is FALSE and Plan iterates again. If no value changes by 0.001 or more, Plan stops iterating.

You can set up three different kinds of completion tests:

- A completion test using the ITERCNT function defines the maximum number of iterations.
- A completion test using the DELTA function defines the maximum change between answers from one iteration to the next.
- A completion test using any logical expression defines a condition that stops iteration when the expression is TRUE.

To set your own completion test:

1. Design a logical expression that describes the completion test.
2. Enter the expression in a cell on the worksheet.
3. Select the OPTION command.
4. Enter the cell reference containing the expression in the completion test at: prompt.
5. Press RETURN to execute the command.

An entry in the completion test at: prompt instructs Plan to use the expression in the selected cell as the completion test for iteration. If the selected cell is blank, Plan uses its built-in completion test.

The most common completion tests are the number of iterations and maximum change. The ITERCNT (iteration count) function allows you to specify the number of times you want Plan to iterate. The DELTA

(maximum change) function allows you to specify the maximum change you will allow.

The DELTA Function

Each time Plan encounters a DELTA function, it resets the internal DELTA value to zero (0). By entering more than one DELTA function, you can isolate the maximum change in a particular part of the worksheet.

You can create a DELTA() that only applies to the differences of a part of the worksheet. This is called a *local DELTA value*. Begin and end that part of the worksheet with cells that contain the DELTA functions. Each DELTA() resets the DELTA value to zero.

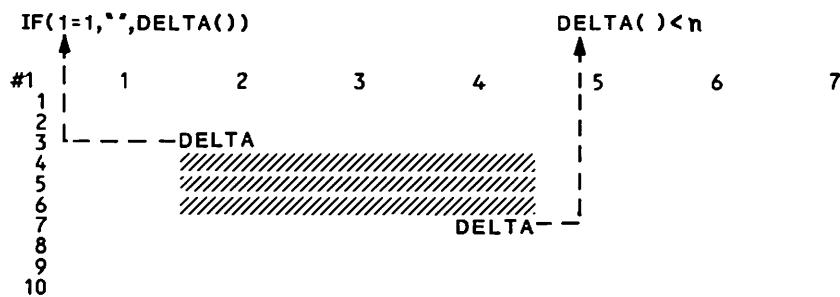
To avoid problems with order of evaluation, enter the first DELTA function in the cell immediately above the block of cells for which you want a local DELTA value. Then, enter the test DELTA formula in the cell immediately below the block of cells to return a local DELTA value. For example, look at Figure 14.23. The local value of DELTA is produced for the shaded area.

Plan recalculates the block of cells column by column. The model shown in Figure 14.23 provides local values of DELTA only if these columns contain no other circular references. Figure 14.24 shows a better model design.

Note that subsequent evaluations of the DELTA function normally include changes to the cell with the first DELTA function. The simple formula DELTA() is usually not sufficient to isolate local values of DELTA. Instead, you could enter a formula such as:

```
IF(TRUE(),"",DELTA())
```

This clears the maximum DELTA value while appearing blank on the screen and presenting no value for the following DELTA to evaluate.



```
> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: WORK R7C4
```

Figure 14.23. Producing a Local Value of DELTA Using DELTA

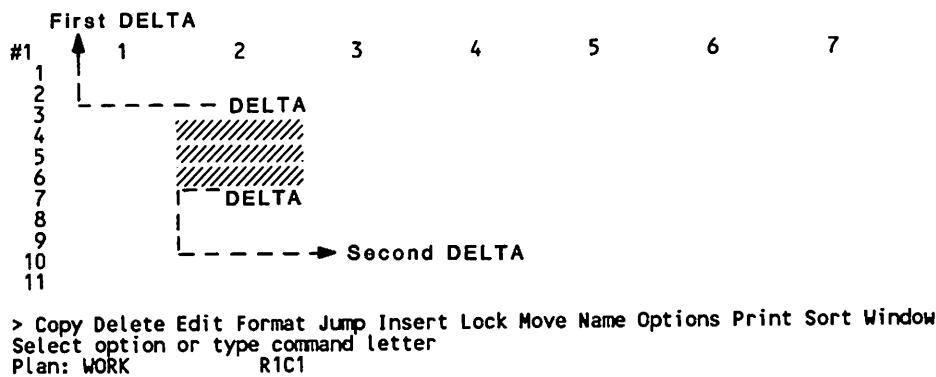


Figure 14.24. Producing a Local Value of DELTA Using a Formula

If you enter the DELTA function as a completion test and the ITERCNT function by itself in a model, you may create divergence. The DELTA function also reads the cell that contains the ITERCNT function. Because ITERCNT changes by 1 during each iteration, DELTA will always return at least 1 unless you set up the model to return local values of DELTA, or you eliminate the ITERCNT formula. The formula ITERCNT()>20 returns TRUE or FALSE after each iteration and, therefore, would not affect convergence.

The ITERCNT Function

The ITERCNT function has three main uses:

- providing initial values for iterating models,
- creating a table of iteration results, and
- providing a completion test.

Many worksheet models require a set initial value, even though they need a formula during iterations. To provide both the formula and a set initial value, use the IF function. For example:

```
IF(ISNA(ITERCNT()),Initial_Value,Gross_Profit-Bonus)
```

During the first calculation after a change to the worksheet, ITERCNT() gives #N/A. This makes ISNA() TRUE, so Plan uses the value from the cell named "Initial Value." After that, ITERCNT() gives a number. This makes ISNA() FALSE. Plan now uses the formula Gross Profit-Bonus to calculate the value.

You can create a table of partial results from an iteration by copying the formula into successive rows, starting at row 10. Note that each row receives the value of Net Profit during a particular iteration and stays unchanged (RC) for all other iterations, before and after.

```
IF(ITERCNT()=ROW()-9,Net_Profit,RC)
```

Use ITERCNT to limit the number of iterations by writing a formula such as `ITERCNT()>=20` in a cell. Choose `Yes` in the iteration: prompt of the OPTIONS command and enter the absolute or name reference to the cell that contains the formula in the completion test at: prompt. Plan will stop after the twentieth iteration.

CONCLUSION

You have used many basic techniques for building worksheets with Plan. With the skills you have learned in this chapter, you are ready to start using Plan for your own work. Go ahead and start experimenting. Use Chapter 15, "Plan Reference," for specific details regarding what commands and functions can do. The Index will help you locate topics throughout this manual.

Before you proceed to Chapter 15 or another application, delete the files you created during this chapter. Use the DELETE command from the System Manager screen. For further information on the System Manager DELETE command, refer to Chapter 2, "System Manager Reference."



CHAPTER 15

PLAN REFERENCE

In this chapter you will find the details specific to operating your ZP-150 Plan application. This chapter includes:

- a description of the function keys that implement Plan's features,
- an alphabetical list of Plan's commands along with details for using commands to accomplish specific tasks,
- a discussion of the special functions you use in formulas to perform complex mathematical calculations, and
- a list of error messages that may occur while you are using Plan.

FUNCTION KEYS

Plan makes use of the following sets of keys:

- Selection Keys
- Scrolling Keys
- Program Function Keys
- Special Purpose Keys (ESC and BREAK)

Selection Keys

The ARROW keys (UP, DOWN, LEFT, or RIGHT ARROW) move the selection highlight to any cell on the screen. For example, the UP ARROW key selects the cell directly above the currently selected cell, while the RIGHT ARROW key selects the cell directly to the right of the currently selected one. Table 15.1 describes the movement of the highlight when you use these keys.

Scrolling Keys

You can also use the ARROW keys to scroll the display. When the selection highlight is in the last visible row on the screen, the DOWN ARROW key scrolls the display forward one row at a time. When the selection highlight is in the first visible row on the screen, the UP ARROW key scrolls the display backward one row at a time.

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Table 15.1. ARROW Key Functions

KEY	ACTION
UP ARROW	Selects the cell directly above the currently selected cell.
DOWN ARROW	Selects the cell directly below the currently selected cell.
LEFT ARROW	Selects the cell directly to the left of the currently selected cell.
RIGHT ARROW	Selects the cell directly to the right of the currently selected cell.

When the selection highlight is in the right-hand column of the screen, the RIGHT ARROW key scrolls to one or more columns hidden from view beyond the right-hand border of the screen. When you scroll the display to expose hidden columns, Plan displays as many complete columns as will fit on the screen. When the selection highlight is in the left-hand column of the screen, the LEFT ARROW key reverses the process described above by scrolling to columns hidden beyond the left-hand border of the screen.

USING THE ARROW KEYS WITH THE SHIFT KEY

By holding down the SHIFT key and pressing the appropriate ARROW key, you display the next or previous screen of rows, or the next or previous screen of columns. The position of the selection highlight remains constant on the screen; rows or columns scroll beneath the highlight. For example, SHIFT-DOWN ARROW displays the next screen of rows on the worksheet. (Each screen contains 7 columns—unless you change the width of one or more columns with the FORMAT command—and 11 rows.) Therefore, if cell R5C2 is currently highlighted, pressing SHIFT-DOWN ARROW scrolls the worksheet until R16C2 becomes the highlighted cell and pressing SHIFT-RIGHT ARROW scrolls the worksheet until R5C9 becomes the highlighted cell. Shift-modified ARROW keys operate as described in Table 15.2.

Table 15.2. SHIFT-Modified ARROW Keys

KEY	ACTION
SHIFT-UP ARROW	Displays the previous screen of rows.
SHIFT-DOWN ARROW	Displays the next screen of rows.
SHIFT-LEFT ARROW	Displays the previous screen of columns.
SHIFT-RIGHT ARROW	Displays the next screen of columns.

USING THE ARROW KEYS WITH THE CTRL KEY

By holding down the CTRL key and pressing the appropriate ARROW key, you display the screen containing the first or last cell on the worksheet. CTRL-modified ARROW keys operate as described in Table 15.3.

NOTE: On a large worksheet, the JUMP command will allow you to move the selection highlight to another screen more quickly than you can with the SHIFT- or CTRL-modified ARROW keys. For details, see the discussion of the JUMP command in Plan Commands.

Program Function Keys

Plan uses program function keys. These keys consist of F1 through F5, F7 through F10, and SHIFT-F2. Their functions are described in Table 15.4.

Table 15.3. CTRL-Modified ARROW Keys

KEY	ACTION
CTRL-UP ARROW	Moves the selection highlight to the first cell on the worksheet (R1C1).
CTRL-DOWN ARROW	Moves the selection highlight to the last nonblank cell on the worksheet.
CTRL-RIGHT ARROW	Selects the next unlocked cell on the worksheet.
CTRL-LEFT ARROW	Selects the previous unlocked cell on the worksheet.

NOTE: For details on locked and unlocked cells, see the LOCK command in this chapter.

Table 15.4. Program Function Keys

FUNCTION	KEY	ACTION
NEXT WINDOW	F2	When you have split the screen into one or more windows with the WINDOW SPLIT command, F2 moves the selection highlight from its current position to the corresponding cell in the next window.
PREV WINDOW	SHIFT-F2	When you have split the screen into one or more windows with the WINDOW SPLIT command, SHIFT-F2 moves the selection highlight from its current position to the corresponding cell of the previous window.
REF	F3	Changes relative references created with the ARROW keys to absolute references. Press F3 immediately after selecting a specific cell in a formula, and the relative reference is changed to an absolute reference.
RECALC	F4	Changes a formula to its resulting value. Press F4 immediately after typing a formula or building a formula with the ARROW keys. Or, it can be used to perform manual recalculation of all cells when automatic recalculation is turned off.
SCRAP	F5	Works in conjunction with the COPY, DELETE, and INSERT commands and the scrap. Specifically, F5 offers you three choices: <ul style="list-style-type: none"> ■ Press F5 until Ap appears on the status line and the COPY and DELETE commands will append any selected rows to the existing contents of the scrap while the INSERT command will copy the specified number of rows or columns from the scrap to the specified row or column. ■ Press F5 until Ns appears on the status line and the COPY command copies the selection to the scrap, the DELETE command erases the selection but does not send it to the scrap, and the INSERT command places blank rows or columns before the specified row or column.

Table 15.4 (continued). Program Function Keys

FUNCTION	KEY	ACTION
		■ Press F5 until nothing appears on the status line, and the COPY and DELETE commands replace the existing contents of the scrap with the selected text while the INSERT command places the specified number of rows or columns from the scrap to the specified row or column.
WORD LEFT	F7	Selects the word to the left of the currently selected word. Use to edit entries in command prompts.
WORD RIGHT	F8	Selects the word to the right of the currently selected word. Use to edit entries in command prompts.
CHAR LEFT	F9	Selects the character to the left of the currently selected character. Use to edit entries in command prompts.
CHAR RIGHT	F10	Selects the character to the right of the currently selected character. Use to edit entries in command prompts.

Special Purpose Keys

Plan contains two special purpose keys: ESC and BREAK. Use the ESC key to cancel a command before you have pressed the RETURN key and use the BREAK key to cancel a command after you have pressed the RETURN key. To cancel a command, such as PRINT, after you have pressed RETURN, simply press the BREAK key. The BREAK key will also cancel the ITERATION function during its operation.

PLAN COMMANDS

Table 15.5 lists each Plan command with a brief description. Following the table is an explanation of each command. This explanation includes:

Plan Reference

- the command submenu or command prompts that appear when you select the command and
- a description of each command prompt.

Table 15.5. Plan Command Summary

COMMAND	DESCRIPTION
COPY	Accesses the submenu of commands that lets you duplicate the contents and format of cells.
DOWN	Copies the contents of the active cell downward a specified number of cells.
FROM	Copies the contents of a cell or group of cells to another area of the worksheet or to and from the scrap.
RIGHT	Copies the contents of the active cell into the specified number of cells to the right.
DELETE	Accesses the submenu of commands for removing cell content.
COLUMN	Removes the specified column(s).
ROW	Removes the specified row(s).
EDIT	Allows entry of or alteration of cell contents.
FORMAT	Accesses the submenu of commands for designing layout of cells and the worksheet.
CELLS	Determines the format of an individual cell or groups of cells.
DEFAULT	Accesses a submenu of commands for changing the defaults for the entire worksheet.
CELLS	Determines the default values for cells.
WIDTH	Determines the default value for cell column widths.
OPTIONS	Displays commas or formulas.
WIDTH	Determines the width of cells for specified column(s).

Table 15.5 (continued). Plan Command Summary

COMMAND	DESCRIPTION
INSERT	Accesses a submenu of commands for inserting the selection from scrap or blank rows or columns to the worksheet.
COLUMN	Places a copy of the specified number of columns from the scrap or blank columns before the specified column number.
ROW	Places a copy of the specified number of rows from the scrap or blank rows before the specified row number.
JUMP	Accesses the submenu of commands for moving within a document.
NAME	Moves to the specified named cell or group of cells.
ROW-COL	Moves to the cell in the specified column of the specified row.
WINDOW	Moves to the specified cell of the specified window.
MOVE	Accesses a submenu of commands for relocating rows or columns within the worksheet.
COLUMN	Moves specified column(s) to the left of a specified column.
ROW	Moves specified row(s) before the specified row.
NAME	Assigns a cell or group of cells a name.
OPTIONS	Sets the recalculation and iteration features.
PRINT	Sends a copy of all or part of the worksheet to the printer or to a text file.
SORT	Sorts all or part of the worksheet.
WINDOW	Accesses a submenu of commands for specifying, formatting, and manipulating windows.
BORDER	Adds or removes a border to the specified window.
CLOSE	Closes the specified window.

15.8

Plan Reference

Table 15.5 (continued). Plan Command Summary

COMMAND	DESCRIPTION
WINDOW (<i>continued</i>)	
LINK	Allows two windows to scroll together either horizontally or vertically, depending on how they were split.
SPLIT	Accesses a submenu of commands for determining how windows are created.
HORIZONTAL	Creates a window by breaking the worksheet at the specified row.
TITLE	Creates two or four windows by breaking the worksheet at a specified row and/or column.
VERTICAL	Creates a window by breaking the worksheet at the specified column.

Using Commands

In Plan, you enter, revise, format, and print your worksheet by using commands from command menus. Specifically:

- before you select a command, in many instances you must select the cell you want the command to act on.
- after selecting a command, you must supply additional information in command prompts.

Select a command either by typing the initial letter of the command name or by pressing TAB or SPACE BAR to position the selection highlight over the command and pressing RETURN. For example, if you wanted to select the PRINT command, you would either press P, or you would press SPACE BAR until the selection highlight is positioned over PRINT in the command menu and then press RETURN. (You may need to press ESC to enter Command mode first.)

For commands with command prompts, you must select responses or make entries (assuming that the default responses do not suit you) before Plan can execute the command. If commands do not have command prompts, Plan executes the command as soon as you select it.

At command prompts you must either make an entry or make a selection from a list of valid responses. The responses in command prompts reflect the choice you made (in a menu), the response you filled in the last time you

used the command, or the built-in responses Plan will use if you do not specify one. Either way, they are called *default selections* or *entries*. If all the responses are acceptable, you simply press RETURN.

If a response is unacceptable, either make a new selection or enter a different response.

To select a selection in a command prompt, either:

- press the initial letter of the option or
- press SPACE BAR to highlight your choice.

NOTE: Use SPACE BAR to move from option to option within a command prompt. Do not press TAB—within command prompt listings, TAB moves you from prompt to prompt while SPACE BAR moves you from option to option.

To enter a different response, either type a new entry or change the existing entry by using the keys shown in Table 15.6.

Once you have completed answering the command's prompts, you are ready to tell Plan to execute the command or to cancel it. To execute a command, press RETURN. To cancel a command before you have pressed RETURN, simply press ESC. To cancel a command, such as PRINT, after RETURN has been pressed, simply press the BREAK key.

Table 15.6. Key Entries in Command Prompts

KEY	ACTION
F7	Moves highlight one word to the left.
F8	Moves highlight one word to the right.
F9	Moves highlight one character to the left.
F10	Moves highlight one character to the right.
DEL	Erases the highlighted character(s).
BACK SPACE	Erases one character to the left of the highlight.

COPY

PURPOSE

Use the COPY command to access a submenu of commands that let you copy the contents and format of cells.

EXPLANATION

There are three commands available with the COPY command submenu. Press C to invoke the COPY command, and the COPY command submenu appears:

COPY: Right Down From

Each of the three submenu commands are explained in full on the pages that follow.

COPY DOWN

PURPOSE

Use the COPY DOWN command to copy the contents of the active cell into the cells below it.

EXPLANATION

To execute the COPY DOWN command:

1. Select the COPY command.
2. Select the DOWN command from the COPY submenu, and the COPY DOWN command line appears:
COPY DOWN number of cells: starting at:
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are two COPY DOWN command prompts. Following is a description of each COPY DOWN command prompt, the message that appears when you use the prompt, and the possible responses.

number of cells:

The Enter number prompt appears in the message line. Enter the desired number of times you want the contents of the active cell to be copied. A valid entry is any number from 1 up to 254. The default response is the value from the last COPY DOWN or COPY RIGHT command.

starting at:

The Enter number prompt appears in the message line. Enter the single row or the row range of the cell(s) whose contents you want to copy.

You can copy down all of a row of cells by specifying a row in the starting at: prompt, such as R5. Or, you can copy down part of a row of cells by specifying a range of cells within the row in the starting at: prompt, such as R7C3:R7C6 or R7C3:6.

COPY FROM

PURPOSE

Use the COPY FROM command to copy the contents of a cell or group of cells to another area of the worksheet or to the scrap. You can also copy from the scrap to a Plan worksheet. This command is most useful when the cells you want to copy are not in the same row or column.

EXPLANATION

To execute the COPY FROM command:

1. Select the COPY command.
2. Select the FROM command from the COPY submenu, and the COPY FROM command line appears:

COPY FROM cells: to cells:

3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are two COPY FROM command prompts. Following is a description of each COPY FROM command prompt, the message that appears when you use the prompt, and the possible responses.

cells:

The Enter reference to cell or group of cells or scrap message appears in the message line. Enter the source of the copy operation. A valid entry is a cell reference, cell range, or the word SCRAP. The default is the active cell.

If you specify only one cell, it is copied to every cell you specify in the to cells: prompt. If you specify a group of cells but you give only one cell as a destination, the cell you specify will be the upper left-hand corner of the area copied to.

to cells:

The Enter reference to cell or group of cells or scrap message appears in the message line. Enter the destination of the copy operation. A valid entry is a cell reference, cell range, or the word SCRAP. The default is the active cell.

If you try to do a copy operation that Plan cannot make, the command will be cancelled automatically, and you will see the message:

Invalid value

When you copy a cell, a row or column, or a block of cells, you can specify just one cell as the destination. This cell represents the upper left-hand cell of the destination area. The source cells are copied to the destination in the same arrangement as they appear in the source area.

You can copy from a row to a column or from a column to a row with the result being a rectangle. For example, if you specify a row range at the cells: prompt, R1C1:R1C5, and a column range at the cell to: prompt, R5C3:R11C3, the result is a block, as shown in Figure 15.1.

To copy information to the scrap, type the location of the rows and/or columns to be copied in the cells: prompt, and type SCRAP in the to cells: prompt. To copy information from the scrap, type the word SCRAP in the cells: prompt; then enter the location of rows and/or columns to receive the information in the to cells: prompt. Any information you copy from the scrap replaces the contents of the cells specified in the to cells: prompt. Use the INSERT command to add information from the scrap without replacing the contents of cells.

The way that data is copied to the scrap depends on the status of the SCRAP key (F5). You can either append the data you copy to the current contents of the scrap, or you can replace the current contents of the scrap with the data you copy. However, the SCRAP key has no effect when you copy data from the scrap to a Plan worksheet.

#1	1	FEB	2	MARCH	3	APRIL	4	MAY	5	6	7
1	JAN										
2											
3											
4											
5				JAN	FEB	MARCH	APRIL	MAY			
6				JAN	FEB	MARCH	APRIL	MAY			
7				JAN	FEB	MARCH	APRIL	MAY			
8				JAN	FEB	MARCH	APRIL	MAY			
9				JAN	FEB	MARCH	APRIL	MAY			
10				JAN	FEB	MARCH	APRIL	MAY			
11				JAN	FEB	MARCH	APRIL	MAY			

```
> Copy Delete Edit Format Jump Insert Lock Move Name Options Print Sort Window
Select option or type command letter
Plan: WORK      R1C1    "JAN"
```

Figure 15.1. Copying a Row to a Column

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Plan Reference

To append the copied data to the current contents of the scrap, press F5 until Ap appears on the status line. Then, carry out the COPY FROM command.

NOTE: You cannot append columns to the scrap, even if you press F5 until Ap appears on the status line.

To replace the current contents of the scrap with copied data, press F5 until either Ns or nothing appears on the status line. A status of Ns (for No scrap or not to scrap) is meaningful to the DELETE and INSERT commands, but not to the COPY FROM command; that is, the COPY FROM command ignores the Ns status of the SCRAP key. Contents of the scrap will be replaced with copied data as long as Ap does not appear on the status line. Carry out the COPY FROM command once you have erased Ap from the status line.

COPY RIGHT

PURPOSE

Use the COPY RIGHT command to copy the contents of the specified cell into the specified number of cells to the right.

EXPLANATION

To execute the COPY RIGHT command:

1. Select the COPY command.
2. Select the RIGHT command from the COPY submenu, and the COPY RIGHT command line appears:
COPY RIGHT number of cells: starting at:
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are two COPY RIGHT command prompts. Following is a description of each COPY RIGHT command prompt, the message that appears when you use the prompt, and the possible responses.

number of cells:

The Enter number prompt appears on the message line. Enter the number of times you want to copy the cell to the right. A valid entry is any number from 1 through 62. The default response is the number used in the last COPY DOWN or COPY RIGHT command.

starting at:

The Enter reference to cell or group of cells message appears in the message line. Enter the single cell or the column range of the cell(s) whose content you want to copy.

You can copy a column of cells to the right by specifying a column in the starting at: prompt, such as C4. Or, you can copy part of a column by specifying a range of cells within the column in the starting at: prompt, such as R7C1:R10C1 or R7:10C1.

DELETE**PURPOSE**

Use the DELETE command to access a submenu of commands that are used to delete rows and columns from a worksheet.

NOTE: To delete the contents of a single cell, refer to the EDIT command.

EXPLANATION

There are two commands available with the DELETE command submenu. Press D to execute the DELETE command, and the DELETE command submenu appears:

DELETE: Row Column

Each of the two submenu commands are explained in full on the pages that follow.

DELETE COLUMN

PURPOSE

Use the DELETE COLUMN command to remove one or more columns from the worksheet.

EXPLANATION

To execute the DELETE COLUMN command:

1. Select the DELETE command.
2. Select the COLUMN command from the DELETE submenu, and the DELETE COLUMN command line appears:
DELETE COLUMN # of columns: starting at:
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

The column(s) is removed. How the data is removed depends on the status of the SCRAP key (F5). If the scrap is set to No Scrap mode (Ns), then the selection is deleted and *not* sent to the scrap. If the scrap is set to Blank Scrap mode (no indicator appears), then the selection replaces the contents of the scrap. If the scrap is set to Append Scrap mode (Ap), then the Cannot append columns to scrap message appears in the message line.

COMMAND PROMPTS

There are two DELETE COLUMN command prompts. Following is a description of each DELETE COLUMN command prompt, the message that appears when you use the prompt, and the possible responses.

of columns:

The Enter number message appears in the message line. Enter the number of adjoining columns that you want to delete. A valid entry is any number from 1 through 63. The default response is 1.

starting at:

The Enter number message appears in the message line. Enter the column number of the first column to be deleted. A valid entry is any column number from 1 through 63. The default response is the column that contains the active cell.

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Plan Reference

After a column is deleted, columns to the right of the deleted columns move left. New columns of blank cells are added at the right edge of the sheet, and the columns are renumbered.

When and how data is deleted to the scrap depends on the status of the SCRAP key (F5). To delete data from a worksheet without placing it in the scrap, press F5 until Ns appears on the status line. To replace the current contents of the scrap with the data you delete, press F5 until neither Ap nor Ns appears on the status line. Then, select the DELETE command.

NOTE: You cannot append the data you delete to the current contents of the scrap, even if you press F5 until Ap appears on the status line.

DELETE ROW

PURPOSE

Use the DELETE ROW command to remove one or more rows from the worksheet.

EXPLANATION

To execute the DELETE ROW command:

1. Select the DELETE command.
2. Select the ROW command from the DELETE submenu, and the DELETE ROW command line appears:

DELETE ROW # of rows: starting at:

3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

The row(s) is removed. How the data is removed depends on the status of the SCRAP key (F5). If the scrap is set to Append Scrap (Ap) or Blank Scrap (no indicator appears) mode, then the selection is sent to the scrap. If the scrap is set to No Scrap mode (Ns), then the selection is deleted and *not* sent to the scrap.

COMMAND PROMPTS

There are two DELETE ROW command prompts. Following is a description of each DELETE ROW command prompt, the message that appears when you use the prompt, and the possible responses.

of rows:

The Enter number message appears in the message line. Enter the number of adjoining rows that you want to delete. A valid entry is any number from 1 through 255. The default response is 1.

starting at:

The Enter number message appears in the message line. Enter the row number of the first row to be deleted. A valid entry is any row number from 1 through 255. The default response is the row that contains the active cell.

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Plan Reference

After a row is deleted, rows below the deleted rows move up. New rows of blank cells are added to the bottom of the sheet and the rows are renumbered.

When and how data is deleted to the scrap depends on the status of the SCRAP key (F5). To delete data from a worksheet without placing it in the scrap, press F5 until Ns appears on the status line. To append data to the scrap, press F5 until Ap appears on the status line. To replace the current contents of the scrap with the data you delete, press F5 until neither Ap nor Ns appears on the status line. Then, select the DELETE command.

EDIT

PURPOSE

Use the EDIT command to enter or change the formula, text, or value in the active cell.

EXPLANATION

To execute the EDIT command, press E, and the EDIT command prompt appears:

EDIT:

The current contents of the active cell are displayed in the EDIT command prompt. The Enter formula message appears in the message line. Enter text, a formula, or numbers. All text entries *must* be enclosed in quotation marks. (Do not enclose numbers or formulas in quotation marks.) If you do not include the quotation marks in the text entries, the #NAME? message appears in the active cell.

A valid text entry can be any entry from 1 to 150 characters long, including spaces. A valid number entry can be any entry from 1 to 63 digits long. If an entry is longer than the specified cell width, as much of the entry that can be displayed appears on the screen while the remainder is stored as part of the cell's contents.

Once you have entered or edited the contents of the cell, press RETURN to put the new cell contents in the worksheet. You can also enter the contents in a cell and move to a new cell while remaining in the EDIT command by pressing any of the ARROW keys.

If the cell you are editing contains a formula, Plan will check the formula for errors when you press any of the ARROW keys or the RETURN key. If an error occurs, a message will appear in the status line, and any errors will be highlighted. Plan remains in the EDIT command so the error can be resolved.

Entering Numbers

Numbers can be integers, decimal fractions, or exponential expressions. Unlike numbers used as text, you do not enclose numbers representing values in quotation marks.

Plan Reference

You can type numbers in three different ways:

- Integers (for example, 123 or 4207 or -7)
- Decimal fractions (for example, 123.45 or 0.9876)
- Scientific notation (for example, 12.1E2 or 5E-10)

Numbers can include only the following characters:

1 2 3 4 5 6 7 8 9 0 - + . E e

The upper- or lowercase letter E identifies the numbers that follow it as the exponent of the number.

You cannot use dollar signs, commas, or other nonnumeric characters when you enter numbers. You can, however, *display* numbers with dollar signs, percent signs, or commas; see the FORMAT commands.

If a number is too long to fit in a cell, the format of the cell determines what is displayed. For all formats except General and Scientific, Plan will fill the cell with a series of number signs (#). For General and Scientific formats, the number is shown in scientific notation. If the cell is too narrow even for that, Plan will fill the cell with number signs.

Plan will try to round decimal fractions in General or Fixed format if the decimal fraction is too long to fit in a cell. However, if the part of the decimal fraction preceding the decimal point is too long, Plan will fill the cell with number signs.

The largest positive number you can use is $9.99999999999999 \times 10^{+62}$; the smallest is $.1 \times 10^{-63}$.

Scientific Notation

Scientific notation can represent very large or very small numbers. In scientific notation, a number has three parts as shown in Figure 15.2.

The number is read as mantissa times 10 to the exponent power. For example, 12.1E2 is read as 12.1 times 10 to the second power, or 1210.

Plan uses scientific notation for a cell in General format when the cell is not wide enough to show the full number. Plan can also round the mantissa to reduce the number of digits displayed. For other number formats or if the cell with General format is too narrow to show even a rounded number in scientific notation, Plan will fill the cell with number signs (#).

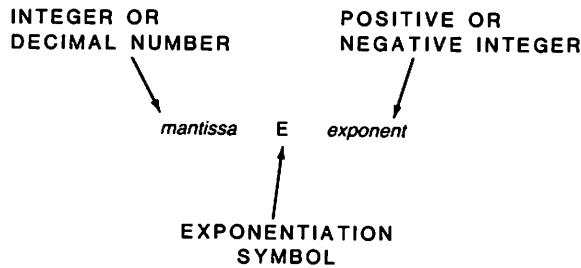


Figure 15.2. Numbers in Scientific Notation

Entering Formulas

A *formula* calculates a new value from existing values. Plan uses *operators* in formulas to express the relationship between the contents of cells. An operator is an instruction to perform a calculation. When building a formula using references to individual cells, you can use the following operators:

OPERATOR	OPERATION
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Percent
^	Exponentiation

In addition to using arithmetic operators, you can use comparison operators when performing calculations with functions. The comparison operators compare two values and give one of the two logical values, TRUE or FALSE. You can use comparison operators in formulas to answer questions like "Are 1984 net profits larger than 1983 profits?"

For example, the formula:

27329.12*12%>=3000.00

returns the value TRUE, because "3,279.49" is greater than "3,000."

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Plan Reference

The Plan comparison operators are:

OPERATOR OPERATION

=	Equal
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
<>	Not equal to

Sometimes if you have more than one operator in a formula, the results depend on the order in which the calculations are performed. To avoid ambiguity, Plan always performs calculations in the following order:

-	Negative number sign
%	Percent
^	Exponentiation
* or /	Multiplication and division
+ or -	Addition and subtraction
=	Equal
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
<>	Not equal to

There is a single Plan text operator, the ampersand (&). The ampersand can be used to combine two or more text values into a new value. For example, typing "accounts" & "receivable" combines the text values to display accounts receivable.

Priority is given to items in parentheses. Enclosing part of an equation in parentheses causes that part to be calculated first. Parentheses can be used to prevent improper results. For example,

$$2 + 3 * 4 = 14$$

while

$$(2 + 3) * 4 = 20$$

In the first equation $3 * 4$ is calculated first (multiplication before addition) while in the second equation $(2 + 3)$ is calculated first (parentheses before operator order).

FORMAT

PURPOSE

Use the FORMAT command to access a submenu of commands that are used to control how cells look, including the position of the contents within the cell, the way numbers are displayed, and the width of columns.

EXPLANATION

There are four commands available with the FORMAT command submenu. Press F to execute the FORMAT command, and the FORMAT command submenu appears:

FORMAT: Cells Default Options Width

Each of the four submenu commands are explained in full on the pages that follow.

FORMAT CELLS

PURPOSE

Use the FORMAT CELLS command to view or change the alignment or format of the active cell or a specified group of cells.

EXPLANATION

To execute the FORMAT CELLS command:

1. Select the FORMAT command.
2. Select the CELLS command from the FORMAT submenu, and the FORMAT CELLS command line appears:

```
FORMAT cells: alignment:(Def)Ctr Gen Left Right -
format code:(Def)Cont Exp Fix Gen Int $ * % - # of decimals:0
```

3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are four FORMAT CELLS command prompts. Following is a description of each FORMAT CELLS command prompt, the message that appears when you use the prompt, and the possible responses.

cells:

The Enter reference to cell or group of cells message appears in the message line. Enter the reference of the cell(s) to be formatted. The default response is the active cell. If you specify a group of cells in the cells: prompt and do not change any of the other prompts, the format of the active cell is applied to the group.

alignment:

The Select option message appears in the message line. The alignment is how the cell contents appears in the cell. To change the alignment of a cell or group of cells, select one of the first five of the six options described in Table 15.7 in the alignment: prompt.

Table 15.7. Types of Alignment for FORMAT CELLS

OPTION	DESCRIPTION
Def (Default)	Align this cell with the default alignment as specified in the FORMAT DEFAULT CELLS command.
Ctr (Center)	Center the cell contents in the column.
Gen (General)	Align text left, numbers right.
Left	Left justify the cell contents in the column.
Right	Right justify the cell contents in the column.
- (hyphen)	Keep the current alignment.

If you want to change the format of a group of cells but do not want to change the alignment of these cells, select the hyphen (-) in the alignment: prompt.

format code:

The Select option message appears in the message line. The format is the way cell contents are displayed. To change the format of a cell or group of cells, select one of the first nine of the ten options described in Table 15.8 in the format code: prompt.

If you want to change the alignment of a group of cells but do not want to change the format of these cells, select the hyphen (-) in the format code: prompt.

of decimals:0

The Enter number message appears in the message line. Enter the number of decimal places for cells to default to if the contents of cells are numeric. Enter a value in this prompt only for cells with either the Fix, Exp, or % format code. Leave this prompt blank if you have selected one of the other formats. A valid entry is any number from 0 through 15.

NOTE: Responses at this prompt will be ignored unless the cell is formatted for Fix, Exp, or %.

Table 15.8. Types of Format for FORMAT CELLS

OPTION	DESCRIPTION
Def (Default)	Use the default format as specified in the FORMAT DEFAULT CELLS command.
Cont (Continuous)	If text is longer than the column width, it is displayed (continued) into the next cell. (The cell to the right must be blank and also have the Continuous format.) Numbers are displayed in the General format.
Exp (Scientific)	Numbers are displayed as a decimal integer to a power of 10 (for example, 2.1E6 for 2,100,000). Use the # of decimals: prompt to set the decimal places.
Fix (Fixed point)	Numbers are rounded to decimal fractions using the value specified in the # of decimals: prompt.
Gen (General)	Numbers are displayed as precisely as possible in the available cell width. If a number is too long to fit in a cell, Plan will convert the number to scientific notation; or if the cell width is too small for scientific notation, then # signs fill the cell.
Int (Integer)	Numbers are rounded to integers.
\$ (Dollar)	Display numbers with a leading dollar sign and two decimal places. Negative numbers are shown in parentheses.
* (Bar graph)	Number is rounded to an integer and the cell displays an equal number of asterisks. Use the Bar graph format code to build a bar graph. Negative numbers are shown in parentheses.
% (Percent)	Display numbers as percentages.
-(hyphen)	Keep format codes as they are.

FORMAT DEFAULT

PURPOSE

Use the FORMAT DEFAULT command to access a submenu of commands that preset cell alignment and format for all cells on the worksheet.

EXPLANATION

There are two commands available with the FORMAT DEFAULT command submenu. To execute the FORMAT DEFAULT command:

1. Select the FORMAT command.
2. Select the DEFAULT command from the FORMAT submenu, and the FORMAT DEFAULT command submenu appears:

FORMAT DEFAULT: Cells Width

Both of the submenu commands are explained in full on the pages that follow.

NOTE: Any defaults that are set with the FORMAT DEFAULT commands can be overridden for a cell or a group of cells by using the FORMAT CELLS or the FORMAT WIDTH command.

FORMAT DEFAULT CELLS

PURPOSE

Use the FORMAT DEFAULT CELLS command to preset alignment and format for all cells on the worksheet.

EXPLANATION

To execute the FORMAT DEFAULT CELLS command:

1. Select the FORMAT command.
2. Select the DEFAULT command from the FORMAT submenu.
3. Select the CELLS command from the DEFAULT submenu, and the FORMAT DEFAULT CELLS command line appears:

FORMAT DEFAULT CELLS alignment: Ctr Gen Left Right
format code: Cont Exp Fix(Gen)Int \$ * % # of decimals:0

4. Make the appropriate responses to the command prompts (described in the following section).
5. Press RETURN.

COMMAND PROMPTS

There are three FORMAT DEFAULT CELLS command prompts. Following is a description of each FORMAT DEFAULT CELLS command prompt, the message that appears when you use the prompt, and the possible responses.

alignment:

The Select option message appears in the message line. The *alignment* is the placement of the cell content in the cell. Initially, the alignment is set to General. Select the option to be the default alignment for all cells. Select one of the four options described in Table 15.9.

format code:

The Select option message appears in the message line. The format is the way cell contents are displayed. Initially, the format is set to General. Select the option to be the default format for all cells. Select one of the eight options described in Table 15.10.

of decimals:

The Enter number message appears in the message line. Enter the number of decimal places for cells to default to if the contents of cells are numeric. Enter a value in this prompt only for cells with either the Fix, Exp, or % format. Leave this prompt blank if you have chosen one of the other formats. A valid entry is any number from 0 through 15.

NOTE: Responses at this prompt will be ignored unless the cell is formatted for Fix, Exp, or %.

Table 15.9. Types of Alignment for FORMAT DEFAULT CELLS

OPTION	DESCRIPTION
Ctr (Center)	Center the cell contents in the column.
Gen (General)	Align text left, numbers right.
Left	Left justify the cell contents in the column.
Right	Right justify the cell contents in the column.

Table 15.10. Types of Format for FORMAT DEFAULT CELLS

OPTION	DESCRIPTION
Cont (Continuous)	If text is longer than the column width, it is displayed (continued) into the next cell. (The cell to the right must be blank and also have the Continuous format.) Numbers are displayed in the General format.
Exp (Scientific)	Numbers are displayed as a decimal integer to a power of 10 (for example 2.1E6 for 2,100,000). Use the # of decimals: prompt to set the decimal places.
Fix (Fixed point)	Numbers are rounded to decimal fractions using the value specified in the # of decimals: prompt.
Gen (General)	Numbers are displayed as precisely as possible in the available cell width. If a number is too long to fit in a cell, Plan will convert the number to scientific notation; or if the cell width is too small for scientific notation, then # signs fill the cell.
Int (Integer)	Numbers are rounded to integers.
\$ (Dollar)	Numbers are displayed with a leading dollar sign and two decimal places. Negative numbers are shown in parentheses.
* (Bar graph)	Number is rounded to an integer and the cell displays that many asterisks. Use the Bar graph format to build a bar graph. Negative numbers are shown in parentheses.
% (Percent)	Display numbers as percentages.

FORMAT DEFAULT WIDTH

PURPOSE

Use the FORMAT DEFAULT WIDTH command to preset the column width of all cells.

EXPLANATION

To execute the FORMAT DEFAULT WIDTH command:

1. Select the FORMAT command.
2. Select the DEFAULT command from the FORMAT submenu.
3. Select the WIDTH command from the FORMAT DEFAULT submenu, and the FORMAT DEFAULT WIDTH command line appears:

FORMAT DEFAULT width in chars:

4. Make the appropriate response to the command prompt (described in the following section).
5. Press RETURN.

COMMAND PROMPT

Following is a description of the FORMAT DEFAULT WIDTH command prompt, the message that appears when you use the prompt, and the possible responses.

width in chars:

The Enter number message appears in the message line. Enter the desired number of characters for the default width of cells. Initially, this width is 10 characters. (The tenth character position is blank to prevent crowding of columns on the worksheet.) A valid entry is any number from 3 through 32.

FORMAT OPTIONS

PURPOSE

Use the FORMAT OPTIONS command to:

- display or hide commas in cells that contain numbers and
- display values or formulas in cells that contain formulas.

EXPLANATION

To execute the FORMAT OPTIONS command:

1. Select the FORMAT command.
2. Select the OPTIONS command from the FORMAT submenu, and the FORMAT OPTIONS command line appears:
FORMAT OPTIONS commas: Yes No formulas: Yes (No)
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are two FORMAT OPTIONS command prompts. Following is a description of each FORMAT OPTIONS command prompt, the message that appears when you use the prompt, and the possible responses.

commas:

The Select option message appears in the message line. This prompt allows you to determine whether or not commas will separate groups of thousands in cells with the Fix, Int, \$, or % format. The default response is the current setting. If you select:

- | | |
|-----|---|
| Yes | cells with the Fix, Int, \$, or % format will have commas separating groups of thousands. |
| No | numbers greater than 999 will not have commas separating groups of thousands. |

formulas:

The Select option message appears in the message line. This prompt allows you to determine whether cells that contain formulas should display the formula or the resulting value. If you select:

- Yes cells display their formulas.
- No cells display the resulting values.

If you select Yes in the formulas: prompt, column widths are automatically doubled, and cells that contain text display their contents in double quotes.

FORMAT WIDTH

PURPOSE

Use the FORMAT WIDTH command to control column width.

Initially, all columns use the default setting (10 characters). You can change this default width with the FORMAT DEFAULT WIDTH command and then change specific columns or groups of columns with the FORMAT WIDTH command.

EXPLANATION

To execute the FORMAT WIDTH command:

1. Select the FORMAT command.
2. Select the WIDTH command from the FORMAT submenu, and the FORMAT WIDTH command line appears:

FORMAT WIDTH in chars or d(default): column: through:

3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are three FORMAT WIDTH command prompts. Following is a description of each FORMAT WIDTH command prompt, the message that appears when you use the prompt, and the possible responses.

in chars or d(default):

The Enter number, or d for default message appears in the message line. Enter the desired number of characters for the width of the column, or enter the letter D to specify the default number. The default number is whatever width you chose with the FORMAT DEFAULT WIDTH command.

column:

The Enter number message appears in the message line. Enter the number of the column or, for a range, the first column. A valid entry is any number from 1 to 63. The default value is the column number of the active cell.

through:

The Enter number message appears in the message line. To change the width of a single column, enter the same value specified in the column: prompt. To change the width of a range of cells, enter the number of the last column in the range. A valid entry is any number from 1 to 63. The default value is the column number of the active cell.

If the text in a cell is too wide for the column, it will be cut off at the right edge of the column unless you widen the column or select the Cont (continuous) option in the format code: prompt of the FORMAT CELLS or FORMAT DEFAULT CELLS command.

If a number is too wide for a column, Plan will convert the number to scientific notation or fill the cell with number signs (#), depending on the format of the number. Plan will attempt to round decimal fractions before converting them to scientific notation. To replace a series of number signs with the number you want, either widen the column or select a different format so that the number fits.

INSERT

PURPOSE

Use the INSERT command to access a submenu of commands that are used for making new rows and columns of cells between existing columns and rows on your worksheet. You can use the INSERT command to insert the contents of the scrap into the new rows or columns.

EXPLANATION

There are two commands available with the INSERT command submenu. Press I to execute the INSERT command, and the INSERT command submenu appears:

INSERT: Row Column

Both of the submenu commands are explained in full on the pages that follow.

INSERT COLUMN

PURPOSE

Use the INSERT COLUMN command to place one or more columns of blank cells preceding the specified column or to insert data from the scrap.

EXPLANATION

To execute the INSERT COLUMN command:

1. Select the INSERT command.
2. Select the COLUMN command from the INSERT submenu, and the INSERT COLUMN command line appears:
INSERT COLUMN # of columns: before column:
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

Blank columns or contents of the scrap are copied to the worksheet. What is inserted onto the worksheet depends on the status of the SCRAP key (F5) and the number specified in the # of columns: prompt.

If the SCRAP key is set for either Append Scrap (Ap) or Blank Scrap (no indicator) mode, then the contents of the scrap will be inserted before the specified column. If the SCRAP key is set for No Scrap mode (Ns), then blank columns will be inserted before the specified column.

The number of blank columns or columns that will be inserted from the scrap is specified in the # of columns: prompt.

Columns to the right of the inserted column(s) move right and are automatically renumbered. Plan adjusts all references that are affected by the newly inserted columns.

COMMAND PROMPTS

There are two INSERT COLUMN command prompts. Following is a description of each INSERT COLUMN command prompt, the message that appears when you use the prompt, and the possible responses.

Plan Reference

of columns:

The Enter number message appears in the message line. Enter the number of columns to be inserted. A valid entry is any number from 1 through 62, as long as the insertion of the specified number of columns will not exceed the limits of the worksheet. The default value is 1.

before column:

The Enter number message appears in the message line. Enter the column number before which the new columns should be inserted. A valid entry is any number from 1 through 63, as long as the insertion of the specified number of columns will not exceed the limits of the worksheet. The default value is the column number of the active cell.

The INSERT command will not be carried out if the insertion of new cells would exceed the limits of the sheet. If you already have data in column 63, for example, you will get the Invalid value message if you try to insert another column.

INSERT ROW

PURPOSE

Use the INSERT ROW command to place one or more rows of blank cells preceding the specified row or to insert data from the scrap.

EXPLANATION

To execute the INSERT ROW command:

1. Select the INSERT command.
2. Select the ROW command from the INSERT submenu, and the INSERT ROW command line appears:
INSERT ROW # of rows: before row:
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

Blank rows or contents of the scrap are copied to the worksheet. What is inserted onto the worksheet depends on the status of the SCRAP key (F5) and the number specified in the **# of rows:** prompt.

If the SCRAP key is set for either Append Scrap (Ap) or Blank Scrap (no indicator) mode, then the contents of the scrap will be inserted before the specified row. If the SCRAP key is set for No Scrap mode (Ns), then blank rows will be inserted before the specified row.

The number of blank rows or rows from the scrap that will be inserted is specified in the **# of rows:** prompt.

Rows below the row(s) added move down and are automatically renumbered. Plan adjusts all references that are affected by the newly inserted rows.

COMMAND PROMPTS

There are two INSERT ROW command prompts. Following is a description of each INSERT ROW command prompt, the message that appears when you use the prompt, and the possible responses.

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Plan Reference

of rows:

The Enter number message appears in the message line. Enter the number of rows to be inserted. A valid entry is any number from 1 through 254, as long as the insertion of the specified number of rows will not exceed the limits of the worksheet. The default value is 1.

before row:

The Enter number message appears in the message line. Enter the row number before which the new rows should be inserted. A valid entry is any number from 1 through 255, as long as the insertion of the specified number of rows will not exceed the limits of the worksheet. The default value is the row number of the active cell.

The INSERT command will not be carried out if the insertion of new cells would exceed the limits of the sheet. If you already have data in row 255, for example, you will get the Invalid value message if you try to insert another row.

JUMP

PURPOSE

Use the JUMP command to access a submenu of commands that move the selection highlight to another part of the worksheet.

EXPLANATION

There are three commands available with the JUMP command submenu. Press J to execute the the JUMP command, and the JUMP command submenu appears:

JUMP: Name Row-col Window

Each of the three submenu commands are explained in full on the pages that follow.

JUMP NAME

PURPOSE

Use the JUMP NAME command to move the selection highlight to the cell in the upper left-hand corner of the specified named group of cells.

EXPLANATION

To execute the JUMP NAME command:

1. Select the JUMP command.
2. Select the NAME command from the JUMP submenu, and the JUMP NAME command line appears:
JUMP name:
3. Make the appropriate response to the command prompt (described in the following section).
4. Press **RETURN**.

COMMAND PROMPT

Following is a description of the JUMP NAME command prompt, the message that appears when you use the prompt, and the possible responses.

name:

The Enter reference to cell or group of cells message appears in the message line. Enter the name of the cell or group of cells you specified in the NAME command. You must have previously named the specified cell(s) with the NAME command. Use the LEFT and RIGHT ARROW keys to step through a list of current names.

JUMP ROW-COL

PURPOSE

Use the JUMP ROW-COL command to move the selection highlight to the cell at the specified row and column.

EXPLANATION

To execute the JUMP ROW-COL command:

1. Select the JUMP command.
2. Select the ROW-COL command from the JUMP submenu, and the JUMP ROW-COL command line appears:

JUMP row: column:

3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are two JUMP ROW-COL command prompts. Following is a description of each JUMP ROW-COL command prompt, the message that appears when you use the prompt, and the possible responses.

row:

The Enter number message appears in the message line. Enter the row number of the cell to which you want to move. A valid entry is any number from 1 to 255. The default value is the row number of the active cell.

column:

The Enter number message appears in the message line. Enter the column number of the cell to which you want to move. A valid entry is any number from 1 to 63. The default value is the column number of the active cell.

JUMP WINDOW

PURPOSE

Use the JUMP WINDOW command to move the selection highlight to the specified row and column of the specified window.

EXPLANATION

To execute the JUMP WINDOW command:

1. Select the JUMP command.
2. Select the WINDOW command from the JUMP submenu, and the JUMP WINDOW command line appears:

JUMP window number: row: column:

3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

If the cell you request is already visible in the specified window, the worksheet will not be scrolled. If the cell you request is not visible in the specified window, the window is shifted to make it visible.

COMMAND PROMPTS

There are three JUMP WINDOW command prompts. Following is a description of each JUMP WINDOW command prompt, the message that appears when you use the prompt, and the possible responses.

window number:

The Enter number message appears in the message line. Enter the window number containing the cell to which you want to move. A valid entry is any number from 1 to 8. The default value is the number of the window that contains the active cell.

row:

The Enter number message appears in the message line. Enter the row number of the cell to which you want to move. A valid entry is any number from 1 to 255. The default value is the row number of the active cell.

column:

The Enter number message appears in the message line. Enter the column number of the cell to which you want to move. A valid entry is any number from 1 to 63. The default value is the column number of the active cell.

LOCK

PURPOSE

Use the LOCK command to access a submenu of commands that are used to protect cells from being changed by the COPY and EDIT commands while you are building the worksheet.

EXPLANATION

There are two commands available with the LOCK command submenu. Press L to execute the LOCK command, and the LOCK command submenu appears:

LOCK: Cells Formulas

Both of the submenu commands are explained in full on the pages that follow.

NOTE: Locked cells can still be changed by using the DELETE, FORMAT CELLS, INSERT, MOVE, or SORT command.

Once you have locked cells, you can use the NEXT UNLOCKED CELL key (CTRL-RIGHT ARROW) to select the next nonblank unlocked cell on the worksheet. Use the PREVIOUS UNLOCKED CELL key (CTRL-LEFT ARROW) to select the previous nonblank unlocked cell on the sheet. You can use the LOCK command and the NEXT or PREVIOUS UNLOCKED CELL key to move quickly around a complex worksheet.

LOCK CELLS

PURPOSE

Use the LOCK CELLS command to protect or unprotect the specified cells.

EXPLANATION

To execute the LOCK CELLS command:

1. Select the LOCK command.
2. Select the CELLS command from the LOCK submenu, and the LOCK CELLS command line appears:

LOCK cells:	status: Locked (Unlocked)
-------------	---------------------------
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are two LOCK CELLS command prompts. Following is a description of each LOCK CELLS command prompt, the message that appears when you use the prompt, and the possible responses.

cells:

The Enter reference to cell or group of cells message appears in the message line. Enter the reference of the cell(s) to be locked or unlocked. A valid entry can be any cell or group of cells within the limits of the worksheet. The default response is the active cell.

status: Locked (Unlocked)

The Select option message appears in the message line. Cells that are locked are protected from being changed by the COPY and EDIT commands. The default response is the status of the active cell.

NOTE: Locked cells can still be changed by using the DELETE, FORMAT CELLS, INSERT, MOVE, or SORT command.

Once you have locked cells, you can use the NEXT UNLOCKED CELL key (CTRL-RIGHT ARROW) to select the next nonblank unlocked cell on the worksheet. Use the PREVIOUS UNLOCKED CELL key (CTRL-LEFT ARROW) to select the previous nonblank unlocked cell on the sheet. You can use the LOCK command and the NEXT or PREVIOUS UNLOCKED CELL key to move quickly around a complex worksheet.

LOCK FORMULAS

PURPOSE

Use the LOCK FORMULAS command to protect all formulas and cells containing values generated by formulas.

NOTE: The LOCK FORMULAS command does not affect cells that contain numbers or entries made after you use the LOCK FORMULAS command.

EXPLANATION

To execute the LOCK FORMULAS command:

1. Select the LOCK command.
2. Select the FORMULAS command from the LOCK submenu, and the LOCK FORMULAS command line appears:
LOCK FORMULAS:
3. Make the appropriate response to the command prompt (described in the following section).

COMMAND PROMPT

Following is a description of the LOCK FORMULAS command prompt, the message that appears when you use the prompt, and the possible responses.

LOCK FORMULAS:

The Enter Y to confirm message appears in the message line. Press Y to protect all values generated by formulas. Only numbers or entries that currently exist in cells are affected by the LOCK FORMULAS command. Press N, ESC, or any entry other than Y to exit without locking the formulas.

To unlock previously locked formulas, use the LOCK CELLS command.

MOVE

PURPOSE

Use the MOVE command to access a submenu of commands that are used to rearrange cells on the worksheet. You can move entire rows with the MOVE ROW command or entire columns with the MOVE COLUMN command.

EXPLANATION

There are two commands available with the MOVE command submenu. Press M to execute the MOVE command, and the MOVE command submenu appears:

MOVE: Row Column

Both of the submenu commands are explained in full on the pages that follow.

MOVE COLUMN

PURPOSE

Use the MOVE COLUMN command to rearrange the order of the columns.

EXPLANATION

To execute the MOVE COLUMN command:

1. Select the MOVE command.
2. Select the COLUMN command from the MOVE submenu, and the MOVE COLUMN command line appears:
`MOVE COLUMN from column: to left of column: # of columns:`
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

When you move cells, the worksheet arrangement is changed, and all references are adjusted. The columns are renumbered, and all cell references are changed to reflect the renumbering.

COMMAND PROMPTS

There are three MOVE COLUMN command prompts. Following is a description of each MOVE COLUMN command prompt, the message that appears when you use the prompt, and the possible responses.

from column:

The Enter number message appears in the message line. Enter the number of the column, or, for a group, the first column you want to move. A valid entry is any number from 1 to 63. The default entry is the column number of the active cell.

to left of column:

The Enter number message appears in the message line. Enter the destination column number. The moved columns will appear directly to the left of the destination column number. A valid entry is any number from 1 to 63, within the limits of the worksheet. The default entry is the column number of the active cell.

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of columns:

The Enter number message appears in the message line. Starting at the column specified in the from column: prompt, enter the number of columns to be included in the move. A valid entry is any number from 1 to 62. The default entry is 1.

To move more complex areas, you can first insert blank cells at the destination, copy the cells into the destination cells, and then delete the original cells.

MOVE ROW

PURPOSE

Use the MOVE ROW command to rearrange the order of the rows.

EXPLANATION

To execute the MOVE ROW command:

1. Select the MOVE command.
2. Select the ROW command from the MOVE submenu, and the MOVE ROW command line appears:
MOVE ROW from row: to before row: # of rows:
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

When you move cells, the worksheet arrangement is changed, and all references are adjusted. The rows are renumbered, and all cell references are changed to reflect the renumbering.

COMMAND PROMPTS

There are three MOVE ROW command prompts. Following is a description of each MOVE ROW command prompt, the message that appears when you use the prompt, and the possible responses.

from row:

The Enter number message appears in the message line. Enter the number of the row, or for a group, the first row you want to move. A valid entry is any number from 1 to 255. The default entry is the row number of the active cell.

to before row:

The Enter number message appears in the message line. Enter the destination row number. The moved rows will appear directly above the destination row number. A valid entry is any number from 1 to 255, within the limits of the worksheet. The default entry is the row number of the active cell.

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Plan Reference

of rows:

The **Enter number** message appears in the message line. Starting at the row specified in the **from row:** prompt, enter the number of rows to be included in the move. A valid entry is any number from 1 to 254. The default entry is 1.

To move more complex areas, you can first insert blank cells at the destination, copy the cells into the destination cells, and then delete the original cells.

NAME

PURPOSE

Use the NAME command to give a cell or group of cells a text reference. You can use this text reference, or name, to refer to cells in a command or formula.

EXPLANATION

To execute the NAME command:

1. Select the NAME command, and the NAME command line appears:

NAME define name: to refer to:

2. Make the appropriate responses to the command prompts (described in the following section).

3. Press RETURN.

COMMAND PROMPTS

There are two NAME command prompts. Following is a description of each NAME command prompt, the message that appears when you use the prompt, and the possible responses.

define name:

The Enter name message appears in the message line. Enter the text (name) you want associated with the cell or group of cells. Do *not* enclose name entries in quotation marks. A valid entry is any entry that meets the following three rules:

- Names can be up to 31 characters long.
- Names must begin with a letter; the remaining characters of a name can be any combination of letters, numbers, the period (.), and the underscore (_).
- Names cannot be a combination of characters that could be confused with a reference.

The default response is either blank or the text in the active cell (with any invalid characters removed). By accepting the default response, you can easily convert the title of a row or column into a name. Entries will be changed as follows: invalid characters are removed, and underscores are substituted for blanks in text strings.

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to refer to:

The Enter reference to cell or group of cells message appears in the message line. Enter the cell(s) to be associated with the text in the define name: prompt. A valid entry is any cell that exists within the limits of the worksheet.

The default response in the to refer to: prompt depends upon the text specified in the define name: prompt. If you entered a name in the define name: prompt that is already defined, the default response will be the current definition. If you entered a new name, the default response is either:

- the active cell, or
- if the last NAME command defined part of a row, then the default response is the active cell's row with the same columns as those specified in the last NAME command, or
- if the last NAME command defined part of a column, then the default response is the active cell's column with the same rows as those specified in the last NAME command.

To view the list of names that have been defined, select the NAME command and then press the LEFT or RIGHT ARROW key to see each name and how it is defined. To change the definition of a name, enter a new response in the to refer to: prompt and press the RETURN key.

To delete a name, enter the name in the define name: prompt, delete the response in the to refer to: prompt and press RETURN.

NOTE: To change the name, you must first delete the old name by deleting the response in the to refer to: prompt and then enter the new name in the define name: prompt. If you just enter the new name over the name in the define name: prompt, both names are assigned to the cell(s).

OPTIONS

PURPOSE

Use the OPTIONS command to preset the way Plan's iteration and recalculation features work.

EXPLANATION

To execute the OPTIONS command:

1. Select the OPTIONS command, and the OPTIONS command line appears:

OPTIONS recalc: Yes No
iteration: Yes (No) completion test at:

2. Make the appropriate responses to the command prompts (described in the following section).
3. Press RETURN.

COMMAND PROMPTS

There are three OPTIONS command prompts. Following is a description of each OPTIONS command prompt, the message that appears when you use the prompt, and the possible responses.

recalc: Yes No

The Select option message appears in the message line. This prompt allows you to set the time when recalculation occurs. The default response is the current setting. If you select:

- | | |
|-----|--|
| Yes | Plan automatically recalculates all formulas whenever a cell is changed. |
| No | Plan recalculates only when the RECALC key (F4) or the QUIT key (CTRL-F10) is pressed. |

If you select No in the recalc: prompt, when you create a formula that contains a circular reference you will not immediately receive the Circular references unresolved message. The message appears after you press F4 or CTRL-F10.

NOTE: If you are making many entries on a large sheet with complicated formulas or if you are using iteration, you may want to set recalc: to No for a quicker response; and when you are finished making entries, manually recalculate by pressing F4.

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iteration: Yes No

The Select option message appears in the message line. This prompt allows you to set whether or not circular references are calculated. The default response is the current setting. If you select:

- Yes Plan calculates values from formulas that form a circle of references.
- No Plan does not calculate formulas that contain a circle of references.
The Circular references unresolved error message appears in the message line.

If you are changing or making new entries on the worksheet while using iteration, you will save time by selecting No in the recalc: prompt.

completion test at:

The Enter reference to cell or group of cells message appears in the message line. Enter the cell reference or name for the cell (within the limits of the worksheet) that contains a completion test. A *completion test* is a formula that returns a logical value (TRUE or FALSE). This formula must have been previously created using the DELTA or ITERCNT functions or some logical test of your own. Plan checks the value of the formula in the cell you specify after each iteration. If the value is TRUE, Plan stops iteration. If the value is FALSE, Plan continues iteration until the value is TRUE. For more information about completion tests, see the DELTA and ITERCNT functions in Plan Functions in this chapter.

The proposed responses are the current settings.

If you leave the completion test at: prompt blank, Plan applies the following formula as the completion test:

`DELTA()<0.001`

You can press the BREAK key to stop iteration, but other keys are ignored during iteration. If you press BREAK, Plan completes the current iteration and checks the completion test. If the test value is not TRUE, the Circular references unresolved message appears on the message line.

The responses specified in the OPTIONS command iteration: and completion test at: prompts are saved with the worksheet. If you return to a worksheet that contains an iterating model, these responses will be in effect, so you may want to reset the iteration: prompt to No and delete the response in the completion test at: prompt before you press the QUIT key to exit the worksheet.

PRINT

PURPOSE

Use the PRINT command to send all or part of a worksheet to the printer or to a text file.

NOTE: To specify the size and the margins for the worksheet page, refer to the System Manager's SET PRINTER command explained in Chapter 2, "System Manager Reference."

EXPLANATION

To execute the PRINT command:

1. Select the PRINT command, and the PRINT command line appears:

```
PRINT to:           area:  
                  row-col numbers: Yes(No)  style:(Text) Sylk
```

2. Make the appropriate responses to the command prompts (described in the following section).
3. Press RETURN.

The ZP-150 can be used with a parallel or serial printer. If you do not know how to connect or operate your printer, read your printer manual before attempting to print worksheets produced by Plan. Refer to Parallel Printer and/or Serial Printer in Chapter 4, "External Devices," for further information on printing with the ZP-150.

Empty columns at the right of the worksheet and empty rows at the bottom of the worksheet will not be printed on the hard copy or to the file. Plan prints as many rows and columns on the page as will fit. Remaining rows and/or columns are printed on additional pages. If the worksheet you are printing is wider than the paper, you can paste it together later.

The time it takes to print depends on the size of the sheet and the speed of the printer. You can press the BREAK key at any time to stop printing a hard copy.

If you want to print formulas in cells instead of the resulting values, select Yes in the formulas: prompt of the FORMAT OPTIONS command before using the PRINT command to print the worksheet. You may want to use this option to record the logic behind a worksheet. Column widths are automatically doubled when the formulas: prompt of the FORMAT OPTIONS command is set to Yes.

COMMAND PROMPTS

There are four PRINT command prompts. Following is a description of each PRINT command prompt, the message that appears when you use the prompt, and the possible responses.

to:

The Enter file name message appears in the message line. This prompt is asking for the destination of the printing operation. Enter PRN: (for a parallel printer) or COM1: (for a serial printer) to print a hard copy or the name of a file to create a text file. The default is PRN:

If you type a file name in the to: prompt and select Text in the style: prompt, the file is stored in your computer's memory just as it would be printed. You can edit the stored file by using Word.

Your ZP-150 will not store two files with the same name and extension. To avoid using a name that you have previously given to another file, you can press any ARROW key while in the to: prompt to display a list of all files in your computer's memory. If you do type the name of a file that already exists, you will see the File exists, overwrite (y/n)? message. To confirm that you want to overwrite the existing file, press Y.

area:

The Enter reference to cell or group of cells message appears in the message line. This prompt allows you to print only a part of the worksheet. Enter the name or the range of cells you want to print. The default for a worksheet that has never been printed is R1:255. The default for a worksheet that has been printed is the area of the worksheet that was printed in the last PRINT command.

row-col numbers: Yes (No)

The Select option message appears in the message line. This prompt is asking you whether or not you want row and column numbers to be printed. If you select:

- Yes row and column numbers are printed.
- No row and column numbers are not printed.

style:(Text) Sylk

The Select option message appears in the message line. This prompt is asking you in which format you want the worksheet to be printed. Select:

- Text when printing the worksheet on your printer or when printing to a file to store the worksheet for printing later or for transferring to a Word document, or

Sylk to print the worksheet to a file in Microsoft's SYLK (SYmbolic LinK) format. SYLK format allows you to transfer a Plan worksheet with attributes intact to such desktop computer applications as Microsoft Multiplan.



SORT

PURPOSE

Use the SORT command to place rows in the specified area in ascending or descending order based upon the contents of the specified column.

EXPLANATION

To execute the SORT command:

1. Select the SORT command, and the SORT command line appears:

SORT by column: between rows: and: order: (>) <

2. Make the appropriate responses to the command prompts (described in the following section).

3. Press RETURN.

When you use the SORT command, the cell contents are sorted into the following groups:

- Numbers
- Text
- Logical and error values
- Blank cells

The numbers and text are sorted into either ascending (>) or descending (<) order. The default response is ascending order, from smallest to largest. Text is arranged according to the ASCII standard character sequence, which is:

! " # \$ % & ' () * + , - . / 0-9 : ; < = > ? @ A-Z [\] ^ ` a-z { } ~

Equal values are left in the order in which they occur. Numbers that are intermixed with text in a cell, or dates represented as text, will be sorted by standard alphabetization. For example, A10 will come before A9 if sorted in ascending order because Plan compares from left to right. Plan drops the zero in A10 and the number 1 comes before 9.

COMMAND PROMPTS

There are four SORT command prompts. Following is a description of each SORT command prompt, the message that appears when you use the prompt, and the possible responses.



by column:

The Enter number message appears in the message line. Enter the number of the column to be placed in ascending or descending order. The default response is the active column.

between rows:

The Enter number message appears in the message line. Enter the number of the first row you want to sort. The default is 1.

and:

The Enter number message appears in the message line. Enter the number of the last row you want to sort. The default is 255.

order (>) <

The Select option message appears in the message line. Enter the order in which you want the column to be sorted. Select:

- > to sort in ascending order, from smallest to largest.
- < to sort in descending order, from largest to smallest.

The default response is ascending order.

To sort multiple columns of a worksheet, sort the least significant column first. Then, sort the other columns one at a time, from the least significant to the most significant.

The SORT command adjusts references to the sorted rows. If you want to generate a sorted report without adjusting the formulas, select No in the recalc: prompt of the OPTIONS command before sorting the worksheet. The values calculated before the sort will be displayed. Press F4 (the RECALC key) to calculate the results of the sort.

WINDOW**PURPOSE**

Use the WINDOW command to access a submenu of commands that are used to manipulate multiple windows on the screen. Each window contains a part of a worksheet.

EXPLANATION

There are four commands available with the WINDOW command submenu. Press W to execute the WINDOW command, and the WINDOW command submenu appears:

WINDOW: Split Border Close Link

Each of the four submenu commands are explained in full on the pages that follow.

WINDOW BORDER

PURPOSE

Use the WINDOW BORDER command to add or remove the border of the specified window.

NOTE: The border reduces the size of the available display area for each window by two lines for each window.

EXPLANATION

To execute the WINDOW BORDER command:

1. Select the WINDOW command.
2. Select the BORDER command from the WINDOW submenu, and the WINDOW BORDER command line appears:

WINDOW change border in window number:

3. Make the appropriate response to the command prompt (described in the following section).
4. Press RETURN.

COMMAND PROMPT

Following is a description of the WINDOW BORDER command prompt, the message that appears when you use the prompt, and the possible responses.

change border in window number:

The Enter number message appears in the message line. Enter the number of the window whose border you want to change; that is, if a border is displayed it will be removed and if a border is not displayed it will be added. A valid entry is any number from 1 through 8, as long as you created the window with the WINDOW SPLIT command. The default is the window containing the active cell.

If you attempt to change the border for a window that does not exist, the Invalid value error message appears in the message line.

WINDOW CLOSE

PURPOSE

Use the WINDOW CLOSE command to remove the specified window.

EXPLANATION

To execute the WINDOW CLOSE command:

1. Select the WINDOW command.
2. Select the CLOSE command from the WINDOW submenu, and the WINDOW CLOSE command line appears:
WINDOW CLOSE window number:
3. Make the appropriate response to the command prompt (described in the following section).
4. Press RETURN.

COMMAND PROMPT

Following is a description of the WINDOW CLOSE command prompt, the message that appears when you use the prompt, and the possible responses.

window number:

The **Enter number** message appears in the message line. Enter the number of the window you want to remove. A valid entry is any number from 1 through 8, as long as you have previously created the window with the WINDOW SPLIT command. The default is the window containing the active cell.

When you close a window, the remaining windows enlarge to occupy the screen area used by the closed window, and the windows are renumbered. Cell contents are not affected by closing a window.

If only one window is open and you attempt to close that window, the WINDOW CLOSE command is ignored. If you attempt to close a window that does not exist, the **Invalid value** error message appears in the message line.

WINDOW LINK

PURPOSE

Use the WINDOW LINK command to view and change the relationship between two windows.

This command allows you to unlink windows that were automatically linked when they were created with the WINDOW SPLIT command, or you can link two unlinked windows so that they scroll together.

EXPLANATION

To execute the WINDOW LINK command:

1. Select the WINDOW command.
2. Select the LINK command from the WINDOW submenu, and the WINDOW LINK command line appears:
WINDOW LINK window number: with window number: linked:Yes (No)
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

COMMAND PROMPTS

There are three WINDOW LINK command prompts. Following is a description of each WINDOW LINK command prompt, the message that appears when you use the prompt, and the possible responses.

window number:

The Enter number message appears in the message line. Enter the number of one of the windows you want to link. The default is the window containing the active cell.

NOTE: You may enter any two window numbers as responses in the window number: and with window number: prompts, but only windows split from the same window can be linked. If you try to link other windows, you will receive the Cannot link those windows message.

with window number:

The Enter number message appears in the message line. Enter the number of the remaining window to be linked. If there is only one window, it is the

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default. If there is more than one window, the default is either the active window or the window from which the active window was split.

linked: Yes (No)

The Select option message appears in the message line. This option determines whether two windows scroll together. Horizontally split windows scroll together horizontally. Vertically split windows scroll together vertically. If you select:

- Yes the contents of the two specified windows scroll together.
- No the specified windows are unlocked; each window is independent of the other and scrolls separately.

When two previously unlinked windows are linked, one set of row or column numbers disappears from the screen. If the pairs are related by a horizontal split, the column numbers disappear. Columns are identified by the numbers in the window above.

If the pairs result from a vertical split, the row numbers disappear. Rows are identified by the numbers in the window to the left.

You can also unlink windows with this command. Windows created by the WINDOW SPLIT TITLES command *cannot* be unlinked.

WINDOW SPLIT

PURPOSE

Use the WINDOW SPLIT command to access a submenu of commands that are used to open new windows by splitting the active window.

Up to eight windows may be opened at once. The WINDOW SPLIT commands retain window borders, giving both windows a border if the original window has one.

EXPLANATION

There are three commands available with the WINDOW SPLIT command submenu. To execute the WINDOW SPLIT command:

1. Select the WINDOW command.
2. Select the SPLIT command from the WINDOW submenu, and the WINDOW SPLIT submenu appears:

WINDOW SPLIT: Horizontal Vertical Titles

Each of the three submenu commands are explained in full on the pages that follow.

WINDOW SPLIT HORIZONTAL

PURPOSE

Use the WINDOW SPLIT HORIZONTAL command to divide horizontally the window containing the active cell at the specified row.

EXPLANATION

To execute the WINDOW SPLIT HORIZONTAL command:

1. Select the WINDOW command.
2. Select the SPLIT command from the WINDOW submenu.
3. Select the HORIZONTAL command from the WINDOW SPLIT submenu, and the WINDOW SPLIT HORIZONTAL command line appears:
WINDOW SPLIT HORIZONTAL at row: linked: Yes (No)
4. Make the appropriate responses to the command prompts (described in the following section).
5. Press RETURN.

The active window is split horizontally at the row you specify. The new window is given the next unused window number and becomes the active window.

COMMAND PROMPTS

There are two WINDOW SPLIT HORIZONTAL command prompts. Following is a description of each WINDOW SPLIT HORIZONTAL command prompt, the message that appears when you use the prompt, and the possible responses.

at row:

The **Enter number** message appears in the message line. Enter the number of the row above which the active window is to be divided horizontally. The new window uses the space below the row where the split took place. The new window is given the next unused window number and becomes the active window. A valid number is any row that is currently visible on the second through tenth lines of the screen and is in the active window.

linked: Yes (No)

The Select option message appears in the message line. This prompt is asking whether or not the original and new windows are to be linked (both windows will scroll together). If you select:

- Yes the original window and the new window are linked—they scroll together horizontally.
- No the windows are not linked, and only the window containing the active cell will scroll.

If the windows are linked, the column numbers of the lower window do not appear on the screen; the columns of this window can be identified with the column numbers of the window above it.

WINDOW SPLIT TITLES

PURPOSE

Use the WINDOW SPLIT TITLES command to divide the active window to form two or four permanently linked windows that scroll together.

NOTE: You *cannot* unlink windows that have been linked by this command.

EXPLANATION

To execute the WINDOW SPLIT TITLES command:

1. Select the WINDOW command.
2. Select the SPLIT command from the WINDOW submenu.
3. Select the TITLES command from the WINDOW SPLIT submenu, and the WINDOW SPLIT TITLES command line appears:

WINDOW SPLIT TITLES: # of rows: # of columns:

4. Make the appropriate responses to the command prompts (described in the following section).
5. Press RETURN.

The rows you specify become a window in the space at the top of the screen occupied by the original window. The columns you specify become a window in the space at the left of the screen occupied by the original window. The remaining space becomes the active window. It scrolls horizontally with the window above it and vertically with the window to its left.

COMMAND PROMPTS

There are two WINDOW SPLIT TITLES command prompts. Following is a description of each WINDOW SPLIT TITLES command prompt, the message that appears when you use the prompt, and the possible responses.

of rows:

The Enter number message appears in the message line. Enter the number of rows to be in the window(s) in the upper part of the display. A valid number is any number from 0 through 9. The default is 0 or the number of the row containing the active cell. (The default response will split the window so that the active cell becomes the upper left-hand corner cell of the active window.)

of columns:

The Enter number message appears in the message line. Enter the number of the columns to be in the left-hand window(s). A valid number is any number from 0 through 6. The default is 0 or the number of the column containing the active cell. The default response will split the window so that the active cell becomes the upper left-hand corner cell of the active window.

To specify two permanently linked windows that scroll together, specify zero in one of the two WINDOW SPLIT TITLES command prompts.

WINDOW SPLIT VERTICAL

PURPOSE

Use the WINDOW SPLIT VERTICAL command to divide vertically the window containing the active cell at the specified column.

EXPLANATION

To execute the WINDOW SPLIT VERTICAL command:

1. Select the WINDOW command.
2. Select the SPLIT command from the WINDOW submenu.
3. Select the VERTICAL command from the WINDOW SPLIT submenu, and the WINDOW SPLIT VERTICAL command line appears:
WINDOW SPLIT VERTICAL at column: linked: Yes (No)
4. Make the appropriate responses to the command prompts (described in the following section).
5. Press RETURN.

The active window is split vertically at the column you specify. The new window is given the next unused window number and becomes the active window.

COMMAND PROMPTS

There are two WINDOW SPLIT VERTICAL command prompts. Following is a description of each WINDOW SPLIT VERTICAL command prompt, the message that appears when you use the prompt, and the possible responses.

at column:

The Enter number message appears in the message line. Enter the number of the column to the left of which the active window is to be divided vertically. The new window uses the space to the right of the column where the split took place. The new window is given the next unused window number and becomes the active window. A valid number is any column that is currently visible in the first seven columns of the screen and is in the active window with the exception of the first column of a window.

linked: Yes (No)

The Select option message appears in the message line. This prompt is asking whether or not the original and new windows are to be linked (both windows will scroll together). If you select:

- Yes the original window and the new window are linked—they scroll together vertically.
- No the windows are not linked, and only the window containing the active cell will scroll.

If the windows are linked, the row numbers of the new window do not appear on the screen; the rows of this window can be identified with the row numbers of the left-hand window.

PLAN FUNCTIONS

This section contains a complete list of Plan's mathematical and financial functions. Each has a brief description, followed by a list of error values you may receive while using the functions. (Functions are entered as part of a formula.) Arguments of a function, enclosed in parentheses, follow the function name. Do not type a space between the function name and the left parenthesis.

Entries within the parentheses describe the arguments of the function. The following abbreviations are used in argument descriptions:

N represents a number; a formula that yields a number. Wherever *N* is shown, only one entry is allowed. When more than one is allowed, *List* is shown.

T represents text; a formula that yields text.

Logical represents a logical value, which must be a reference to a single cell, a formula expressing a relation ($=,<,>,<=,>=,<>$), or a function that returns a logical value. Otherwise a #VALUE! error value is returned.

List represents a list of items, separated by commas. An "item" can be either a value that represents itself or a reference to a group of cells that represent a collection of values in those cells. For example, the list:

1,B

where B is defined as R1C2:3, R1C2 contains a value 2, and R1C3 contains the value 3, represents the collection of values 1,2,3. Lists can be up to five items long, but they can represent any number of values through references.

Following is the detailed list of the mathematical and financial functions that can be used in Plan formulas.

ABS(N)

DESCRIPTION

Returns the absolute value of N .

EXAMPLES

The entry:

"Difference":&DOLLAR(ABS(first-second))

where *first* and *second* both either represent single cells or ranges of cells, returns the absolute value in dollars of *first* minus *second*. The entry:

ABS(AVERAGE(R1C1:10)-R1C1)

yields how far the first item (R1C1) is from the average.

AND(*List*)

DESCRIPTION

Returns the logical value true if all of the values you list are true. Otherwise, returns false. If the list contains anything but logical values, the #VALUE! error value is returned.

EXAMPLE

In the entry:

IF((AND(SUM(Homework)>82,Final>50)),credit,"not qualified")

if SUM(Homework)>82 and if Final>50, then the value or text represented by credit is displayed. Otherwise, the text "not qualified" is displayed.

ATAN(*N*)**DESCRIPTION**

Calculates the Arctangent (inverse Tangent) function of *N*, yielding an angle in radians in the range (- $\pi/2$) to (+ $\pi/2$). ATAN can be used to calculate Arcsin and Arccos.

EXAMPLE

ATAN(thetarowC)

AVERAGE(*List*)**DESCRIPTION**

Calculates the average of the values you list. Yields the same result as the formula SUM(list)/COUNT(list).

EXAMPLES

AVERAGE(Balance)
AVERAGE(1,5,6,5,5)

COLUMN()**DESCRIPTION**

Returns the number of the column in which the formula containing this function appears.

EXAMPLE

The entry:

1985+COLUMN()-4

can produce the sequence of years 1985, 1986, . . . , starting in column 4. (Place this formula in column 4, then COPY RIGHT from column 4 as many cells as the number of years you want in the series.)

COS(N)

DESCRIPTION

Calculates the cosine of N , an angle in radians.

EXAMPLE

COS(thetaRowC)

COUNT($List$)

DESCRIPTION

Returns the count of the number values you list. Cells are counted only if they contain number values.

EXAMPLE

DOLLAR(COUNT(checks)*0.15+1.00)&" is service charge"

DELTA()

DESCRIPTION

Returns the maximum absolute value of the changes in values from one iteration to the next. Returns the #N/A error value if No is selected in the iteration: prompt. Plan counts only the values in the cells that it evaluates between two successive DELTA functions. The DELTA function returns the #N/A error value when ITERCNT()=1 or when ISNA(ITERCNT()) returns TRUE (that is, during the first calculation of a circular model) because no previous values exist from which to calculate changes.

Use the DELTA function in a convergence test formula to calculate the results of an iteration. Each time Plan encounters a DELTA function, it resets the internal DELTA value to 0. By entering more than one DELTA function, you can isolate the maximum change in a particular part of the worksheet. To create a DELTA() that only applies to the differences of a part of the worksheet, bracket the cells with cells that contain the DELTA function.

To avoid problems with order of evaluation, enter the first DELTA function in the cell immediately above the block of cells for which you want a local

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DELTA value. Then, enter the test DELTA formula in the cell immediately below the block of cells to return a local DELTA value.

EXAMPLE

The entry:

`DELTA()<.00001`

returns "TRUE" if no cell changes by more than .00001 and "FALSE" if a cell changes by more than .00001.

DOLLAR(N)

DESCRIPTION

Converts N to text showing a dollar amount, like the \$ format in the FORMAT CELLS command. N is rounded to two decimal places. If N is less than 1, a zero appears in the units position. A dollar sign is added before the leftmost digit. If N is less than zero, the result is enclosed in parentheses (the standard way of showing a negative balance in bookkeeping).

EXAMPLES

"Total:"&DOLLAR(SUM(deposits))

`DOLLAR(2.715)` produces \$2.72

`DOLLAR(.15)` produces \$0.15

`DOLLAR(0)` produces \$0.00

`DOLLAR(-1)` produces (\$1.00)

EXP(*N*)

DESCRIPTION

Calculates e (2.7182818 . . . , the base of the natural logarithm) to the power of *N*. This is the inverse function of LN. Powers of other bases are calculated using the exponentiation operator (^).

EXAMPLES

"e' is"&FIXED(EXP(1),14)

"SINH ="&FIXED((EXP(theta)-EXP(-theta))/2,8)

FALSE()

DESCRIPTION

Returns the logical value false.

EXAMPLE

If you are planning to insert a complex condition into a cell, you can use FALSE() to create a logical value in an equation for testing before you construct the more complicated expression.

IF((x+y)<=z,TAN(x+y*PI()/z),FALSE())

FIXED(*N,Digits*)

DESCRIPTION

Converts *N* to text showing a fixed-decimal number with the number of decimal digits specified, like the Fix format in the FORMAT CELLS command. If the value is negative, a minus sign is placed before the leftmost digit. If *Digits* is negative, rounding is done to the left of the decimal point.

Digits must be an integer from -29 through 30, inclusive.

EXAMPLE

FIXED((first/second)*100,2)&"percent"

IF(*Logical, Then Value, Else Value*)

DESCRIPTION

If the *Logical* is true, returns the *Then Value*. Otherwise, returns the *Else Value*. These values can be numeric, text, or logical values.

EXAMPLE

IF(grade>80,"excellent",grade)

INDEX(*Area, Subscripts*)

DESCRIPTION

Returns the value of a cell selected by *Subscripts* from the rectangular *Area*. You can give one or two subscripts. With one subscript, the area must be part of one row or one column. Subscript value 1 selects the first cell in the row or column, value 2 the second cell, and so on. If two subscripts (separated by commas) are given, the area may be rectangular. The subscripts select the row and column in the area, starting at 1 in each case.

If any index exceeds the limits of the area, the #N/A (not available) error value is returned.

EXAMPLES

To repeat the first column in the first row, copy the formula:

INDEX(C1,COLUMN())

throughout the first row.

If the area Score is a table giving adjusted composite scores for raw scores on two components in a test, then:

INDEX(Score,Raw1_C,Raw2_C)

will give the appropriate composite score based on the two raw scores.

INT(N)

DESCRIPTION

Returns the largest integer less than or equal to N . The decimal portion of N will be truncated.

EXAMPLES

```
"fraction=&FIXED(number-INT(number),4)
```

INT(6) is 6

INT(8.9) is 8

INT(-123.999) is -124

ISERROR($Value$)

DESCRIPTION

Returns the logical value true if the $Value$ is any of the error values: #N/A, #VALUE!, #REF!, #DIV/0!, #NUM!, #NAME?, #NULL!. Otherwise, returns false.

EXAMPLE

```
IF(ISERROR(ratio),"check your numbers","","")
```

ISNA($Value$)

Returns the logical value true if the $Value$ is #N/A (not available). Otherwise, returns false.

EXAMPLE

```
IF(ISNA(balance),"0",balance)
```

ITERCNT()

DESCRIPTION

Returns the current iteration count, starting with 1 for the first iteration. During the first recalculation after each change to the worksheet, ITERCNT returns the #N/A error value.

The ITERCNT function provides initial values for iterative models, creates a table of iteration results, and provides a completion test.

EXAMPLES

In the example:

```
IF(ISNA(ITERCNT()),Initial_Value,Gross_Profit-Bonus)
```

the first calculation after a change to the worksheet causes ITERCNT() to give an #N/A error value. This makes ISNA() TRUE, so Plan uses the value from the cell named "Initial Value." After subsequent iterations, ITERCNT() gives a number; this makes ISNA() FALSE. Plan now uses the formula Gross Profit-Bonus to calculate the value.

You can create a table of partial results from an iteration by copying the formula into successive rows, starting at row 10.

```
IF(ITERCNT()=ROW()-9,Net_Profit,RC)
```

Note that each row receives the value of Net Profit during a particular iteration and stays unchanged (RC) for all other iterations, before and after.

ITERCNT can be used to limit the number of iterations. Enter a formula like:

```
ITERCNT(>=20
```

in a cell. Be sure to select Yes in the iteration: prompt of the OPTIONS command and enter an absolute or name reference to the cell containing the formula in the completion test at: prompt. Plan stops after 20 iterations.

LEN(T)

DESCRIPTION

Returns the number of characters in the text value.

EXAMPLE

MID(T,LEN(T),1)

LN(N)

DESCRIPTION

Calculates the natural logarithm of N . N must be positive. A #NUM! error value is returned if N is less than or equal to zero.

EXAMPLE

The entry:

"log2=&FIXED(LN(value)/LN(2),8)

yields the natural log of the value divided by 2.

LOG10(N)

DESCRIPTION

Calculates the base 10 logarithm of N . N must be positive. A #NUM! error value is returned if N is negative.

EXAMPLE

"Order of Magnitude: "&FIXED(LOG10(value),0)

LOOKUP(*N,Table*)**DESCRIPTION**

Searches for *N* in the first row or column of *Table*. *Table* is a group of cells on the worksheet. Returns the contents of a cell from the last row or column of *Table*.

The dimensions of *Table* determine the direction of the search. If *Table* is square, or higher than it is wide, Plan searches in the first column of *Table* until it finds the cell that has the largest value that is less than or equal to *N*. The value in the last cell in that row of *Table* is returned as the result of the function. If the values in all cells in the first column are less than *N*, the last row of *Table* is used. If the values in all cells in the first column are greater than *N*, a #N/A value is returned.

If *Table* is wider than it is high (has more columns than it has rows), then Plan searches for *N* in the first row of *Table*. The value in the last cell in that column of *Table* is returned as the result of the function. If the values in all cells in the first row are less than *N*, the last column of *Table* is used. If the values in all cells in the first row are greater than *N*, a #N/A value is returned.

Table must be a cell reference to a rectangular area in the active worksheet. The result returned can be either a number value, a text value, or a logical value.

LOOKUP expects that the values in the first row or column are in ascending order. If values are not in ascending order, LOOKUP will return either the #VALUE! or #N/A error value.

EXAMPLE

Assume that column 1 (C1) lists base salaries, column 2 (C2) lists minimum tax, and column 3 (C3) lists marginal tax rates as percents:

C1	C2	C3
0	0	0%
2300	0	14%
3400	154	16%
4400	314	18%
6500	692	19%
8500	1072	21%
...

Also assume that a "Salary" has been defined and that it contains a value *N*.

The tax on a salary in one of the brackets in *Table* can be expressed as:

$\text{LOOKUP}(\text{Salary}, \text{C1:C2}) + (\text{Salary} - \text{LOOKUP}(\text{Salary}, \text{C1})) * \text{LOOKUP}(\text{Salary}, \text{C1:C3})$

Notice in the first lookup, tax is calculated on the "base" amount (using C1 to find a value in C2). In the second lookup, the actual base amount is found (using C1 to find a value in itself; in fact, *Table* could be only one column wide or one row high). And in the third lookup, the marginal tax rate for the amount of salary that exceeds the base amount (using C1 to find a value in C3) is calculated.

MAX(*List*)

DESCRIPTION

Returns the largest number value from the list. Returns zero if there are no number values in the list.

EXAMPLE

"Best of" & FIXED(COUNT(scores),0) & "is" & FIXED(MAX(scores),2)

MID(*T,Start,Count*)

DESCRIPTION

Returns characters from *T*. *Start* gives the position of the first character of *T*, counted from the left end of *T*. The first character is position 1. *Count* specifies the number of characters to return.

If *Count* is zero, or if *Start* is greater than the length of the result of *T*, no characters are returned. *Start* and *Count* must be *N* values. If either *Start* or *Count* has a fraction, the fraction part is truncated before the integer part is used.

EXAMPLE

MID("EEEEEDCBAA",INT(grade/10),1)

MIN(*List*)

DESCRIPTION

Returns the smallest number value from *List*.

EXAMPLE

"Lowest of"&FIXED(COUNT(times),0)&"is"&FIXED(MIN(times),0)

MOD(*Dividend*,*Divisor*)

DESCRIPTION

Returns the remainder of *Dividend* divided by *Divisor*. The result has the same sign as *Divisor*. Both the *Dividend* and the *Divisor* must be a value. If *Divisor* is zero, a #DIV/0! error value is returned.

EXAMPLES

MOD(3,2)=1
MOD(-3,2)=1
MOD(-3,-2)=-1
MOD(3,-2)=-1

In general:MOD(x,y)=x-INT(x/y)*y

NA()

DESCRIPTION

Returns the #N/A (not available) special value. This value can be used to mark data points that are not yet defined.

EXAMPLE

By assigning NA() to the named cell (such as interest rate), all values on the worksheet that depend on the interest rate will change to #N/A.

NOT(*Logical*)

DESCRIPTION

Returns the opposite of the logical value (false if the argument is true; true if the argument is false).

EXAMPLE

`IF(OR(credit>limit,NOT(AND(conditions))), "not qualified", "")`

where *conditions* is a group of cells, and each cell contains one necessary condition of credit worthiness.

NPV(*Rate*,*List*)

DESCRIPTION

Net Present Value (NPV) calculates the amount of money required now to produce a specified cash flow in the future, given some interest rate. The formula used is:

$$\sum_{i=1}^n \frac{\text{List}_i}{(1 + \text{Rate})^i}$$

Rate is an interest rate expressed as a decimal fraction (0.11 is a rate of 11%). It must be an *N* value. The first value in the list is income required at the end of the first period, the second the income required at the end of the next period, and so on.

EXAMPLE

You are given the opportunity to lease a parking lot for five years for a \$80,000 one-time payment. The lot currently generates \$15,000 net operations income annually. Based on research and profit studies you have done, you expect the income to increase 30 percent annually.

Enter \$15,000 in cell R1C1. Enter $RC[-1]*1.3$ in cell R1C2, and copy it right to the next three cells. Name the area R1C1:R1C5 Flow. Now, you can figure the net present value of the cash flow.

If your opportunity rate is 15 percent, then entering `NPV(15%,Flow)` in R2C1 gives you the present value of \$84,598.24. Since this is greater than the cost of the lease, you conclude that it is a worthwhile investment.

OR(*List*)**DESCRIPTION**

Returns the logical value true if any value in *List* is true. Otherwise, returns false. If the list contains anything but logical values, the #VALUE! error value is returned.

EXAMPLE

IF(OR(grade>80,final>=150),"good work","")

PI()**DESCRIPTION**

Returns the value 3.1415926535898, an approximation of the mathematical constant π .

EXAMPLE

The entry:

SIN(PI()/4)

returns the result of 0.7071068.

REPT($T, Count$)

DESCRIPTION

Returns a text value consisting of $Count$ repetitions of T . If $Count$ is zero or negative, #VALUE! is returned. Otherwise, the length of the result will be the length of T multiplied by $Count$.

You can use this function to create bar graphs or repeating patterns (such as printers' rules) to separate areas of the worksheet.

T is usually a single character, but it can be any number of characters. $Count$ must be an N value, which will be truncated to an integer.

EXAMPLE

REPT("+",Score/3)

ROUND($N,Digits$)

DESCRIPTION

Returns a value, rounded to the number of decimal places specified by $Digits$.

$Digits$ specifies the rounding as follows: If $Digits$ is greater than zero, then the result will be rounded to that many decimal places. For example, ROUND (3.1416,3) produces 3.142.

If $Digits$ is zero, the result is rounded to an integer. If $Digits$ is negative, rounding is carried into the integer. For example, ROUND (21,-1) produces 20 while ROUND (991,-2) produces 1000.

EXAMPLE

Balance+ROUND(Balance*Interest/12,2)

ROW()

DESCRIPTION

Returns the number of the row where the formula containing this function appears.

EXAMPLE

Copying the expression `ROW()*10` throughout the first column creates the sequence of numbers:

10
20
30
...

SIGN(N)

DESCRIPTION

Returns a number representing the algebraic sign of N . If the sign of N is positive, the function returns 1. If the value of N is zero, the function returns 0. If the sign of N is negative, the function returns -1.

EXAMPLE

To display the magnitude of a number in a bar chart form and its sign, you would enter:

`REPT(MID("- +",SIGN(num)+2,1),ABS(num))`

SIN(N)

DESCRIPTION

Calculates the sine of N , an angle in radians.

EXAMPLE

`SIN(thetaRowC)`

SQRT(*N*)

DESCRIPTION

Returns the square root of the argument. *N* must be positive. If *N* is negative, a #NUM! error value is returned.

EXAMPLE

`SQRT(cell1*cell1+cell2*cell2)`

where *cell1* and *cell2* represent a cell referenced or the name of a cell.

STDEV(*List*)

DESCRIPTION

Calculates the sample standard deviation of the number values in the list according to the formula:

$$s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}}$$

EXAMPLE

`STDEV(grades)`

SUM(*List*)

DESCRIPTION

Returns the sum of the number values represented by *List*.

EXAMPLE

`(1+rate)*SUM(deposits January)`

NOTE: The space between "deposits" and "January" means "the intersection of" those two named cells or cell groups.

TAN(N)**DESCRIPTION**

Calculates the tangent of N , an angle in radians.

EXAMPLE

`TAN(thetaRowC)`

TRUE()**DESCRIPTION**

Returns the logical value true.

EXAMPLE

If you are planning on putting a complex condition into a cell, you can use `TRUE()` to put a logical value in for testing before you construct the more complicated expression.

VALUE(T)**DESCRIPTION**

This function returns the numeric representation of T . T must be the text form of a number, that is, a number enclosed in quotation marks. It can contain a leading dollar sign or a leading minus sign. It can be written in scientific notation.

If the contents of T do not describe a number (for example, if they include letters or two decimal points), a #VALUE! error value is returned.

EXAMPLE

Suppose that the cell named *date* contains the text "6/15/85". Then,

`VALUE(MID(date,3,2))`

returns the number 15.

Error Values

When a Plan function, operation, or reference is used incorrectly, an error value will result. There are different error values for different error conditions. Error values "propagate," meaning that operations or functions that result in error values in one cell cause the same error values in all the cells that refer to that first cell. This also means that when you notice an error value in a cell, the propagation has to be unraveled step-by-step until the source of the error is found.

For example, you notice that cell R1C1 displays the #NAME? (undefined name) error value. The formula in R1C1 is *a+1*. Check the definition of *a* using the NAME command. The name *a* is defined to refer to R1C2. That cell is the next step in the search. When you look in cell R1C2, you may find the cause there, but you may also find references to other quantities that will have to be inspected. You may have to look at more than one cell to find the source of the error.

The error values and their causes are:

VALUE	CAUSE
#DIV/0!	result of an attempt to divide by 0.
#NAME?	result of an undefined label reference.
#N/A	result when the value is not available. Also, #N/A is a special value that can be created using the NA() function and that will be propagated by arithmetic.
#NULL!	result of specifying an intersection of disjointed areas, such as R1 R2 (use union instead, R1,R2).
#NUM!	result of an overflow (number is too large or too small) or of an illegal use of an arithmetic function, such as SQRT(-1).
#REF!	result of a relative reference reaching outside the sheet or of a reference to a deleted area.
#VALUE!	result of using text where a number is needed or vice versa or of using references when a value is needed.
####	result of a cell containing a number too wide to be displayed in the current column width.

ERROR MESSAGES

Following are explanations of error messages that can occur as you use Plan. After each message is a brief description of the probable cause and what you are to do to recover from it.

Cannot append columns to scrap

EXPLANATION: Plan cannot delete a column to scrap when the ZP-150 is in Append Scrap (Ap) mode.

Cannot copy union to scrap

EXPLANATION: Plan cannot copy a nonrectangular area into the scrap.

Cannot link those windows

EXPLANATION: An attempt was made to link two windows that were not split from each other. Also can occur during unlinking, especially unlinking a TITLE SPLIT. For information about linking windows, refer to the WINDOW LINK command.

Cannot open file

EXPLANATION: An attempt to print over a system file or to access an unknown file was made. Check that the file name entered is correct and try again.

Cannot write file

EXPLANATION: An attempt was made to print a file. Verify that the printer is connected properly and ready to print and that your system memory is not too low.

Circular reference unresolved

EXPLANATION: Cells refer to each other in a chain so that the last refers back to the first. (The simplest case is a cell containing a reference to itself—RC—but the chain may be many steps long). Plan has calculated all the cells in the chain once and has found itself starting over. It stops calculating, leaving the cells in the circular chain in an undefined state. Alter the logic of the sheet so that there is no circularity.

Error in formula

EXPLANATION: A badly formed formula was specified in the EDIT command (or read in while reading a SYLK file). The highlight begins at the point an error was noted. Check all punctuation, especially parentheses, quotes, and brackets. Check the spelling of function names. Check for a mismatch of data types, as in concatenating text to a number. Make sure the formula has not exceeded the length permitted by Plan.

Expression is too long

EXPLANATION: A formula or text being edited has exceeded the length permitted by Plan or is too deeply nested. Shorten the formula or create an intermediate storage cell.

Illegal or wildcarded file name

EXPLANATION: A wildcard character was used in the file name specified for a printing operation. The PRINT command does not permit wildcards in the destination specified. Try printing again and enter a file name that does not contain wildcard characters.

Illegal width of column

EXPLANATION: The column width you requested was out of range. Reenter the command and make sure you specify the width as a number between 3 and 32, inclusive.

Invalid file name

EXPLANATION: An invalid file name has been entered. Check that the file name contains valid characters and does not exceed eight characters (plus a three-character extension), the maximum length for names.

Invalid option

EXPLANATION: An option has been selected that is not available for this menu or prompt. For example, if you pressed B to select a command from the command line, you would receive this message.

Invalid value

EXPLANATION: This is a result of entering an invalid value into a command prompt that asks for a numeric value. For example, you would see this message if you entered 65 in the number of cells: prompt of the COPY RIGHT command, since there are only 63 columns available.

List is empty

EXPLANATION: This message is displayed if you press an ARROW key to produce a full-page listing of files and no work or data files are present.

Locked cell may not be changed

EXPLANATION: An attempt was made to modify the contents of a locked cell. If you need to change the cell, unlock it first, using the LOCK CELLS command.

Name too long

EXPLANATION: The name you have entered exceeds the 31-character maximum. Enter a shorter name.

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Not enough system memory

EXPLANATION: The amount of memory required to execute your command is greater than the amount available to your system. Save your worksheet and delete any unnecessary files from the System Manager screen.

Not enough work space

EXPLANATION: The amount of memory available for this application is too low to complete your command. Delete any unnecessary data from the worksheet or separate the worksheet into two or more files.

Output file too large

EXPLANATION: This message is a result of attempting to print a work file that is larger than Plan will allow to a text file. For example, this message may occur when printing a file in symbolic link (SYLK) format because the SYLK format is larger than the original Plan file. The maximum file size is 64K bytes.

Response too long

EXPLANATION: The entry in a command prompt is larger than the maximum allowable characters. Reenter a shorter response.

Scrap cannot be source and destination

EXPLANATION: In the COPY command, the scrap cannot be both the source and the destination. Change the response in the appropriate prompt.

Too many windows

EXPLANATION: There is a limit of eight windows, and the WINDOW SPLIT command has been used in an attempt to obtain a ninth. Review the existing windows; use the WINDOW CLOSE command to remove some of them.

Unable to write to scrap

EXPLANATION: The amount of memory reserved for the scrap is not large enough to hold the selected data. As much data as possible will be written to scrap.

Window will not fit

EXPLANATION: The window is too small to border or split. Close an adjacent window to get more room on the screen or rethink your screen layout.

CHAPTER 16

INTRODUCTION TO TELCOM

OVERVIEW

Telcom is a full-featured, asynchronous telecommunications program. It allows your ZP-150 to function as a data communications terminal. Using your ZP-150's built-in modem and Telcom, you can access many time-sharing services and large computer databases to retrieve information on a variety of subjects. In addition, you can use Telcom to transfer files between your ZP-150 and a desktop computer system such as the Z-100 and Z-100 PC Series systems.

Telcom is menu-driven; all the commands available to you are presented in a command menu on the screen. There is no special language you need to learn and no difficult syntax to remember.

Telcom has two modes of operation:

- Command mode and
- Terminal mode.

You use *Command mode* whenever you are setting parameters within Telcom, including parameters such as the phonebook name, baud rate, number to dial, or the name of the text capture file you want to use. You also use Command mode to initiate and terminate communications connections.

Terminal mode is entered upon successful connection to a remote computer system. This is known as being "on-line." In Terminal mode, your ZP-150 behaves as if it were a data communications terminal that receives and displays incoming text, and sends locally typed characters to the remote system.

Telcom has two main command screens:

- the SESSION command screen and
- the SCRIPT command screen.

These command screens are described in the paragraphs that follow.

SESSION Command Screen

The SESSION command screen is the default Telcom screen display; it is displayed when you first start Telcom. Otherwise, access the SESSION command screen by selecting the SESSION command from the SCRIPT command screen. The eight commands available from the SESSION command screen are:

- ANSWER
- CONNECT
- DISCONNECT
- MODIFY
- OPTIONS
- RUN
- SCRIPT
- TRANSFER

You use the SESSION command screen when you want to perform operations such as:

- establishing a communications connection,
- terminating a communications connection,
- changing the communications line parameters,
- establishing global settings for Telcom,
- running a script,
- transferring files to and from a remote computer system, or
- letting another computer have access to your files.

The commands that you select and execute from the SESSION command screen are effective immediately. For example, if you change Telcom's global settings and then establish a connection to another system, the changed settings are used immediately. Conversely, you use the commands on the SCRIPT command screen to create a script containing commands that will be effective only when the script is run.

SCRIPT Command Screen

Scripts are files you create that contain a series of instructions to be automatically performed by Telcom. Access the SCRIPT command screen by selecting the SCRIPT command from the SESSION command screen. The eight commands available from the SCRIPT command screen are:

- CONNECT
- DISCONNECT
- MODIFY
- OPTIONS

- PAUSE
- RESPOND
- SESSION
- TRANSFER

All commands except PAUSE, RESPOND, and SESSION are also available on the SESSION command screen. The difference between the effect of a command executed from the SCRIPT rather than the SESSION command screen is that, when commands are executed from the SCRIPT command screen, a *phrase* is inserted into a script. The command that the phrase contains is not actively executed until the script is run. For example, you use the SCRIPT command screen when you want to create a script to:

- automatically dial a host computer system,
- automatically log on to a host computer, or
- initiate an unattended file transfer.

Together, the SESSION and SCRIPT command screens help you to completely customize Telcom to your particular needs and operating environment.

This chapter includes tutorials to help you learn the fundamentals of using the SESSION and SCRIPT command screens and to introduce you to some of the more advanced features of Telcom.

FEATURES

Telcom allows you to perform many communications tasks easily and efficiently.

- Through the use of scripts, you can automatically log on to a remote computer system, perform a number of tasks, and disconnect—all by executing a single command.
- With the phonebook facility, you can keep a file of your more commonly called numbers and their communication settings. When you create a phonebook, you need not type in commonly used numbers more than once.
- The review buffer lets you retrieve information that has scrolled off the screen while your ZP-150 was communicating with a remote computer system. This text can be reviewed and, should you decide that you want to keep a permanent copy, written to a file.

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- An entire session with another computer can be captured and written to a file so you can review any part of the communications session at a later time. This would be very useful if you were on-line to a large computer database. The information you retrieve could be saved and studied later, thus saving expensive connection costs.
- Telcom supports the popular file transfer protocol XMODEM. Using XMODEM, you can be assured of virtually error-free file transfers between the ZP-150 and other computer systems.
- Through the use of the VOICE key, you can use the phone line for either voice or data communications. This allows you to connect your telephone set and the ZP-150 to the same phone line.
- At all times, status line indicators show the modes that are active and the options that have been selected. As with other Works programs, the status line is displayed on the last line of the screen. Some of these indicators are presented in the tutorials in this chapter. All the status line indicators that you may see while working in Telcom are described in Chapter 17, "Telcom Reference."

RELATED APPLICATIONS

Telcom can be used with many of the other programs in Works. The following list illustrates some of these.

File—Telcom uses File's database utility to retrieve and autodial phone numbers and set line communications protocol.

Plan—Use Telcom to transfer your Plan files to another system. Download Plan files created on another microcomputer system to the ZP-150 to take with you on a business trip.

Word—Telcom can transfer any of your Word text files to another computer system. Alternately, Word files created on another system, such as a Z-100 PC Series microcomputer, can be downloaded to the ZP-150.

TUTORIAL

In order for you to become familiar with Telcom's features, several tutorial sessions are included. These tutorials are designed to take you through some of the more commonly used operations of Telcom. Following are some of the operations that will be discussed.

- establishing a communications connection,
- transferring files using XMODEM protocol,
- disconnecting from the remote computer system,
- developing and using a script,
- creating and using a phonebook,
- changing phonebook entries, and
- accessing your ZP-150 from another computer system.

NOTE: This tutorial assumes that you have a modular telephone set.

You will need a standard telephone line to use for data communications, and you must have access to a computer system that you can dial up.

NOTE: The Heath company has a computer system that you can connect to. This system provides a billboard service with the latest information about Heath/Zenith software, hardware, and currently shipping products. The number is (616) 982-3503. In order to provide you with specific procedures, this system is used in the tutorials. The billboard service itself is free; however, you will be billed by the telephone company for the call you place to the service.

With Telcom, you can establish two types of connections:

- a switched connection over the telephone network (a dial-up telephone line connection) and
- a direct connection.

A telephone line connection lets you communicate with large databases, such as The Source and CompuServe, and also with other computers more similar in capacity and design to yours, such as a Z-100 PC. A telephone line connection requires the use of a modem—either the ZP-150's built-in modem or an external modem or acoustic coupler.

A direct connection, which is only possible if the host is in close proximity, requires the use of a cable connected to the RS-232C port instead of a modem.

For either type of connection, you use the CONNECT command to initiate the connection. You can execute CONNECT directly from the SESSION command screen or indirectly from a script. You can manually enter the number that you want Telcom to dial, or you can have Telcom look up the number in a phonebook file.

When you use a phonebook, Telcom will search the phonebook for a name you specify and will use the phone number and settings associated with that name in establishing the connection. These settings will become the current settings. Unless you specify a particular name, the next time you establish a connection (and, presumably, Telcom finds its associated settings), the current communications settings will be used again.

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You may want to specify that Telcom use a prepared message to establish the connection. Any time you prepare a message ahead of time, you create a script. A *login script* generally contains specific information that the host requests of you every time you want to establish a connection with it. The first part of the script will contain the instructions to initiate a communication connection (via the CONNECT command). The CONNECT command will put your ZP-150 into Terminal mode after the connection is established.

More information about scripts and about creating and using a phonebook is provided later in this chapter. In the first part of this tutorial, you will see how a communications connection is established *without* the use of Telcom's script and phonebook capabilities. Then, later you will see how these special features can save you time and simplify your use of Telcom.

Following are step-by-step instructions on how you can use Telcom to establish your first communications connection.

NOTE: All commands, the associated submenus, and command prompts are discussed in greater detail in Chapter 17, "Telcom Reference."

Starting Telcom

When you first turn on your computer, the System Manager screen appears. If you are working with another program, press **CTRL-F10** (the QUIT key) to return to the System Manager.

On the System Manager screen, the Works programs are listed along the left-hand side of the display. Word should be the program name that is highlighted, and the RUN command will be highlighted in the command line at the bottom of the screen.

To start Telcom:

1. Use the ARROW keys to select the Telcom program and press RETURN.
2. The SESSION command screen appears. The upper area of the screen is blank; this is the area that will display data and text during your communications session. The command, message, and status lines display:

```
> Answer Connect Disconnect Modify Options Run Script Transfer  
Copyright (1984, 1985) Microsoft Corp.  
Telcom Session: OFFLINE
```

Notice that **Connect** is highlighted in the command menu. CONNECT is the default command whenever the SESSION command screen first appears.

Defining Line Protocol

Before you initiate a connection to another system, you must define the line protocol that will be used. *Line protocol* is the agreement between the ZP-150 and the host about how they will communicate; it is the settings and parameters such as baud rate, word length, parity, and flow control.

NOTE: Line protocol refers only to the logistics of communication between two computers. It has no bearing on the actual contents of files the computers will send or receive, if any.

In Telcom, you define line protocol by executing the MODIFY command. To define line protocol, proceed with the following steps.

1. When the SESSION command screen is displayed, press SPACE BAR to move the selection highlight on the command line and select the MODIFY command and press RETURN, or enter M. The MODIFY command prompts are displayed as shown in Figure 16.1.
2. Look carefully at the MODIFY command prompts displayed on your screen. To access the Heath billboard service, you do not need to change any of the default entries and selections. Generally, however, you must make sure that you know the host computer's requirements for:
 - baud rate,
 - word length,
 - parity,
 - number of stop bits, and
 - flow control.

For purposes of this tutorial, only the prompts for the above settings will be discussed. For information about remaining prompts and settings, refer to the MODIFY command in Chapter 17, "Telcom Reference."

```
MODIFY name:          baud rate: 300      stop bits:(1)2
word length: 6 7(8)    parity: Even Odd(None)Ignore
xon/xoff:(Yes)No      duplex: Half(Full)   terminal:(Yes)No
add to EOL:(None)CR LF strip linefeeds:(Yes)No filter chars:(Yes)No
```

Figure 16.1. MODIFY Command Prompts

3. Press **TAB** to select the **baud rate:** prompt. *Baud rate* refers to the speed of data transmission. The default entry at this prompt is 300. This is the baud rate supported by the ZP-150's internal modem. If you were going to establish a connection to a system other than the Heath billboard, you would need to enter the baud rate for the host system. If you needed to use a baud rate higher than 300, you would have to use an external modem rather than your ZP-150's built-in modem.
4. Press **TAB** to advance to the **stop bits:** prompt. Stop bits are sent with each character transmitted to signify the end of the character. Telcom can send 1 or 2 stop bits with each character. The default (and correct, for this tutorial) setting is 1.
5. Continue pressing the **TAB** key to advance from prompt to prompt until you have checked the default selections at the **word length:, parity:, xon/xoff:, and duplex:** prompts. As mentioned previously, the factory-set defaults for all **MODIFY** prompts are correct for accessing the Heath bulletin board. The defaults are:
 - word length, 8 bits—This is the size of the data packet or word in which each character will be transmitted and received.
 - no parity—Parity is a form of error checking.
 - XON/XOFF supported—This is a method of flow control in which the connected systems can transmit, receive, and respond to signals to stop and resume data transmission.
 - Full Duplex mode—This is an operational mode in which characters transmitted to the host system are *not* immediately displayed on the sending system's screen. Generally, this mode is used when the host echoes the characters it receives back to the sending system. When the echoed characters are received by the sending system, they are displayed on the screen.
6. When you are finished reviewing the **MODIFY** command prompts, press **ESC** to return to the **SESSION** command screen. If you had changed the values specified at any of the prompts, you would press **RETURN** to execute the **MODIFY** command and store the new line protocol parameters for Telcom's use.

Establishing a Communications Connection

After defining the line protocol to be used, you are ready to call the host system and establish a communications connection. To establish a connection to the Heath billboard:

1. Disconnect the telephone line cord from your telephone and insert the plug into the TEL LINE jack in the back panel of your ZP-150. Make sure that the ACP/DIR slide switch is in the DIR position. This is the switch setting required in order for you to use the internal modem. (You would use the ACP setting if you were using an acoustic coupler.)
2. The SESSION command screen should still be displayed. Press SPACE BAR to select the CONNECT command and press RETURN, or enter C. The CONNECT command prompts appear as shown in Figure 16.2.
3. The active CONNECT command prompt is to:. An entry is required at this prompt only if you are using a phonebook. Leave this prompt blank and press TAB to advance to the number: prompt.
4. At this prompt, you must enter the telephone number of the system with which you want to establish a connection. Enter 6169823503. (This is the number of the Heath billboard. If you are within the 616 area code, you do not need to enter the first three digits. If you must normally dial any access codes, such as "1" for a long distance call, enter them as appropriate.) Verify that you entered the number correctly, then press TAB to advance to the using modem: prompt.
5. At the using modem: prompt, you make a selection to specify whether you are using the internal modem. The default selection is Yes (using internal modem). If you were using an external modem, you would select No by pressing SPACE BAR until No was highlighted, or by entering N. Make sure that the selection at this prompt is Yes.
6. Press TAB to advance to the comm line: prompt. At this prompt, you make an entry to specify whether you are using logical device COM0: or COM1:. Valid entries are 0 and 1 (for COM0: and COM1:, respectively); the default is 0. COM0: corresponds to the internal modem. (If you were using an external modem, you would enter 1. Logical device COM1: corresponds to the RS-232C connector on the back panel of your ZP-150.) Make sure that the entry at this prompt is 0.
7. Press RETURN to execute the CONNECT command.

CONNECT to:
using modem:(Yes)No

number:
comm line: 0

Figure 16.2. CONNECT Command Prompts

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8. As Telcom dials the number you entered at the `number` prompt, the message line displays:
Dialing...
 9. When the number has been dialed and Telcom is waiting for the host system to answer and complete the connection, the message line displays:
Waiting...
 10. When the host answers, the screen clears, and then the status line displays:

Telcom Session: ONLINE hh:mm:ss

where hh:mm:ss is an elapsed-time display. It initializes at 00:00:00 as soon as the connection is established, and increments until the connection is terminated.

When the **ONLINE** status message is displayed, your system is in Terminal mode.

In the upper area of the screen, you will see text transmitted by the host to your ZP-150. The Heath billboard is self-explanatory and menu-driven. Follow the instructions on your screen. Any keyboard entries you make will be transmitted to the host.

NOTE: If, for some reason, the connection could not be completed or the host did not answer, the message line would display

Host doesn't respond

If this happens, reexecute the CONNECT command. Generally you will not need to make new entries and selections at the CONNECT command prompts; the values you previously specified will be retained. Thus, you can select the CONNECT command and press RETURN, and verify that you entered the correct telephone number. Then press RETURN again to execute the command.

11. When you are ready to end your communications session, go on to Disconnecting in this chapter.

Disconnecting

When you are ready to end your communications session, you must disconnect your system from the host system. The Heath billboard has a menu option for disconnecting. However, for purposes of this tutorial, do not use the billboard option. Instead, you will learn how to disconnect using Telcom's **DISCONNECT** command.

To end your communications session and disconnect:

1. While you are still using Terminal mode (the ONLINE message is on the status line), press SHIFT-ESC to return to Command mode. The SESSION command appears. Notice that the status line still displays:

Telcom Session: ONLINE

When a communications connection exists, you can always return to Command mode without disconnecting by pressing SHIFT-ESC; and you can always return to Terminal mode from the SESSION command screen by pressing RETURN when the CONNECT command is selected. (Remember that CONNECT is the default selection on the SESSION command screen.) Try switching between the two modes several times, then return to the SESSION command screen.

2. Select the DISCONNECT command from the command menu and press RETURN, or enter D. The DISCONNECT command prompt appears:

DISCONNECT:
Enter Y to confirm

3. To disconnect, enter Y. The connection is terminated, the SESSION command screen reappears, and the status line displays OFFLINE.

If you decided that you did not want to terminate the connection, you would press any key other than Y. You could then continue your communications session.

Saving a Telcom File

You have now learned how to use Telcom to set line protocol, establish a communications connection, and disconnect. Before going on to the next sections to learn about other features such as scripts, transferring files, and phonebooks, and using Telcom for voice communications, you should know how to quit Telcom.

To exit Telcom, press CTRL-F10 (the QUIT key). Any open files are closed and saved so that no data is lost; the current status (off-line, on-line, and whether you are in the SESSION command screen or the SCRIPT command screen) of Telcom is retained. The screen clears, and then the System Manager screen is displayed. When you start Telcom again, you will be returned to the point at which you quit.

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You can exit Telcom and return to the System Manager at any time. You can even quit while you are still connected to a remote system, use another Works program, and then return to Telcom and continue your telecommunications session. For example, suppose you needed to check some figures in a Plan worksheet during a communications session. To do so, you could press CTRL-F10 to exit Telcom, run Plan, then press CTRL-F9 (RUN PREVIOUS) to return to Telcom.

Developing and Using a Script

With Telcom, you can prepare for an upcoming communications session by creating a script. A script frees you from having to type the messages required in order to communicate with the host system.

Perhaps the most obvious situation for which you might want to create a script is when you want to access a host system that has a very complicated logon sequence. However, scripts are also handy for automating relatively short messages that you use frequently and do not want to bother retying every time. For *any* telecommunications session, scripts lessen the risk of error and speed up the process of establishing a connection.

You create and modify scripts by working from Telcom's SCRIPT command screen. Each time you execute a command other than SESSION, you enter a *phrase* into the script. Each phrase is a command sequence that occupies one line in the script. When you execute the SESSION command, your script is saved to file and you are returned to the SESSION command screen.

In this section of the tutorial, you will learn how to create and run a script that will connect your ZP-150 to the Heath billboard.

CREATING A SCRIPT

To create a script:

1. When the SESSION command screen is displayed, select the SCRIPT command and press RETURN, or enter S. The SCRIPT command prompt appears:

SCRIPT name:

2. At this prompt, you must enter the name that you want your script to have. (Scripts are saved as files.) You need only enter the primary file name. You do not need to enter a file name extension because Telcom will provide a default extension (.TEL) when you save the script.

Enter HEATH and press RETURN. The SCRIPT command screen is displayed as shown in Figure 16.3.

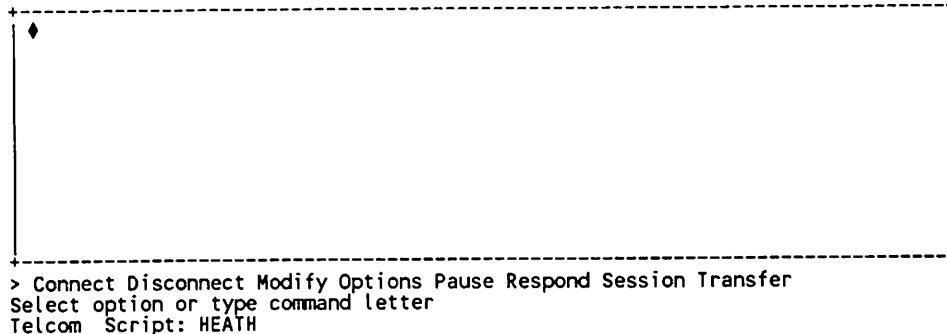


Figure 16.3. SCRIPT Command Screen

3. Look at the status line on your screen. It informs you that you are using the SCRIPT command screen (Telcom Script:) and that the name of the script you are creating is HEATH. Also notice that the command line displayed on this screen is much like that displayed on the SESSION command screen. The commands that are unique to this screen are the PAUSE, RESPOND, and SESSION commands. More information about their use is provided later in this tutorial.

4. Look again at how you used the CONNECT command in Establishing a Communications Connection. To enter a phrase into your script that will accomplish the same result automatically, you use the CONNECT command from the SCRIPT command screen.

Select the CONNECT command from the command menu and press RETURN, or enter C. The CONNECT command prompts appear on the SCRIPT command screen as shown in Figure 16.4. Notice that the default entries and selections at the command prompts are those you made when you executed CONNECT earlier.

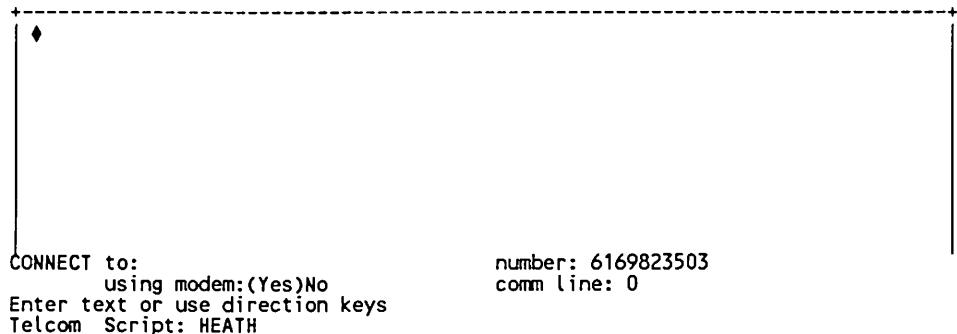


Figure 16.4. CONNECT Command Prompts on SCRIPT Command Screen

5. Since the default entries and selections are correct, press RETURN to execute the command and enter a Connect: phrase in your script. The SCRIPT command screen now appears as shown in Figure 16.5. Notice that in addition to the the Connect: phrase, a Modify: phrase was entered into your script. The Modify: phrase is automatically added each time you enter a Connect: phrase and reflects the current line protocol settings as defined at the MODIFY command prompts. The values in the Modify: phrase on your screen are called a *settings string* and they represent the following settings:

300	300 baud
1	1 stop bit
8	8-bit word length
N	no parity
X	XON/XOFF flow control supported
F	Full Duplex mode
V	ANSI terminal support on
N	no characters added to End of Line (EOL)
L	strip linefeeds
F	filter graphics characters

You may wish to display the MODIFY command prompts to see the correlation of values in the settings string with the actual MODIFY command prompts. If so, select the MODIFY command and press RETURN, or enter M. When you are finished looking at the prompts, press ESC to cancel the MODIFY command.

NOTE: For now, you need only be aware that entering a Connect: phrase into your script also enters a Modify: phrase that reflects the current line protocol settings. Later, in your own work, you may wish to include a Modify: phrase in a script to change the line protocol for a specific host system. When you do, you may need to delete the Modify: phrase that is automatically added with a Connect: phrase.

```
+-----+
|Modify: 300;1;8;N;X;F;V;N;L;F
|Connect: ;6169823503;M;0
|◆
+-----+
> Connect Disconnect Modify Options Pause Respond Session Transfer
Select option or type command letter
Telcom Script: HEATH
```

Figure 16.5. SCRIPT Command Screen after Execution of the CONNECT Command

Next, you will add a **Pause:** phrase to your script to tell Telcom to wait a few seconds after dialing the number specified in the **Connect:** phrase.

6. Select the PAUSE command from the command menu and press RETURN, or enter P. The PAUSE command prompt appears:

PAUSE for:

At this prompt, you specify the number of seconds that you want Telcom to wait before executing the next phrase of the script. Enter 4 and press RETURN. A **Pause:** phrase is added to your script as shown in Figure 16.6.

The menu produced by the Heath billboard includes an option that lets you change the default screen depth. Since the ZP-150 has a 16-line display and the billboard normally allows for a 25-line display, you can include a series of **Respond** phrases in your script to automatically change the default as soon as your system is connected to the billboard.

7. Select the RESPOND command from the command menu and press RETURN, or enter R. The RESPOND command prompts appear:

RESPOND to:

with:

8. Type Enter the number of the desired option - at the **to:** prompt.

This is the text of a prompt received from the billboard to which you want to enter an automatic response. After typing your entry, press TAB to advance to the **with:** prompt.

```
+-----+
|Modify: 300;1;8;N;X;F;V;N;L;F
|Connect: ;6169823503;M;0
|Pause: 4
|◆
+-----+
> Connect Disconnect Modify Options Pause Respond Session Transfer
Select option or type command letter
Telcom Script: HEATH
```

Figure 16.6. SCRIPT Command Screen after Execution of PAUSE Command

9. Enter Y at the with: prompt. This value will select the billboard menu option that allows you to change the default number of lines per screen.

After verifying that your entries at the RESPOND command prompts are correct, press RETURN to enter the Respond phrases into your script. The SCRIPT command screen now appears as shown in Figure 16.7.

10. Select the RESPOND command again. This time, make the following entries:

- Type Enter new number of lines per screen? at the to: prompt.
- Enter 14^M at the with: prompt.

Verify that your entries are correct, then press RETURN to enter two more Respond phrases into your script. The Respond To: phrase is a prompt that will be received from the billboard. The Respond With: phrase will cause the billboard to change the default number of lines to 14. The characters ^M in the phrase will be transmitted to the remote system as a RETURN.

In the preceding steps, you entered text at both of the RESPOND command prompts. However, you can make an entry at only one of the prompts and thus enter only one phrase (either Respond To: or Respond With:) into your script. If you do *not* make an entry at the RESPOND command to: prompt and *do* make an entry at the with: prompt, then the entry you made will be transmitted to the host as soon as the Respond With: phrase is encountered in your script.

Recall that a rather lengthy menu is displayed when you first complete a connection to the Heath billboard. In the next steps, you will insert a Respond With: phrase into your script to interrupt the initial display of the menu. In this way, Telcom will not have to wait for the entire menu to display before sending the phrases to change the default number of lines per screen.

```
+-----+
|Modify: 300;1;8;N;X;F;V;N;L;F
|Connect: ;6169823503;M;0
|Pause: 4
|Respond To: Enter the number of the desired option -
|Respond With: Y
|◆
+-----+
> Connect Disconnect Modify Options Pause Respond Session Transfer
Select option or type command letter
Telcom Script: HEATH
```

Figure 16.7. SCRIPT Command Screen after Execution of the RESPOND Command

11. When you execute a command to insert a phrase into a script, the phrase is inserted in front of the phrase that is selected, or highlighted. Press UP ARROW four times to select the first Respond To: phrase in your script. The entire line—Respond To: Enter the number of the desired option —will be highlighted.
12. Select the RESPOND command again. This time, instead of making a new entry at the to: prompt, press DEL to delete the default entry. Leave the prompt entry area blank and press TAB to advance to the with: prompt.
13. At the with: prompt, press CTRL-K rather than make a text entry. (That is, hold down the CTRL key and press K, then release both keys simultaneously.) This key sequence will be displayed as a graphics character but will be transmitted to the host as you entered it.
14. Press RETURN to execute the RESPOND command and insert a Respond With: phrase into your script. Your screen should now appear as shown in Figure 16.8. If it does not, refer to Editing Scripts in this chapter, delete the incorrect phrases, and go through this exercise again to insert the phrases you need.
15. Now you are ready to save your script. Select the SESSION command from the command menu. The command line of the screen momentarily displays:

SESSION:

Then the screen clears and the SESSION command screen is displayed again. Whenever you execute the SESSION command, the script on which you were working is saved and you are returned to the SESSION command screen.

```
+-----+
| Modify: 300;1;8;N;X;F;V;N;L;F
| Connect: ;6169823503;M;0
| Pause: 4
| Respond With: ♂
| Respond To: Enter the number of the desired option -
| Respond With: Y
| Respond To: Enter new number of lines per screen?
| Respond With: 14^M
| ♦
+-----+
> Connect Disconnect Modify Options Pause Respond Session Transfer
Select option or type command letter
Telcom Script: HEATH
```

Figure 16.8. Completed Script

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The script you created in this tutorial is saved under the name HEATH.TEL. Remember that HEATH is the name you specified when you first invoked the SCRIPT command, and .TEL is the default extension that Telcom assigns to script file names.

EDITING SCRIPTS

When you have a script file that you want to modify or edit, you invoke the SCRIPT command as described previously and enter the name of the existing script file at the SCRIPT command name: prompt. When you press RETURN to execute SCRIPT, the contents of the script file you specified will be displayed in the upper area of the SCRIPT command screen.

If you want to insert a phrase, use DOWN and/or UP ARROW to select the phrase before which you want to make your insertion. Then, execute the appropriate command to insert the phrase you want.

If you want to delete a phrase, use DOWN and/or UP ARROW to select the phrase you want to delete, then press DEL. The selected phrase is erased, and any phrases that followed it in the script are moved up one line.

If you want to delete more than one adjacent phrase:

1. Select the first or last phrase in the group you want to delete.
2. Press F6 to turn on the Extend Selection feature. The Ex indicator is displayed on the status line.
3. Use the UP or DOWN ARROW key to extend your selection to the adjacent phrases that you want to delete.
4. Press DEL to erase the selected phrases.

NOTE: Telcom does not use the scrap when you delete phrases from a script. Any phrases that you delete as described above are irretrievably erased. The only way to insert phrases into a script is to execute commands from the SCRIPT command screen.

USING A SCRIPT

Once you have created a script, you can use it by selecting the RUN command and entering the script name. If you cannot recall the name of a script, you can press any ARROW key after invoking the RUN command and a full-page listing of files, including script files, will be displayed on the screen. You can then use the ARROW keys to select the file name that you want.

To execute a script file:

1. Make sure that your telephone line cord is properly connected to your ZP-150 as described in Establishing a Communications Connection in this chapter.

2. From the SESSION command screen, select the RUN command and press RETURN, or enter R. The RUN command prompt appears:

RUN script:

At this prompt, you enter the name of the script you want to run.

3. For practice in using full-page listings, press any ARROW key. A full-page listing of files similar to that shown in Figure 16.9 will be displayed. Locate the file named HEATH.TEL in the listing, and use the ARROW keys to move the selection highlight to that file name. Notice that the file name that is selected on the full-page listing appears as the default entry at the to: prompt.

NOTE: If you enter the script file name by using the keyboard, you do not need to enter the file name extension. The default .TEL extension will be assumed.

4. After selecting HEATH.TEL in the full-page listing, press RETURN to execute the RUN command. The Dialing... and Waiting... messages will be displayed, then the billboard menu will start to appear. Watch your screen carefully to see how the Respond phrases you entered into your script are executed.
5. After all phrases in the script have been executed, your ZP-150 remains on-line, and the SESSION command line is displayed (that is, you are in Command mode). To begin manual communications with the remote system (that is, to enter Terminal mode), enter C.
6. When you are finished, disconnect using the Telcom DISCONNECT command.

ALARM.!00	CALC.!00	DIALING.!00	WORD.!30	CALENDAR.!35
FILE.!40	DAT.!41	TELCOM.!45	PLAN.!50	SYLK.!51
BASIC.!55	BAS.!56	FORMAT.!60	INSTALL.!70	MSDOS.!80
DBCALLS.LIB	ENVIRON.SYS	HEATH.TEL	SESSION.TXT	TELCOM.WRK

RUN script: HEATH.TEL
 Enter file name
 Telcom Session: OFFLINE

Figure 16.9. Full-Page Listing Invoked at RUN Command Prompt

Reviewing and Capturing Text

When you ask Telcom to receive information (for example, a collection of newspaper articles from a news-orientated information service), the incoming text is automatically displayed on the screen. The text may appear on your screen very rapidly.

Assuming that the information you requested will take up more than one screen, the first screenful will scroll off the screen to make room for the second screenful, and so on. This is called *free forward scrolling*. You can suspend free forward scrolling at any time by pressing the PAUSE key. This will allow you to suspend free forward scrolling so that you can review what has scrolled off the screen.

NOTE: If the host computer system does not support XON/XOFF flow control, any text received after you press PAUSE may be lost.

Telcom stores incoming text in a special buffer so that you can review it. (The size of the buffer is determined by the entry at the OPTIONS command *review text lines: prompt*. For more information, refer to the OPTIONS command in Chapter 17, "Telcom Reference.") Once you have pressed PAUSE to enter Review Text mode, you can move about within the review buffer using the UP and DOWN ARROW keys. To resume free forward scrolling, you press PAUSE again. Essentially, you use the PAUSE key to alternate between free forward scrolling (Terminal mode) and reviewing your work (Review Text mode). (See Function Keys in Chapter 17, "Telcom Reference," for a complete discussion of using the ARROW keys to move the selection highlight within the the review buffer.)

Once you view the articles in the buffer, you may want to retain them permanently. This is called *capturing* text. You can capture just a small part of the text or the entire buffer.

The captured text is written to the file name specified at the OPTIONS command *capture to: prompt*. If no file name is specified, Telcom captures text to a file with the default name SESSION.TXT. (Refer to the OPTIONS command in Chapter 17, "Telcom Reference," for more information.) You can execute the OPTIONS command and specify the text capture file name before you establish a connection to the remote system or you can execute the OPTIONS command while you are working in Review Text mode.

You capture specific portions of text by using the UP and DOWN ARROW keys to select the text you want to capture and then pressing the TEXT CAPTURE key (F3).

You can use the TEXT CAPTURE key in either Terminal mode or Review Text mode. The effect the TEXT CAPTURE key has depends upon the mode you are in when you press the key.

When you are in Review Text mode (*Rv* is displayed on the status line) and press TEXT CAPTURE, whatever is already selected in the review buffer is

written to the text capture file. If some text is already in the file, the selected text is appended to the contents of the text capture file. To capture selected portions of text:

1. While you are using Terminal mode, press **PAUSE** to enter Review Text mode.
2. Use the **UP** and **DOWN ARROW** keys and **F6** to select the text in the review buffer that you want to capture.

NOTE: When the Extend Selection feature is on, **Ex** is displayed on the status line.

3. Press **F3**. The selected text is written to the text capture file. If you made an extended selection of more than one line, the extended selection highlight is erased and the Extend Selection feature is turned off (**Ex** no longer appears on the status line) after the text is written to the file.
4. If you want to append another selection from the review buffer to the text capture file, repeat steps 2 and 3.
5. When you are ready to return to Terminal mode, press **PAUSE**.

When your ZP-150 is in Terminal mode (free forward scrolling is occurring) and you press **F3**, *all* characters beginning with the next one that is received are appended to the capture file. You might want to use the Text Capture feature in this way when you want to receive and save data for later review. Doing so will often save you telephone line charges.

To capture large quantities of text as it is received:

1. While you are using Terminal mode, press **F3**. The **Cp** indicator appears on the status line, and all characters received are written to the text capture file specified at the OPTIONS command **capture to:** prompt. (This may be the default file, SESSION.TXT.)
2. When you do not want to capture any more of the incoming data, press **F3** again while you are still using Terminal mode. Telcom will stop appending data to the text capture file immediately.

If you want to capture all of a communications session, press **F3** before you complete your connection to the remote system.

NOTE: If you capture large amounts of text to file, you may run out of workspace. The maximum file size for any file in Works is 64K. Refer to Using Telcom under Low Memory Conditions in Chapter 17 for more information.

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You may want to log on to the Heath billboard again to practice using Telcom's review buffer and Text Capture feature. If so:

1. Use your HEATH script or the CONNECT command to complete the communications connection.
2. When the billboard menu is displayed, select option Y and set the default number of lines per screen to a high value so that you get the effect of free forward scrolling.
3. Experiment with the Text Capture feature by using the procedures described earlier in this section.

The files that are created by Telcom when you capture text are formatted as ASCII text files. When you wish to review their contents, you can print them by using the System Manager PRINT command, or you can load them with the Word application as a data file. For information about the System Manager PRINT command, refer to the PRINT command in Chapter 2, "System Manager Reference." For information about Word, refer to Chapters 18 and 19.

Transferring Files

Telcom supports file transfer between the ZP-150 and other computer systems. You can send files to a host system (known as *uploading*) or receive files from a host system (*downloading*). There are two ways to send and receive files with Telcom:

- No protocol (no error checking)
- XMODEM protocol (error checking)

Use the *No protocol* option if you do not require any error checking. When the file is transferred there will be no way to recover any data that is garbled in transmission.

XMODEM is a commonly used file transfer protocol. It imposes error checking on the data blocks being transferred. XMODEM should be used whenever possible as it ensures that the file will be transferred intact. In order for you to use XMODEM, it must be supported by the remote system as well as enabled for your ZP-150.

In Telcom, you send and receive files by executing the TRANSFER SEND and TRANSFER RECEIVE commands. Following is an outline for a tutorial that you can perform if you have access to a host computer system that supports XMODEM protocol. The tutorial is in two parts: one for sending a file and one for receiving a file.

Before beginning, refer to Defining Line Protocol and to Establishing a Communications Connection earlier in this chapter. Complete a connection to

a host system that supports XMODEM protocol. Once you are in Terminal mode (the status line displays **ONLINE**), perform the following procedures to send and to receive a file.

To send a file:

1. Load and run the host system's XMODEM program to receive a file. You will probably need assistance from the host system's personnel or the host system's user documentation.
2. Press **SHIFT-ESC** to return to Command mode. The **SESSION** command screen appears.
3. From the command menu, select the **TRANSFER** command and press **RETURN**, or enter **T**. The **TRANSFER** command submenu is displayed:

TRANSFER: Receive Send

4. To invoke the **TRANSFER SEND** command, select **Send** and press **RETURN**, or enter **S**. The **TRANSFER SEND** command prompts appear:

TRANSFER SEND from: **protocol: (None)Xmodem**

5. At the **from:** prompt, enter the full file name (that is, the primary file name and extension) of the file that you want to transfer to the host system. The file must be resident in memory. You cannot transfer a file from an external device.

You can also select the name of the file you want to send from a full-page listing of files. To do so, press an **ARROW** key to display the listing, then use the **ARROW** keys to select the name of the file you want to send.

After making a valid entry or after selecting the file from a full-page listing, press **TAB** to advance to the **protocol:** prompt.

6. Select **Xmodem** at the **protocol:** prompt.
7. Press **RETURN** to execute the **TRANSFER SEND** command.
8. As Telcom locates the file in memory and gets ready to transmit it to the host, the message line displays:

Waiting...

9. When the actual transfer of the file begins, the message line displays:

Transferring block n

where n is the number of the data block being transferred. This value is incremented throughout the file transfer, until the last block of data in the file is sent.

10. When all of the file's contents have been transmitted to the host system, the SESSION command screen is displayed again.
 11. At the end of the file transfer, the SESSION command screen will be displayed again. To return to Terminal mode, press RETURN after making sure that the CONNECT command is selected, or enter C.

NOTE: If the remote computer does not correctly support XMODEM protocol, the TRANSFER SEND command will be aborted and the Host doesn't respond during file transfer message line will display.

To receive a file from the host system:

1. Load and run the host system's XMODEM program to send a file. You will probably need assistance from the host system's personnel or the host system's user documentation.
 2. Press **SHIFT-ESC** to return to Command mode. The SESSION command screen appears.
 3. From the command menu, select the TRANSFER command and press **RETURN**, or enter **T**. The TRANSFER command submenu is displayed:

TRANSFER: Receive Send

4. To invoke the TRANSFER RECEIVE command, select the RECEIVE command and press RETURN, or enter R. The TRANSFER RECEIVE command prompts appear:

TRANSFER RECEIVE to: protocol: (None)Xmodem timeout: 10

5. At the `to:` prompt, enter the full file name (that is, the primary file name and extension) of the file to which you want to write the data that the host will send you. Note that you cannot include an external device name as part of the file name. You can only write the received file to memory.

If you want to make sure that you do not enter the name of a file that already exists, you can display a full-page listing of files by pressing any ARROW key. You should enter a unique file name, since if you enter the name of an existing file, it will be overwritten and the original contents will be lost.

After making a valid entry, press TAB to advance to the protocol prompt.

6. Press **SPACE BAR** to select **Xmodem** at the **protocol:** prompt. You do not need to make any entry at the **timeout:** prompt. The information provided at this prompt is used only for receiving files with no protocol.
7. Press **RETURN** to execute the **TRANSFER RECEIVE** command.

Using the VOICE Key

You can use the CONNECT command and Telcom's VOICE key (SHIFT-F4) to make normal telephone calls for voice communications. The CONNECT command is used for voice communications just as for data communications. You can use a phonebook, or manually enter the number you want Telcom to dial.

The VOICE key functions as follows:

- If you press SHIFT-F4 before you establish a connection with the CONNECT command, the status line displays **Voice** and Telcom expects you to talk on the telephone after it dials the number for you.
- If you do not press SHIFT-F4 before you establish a connection, Telcom expects you to transmit and/or receive data after it dials the number for you. You cannot activate the VOICE key *after* a connection has been established.

In order to take advantage of the VOICE key, you must connect your telephone set and the ZP-150 to your telephone line in series. Use a "Y" telephone jack connector and an extra modular telephone line cord for this purpose. (A Y connector has two standard modular jacks and one standard plug for connecting two lines to one jack.)

Plug the Y connector into the telephone line jack on your telephone. Then, use one jack on the Y connector to connect your phone to the telephone line, and the other jack and extra telephone line cord to connect your telephone set to the TEL LINE connector on the back panel of the ZP-150. When you complete hardware connections in this fashion, you have three alternatives at any given time. You can:

- use your telephone as you normally would (that is, lift the handset and dial the telephone to place a normal call),
- use the VOICE key to place calls through Telcom, or
- use the telephone line for data communications.

If, for example, you are going to connect to a branch office where a host system is located, but want to talk to the system operator rather than conduct data communications, press the VOICE key before you place the call. When the **Voice** status line indicator appears, Telcom is ready to dial your call and expects you to conduct voice communications. If you did not

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press VOICE, Telcom would expect to conduct data communications once a connection was established.

Use the CONNECT command to dial the number. (You can use a phone-book.) After dialing the number, simply pick up the handset to talk.

NOTE: Even when you complete hardware connections as described here, you must terminate voice communications by hanging up your telephone, and you must use Dialer to answer incoming voice calls. Telcom will only dial the number for a call you place. Generally, if you wish to conduct voice communications through your ZP-150, it is simpler and more efficient to use the Dialer program. Refer to Chapter 7, "Dialer," for more information.

Letting Another Computer Access Your ZP-150

Instead of establishing a connection and then transferring specific files to a host system by using the TRANSFER SEND command, you may want to give another computer access to your entire file system. To do so, choose the ANSWER command from the SESSION command screen. Executing the ANSWER command puts Telcom into Answer mode.

In Answer mode, Telcom waits for an incoming call and file transfers effected at a remote system. The Answer mode gives the calling system access to files maintained by your ZP-150. It allows the host to display the file directory and upload or download any of the files in your ZP-150's memory. You can even put your system in Answer mode and leave it unattended so that files may be transferred in your absence.

General procedures for using Answer mode are provided in this section. You may wish to try the procedures if you have access to another system from which you can make data communications connections.

The ANSWER command produces four command prompts that are displayed at the local system, and a command line that is displayed at the remote system. The *local system* is the ZP-150 at which the ANSWER command is invoked. The *remote system* is the host system that establishes a connection to the ZP-150 once it is in Answer mode. The command prompts and command line are discussed in the paragraphs that follow.

LOCAL COMMAND PROMPTS

At the local system, the ANSWER command produces four command prompts at which you must make entries to tell Telcom more about the type of connection that will be established, and whether or not a password is to be used.

To use the ANSWER command:

1. When the SESSION command screen is displayed, select the ANSWER command and press RETURN, or enter A. The ANSWER command prompts appear:

ANSWER using modem: Yes No
password:

comm line:
greeting:

2. Your selection at the using modem: prompt specifies whether you are using a modem connection or a direct connection. If you are using your ZP-150's internal modem or an external modem, select Yes. When the ANSWER command is executed, Telcom will wait for an incoming call via the modem.

If you are using a direct-connect configuration, select No. When the ANSWER command is executed, Telcom will be ready to respond to the host system immediately.

After making the appropriate selection at this prompt, press TAB to advance to the next prompt.

3. Your entry at the comm line: prompt specifies whether you are using the ZP-150's internal modem or an external modem or direct-connect cable (that is, it specifies whether you are using COM port 0 or 1).

If you are using the internal modem, enter 0 at this prompt to specify COM0:.

If you are using an external modem or direct-connect configuration, enter 1 at this prompt to specify COM1:.

NOTE: When you select No at the using modem: prompt, your entry at the comm line: prompt *must* be 1. This tells Telcom that you are using the external RS-232C port for communications.

After making a valid entry at this prompt, press TAB to advance to the next prompt.

4. Use of the password: prompt is optional. At this prompt, you can enter a password of up to 15 characters that must be received from the remote system before Telcom will permit any file transfers to take place. If you do not require a password to limit access to your system, leave this prompt blank. Otherwise, enter the password you want. Any characters, including spaces, can be used in the password.

After making a valid entry at this prompt or after electing to leave the prompt blank, press TAB to advance to the next prompt.

5. At the greeting: prompt, you can enter the text of a message that will be transmitted to the remote system after receipt of the password (if

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one was specified) or after completion of the incoming connection (if no password was specified). Use of this prompt is optional.

If you do not want to specify a message that will be sent to the remote system, leave this prompt blank. Otherwise, enter the text of the message you want Telcom to send. You can enter a message of up to 25 characters in length, including spaces.

6. After making selections and entries at the ANSWER command prompts, press RETURN to execute the command. If you selected Yes at the using modem: prompt, Telcom enters Answer mode and waits to receive an incoming call. The message and status lines display:

Waiting for call...
Telcom Answer: OFFLINE

until a called is received and a connection established. Then the status line displays:

Telcom Answer: ONLINE hh:mm:ss

where hh:mm:ss is an elapsed-time display.

If you selected No at the using modem: prompt, Telcom is ready to respond to the remote system as soon as the ANSWER command is executed. The status line displays:

Telcom Answer: ONLINE hh:mm:ss

where hh:mm:ss is an elapsed-time display.

NOTE: If you are already connected to a host system when you invoke the ANSWER command, then no ANSWER command prompts will be displayed. Instead, control is immediately transferred to the host system, and the status line displays the Telcom Answer: ONLINE message.

If you remain at your ZP-150 while Answer mode is in effect, you will see a log of what the person at the remote system has done displayed on the LCD screen. If you wish, you can use the Review Text mode and/or Text Capture feature to save a record of the session to file. (See Reviewing and Capturing Text in this chapter.) To terminate Answer mode at any time, press BREAK.

REMOTE COMMAND LINE

When your system is in Answer mode, the operator at the remote system will see a command line generated by the ANSWER command. The command line, which is displayed at the remote system throughout the connection, appears as follows:

List Quit Receive Send>

The remote system operator can invoke any command by entering the first letter of the command name on the keyboard. Each command will provide the host operator with one or more command prompts for the specification of file names, protocol, and so on. Refer to the ANSWER command in Chapter 17, "Telcom Reference," for more information.

Just as in Command mode for your ZP-150, the ESC key will cancel a command at the remote system as long as the operator presses the key before pressing RETURN to execute the selected command.

When the remote system operator executes the QUIT command, Telcom will terminate the communications connection and remain in Answer mode. Telcom will wait for the next caller.

NOTE: If the ZP-150 is connected to an external modem or if you used a direct-connect configuration, Telcom will exit Answer mode and the SESSION command screen will be displayed when the remote system operator executes QUIT. If you want Telcom to wait in Answer mode for another call, you must execute the ANSWER command again.

ADVANCED FEATURES

This section provides information about creating and using a phonebook file and about the OPTIONS command. Creating and using a phonebook is not in itself difficult, but you must be familiar with the File application in order to create a phonebook. If you have not already worked through the tutorials for File that are provided in Chapter 12, "Introduction to File," you may wish to do so at this point.

NOTE: The phonebook files you create for use with Telcom can also be used by the Dialer program. Refer to Chapter 7, "Dialer," for more information.

The OPTIONS command is used to specify global default parameters for Telcom. While the factory-set defaults are adequate for working through the tutorials in this chapter, you will need to know how to use the OPTIONS command when you are ready to establish data communications connections for your own use. The information provided here for the OPTIONS command is intended to be an overview. For detailed information, refer to the OPTIONS command in Chapter 17, "Telcom Reference."

Developing and Using a Phonebook File

Just as a script can make your data communications work faster and simpler, the use of a phonebook can speed up and simplify the placement of calls and the definition of the line protocol required for any given call. Once you

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create a phonebook file, all you need do is give Telcom a name and Telcom will look up the number to dial and the required communications settings.

CREATING A PHONEBOOK FILE

Phonebook files are created with the File application and must conform to certain format and data entry requirements. Otherwise, Telcom will not be able to use them.

To create a phonebook file:

1. From the System Manager screen, use the ARROW keys to select the File application and then enter R to invoke the RUN command. The RUN command prompts appear:

RUN application: FILE file:

2. Notice that FILE is the default entry at the application: prompt. Press TAB to advance to the next prompt.
3. At the file: prompt, enter the name you want your phonebook file to have—for example, PHONE. You need only to enter the primary file name; the File default file name extension will be assigned when you save your file.
4. Press RETURN to load and run File.

Once the File screen appears, you must format the fields for your phonebook file. Decide how many fields of data you want the phonebook to contain for each name that you will enter. Telcom requires three fields in the first three column positions, but you are not limited to these three fields. Telcom requires NAME, NUMBER, and SETTINGS fields, but you may also want to add fields for addresses, birthdays, and anything else you want. When accessing a phonebook file, Telcom expects to find the NAME, NUMBER, and SETTINGS fields in the first, second, and third columns, respectively, but ignores any fields beyond the third field.

5. In File, format (using the FORM record) and name (using the ID record) the NAME, NUMBER, and SETTINGS fields first, then add any fields you want for your own use. The NAME, NUMBER, and SETTINGS fields should be formatted as text fields. They can be any width you want. If you want to make sure that whole settings strings are displayed when you load your phonebook with the File program, you should format the SETTINGS field to be about 25 characters wide. Refer to Formatting Data Fields in Chapter 12, "Introduction to File," for more information about formatting fields.

6. After formatting and naming your fields, enter the names and numbers in the phonebook file NAME and NUMBER fields. You can use delimiters such as parentheses [()] and hyphens (-) in the NUMBER field; Telcom will ignore them when looking up and dialing the numbers.

You do not have to enter the settings strings in the SETTINGS field. However, if you do, you must enter settings in the order of the MODIFY command prompts and you must enter them in the format shown for a Modify: phrase on the SCRIPT command screen. That is, you must use the letter codes that Telcom will recognize, and you must include a semicolon between each string value and those adjacent to it. The simplest way to enter the settings strings is to create them with the MODIFY command as described in Entering or Changing Settings Data in a Phonebook in this chapter.

7. A sample phonebook with entries in the NAME and NUMBER fields is shown in Figure 16.10. After making your entries, quit File and save your phonebook file by pressing **CTRL-F10**.

ENTERING OR CHANGING SETTINGS DATA IN A PHONEBOOK

In the previous section, you learned how to create a phonebook file. In this section, you will learn how to use Telcom's MODIFY command to enter or change the data in the SETTINGS field for any name in your phonebook.

The MODIFY command simplifies the process by which you modify the settings. Refer to the section entitled Establishing a Communications Connection for an initial discussion of the MODIFY command. Entries at the MODIFY command prompts allow you to customize your phonebook entry. (Refer to Figure 16.1 for an illustration of the MODIFY command prompts.) Before you can use the MODIFY command to enter/edit settings data, you must first specify the phonebook file name at the OPTIONS command phonebook: prompt. (Refer to The OPTIONS Command in this chapter or to the OPTIONS command in Chapter 17, "Telcom Reference," for more information about the OPTIONS command.)

ID	NAME	NUMBER	SETTINGS	NEW
FORM	AAAAAAAAAAAAAAA	(AAA) AAA-AAAA	AAAAAAAAAAAAAAA	AAAAAAAAAAA
SORT				
FIND				
1	Home office	(012) 654-3210		
2	VAX computer	(012) 345-6789	1200;1;7;E	
3	Heath	(616) 982-3503		
4	Central office	(012) 543-2109		
NEW				

> Copy Delete Edit Find Insert Jump LookUp Move Options Print
Select option or type command letter
File: PHONE Records: 4/4

Figure 16.10. Sample Phonebook

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All of the changes you make using the MODIFY command will be applied to the phonebook entry you specify at the MODIFY command name: prompt and its current settings when you press RETURN to execute the MODIFY command. Note, however, that if you use all of the default values and selections at the MODIFY command prompts, the SETTINGS field for the name will be blanked out. If you change some, but not all, settings, only the settings that are different from the factory-set defaults will be displayed in the phonebook file.

At the MODIFY command name: prompt, you can use an ARROW key to display a full-page listing of the names in your phonebook.

You can also use wildcard characters (*) or (?) in your entry at the name: prompt and then press any ARROW key to display a selection of names from your phonebook. For example, you could enter Jones* and press any ARROW key, and Telcom would provide a list of all of the Joneses you had listed in the phonebook. Refer to Files and File Names in Chapter 1, "System Manager," for a complete discussion of the * and ? wildcard characters.

USING A PHONEBOOK FILE

Once you have created a phonebook file, you can direct Telcom to use it when establishing a communications connection, whether data or voice. In order for Telcom to use the phonebook, however, you must first specify the phonebook file name at the OPTIONS command phonebook: prompt. (Refer to The OPTIONS Command in this chapter, or to the OPTIONS command in Chapter 17, "Telcom Reference," for more information about the OPTIONS command.)

Once you have identified the phonebook file for Telcom, you can simply enter the name of the system or person you want to call at the CONNECT command name: prompt. If you do not remember how you entered the name in your phonebook file, you can press any ARROW key when the name: prompt is active and Telcom will display a full-page listing of all the names listed in the phonebook. You can then use the ARROW keys to select the name of the system or person you want to call, and Telcom will place the call for you. That is, Telcom will set the line protocol according to the requirements specified in the SETTINGS field for the name you entered, and then will dial the number you entered in the NUMBER field.

EXERCISE

For practice, create a phonebook file as specified in Creating a Phonebook File, then make entries in the NAME, NUMBER, and SETTINGS fields as follows:

1. Enter HEATH in the NAME field.

2. In the NUMBER field, enter the number of the Heath billboard. That is, enter **6169823503**, and include any access digits that you require.
3. Leave the SETTINGS field blank, since the factory-set defaults for the MODIFY command prompts are correct for accessing the billboard using the internal modem.
4. Save your phonebook file.

Next, start Telcom. When the SESSION command screen is displayed:

1. Select the OPTIONS command and press RETURN, or enter **O**. The OPTIONS command prompts appear.
2. At the phonebook: prompt, enter the primary file name of your phonebook file. You do not need to enter a file name extension; Telcom assumes the file has the .DAT extension.
3. You do not need to make entries or selections at any other OPTIONS command prompts for purposes of this exercise. Press RETURN to execute the OPTIONS command.

Now you are ready to place a call to the Heath billboard by using your phonebook. To do so, first make sure that your telephone line is properly connected to the TEL LINE connector on your ZP-150. Then:

1. From the command menu, select the CONNECT command and press RETURN, or enter **C**. The CONNECT command prompts appear.
2. Enter **HEATH** at the **to:** prompt. Alternatively, if the prompt has no default entry, press any ARROW key to display all the names in your phonebook and then use the ARROW keys to select **HEATH**.
3. Press TAB to advance to the **number:** prompt. Notice that when this prompt becomes active, Telcom automatically reads in the proper telephone number from your phonebook. (If there were a default entry at this prompt, you would have to make the prompt active in order to ensure that Telcom will look up and dial the correct number. If there was no default, you would not have to advance the selection highlight to this prompt.)
4. Check the selection and entry at the **using modem:** and **comm line:** prompts, respectively, to make sure they are correct. Then press RETURN to execute the CONNECT command.
5. Telcom dials the number to complete your connection, and uses the line protocol settings string specified in the phonebook once the connection is established.

The OPTIONS Command

The OPTIONS command lets you set some ground rules for how you want Telcom to work for you. Through this command you can specify information such as:

- the name of the file to which you want Telcom to send captured text,
- the phonebook file name, and
- the number of times you want a number redialed if there is no answer or a busy signal is encountered on the first try.

You set these by making entries and selections at the OPTIONS command prompts. When the command is executed, Telcom will remember the settings you specified and use them for all your communications sessions until you change them by executing the OPTIONS command again.

When you invoke the OPTIONS command, the OPTIONS command prompts will be displayed as shown in Figure 16.11.

At the `capture to:` prompt, you can specify the name of the file to which you want Telcom to send any captured text you will be receiving. If you do not make an entry at this prompt, Telcom will use the default file name SESSION.TXT.

To the right of the `capture to:` prompt is the `phonebook:` prompt. This is where you specify the name of the database file you want Telcom to use as the phonebook. Telcom will use the file containing the currently used phonebook listing if you do not specify otherwise. The first time you use Telcom, however, there is no default entry for this prompt.

There will be instances when you want to access a long distance number using an independent telephone service. To do so, you dial a sequence of numbers, perhaps with a pause (entering a plus sign (+) will cause Telcom to pause for one second). You can make an entry at the `dialing prefix:` prompt that specifies up to 15 characters that Telcom should automatically prefix to any number before dialing. There is no factory-set default for this prompt. Otherwise, the default entry is the prefix you specified the last time you executed the OPTIONS command.

```
OPTIONS capture to: SESSION.TXT          phonebook:  
dialing prefix:                      area code:           call retries: 0  
dialing type:(Tone)Pulse            speed:(Slow)Fast    wait for tone: 2  
review text lines: 30                  disconnect after: 10
```

Figure 16.11. OPTIONS Command Prompts

At the **area code:** prompt, you can specify how you want the numbers stored in the phonebook to be used by Telcom. While you can list phone numbers with area codes, you may want to dial certain numbers locally. When you access an information utility or database using a timesharing service, you can use a local number, but you still want to keep the area code in your phonebook listing. At the **area code:** prompt, you can specify up to five digits you want Telcom to drop from the beginning of a phone number before dialing it. The default entry at this prompt is the entry you made the last time you executed the OPTIONS command. There is no factory-set default for this prompt.

Occasionally, you will request Telcom to dial a number and it will receive a busy signal or no answer. At the **call retries:** prompt, you can state the number of times you want Telcom to try redialing. Telcom will wait 5 seconds between not getting a response and redialing. You can specify between 0 and 15 retries. As your ZP-150 is shipped, Telcom will use 0 as the default entry. Otherwise, the default entry at this prompt is the entry made the last time you executed the OPTIONS command.

The information you need in order to make the correct selections at the **dialing type:** and **speed:** prompts is easily obtained by calling your local telephone company. You need to know:

- the type of dialing supported—tone or pulse and
- if it is pulse dialing—fast or slow.

The selection you make at the **speed:** prompt is used by Telcom only if you specified pulse dialing at the **dialing type:** prompt.

Your entry at the **wait for tone:** prompt specifies the amount of time in seconds that Telcom will let pass between seizing the phone line (going off-hook) and dialing the first digit of a number. You can enter a value between 1 and 15 seconds, inclusive. The default entry at this prompt is 2 seconds, or the value that was specified the last time you executed the OPTIONS command.

The **review text lines:** prompt allows you to adjust the size of the review buffer so that you can save the information that scrolls off the screen for later review.

The **disconnect time:** prompt helps keep down connect time charges. You are charged for every second you are connected to a host system, even when you are not actively communicating, sending, or retrieving information. Disconnect time safeguards you from being charged for idle time. You specify what you consider to be a fair amount of idle time you will allow to pass—from 1 to 1440 minutes—before you want Telcom to terminate the communications connection. If you never want Telcom to automatically terminate a connection, specify 0 minutes.



CHAPTER 17

TELCOM REFERENCE

In this chapter you will find the details specific to operating your ZP-150 Telcom application. This chapter includes a description of the function keys that implement Telcom's features, an alphabetical list of Telcom's commands, and a list of error messages that can occur while you are using Telcom.

FUNCTION KEYS

In addition to the system function keys described in Chapter 1, "System Manager," Telcom makes use of the following sets of keys:

- Selection Keys
- Scrolling Keys
- Program Function Keys
- Special Purpose Keys

Selection Keys

Throughout Works, the ARROW keys are called *selection keys* when you use them to select text or data for command execution. In Telcom, one function of the UP ARROW and DOWN ARROW keys is to select various locations in the review buffer as you use Review Text mode. They can also be used in the SCRIPT command screen to select phrases in the script you are creating or modifying.

At command prompts requiring the entry of a file name, the ARROW keys can be used to display a full-page listing of files.

Table 17.1 describes the functions of the ARROW keys in Telcom. For information about full-page listings of files, refer to Chapter 1, "System Manager."

Once you have selected a particular character or phrase, you can use the ARROW keys in combination with the EXTEND SELECT key (F6) to extend the selection to include any group of lines. See Program Function Keys later in this chapter for more details.

Table 17.1. ARROW Key Functions

KEY	ACTION
UP ARROW	In Review Text mode—selects the line directly above the currently selected line. In the SCRIPT command screen—selects the phrase directly above the currently selected phrase. At specific command prompts—provides a full-page listing of files. While on-line—enters Review Text mode and scrolls the display up one line.
DOWN ARROW	In Review Text mode—selects the line directly below the currently selected line. In the SCRIPT command screen—selects the phrase directly below the currently selected phrase. At specific command prompts—provides a full-page listing of files. While on-line—enters Review Text mode and scrolls the display down one line.
LEFT ARROW	At specific command prompts—provides a full-page listing of files.
RIGHT ARROW	At specific command prompts—provides a full-page listing of files.

Scrolling Keys

You can also use the ARROW keys to scroll the display in Review Text mode.

When the selection highlight is on the last visible line on the screen, the DOWN ARROW key scrolls the display forward (up) one line at a time, as well as selecting the next line of data.

When the selection highlight is on the first visible line on the screen, the UP ARROW key scrolls the display backward (down) one line at a time, as well as selecting the previous line of data.

Table 17.2. SHIFT-Modified ARROW Keys

KEY	ACTION
SHIFT-DOWN ARROW	In Review Text mode—displays the next screen of text. In the SCRIPT command screen—displays the next screen of phrases.
SHIFT-UP ARROW	In Review Text mode—displays the previous screen of text. In the SCRIPT command screen—displays the previous screen of phrases.

USING THE ARROW KEYS WITH THE SHIFT KEY

By holding down the SHIFT key and pressing the appropriate ARROW key, you display the next or previous screen of text in the SCRIPT command screen or in Review Text mode. SHIFT-modified ARROW keys operate as described in Table 17.2.

USING THE ARROW KEYS WITH THE CONTROL KEY

By holding down the CTRL key and pressing the UP or DOWN ARROW key, you display the first or last line or phrase of text in Review Text mode or in the SCRIPT command screen, respectively. CTRL-modified ARROW keys operate as described in Table 17.3.

Table 17.3. CTRL-Modified ARROW Keys

KEY	ACTION
CTRL-UP ARROW	In Review Text mode—moves the selection highlight from the currently selected line to the first line of text. In the SCRIPT command screen—moves the selection highlight from the currently selected phrase to the first phrase in the script.
CTRL-DOWN ARROW	In Review Text mode—moves the selection highlight from the currently selected line to the end-of-text marker. In the SCRIPT command screen—moves the selection highlight from the currently selected phrase to the end-of-text marker.

Program Function Keys

Telcom contains two sets of program function keys. The first set consists of F1, F3, F4, F6, and the Edit keys, F7–F10. Table 17.4 describes their functions.

Table 17.4. Program Function Keys

FUNCTION	KEY	ACTION
LABEL	F1	Displays a keymap of the other keys in the set. The keymap replaces the command, message, and status lines. Press any other key in the set or, to simply erase the keymap, press F1 again.
TEXT CAPTURE	F3	Turns the Text Capture feature on and off; <i>Cp</i> appears on the status line.
PRINT TEXT	F4	Turns the Print Text feature on and off; <i>Pr</i> appears on the status line.
EXTEND SELECT	F6	In Review Text mode or when creating or editing scripts, this key allows you to use the ARROW keys to expand the current selection to any group of lines. Press F6 once more to erase extended selection and cause ARROW keys to again select individual characters. You can select large portions of text by pressing the EXTEND SELECT key and then using SHIFT-modified or CTRL-modified ARROW keys. When you scroll the display after pressing EXTEND SELECT, Telcom extends the selection highlight from the starting point to the ending point of the scrolling action.
WORD LEFT	F7	Selects the word to the left of the currently selected word. Use to edit entries at command prompts.
WORD RIGHT	F8	Selects the word to the right of the currently selected word. Use to edit entries at command prompts.
CHARACTER LEFT	F9	Selects the character to the left of the currently selected character. Use to edit entries at command prompts.
CHARACTER RIGHT	F10	Selects the character to the right of the currently selected character. Use to edit entries at command prompts.

Table 17.5. SHIFT-Modified Program Function Keys

FUNCTION	KEY	ACTION
LABEL	SHIFT-F1	Displays a keymap of the other keys in the set. The keymap replaces the command, message, and status lines. Press any other key in the set or to simply erase the keymap, press SHIFT-F1 again.
CLEAR CAPTURE FILE	SHIFT-F3	Erases the contents of the Text Capture file.
VOICE	SHIFT-F4	VOICE key is on, indicating that only voice (and no data) communications will be conducted.

USING THE PROGRAM FUNCTION KEYS WITH THE SHIFT KEY

You use the second set of Telcom's program function keys by holding down the SHIFT key and pressing F1, F3, or F4. Refer to Table 17.5 for a description of those keys.

Special Purpose Keys

Telcom has a few other keys that perform important functions. These are described in Table 17.6.

Table 17.6. Special Purpose Keys

KEY	ACTION
BREAK	Aborts an in-progress operation or command execution; cancels a command after RETURN is pressed. NOTE: BREAK is entered by pressing SHIFT-PAUSE.
CTRL-ALT-PAUSE	Transmits a break signal to the host while you are using Terminal mode.
DEL	In Terminal mode—transmits a delete character. At command prompts—deletes the current selection. In the SCRIPT command screen—deletes selected phrase(s).
ESC	Cancels the current command before RETURN is pressed.
PAUSE	Enters Review Text mode.
SHIFT-ESC	Switches Telcom from Terminal mode to Command mode.

STATUS LINE INDICATORS

The status line displays various indicators that show what modes or features are currently active. Status line indicators that you may see in Telcom are described in Table 17.7.

Table 17.7. Status Line Indicators

INDICATOR	DESCRIPTION
Voice	The VOICE key is on, indicating that only voice (and no data) communications will be conducted.
Cp	The Text Capture feature is active. All data sent and received over the communications line is written to a file.
Pr	The Print Text feature is active. All text that appears on the screen will be echoed to the attached printer.
Rv	The Review Text mode is in effect. This appears only if you are reviewing text in Terminal mode.
Xoff	Telcom has received an XOFF character from the remote/host computer system. Telcom has been requested to temporarily suspend data transmission.
Ex	The Extend Selection feature is active. (Refer to Program Function Keys in this chapter for details.)
Lo	System memory is low. To free more memory, return to the System Manager screen, decide what files to delete, and delete them.
♫	Displayed only if the ZP-150 is connected to a phone line and an incoming call is detected.
☀	Displayed only if alarms you have set (via Calendar or Alarm) have rung and need to be acknowledged.

RS-232C HARDWARE CONNECTIONS

The ZP-150 has a rear connector (a *port*) that can be used with an external modem to achieve a higher throughput than the internal modem can provide. This external port, labeled RS 232C, can also be used when you want to make a direct (hard-wired) connection to another computer system.

The port is a 25-pin DB-25 connector located in the rear panel of the ZP-150. It conforms to the RS-232C communications standards.

This port is wired as Data Terminal Equipment (DTE). You will need to know this in order to successfully connect the ZP-150 to another computer system or modem using this port.

Consult the manual that comes with the device with which you are attempting to communicate. If the port is wired as Data Communications Equipment (DCE), you will need an 8-conductor RS-232C communications cable to complete the connection.

If the port is wired as a DTE, you will need an 8-conductor RS-232C null communications cable.

CONFIGURING YOUR SYSTEM FOR A SERIAL PRINTER

One function of Telcom that is important throughout Works is the use of Telcom commands to configure Works for a serial printer. When your system is properly configured, the ZP-150 supports any printer that has an RS-232C serial port. Use a null communications cable with appropriate connectors at each end to complete the hardware interconnections.

To configure your system for a serial printer:

1. From the SESSION command screen, select **Modify** and press RETURN, or enter **M**. The MODIFY command prompts are displayed. (Refer to the MODIFY command in this chapter.)
2. At the appropriate MODIFY command prompts, specify the baud rate, word length, stop bits, and parity for your serial printer. In addition, select XON/XOFF if your printer supports that type of handshaking.
3. Press RETURN to execute the MODIFY command.
4. From the SESSION command screen, select **Connect** and press RETURN, or enter **C**. The CONNECT command prompts will be displayed. (Refer to the CONNECT command in this chapter.)

5. At the CONNECT command using modem: prompt, select No. At the comm line: prompt, enter 1. Leave the other two CONNECT command prompts blank.
6. Press RETURN to execute the CONNECT command.
7. Press SHIFT-ESC to exit Terminal mode and return to Command mode.
8. Select Disconnect and press RETURN, or enter D.
9. When the DISCONNECT command prompts you to Enter Y to confirm, enter Y. Serial port COM1: is now configured for printing.

Once your system is properly configured as described in the preceding steps, you can print to your serial printer by entering COM1: at any command prompt that normally allows you to specify PRN:.

NOTE: Hardware handshaking is not supported. The ZP-150 provides no handshaking signals to the serial port. Some printers, such as the Diablo, require pin 6 (Data Set Ready) to be high before they will print data. For printers such as this, the cable you use must have pin 6 tied to pin 20 on the printer end.

USING TELCOM UNDER LOW MEMORY CONDITIONS

General considerations for conserving system memory and recovering from low memory or an out of workspace condition are provided in Chapter 1, "System Manager." In Telcom, there are a number of circumstances under which you may run out of workspace or system memory. This section provides general guidelines and recovery procedures for these circumstances and situations.

When you are working in Telcom and memory is limited, you may run out of memory in the midst of any of the following tasks:

- temporarily storing text in the review buffer,
- capturing text to a file,
- receiving data to a file through the TRANSFER RECEIVE command,
or
- editing a script.

Storing Text in the Review Buffer

The number of lines that you can store in the review buffer at any given time depends on more than the size of the review buffer as specified with the OPTIONS command. It also depends on:

- the amount of workspace left in your review buffer file and
- the amount of free system memory available.

When you first start Telcom, the L_o indicator will appear on the status line if available system memory is not sufficient to support the size that is currently specified for the review buffer. If you see the L_o indicator when you first start Telcom, you can either:

- increase the amount of available system memory by following the procedures described in Chapter 1, "System Manager" or
- decrease the size of the review buffer as defined with the OPTIONS command.

If available workspace in the review buffer file is not sufficient for the buffer size you specify at the OPTIONS command review text lines: prompt, then your entry will be disallowed and the message line will display:

Number outside allowable range

If you see this message when you are trying to execute the OPTIONS command, specify a smaller value at the review text lines: prompt.

Capturing Text to a File

The amount of new text that you can capture to a file depends upon the amount of system memory available and the current size of the text capture file. If your text capture file reaches the maximum allowable size (64K) before you have captured all incoming text, Telcom displays an error message and returns you to Command mode. You will not, however, lose your connection to the remote system.

If the error message displayed is:

Not enough system memory

then use the procedures provided in Chapter 1, "System Manager," to recover enough system memory to allow you to increase the amount of text you can capture.

If the error message displayed is:

Output file too large

then you have run out of workspace in your text capture file. You should invoke the OPTIONS command, enter a new file name at the capture to: prompt, and press RETURN to execute the OPTIONS command. The file that was open to receive captured text is closed, and the new file is opened. You can then return to Terminal mode and continue capturing text to the new file.

Receiving Data to a File

The amount of data that you can receive to a file when you are using the TRANSFER RECEIVE command depends upon the amount of system memory available and upon the current size of the file. If the file you are receiving reaches the maximum allowable size (64K) or if you run out of system memory before you have received all of the file, Telcom terminates the TRANSFER RECEIVE command and displays an error message. Telcom will be in Command mode, but you will not lose your connection to the remote system.

If the error message displayed is:

Not enough system memory

then use the procedures provided in Chapter 1, "System Manager," to recover enough system memory to allow you to increase the size of the file you can receive. Delete the partial file you received, then invoke the TRANSFER RECEIVE command again.

If the error message displayed is:

Output file too large

then you have run out of workspace for the file you are receiving. You should invoke the TRANSFER RECEIVE command again and specify a new file at the to: prompt. When you press RETURN to execute the TRANSFER RECEIVE command, the filled file will be closed, the new file opened, and you can return to Terminal mode. Additional data will be written to the new file.

Editing a Script

While it is unlikely that you will ever run out of workspace while adding phrases to or deleting phrases from a script, you may run out of system memory. If system memory becomes too low to allow you to continue editing

a script, the phrase deletion or insertion that you were attempting will be disallowed and the message line will display:

Free space in system memory: nnnnn

where *nnnnn* is the amount of memory remaining, in bytes.

If this occurs, you should save your script and use the procedures described in Chapter 1, "System Manager," to free enough system memory so that you can complete your script.

Should you ever create a script so large that it requires a file greater than 64K in size (that is, if the message line ever displays Free work space: nnnn while you are editing a script), then you will have to create two scripts to accomplish the sequences you want. Then, when you are using the scripts, you can run them consecutively in the proper order.

TELCOM COMMANDS

Table 17.8 lists each Telcom command with a brief description. Following the table is a description of command selection and then a detailed explanation of each command. This explanation includes:

- the command submenu or command prompts that appear when you select the command and
- a description of each command prompt.

Using Commands

In Telcom, you establish and terminate a communications connection, modify communications line parameters, and transfer files by using commands from command menus.

Choose a command either by typing the initial letter of the command name or by pressing TAB or SPACE BAR to position the selection highlight over the command and pressing RETURN. For example, if you wanted to select the CONNECT command, you would either press C, or you could press SPACE BAR until the selection highlight is positioned over Connect in the command menu and then press RETURN.

For most commands, you must select from listed responses or make entries (assuming that the default responses do not suit you) before Telcom can execute the command. If you have already established a connection, Telcom executes some commands as soon as you invoke them.

Table 17.8. Telcom Command Summary

COMMAND	DESCRIPTION
ANSWER	Lets other systems access your ZP-150.
CONNECT	Establishes a communications connection to another computer system or telephone.
DISCONNECT	Terminates a communications connection.
MODIFY	Defines the operating environment and sets line communications protocol.
OPTIONS	Specifies settings for some of the more advanced features of Telcom.
PAUSE	Allows you to pause for a specified interval within a script before the next phrase is executed.
RESPOND	Allows you to enter phrases in a script to respond to a received character string with a character string.
RUN	Executes a script.
SCRIPT	Allows you access the SCRIPT command screen to create a script or modify an existing one.
SESSION	Saves the current script and returns you to the SESSION command screen.
TRANSFER	Displays a submenu of commands you can use to send and receive files.
TRANSFER RECEIVE	Lets your ZP-150 receive files from another computer system.
TRANSFER SEND	Lets your ZP-150 send files to another computer system.

At command prompts you must either make an entry or make a selection from a list of valid responses. Depending upon the command, the default entries or selections at command prompts reflect either Telcom's built-in defaults or the entry or selection you made the last time you used the command. If all defaults are correct, you simply press RETURN to execute the command. If the default for a command prompt is unacceptable, either make a new selection or a new entry.

To choose a selection at a command prompt that lists valid responses, either:

- press the initial letter of the option or
- press SPACE BAR to highlight your choice.

NOTE: Use SPACE BAR to move from option to option within a command prompt. Do not press TAB—within command prompt listings, TAB moves you from prompt to prompt and SPACE BAR moves you from option to option.

To enter a different response, either type a new entry or change the existing entry by using the keys shown in Table 17.9.

Once you have completed answering the command's prompts, you are ready to tell Telcom to execute the command or to cancel it. To execute the command, press RETURN. To cancel a command before you have pressed RETURN, simply press ESC.

To cancel a command after RETURN has been pressed, simply press the BREAK key (SHIFT-PAUSE). For example, this key might be used to abort the CONNECT command after the first few digits of the telephone number had already been dialed.

NOTE: The command menu displayed on the SCRIPT command screen has five commands that are identical to their SESSION command screen counterparts. The only difference is in the way they are used. Within the SCRIPT command screen the commands will be inserted into a script and will be executed automatically when that script is run.

Table 17.9. Key Entries in Command Prompts

KEY	ACTION
F7	Moves highlight one word to the left.
F8	Moves highlight one word to the right.
F9	Moves highlight one character to the left.
F10	Moves highlight one character to the right.
DEL	Erases the highlighted character(s).
BACK SPACE	Erases one character to the left of the highlight.

ANSWER

PURPOSE

Use the ANSWER command to put your ZP-150 in Answer mode and allow a host computer system access to your files.

EXPLANATION

The ANSWER command is available only from the SESSION command screen.

The ANSWER command has four command prompts. To execute the ANSWER command:

1. Select Answer and press RETURN, or enter A. The ANSWER command prompts appear:

ANSWER using modem: Yes No password:	comm line: 0 greeting:
---	---------------------------

2. Make the appropriate entries at the command prompts (described in the following section).
3. Press RETURN to execute the command.

The ANSWER command can be used any time you want to access your ZP-150 from another computer. You may have Word files on the ZP-150 that you want to archive or edit on your office microcomputer system. Answer mode can be used to transfer these files through either a direct connection or the phone lines. Plan files and BASIC programs can also be transferred this way.

You may have a file that contains a record of your last communications session (using the Text Capture feature) that you want to keep. This file can be transferred to your office computer system. Alternatively, you may have a Word file on your office microcomputer that you would like to transfer to the ZP-150 and take with you on a business trip. The ANSWER command will let you do this easily.

NOTE: Word files that are sent from another computer system must have been saved *unformatted*. The file name you specify on the ZP-150 side must not end in .WRD, .TEL, or .PLN. These are reserved for System Manager use. Refer to Chapter 18, "Introduction to Word," for information on preparing ZP-150 Word files for transfer. For more information about transferring files between your ZP-150 and a desktop computer system, refer to Chapter 3, "ZP-150 Applications."

Plan files should be saved in SYLK format. Refer to the chapters on Plan for instructions on converting Plan files to the SYLK format.

NOTE: In Answer mode, Telcom automatically changes parameters specified at the MODIFY command prompts to be the following:

filter chars: No
xon/xoff: Yes
terminal: No
strip linefeeds: No

This is done to better facilitate communications. Your own parameter settings in the MODIFY command prompts will be restored when you exit Answer mode.

COMMAND PROMPTS

The ANSWER command has four command prompts that are displayed at the local system and a command line that is displayed at the remote system. The *local system* is the ZP-150 at which the ANSWER command was invoked. The *remote system* is the host system. The local command prompts and the remote command line are discussed in the subsections that follow.

Local Command Prompts

At the local system, the ANSWER command produces four command prompts. Following is a description of each prompt, the message that is displayed when each prompt is active, and the selections or entries you can make.

using modem:

When this prompt is active, the message line displays Select option.

Your selection at this prompt specifies whether you are using a modem or a direct connection. If you are using a modem, select Yes. When the ANSWER command is executed, Telcom will wait for an incoming call via the modem.

If you are using a direct connection, select No. When the ANSWER command is executed, Telcom will be ready to respond to the host system immediately.

The default selection at this prompt is always Yes.

After making a valid selection at this prompt, press TAB to advance to the next prompt.

comm line:

When this prompt is active, the message line displays Enter number.

Your entry at this prompt specifies whether you are using the ZP-150's built-in modem or an external modem or direct connection. Valid entries are 0 or 1.

If you are using the internal modem, enter 0.

If you are using an external modem or direct-connect cable, enter 1.

The default entry at this prompt is the entry made the last time the ANSWER command was executed. As your ZP-150 is shipped, the default is 0 for the internal modem.

After verifying the default entry or making a valid entry at this prompt, press TAB to advance to the next prompt.

password:

When this prompt is active, the message line displays Enter text. You can enter a password of up to 15 characters that the remote computer operator must enter before he or she can gain access to your ZP-150. Use of a password is optional; leave this prompt blank if you do not require a password.

The default entry at this prompt is the currently specified password, if one exists. Otherwise, there is no default.

If you want to specify a password, enter the password. You can use any characters, including spaces, as long as the total length of the password does not exceed 15 characters.

After making a valid entry at this prompt, press TAB to advance to the next prompt.

greeting:

When this prompt is active, the message line displays Enter text. You can enter a message that will be sent to the host after receipt of the password specified at the password: prompt. Or, if no password is specified, the message you enter at the greeting: prompt will be transmitted to the remote as soon as a connection is established. Use of a greeting is optional; leave this prompt blank if you do not want to send a message to the remote.

The default entry at this prompt is the currently specified message, if one exists. Otherwise, there is no default.

If you want to specify a message, enter the text of the message, up to a maximum of 25 characters. You can use any characters, including spaces, as long as the total length of the message does not exceed 25 characters.

After making a valid entry at this prompt, press RETURN to execute the ANSWER command.

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If you selected Yes at the using modem: prompt, Telcom will wait to receive a call, and the message and status line will display:

Waiting for call...
Telcom Answer: OFFLINE

until a call is received and a connection established. To terminate Answer mode, press BREAK or ESC.

If you selected No at the using modem: prompt, Telcom is ready to respond to the remote system, and the status line displays:

Telcom Answer: ONLINE hh:mm:ss

where hh:mm:ss is an elapsed-time display.

Remote Command Line

Once you make entries at the command prompts and press RETURN, Telcom switches to Answer mode. After a connection has been established, the remote or host system operator sees the following command line:

List Quit Receive Send>

The host operator chooses a command from this command line by entering the first letter of the command. Each command will display a prompt in the message line. In most cases, the host operator can enter the first letter of an appropriate response to prompts regarding protocol.

To cancel a command before RETURN has been pressed, the host operator can press ESC.

NOTE: The ZP-150 operator (if one is present) will see the entire session on the screen. Both Text Capture and Review Text mode are active. Answer mode can be aborted from the ZP-150.

In the paragraphs that follow, each of the four commands on the remote command line are described individually, along with any messages or prompts that are displayed when the command is selected.

LIST

Use the LIST command to obtain a listing of one, some, or all files in the ZP-150. To use the LIST command:

1. Enter L.
2. Enter the primary file name and extension of the file. Wildcard characters can be used to list all files or a selected group of files. For

information about wildcard characters, refer to Chapter 1, "System Manager."

3. Press RETURN to execute the command.
4. The specified file(s) will be transmitted to the host and listed on the screen.

QUIT

Use the QUIT command to terminate the communications session. To use the QUIT command:

1. Enter Q. The following prompt is displayed:
Enter Y to confirm
2. To confirm selection of the QUIT command and terminate the communications session, enter Y. The ZP-150 will remain in Answer mode and wait for the next call.

NOTE: If you are using an external modem or direct-connect cable instead of the internal modem, then the ZP-150 will *not* remain in Answer mode. It will return to Command mode, and subsequent incoming calls will not be answered.

If you do not want to terminate the session, enter N. The ZP-150 will remain connected to the host. The remote command line will be displayed again, and another command can be selected.

RECEIVE

Use the RECEIVE command to transfer a file from the ZP-150 to the host system. A file transfer program must be used in conjunction with RECEIVE to ensure proper file transfer and receipt. To use the RECEIVE command:

1. Enter R. The following prompt is displayed:
protocol:
2. To use XMODEM protocol, enter X. If no protocol is to be used, enter N.
3. Press RETURN. The following prompt is displayed:
file to receive:

4. Enter the name of the file that is to be transferred from the ZP-150 to the host system.
5. Press **RETURN** to begin file transfer.

Once the file transfer is in progress, the host system operator can abort it by pressing **BREAK**.

SEND

Use the SEND command to transfer a file from the host computer system to the ZP-150. A file transfer program must be used in conjunction with SEND to ensure proper file transfer and receipt. To use the SEND command:

1. Enter **S**. The following prompt is displayed:
protocol:
2. To use XMODEM protocol, enter **X**. If no protocol is to be used, enter **N**.
3. Press **RETURN**. The following prompt is displayed:
file to send:
4. Enter the name of the file that is to be transferred from the host system to the ZP-150.
5. Press **RETURN** to begin file transfer.

Once the file transfer is in progress, the host system operator can abort it by pressing **BREAK**.

Refer to the TRANSFER command in this chapter and to Transferring Files in Chapter 16, "Introduction to Telcom," for details on file transfer and XMODEM protocol.

CONNECT

PURPOSE

Use the CONNECT command to initiate and establish a communications connection. Execution of the CONNECT command puts your ZP-150 in Terminal mode.

EXPLANATION

Whenever you want to initiate a connection with another computer system, you will use the CONNECT command. You can specify the number you want to dial, either through a phonebook entry or by using the keyboard and the communications line you will use.

The CONNECT command is available from both the SESSION command screen and the SCRIPT command screen. When you execute CONNECT from the SESSION command screen, it will be executed immediately. When you execute CONNECT from the SCRIPT command screen, it will be executed when the script you are creating or modifying is run.

To execute the CONNECT command:

1. Select Connect and press RETURN, or enter C. The CONNECT command prompts appear:

CONNECT to: using modem: Yes No	number: comm line:
------------------------------------	-----------------------

2. Make appropriate entries and selections at the prompts (described in the following section).
3. Press RETURN to execute the command.

COMMAND PROMPTS

The CONNECT command has four command prompts. Following is a description of each prompt, the message that is displayed when each prompt is active, and the entries and selections you can make.

to:

When this prompt is active, the message line displays Enter text or use direction keys. An entry need be made at this prompt *only* if you have a phonebook file and are using the internal modem and want Telcom to dial the number for you. If you are using an external modem or do not have a phonebook file, leave this prompt blank.

If you have previously created a phonebook file, enter the name listed in the phonebook for the system or party you want to call. Alternatively, you can press any ARROW key to display a list of all the names in the phonebook and then use the ARROW keys to select the name from the list. The prompt entry area must be blank to display all phonebook entries.

NOTE: The phonebook file in which the name you enter is listed must be specified with the OPTIONS command.

When you enter a name at the **to:** prompt, you can use wildcards in your entry and then press an ARROW key to search for and display a selected group of names in the phonebook. Wildcards are used in the same manner as when they are used in file names at other command prompts. For example, adding an asterisk (*) to a name will cause Telcom to search for a name that matches any of the characters in the name you entered. Adding a question mark (?) will cause Telcom to search for any names that match all the other characters. Refer to Files and File Names in Chapter 1, "System Manager," for more information about wildcard characters.

The default entry at this prompt is the name that was entered the last time the CONNECT command was executed.

After verifying that the default entry is correct or after making a valid entry, you can press RETURN to execute the command. No other command prompt entries are required. (The number listed in the phonebook for the name you entered or selected will be dialed.)

However, if you are not using a phonebook entry, if you wish to dial a number not listed in the phonebook, or if you are not using the internal modem, press TAB to advance to the next prompt.

NOTE: If you choose to *type* in a name listed in the phonebook, the corresponding number will not display at the **number:** prompt unless you move the selection highlight to that prompt.

number:

When this prompt is active, the message line displays **Enter text.** The default entry at this prompt is the number listed in the phonebook for the name entered at the **to:** prompt, or the last number dialed (if no entry was made at the **to:** prompt). An entry need be made at this prompt *only* if you are using the internal modem. If you are not using the internal modem, leave this prompt blank.

If the default entry is not correct, enter the number you want Telcom to dial. You can enter any number string up to 35 characters in length. Any combination of the following characters can be entered:

- | | |
|---|-------------------------|
| P | initiates pulse dialing |
| T | initiates tone dialing |

* or # causes the appropriate tones associated with the symbol to be generated
0-9 dials the digits with the appropriate tones or pulses
+ causes a one-second pause in the dialing sequence

Telcom will try to dial whatever number you give it; however, it will dial for you only when you are using the internal modem.

using modem:

When this prompt is active, the message line displays **Select option**. The selection you make at this prompt specifies whether you are using the internal modem (or an acoustic coupler) or an external modem. Valid selections are **Yes** and **No**.

If you are using the internal modem or an acoustic coupler, select **Yes**. Connect the phone line or the acoustic coupler to the appropriate connector on your ZP-150. (Refer to Chapter 4, "External Devices.") In addition, if you are using the internal modem, set the ACP/DIR switch to DIR. For an acoustic coupler, set the switch to ACP. When you use the internal modem, Telcom will attempt to dial the number specified at the **number:** prompt. When you are using an acoustic coupler, you should leave the **number:** prompt blank and dial the number manually.

NOTE: If you are using an acoustic coupler, the baud rate cannot exceed 300 baud.

If you are using an external modem or direct connection to another system, select **No** at the **using modem:** prompt. Hardware connections must be completed via the ZP-150 RS-232C port. When the CONNECT command is executed, Telcom will connect directly to the modem or remote system. Any entry that was made at the **number:** prompt will be ignored. Consult your modem manual for the proper keyboard sequence needed to initiate dialing.

comm line:

When this prompt is active, the message line displays **Enter number**.

Your entry at this prompt specifies whether you are using the ZP-150's built-in modem or an external modem or direct connection. Valid entries are **0** or **1**.

If you are using the internal modem, enter **0**.

If you are using an external modem or direct-connect cable, enter **1**.

The default entry at this prompt is the entry made the last time the CONNECT command was executed. As your ZP-150 is shipped, the default is **0** for the internal modem.

After making a valid entry at this prompt and after verifying that entries and selections at all prompts are correct, press RETURN to execute the CONNECT command. If you are working in the SCRIPT command screen, the CONNECT command, along with the entries you made, is entered into the script.

If you are working in the SESSION command screen and Telcom is dialing the number you specified, the message line displays:

Dialing...

while the number is actually being dialed. When dialing is complete and Telcom is waiting for an answer at the called number, the message line displays:

Waiting...

and the status line displays:

Telcom Session: OFFLINE

Once a connection has been established, the status line displays:

Telcom Session: ONLINE hh:mm:ss

where hh:mm:ss is an elapsed-time display.

DISCONNECT

PURPOSE

Use the DISCONNECT command to terminate a communications connection.

EXPLANATION

Once you have used the CONNECT command to establish a communications session, you will execute the DISCONNECT command when you are finished and no longer want to communicate with the remote computer system.

NOTE: Telcom will automatically disconnect if the carrier tone (supplied by the host computer's modem) is lost in the middle of a connection.

You cannot terminate the connection by pressing the QUIT key (CTRL-F10). This is because the QUIT key is designed to retain the connection while you work with other programs.

The DISCONNECT command is available from both the SESSION command screen and the SCRIPT command screen. When you execute DISCONNECT from the SESSION command screen, it will be executed immediately. When you execute DISCONNECT from the SCRIPT command screen, it will be executed when the script you are creating or modifying is run.

To execute the DISCONNECT command:

1. Select Disconnect and press RETURN, or enter D. The DISCONNECT command prompt appears:

DISCONNECT:
Enter Y to confirm

2. Respond to the prompt (described in the following section).

COMMAND PROMPT

The DISCONNECT command has one command prompt. Following is a description of the prompt and the entries you can make.

DISCONNECT:
Enter Y to confirm

When this prompt is displayed, you must make an entry to confirm that you want to terminate the connection before Telcom will disconnect.

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Telcom Reference

If you want to terminate the connection, enter Y.

If you do *not* want to terminate the connection, enter N to abort the command and continue the communications session.

MODIFY

PURPOSE

Use the MODIFY command to change line communication parameters and to select ANSI terminal emulation. Also, use it to configure Works for the use of a serial printer connected to the RS-232C connector.

EXPLANATION

Successful computer communications depend upon configuring both your ZP-150 and the host computer for the same operating environment. That is, parameters such as baud rate, stop bits, and word length must be consistent between both computer systems. To properly configure your ZP-150, you must be able to answer the MODIFY command prompts correctly with the settings of the host computer system that you want to dial.

If you wish to use a serial printer, you must use the MODIFY command to configure your system. After specifying appropriate printer parameters with the MODIFY command, you must use the CONNECT command to access serial port COM1: (Refer to Configuring Your System for a Serial Printer in this chapter.) Once your system is properly configured, you can print on a serial printer by specifying COM1: at any command prompt that allows you to specify PRN: (PRN: is the device name used for a parallel printer. For more information about external devices and device names, refer to Chapter 4, "External Devices.")

The MODIFY command is also used to create or make changes to the contents of the SETTINGS field in the phonebook without editing the phonebook with File. This is the easiest way to create or modify the parameters in the SETTINGS field. Changes that you make when using the MODIFY command will be added to the phonebook when you press RETURN.

NOTE: If you change settings directly (via the phonebook), you will be presented with the string of setting items. See Using MODIFY to Change Phonebook Settings Strings for more information about settings strings requirements and both methods of modifying your settings.

The MODIFY command is available from both the SESSION command screen and the SCRIPT command screen. When you execute MODIFY from the SESSION command screen, it will be executed immediately. When you execute the MODIFY command from the SCRIPT command screen, it will be entered into the script you are creating or modifying and executed when the script is run.

To execute the MODIFY command:

1. Select Modify and press RETURN, or enter M. The MODIFY command prompts are displayed:

```
MODIFY name:          baud rate: 300      stop bits:(1)2
word length: 6 7(8)    parity: Even Odd(None)Ignore
xon/xoff:(Yes)No      duplex: Half(Full)   terminal:(Yes)No
add to EOL:(None)CR LF strip linefeeds:(Yes)No filter chars:(Yes)No
```

2. Make the appropriate entries and selections at the prompts (described in the following section).
3. Press RETURN to execute the command.

USING MODIFY TO CHANGE PHONEBOOK SETTINGS STRINGS

If you change settings strings directly in the phonebook, you will be presented with the string of settings or parameters. Using File to make direct changes to a particular setting is more complicated than using the MODIFY command. This is because there is no command prompt to identify which item is which in the string when you change the settings directly.

In a phonebook SETTINGS field, a typical string looks like this:

300;2;7;O;X;F;V;C;L;f;

In this example, the settings string specifies:

- 300 baud
- 2 stop bits
- 7-bit word length
- odd parity
- XON/XOFF supported
- Full Duplex mode
- VT52, ANSI (VT100), and H/Z 19/29 escape codes supported
- add carriage return at end of line
- strip line feeds
- filter graphics characters

When you enter settings strings directly in the phonebook, you must enter applicable values in the following sequence:

- baud rate
- stop bits (1 or 2)
- word length (6, 7, or 8)
- parity (E for even parity, O for odd parity, N for no parity, or I for ignore parity)
- XON/XOFF (X for XON/XOFF supported, x if not supported)
- mode (F for Full Duplex, H for Half Duplex)

- ANSI terminal support (V if supported, T if not)
- character to add to end of line (N for none, C for carriage return, L for line feed)
- strip line feeds (L for yes, I for no)
- filter graphics characters (F for yes, f for no)

Each value must be separated from adjacent ones by a semicolon. Two consecutive semicolons indicate the default value for that position in the string. The string can end at any value; default values will be used for remaining, unspecified values.

To save time and avoid errors, you can specify or change settings strings in the phonebook by using the MODIFY command. To do so, enter the name (as listed in the phonebook) for which you want to specify/change the settings string at the MODIFY command `name:` prompt. Then make appropriate entries and selections at the remaining prompts. When you press RETURN to execute the MODIFY command, the settings you specified will be entered in the SETTINGS field. (Note, however, that only values that are *not* factory-set Telcom defaults will be displayed if you run File and load your phonebook file.)

COMMAND PROMPTS

The MODIFY command has 11 command prompts, each of which pertains to a given communications parameter or setting. Following is a description of each prompt, the message that appears when each prompt is active, and the entries and selections you can make.

`name:`

When this prompt is active, the message line displays `Enter text or use direction keys.` At this prompt, you can specify the name of the computer system or person listed in your phonebook file for which you want to modify the communications settings. If you are using MODIFY only for the current work session and are not modifying a phonebook entry, leave this prompt blank.

Enter a valid name from your phonebook file. Alternatively, you can press any ARROW key to display a list of all names in the phonebook and then use the ARROW keys to select the name from the list.

NOTE: If you enter a name from a phonebook file, the phonebook file in which the name is located must be specified with the OPTIONS command.

You can use wildcard characters in your entry at this prompt to cause Telcom to display a selected group of names (rather than all names in the phonebook) from which you can make your selection. For more information, refer to the CONNECT command in this chapter.

After making a valid entry at this prompt, press TAB to advance to the next prompt.

baud rate:

When this prompt is active, the message line displays **Enter number**. Your entry at this prompt specifies the baud rate that will be used. *Baud rate* describes the rate of data transmission. The baud rate you specify and the baud rate used by the remote system (or printer, if you are configuring your system for a serial printer) must be the same.

The default entry at this prompt is 300; this is the baud rate used by the ZP-150's internal modem.

Enter a valid baud rate.

After verifying that the default entry is correct or after making a valid entry, press TAB to advance to the next prompt.

stop bits:

When this prompt is active, the message line displays **Select option**. Your selection at this prompt specifies whether each character will be transmitted with one or two stop bits. Valid selections are 1 and 2. The default selection is 1.

NOTE: You do not need to specify start bits. With Telcom, every character is transmitted with one start bit.

To specify one stop bit, enter 1 or press SPACE BAR until 1 is highlighted.

To specify two stop bits, enter 2 or press SPACE BAR until 2 is highlighted.

After making your selection, press TAB to advance to the next prompt.

word length:

When this prompt is active, the message line displays **Select option**. Your selection at this prompt specifies the size of the data word or packet in which each character will be transmitted and received. Valid word lengths are 6, 7, or 8 bits. The default selection is 8, for 8-bit data words.

To make your selection, enter the appropriate number (6, 7, or 8) or press SPACE BAR until the number you want is highlighted.

After making your selection, press TAB to advance to the next prompt.

parity:

When this prompt is active, the message line displays **Select option**. Your selection at this prompt specifies whether even, odd, or no parity will be

used, or whether parity bits are to be ignored. *Parity* is a form of error checking used to decrease the chance that incorrect characters are received.

Valid selections are Even, Odd, None, and Ignore. The default selection is None.

To make your selection, enter the first letter of your choice (E for even parity, O for odd parity, N for no parity, or I if you want Telcom to ignore any parity bits received) or press SPACE BAR until the selection you want is highlighted.

After making your selection, press TAB to advance to the next prompt.

xon/xoff:

When this prompt is active, the message line displays Select option. Your selection at this prompt specifies whether XON/XOFF flow control is to be supported. Valid selections at this prompt are Yes (XON/XOFF supported) and No (XON/XOFF not supported). The default selection is Yes.

XON/XOFF is a method of flow control that enables the ZP-150 to receive incoming data at higher baud rates without losing any characters. If you notice that you seem to be losing characters during data transmission, setting this feature to on (that is, selecting Yes) will most likely solve the problem. It is highly recommended that you do use XON/XOFF whenever possible.

NOTE: The host computer system must also support XON/XOFF if you select Yes. In some cases, using XON/XOFF will lock up the ZP-150 if the host computer does not support it *and* echoes all received characters. If this situation occurs, use the BREAK key and the DISCONNECT command to terminate the connection. Alternatively, if you have access to the host machine, you can send an XON character to the ZP-150 by pressing CTRL-Q at the host keyboard.

If you want to use XON/XOFF flow control, select Yes. (That is, press SPACE BAR until Yes is highlighted or enter Y.)

If you do not want to use XON/XOFF flow control, select No. (That is, press SPACE BAR until No is highlighted or enter N.)

After making your selection, press TAB to advance to the next prompt.

duplex:

When this prompt is active, the message line displays Select option. Your selection at this prompt specifies whether Half or Full Duplex mode will be used. Valid selections are Half and Full. The default is Full.

Half Duplex mode causes characters entered at the keyboard to be displayed on the screen as they are transmitted to the host computer system. If you wish to use Half Duplex mode, select Half or enter H.

In Full Duplex mode, the characters are transmitted to the host and are not simultaneously sent to the screen. You should use Full Duplex mode if the host echoes received characters. If you wish to use Full Duplex mode, select **F** or enter **F**.

After making your selection, press **TAB** to advance to the next prompt.

terminal:

Telcom optionally supports a subset of VT52, ANSI (VT100), and Heath/Zenith 19/29 terminal escape sequences. At this prompt, you specify whether you want to connect to a host computer that recognizes any of these modes.

When this prompt is active, the message line displays **Select option**. Valid selections are **Yes** and **No**. The default selection is **Yes**.

If you want to use Terminal mode (VT52, ANSI, and/or Heath/Zenith 19/29 escape code sequences), select **Yes**. (That is, enter **Y** or press **SPACE BAR** until **Yes** is highlighted.)

If you do not want to use terminal mode, select **No**. (That is, enter **N** or press **SPACE BAR** until **No** is highlighted.)

In Terminal mode, escape sequences are supported for the cursor movement, erasing, and insertion/deletion commands listed below.

CURSOR MOVEMENT

Cursor up
Cursor down
Cursor right
Cursor left
Direct cursor addressing

ERASING

From the cursor to the end of line
From the beginning of line to the cursor
Entire line containing the cursor
From the cursor to end of the screen
From the beginning of screen to the cursor
Entire screen

INSERTION/DELETION

Insert line
Delete line
Delete character

add to EOL:

When this prompt is active, the message line displays **Select option**. Your selection at this prompt specifies whether a carriage return, line feed, or no character should be added at the End of Line (EOL) marker in received data. Valid selections are **None**, **CR** (for carriage return), and **LF** (for line feed). The default is **None**.

The selection made at this prompt is used only during no-protocol file transfers. Normally, no character need be added at the end of lines. However, if you receive files incorrectly in a no-protocol file transfer, you can select **CR** or **LF**.

Select **CR** if lines are stepped across the screen, as shown:

```
line ends here
    line ends here
        line ends here
line ends here
    line ends here
line ends here
    line ends here
        line ends here
```

Select **LF** if the file you are receiving is overwriting the previous line.

After making your selection, press **TAB** to advance to the next prompt.

strip linefeeds:

When this prompt is active, the message line displays **Select option**. Your selection at this prompt specifies whether line feeds are to be stripped from transmitted text files. Valid selections are **Yes** and **No**. The default is **Yes**.

The selection made at this prompt is used only during no-protocol file transfers. Some computer systems will append a line feed character to every carriage return encountered within incoming text files. If files that you send with no protocol are ending up double-spaced (extra line feed every line), selecting **Yes** will correct the problem.

If you want line feeds stripped from text files as they are transmitted, select **Yes**.

If you do not want line feeds stripped, select **No**.

After making your selection, press **TAB** to advance to the next prompt.

filter characters:

When this prompt is active, the message line displays **Select option**. The selection you make at this prompt specifies whether special graphics characters are to be stripped from incoming data. Valid selections are **Yes** and **No**. The default is **Yes**.

Telcom Reference

The selection specified at this prompt is used when your ZP-150 is receiving characters from a host computer system. Some of the characters may be outside the range of normal printable characters (20-7F Hex). Select Yes to tell Telcom to ignore these characters. The characters will be stripped. Select No to display the special graphics associated with these characters.

After making your selection at this prompt, verify that the entries and selections at all MODIFY command prompts are correct. Then press RETURN to execute the command.

OPTIONS

PURPOSE

Use the OPTIONS command to specify settings or parameters for some of the more advanced features of Telcom.

EXPLANATION

Telcom offers a variety of options designed to make your communications sessions easier. The OPTIONS command is used to enter choices such as the size of the review buffer, a dialing prefix to your phone number, and the phonebook that you will use. Once you set these by making entries at the OPTIONS command prompts, Telcom will remember them for the next communications session.

The OPTIONS command is available from both the SESSION command screen and the SCRIPT command screen. When you execute OPTIONS from the SESSION command screen, the command will be executed immediately. When you execute the OPTIONS command from the SCRIPT command screen, the command will be entered into the script you are creating or modifying and executed when the script is run.

To execute the OPTIONS command:

1. Select Options and press RETURN, or enter O. The OPTIONS command prompts appear:

```
OPTIONS capture to:          phonebook:  
dialing prefix:             area code:           call retries: 0  
dialing type:(Tone)Pulse    speed:(Slow)Fast       wait for tone: 2  
review text lines: 30        disconnect after: 10
```

2. Make appropriate entries and selections at the prompts (described in the following section).
3. Press RETURN to execute the command.

NOTE: After you carry out the OPTIONS command, a message appears on the message line informing you of the status of available memory. If system memory is low, return to the System Manager and decide what to erase from there. For more information, refer to Using Telcom under Low Memory Conditions in this chapter.

COMMAND PROMPTS

The OPTIONS command has 10 command prompts. Following is a description of each of the prompts, the message that is displayed when each prompt is active, and the entries and selections you can make.

capture to:

When this prompt is active, the message line displays `Enter file name`. The entry you make at this prompt specifies the file in which incoming text will be written when you use the Text Capture feature. The default entry at this prompt is the file name that was entered the last time you executed the OPTIONS command. If you do not specify a file name, the default used by Telcom is SESSION.TXT.

Enter the primary file name and extension of the file to which you want incoming text to be saved. You can enter any valid file name. Alternatively, you can press an ARROW key to display a full-page listing of files and select the file name from that listing. However, you should be careful not to select a file that you do not want to be overwritten. (Refer to Chapter 1, "System Manager," for more information about using full-page listings.)

After making a valid entry at this prompt, press TAB to advance to the next prompt.

phonebook:

When this prompt is active, the message line displays `Enter file name`. Your entry at this prompt specifies the phonebook file Telcom should reference when executing the CONNECT or MODIFY command. The default entry at this prompt is the phonebook file that was specified the last time you executed the OPTIONS command.

Enter the name of a valid phonebook file that you have created with File. If the phonebook file has the extension .DAT, you need only enter the primary file name. However, if your phonebook file has a different extension, you must enter the full file name.

NOTE: If you enter a name from a phonebook at the CONNECT command `to:` prompt or the MODIFY command `name:` prompt, the phonebook file name must first be specified at this OPTIONS command prompt. If it is not, Telcom will display the error message `Phonebook file not found`.

For more information about creating phonebook files, refer to Developing and Using a Phonebook File in Chapter 16, "Introduction to Telcom."

After making a valid entry at this prompt, press TAB to advance to the next prompt.

dialing prefix:

When this prompt is active, the message line displays **Enter text**. At this prompt, you can specify a dialing string prefix of up to 10 characters in length. The default entry at this prompt is the entry you made the last time the OPTIONS command was executed.

If you specify a prefix at this prompt, Telcom will automatically add the prefix to any digit string it dials. This feature is particularly useful if you subscribe to an independent telephone service that requires an access code be entered every time you place a call. You can also use this if your phone system requires that you dial an access number to reach an outside line.

Enter the desired dialing prefix. You can enter any number string up to 10 characters in length. Any combination of the following characters can be entered:

P	initiates pulse dialing
T	initiates tone dialing
* or #	causes the appropriate tones associated with the symbol to be generated
0-9	dials the digits with the appropriate tones or pulses
+	causes a one-second pause in the dialing sequence

If you do not need to have a prefix added to your dialing strings, leave this prompt blank.

After making a valid entry at this prompt, press **TAB** to advance to the next prompt.

area code:

When this prompt is active, the message line displays **Enter text**. At this prompt, you can specify up to five digits or characters for Telcom to strip from a dialing string. The default entry at this prompt is the entry made the last time the OPTIONS command was executed.

If you make an entry at this prompt, Telcom will strip the specified characters as it dials each string in which the specified characters occur. (Note, however, that if the digits do not occur at the beginning of a given dialing string in the order that you enter them at this prompt, no digits or characters will be stripped.) This feature lets you store complete telephone numbers in your phonebook file and tailor their use to your needs at any given time. For example, suppose you have included the area code in every number in your phonebook. When you are traveling and do not need to dial a given area code, you can enter the area code at this prompt and Telcom will not dial it when you place calls in the area. When you again need to dial the area code, you can execute OPTIONS again and leave this prompt blank or enter a different series of characters to be stripped.

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Enter up to five digits that you want Telcom to strip from dialing strings. Any combination of the following characters can be entered:

P	initiates pulse dialing
T	initiates tone dialing
* or #	causes the appropriate tones associated with the symbol to be generated
0-9	dials the digits with the appropriate tones or pulses
+	causes a one-second pause in the dialing sequence

If you do not want Telcom to strip any digits, leave this prompt blank.

After making a valid entry at this prompt, press TAB to advance to the next prompt.

call retries:

When this prompt is active, the message line displays Enter number. Your entry at this prompt specifies the number of times you want Telcom to redial a number if it encounters a line busy or no answer condition. Valid entries are from 0 to 15 retries. The default entry is 0 (for no retries).

If you want to use Telcom's automatic retry feature, enter the number of retries from the range of 1 through 15, inclusive. When performing retries, Telcom will wait 5 seconds between each attempt.

If you do not want any retries to be made, enter 0.

After making a valid entry at this prompt, press TAB to advance to the next prompt.

dialing type:

When this prompt is active, the message line displays Select option. Your selection at this prompt specifies whether the telephone line and network through which you will be establishing your connections supports dial pulse or tone dialing. Valid selections at this prompt are Tone and Pulse. The default selection is Tone.

Note that the selection you make at this prompt is the default for all dialing that Telcom performs, but that it can be overridden by the entry of T or P in a specific dialing string or prefix. Thus, you could select Tone at this prompt for common usage. Then, if you were traveling and wanted to place a call using a dial pulse line, you could precede your dialing string with P (for pulse).

For tone signalling, select Tone. For dial pulse signaling, select Pulse. If you are not sure about the selection you should make, contact your local telephone company for information.

After making a valid selection at this prompt, press TAB to advance to the next prompt.

speed:

When this prompt is active, the message line displays Select option. Your selection at this prompt specifies pulse dialing speed. The information specified at this prompt is not used for tone dialing. Valid selections at this prompt are Slow and Fast. Slow is the default selection. For most telephone switching systems, a slower pulse dialing rate will be satisfactory.

For a slower pulse dialing rate, select Slow. For a faster pulse dialing rate, select Fast. If you are not sure about the selection you should make, contact your local telephone company for information.

After making your selection at this prompt, press TAB to advance to the next prompt.

wait for tone:

When this prompt is active, the message line displays Enter number of seconds. Your entry at this prompt specifies the number of seconds Telcom should wait to begin dialing after going off-hook. Valid entries are from 1 to 15 seconds. The factory-set default entry is 2. Otherwise, the default entry is the value specified the last time you executed the OPTIONS command.

The default value is adequate for most telephone switching systems. However, in slower systems, a longer interval may be required. To gauge the required interval, check the time that elapses before you receive dial tone when you pick up a conventional telephone handset.

If you do not want to use the default value, enter the desired interval from the range of 1 to 15 seconds.

After making a valid entry at this prompt, press TAB to advance to the next prompt.

review text lines:

When this prompt is active, the message line displays Enter number. Your entry at this prompt specifies the size of the Telcom review buffer, in lines of text. The factory-set default is 30 lines. Otherwise, the default is the entry made the last time the OPTIONS command was executed.

Works allocates system memory for the Telcom review buffer on the basis of the value specified at this prompt. The maximum number of lines you can specify is determined by the Works limit on file size (64K) and amount of free system memory. Memory allocated for the review buffer cannot be accessed by any other program. In order to make the best use of available system memory, it is recommended that you do not routinely specify an overlarge value for the review buffer.

NOTE: The review buffer is saved in the hidden file named TELCOM.WRK. If you change the value specified at the **review text lines:** prompt when the review buffer is active (that is, when it has textual data in it), then the buffer's contents will be lost when the OPTIONS command is executed.

Enter the number of lines you want Telcom to retain in its review buffer. After making a valid entry at this prompt, press TAB to advance to the next prompt.

disconnect after:

When this prompt is active, the message line displays **Enter number of minutes.** Your entry at this prompt specifies the number of minutes that a communications line can be idle before Telcom automatically disconnects. A communications line is *idle* when no characters are transmitted or received. Valid entries at this prompt are any number of minutes from the range of 0 through 1,440. The factory-set default is 10 minutes. Otherwise, the default is the value entered the last time the OPTIONS command was executed.

If you do not want to use the default entry at this prompt, enter the number of minutes from the range of 1 to 1440, inclusive. Telcom will automatically disconnect if a line is idle for the specified interval.

If you do not want Telcom to automatically disconnect because of an idle line condition, enter 0. Disabling this idle-line timeout interval for automatic disconnect will not affect Telcom's disconnecting upon loss of carrier.

After making a valid entry at this prompt, verify that the entries at all OPTIONS command prompts are correct, then press RETURN to execute the OPTIONS command.

PAUSE

PURPOSE

Use the PAUSE command to temporarily suspend execution of a script.

EXPLANATION

The PAUSE command is available only from the SCRIPT command screen. (For information about the SCRIPT and SESSION command screens, refer to the SCRIPT and SESSION commands in this chapter.)

When you create or modify a script, you can use the PAUSE command to introduce a "wait" interval into the script sequence. One or more intervals, or pauses, can be inserted between any of the phrases that a script contains.

The PAUSE command is especially useful in tailoring scripts to meet your needs. For example, you might use PAUSE in a script for a computer system that is slow in responding to certain commands, or you may want to wait a few extra seconds after dialing a long distance number. With PAUSE, you can induce a wait interval of the desired duration. When Telcom encounters a **Pause:** phrase in a script, it will wait the specified number of seconds before processing the next phrase in the script.

To execute the PAUSE command:

1. Select **Pause** and press RETURN, or enter **P**. The PAUSE command prompt is displayed:

PAUSE for:

2. Make a valid entry at the prompt (described in the following section).
3. Press RETURN to execute the PAUSE command. A phrase for the wait interval you specified is entered into the script as shown below:

Pause: n

where *n* is the interval you specified.

COMMAND PROMPT

The PAUSE command has one command prompt. Following is a description of the prompt, the message that is displayed when the prompt appears, and the entries you can make.

Telcom Reference

for:

When this prompt appears, the message line displays **Enter number of seconds.** Your entry at this prompt specifies the number of seconds that you want Telcom to wait before processing the next phrase in the script. Valid entries are from 0 to 60 seconds. The factory-set default is 2 seconds. Otherwise, the default entry is the entry you made the last time you executed the PAUSE command.

If you want Telcom to wait before processing the next phrase, enter the desired interval from the range of 1 through 60 seconds. If you do not want Telcom to wait before processing the next phrase, enter 0.

Note that if you need a wait interval longer than 60 seconds, you can enter more than one **Pause:** phrase in series, until the total of the specified intervals is the amount of time you need Telcom to wait.

After making a valid entry at this prompt, press **RETURN** to execute the PAUSE command.

RESPOND

PURPOSE

Use the RESPOND command to enter phrases in scripts for automatic responses to host computer system prompts.

EXPLANATION

The RESPOND command is available only from the SCRIPT command screen. (For information about the SCRIPT and SESSION command screens, refer to the SCRIPT and SESSION commands in this chapter.)

When you create or modify a script, you can use the RESPOND command to enter into the script prompts you routinely receive from the host computer system and the responses you normally make to those prompts. For example, most host systems will give you a logon prompt once a communications connection has been established, and you must enter an acceptable response before you can continue the session. By using the RESPOND command, you can enter both the host's logon prompt and your response into a script. Then, when the script is run, Telcom will complete the logon sequence for you. The host's prompts and your responses must be entered exactly as they would appear if you entered them manually. Therefore, you need to know exactly what characters the host will be sending you in order to use this command effectively.

To execute the RESPOND command:

1. Select **Respond** and press **RETURN**, or enter **R**. The **RESPOND** command prompts appear:
RESPOND to: **with:**
 2. Make appropriate entries at the prompts (described in the following section).
 3. Press **RETURN** to execute the **RESPOND** command. The host prompt and your response are entered as two phrases in the script as follows:

Respond To: prompttext
Respond With: responsetext

where `prompttext` is the entry you made at the `to:` prompt, and `responsetext` is the entry you made at the `with:` prompt.

COMMAND PROMPTS

The RESPOND command has two command prompts. Following is a description of each prompt, the message that is displayed when each prompt is active, and the entries you can make.

to:

When this prompt is active, the message line displays **Enter text**. At this prompt, you can specify a prompt string or message that you will receive from the host system. The text can include up to 60 characters and *must* be entered *exactly* as it is received.

The default entry at this prompt is the entry that was made the last time the RESPOND command was executed. You can use the default entry, edit the default entry by using the editing keys, or make a new entry. (Editing keys are listed in Table 17.9.) You can include any characters that are received from the host.

You do not have to make an entry at this prompt. If you leave this prompt blank, Telcom will transmit the text specified in the **with:** prompt as soon as the **Respond With:** phrase is encountered in the script. If you leave this prompt blank, no **Respond To:** phrase will be entered in the script.

After making a valid entry at this prompt, or after electing to use the default entry or to leave the prompt blank, press TAB to advance to the next prompt.

with:

When this prompt is active, the message line displays **Enter text**. At this prompt, you can specify a character string to be transmitted to the host system. If a prompt string or message was specified at the **to:** prompt, the character string you specify here will be sent as soon as the specified string or message is received from the host. If no string was specified at the **to:** prompt, then the character string that you specify here will be sent to the host as soon as Telcom encounters the **Respond With:** phrase in the script.

The character string that you enter at this prompt can include up to 60 characters and *must* be entered *exactly* as you want it to be sent.

The default entry at this prompt is the entry that was made the last time the RESPOND command was executed. You can use the default entry, edit the default entry by using the editing keys, or make a new entry. (Editing keys are listed in Table 17.9.) You can include any characters in the string that you can normally enter via the keyboard for transmission to the host system.

NOTE: To include a carriage return in your entries at these prompts, use a caret (^) and a capital M (^M) to represent the carriage return. This is necessary because pressing the RETURN key will terminate the current line

and execute the RESPOND command. In the same way, use the caret (^) and question mark (^?) to represent the DELETE character.

You do not have to make an entry at this prompt. If you leave this prompt blank but made an entry at the to: prompt, only a Respond To: phrase will be entered into the script file. Then, if a response is required when the prompt or message is received, you must make it manually, via the keyboard. You may wish to construct a script in this manner when you have written a script to access and work with a system that requires variable responses to a given prompt. In situations like this, however, the Respond To: phrase must be the last phrase in the script. You cannot suspend execution of a script to make manual entries and then resume running the script.

If you make an entry at this prompt and do not make an entry at the to: prompt, then the entry you made will be transmitted to the host when the Respond With: phrase is encountered in the script. For example, some systems require the receipt of certain characters (such as carriage returns) as soon as a connection is established. For systems such as this, you could write a script to take you through establishing the communications connection, and then enter a Respond With: phrase containing the required carriage returns.

After making a valid entry at this prompt, or after electing to use the default entry or to leave the prompt blank, press RETURN to execute the RESPOND command.

RUN

PURPOSE

Use the RUN command to select and execute a script.

EXPLANATION

The RUN command is available only from the SESSION command screen. You cannot run a script from the SCRIPT command screen.

By supporting the creation and use of scripts, Telcom can automatically perform many routine communications tasks. Once you have created a script with the commands available on the SCRIPT command screen, you can cause Telcom to execute the script whenever you wish by using the RUN command. (The SCRIPT command screen is accessed by using the SCRIPT command. Refer to SCRIPT in this chapter for more information.)

To execute the RUN command:

1. If the SCRIPT command screen is displayed, execute the SESSION command to display the SESSION command screen.
2. Select Run and press RETURN, or enter R. The RUN command prompt appears:
RUN script:
3. Make a valid entry at the prompt (described in the following section).
4. Press RETURN to execute the RUN command.

NOTE: The Telcom RUN command is not the only way to run a script file. You can also specify a valid script file name at the System Manager RUN command file: prompt. When you do this, Telcom will execute the commands in the script file as soon as it is loaded, and you do not have to use the Telcom RUN command.

COMMAND PROMPT

The RUN command has one command prompt. Following is a description of the prompt, the message that is displayed when the prompt is active, and the entries you can make.

script:

When this prompt appears, the message line displays Enter file name. Your entry at this prompt specifies the script file that you want Telcom to run. The

default entry is the script file you specified the last time you executed the RUN command.

Enter the name of a valid script file. You need only enter the primary file name; the default script file name extension (.TEL) is assumed. However, if your script file has an extension other than .TEL, you *must* enter the extension as well as the primary file name.

Alternatively, you can press any ARROW key to display a full-page listing of files and select a script file from the listing. (Refer to Chapter 1, "System Manager," for more information about using full-page listings.)

After making a valid entry, press RETURN to execute the RUN command. Telcom will access the script file you specified and execute the commands it contains.

SCRIPT

PURPOSE

Use the SCRIPT command to display the SCRIPT command screen and access a submenu of commands that you can use to create or modify a script.

EXPLANATION

The SCRIPT command is available only from the SESSION command screen. When you execute SCRIPT, the screen clears, and then the SCRIPT command screen and command submenu are displayed as shown in Figure 17.1. When this screen is displayed, you can create or modify a script.

A *script* is a series of Telcom commands saved to a file; it allows you to automate your communications sessions. Operations and commands that are performed every time that you log on to a particular computer system or service can be put into a script. When you execute the script, all the routine commands and operations will be performed automatically, without any intervention. Each operation or command in a script occupies one line that is called a *phrase*.

To execute the SCRIPT command:

1. On the SESSION command screen menu, select Script and press RETURN, or enter S. The SCRIPT command prompt appears:
SCRIPT name:
2. Make an entry at the prompt (described in the following section).
3. Press RETURN to execute the SCRIPT command. The SCRIPT command screen will be displayed as shown in Figure 17.1. Notice that if you are modifying an existing script rather than creating a new one, the current contents of the script file will be displayed in the upper area of the screen.

The script that you create or modify is saved automatically when you return to the SESSION command screen. Notice that if you want to create or edit more than one script, you must exit the SCRIPT command screen by using the SESSION command after finishing each script and then reinvoke the SCRIPT command to work on the next script. You cannot save one script file and load another from the SCRIPT command screen.

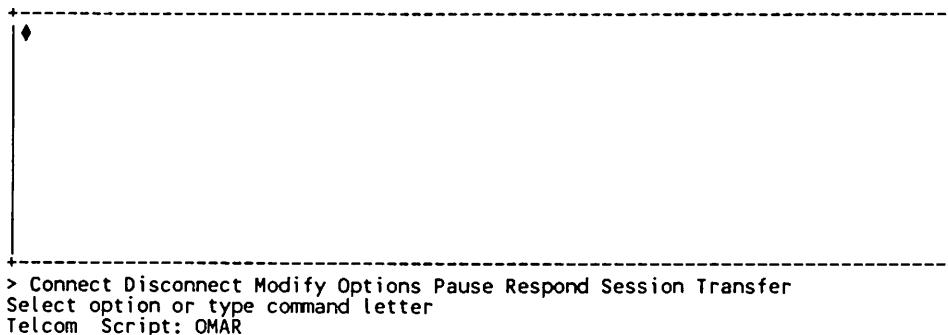


Figure 17.1. SCRIPT Command Screen

COMMAND PROMPT

The SCRIPT command has one command prompt. Following is a description of the prompt, the message that is displayed when the prompt appears, and the entries you can make.

name:

When this prompt appears, the message line displays Enter file name. Your entry at this prompt specifies the name of the script that you want to create or modify. The default entry at this prompt is the script that was specified the last time you executed the SCRIPT command.

If you want to create a script, enter any valid file name. You should enter a unique file name. You do not, however, have to enter a file name extension. Telcom will assign the default script file extension, .TEL.

If you wish to modify an existing script file, enter the name of the file. You do not need to enter the file name extension as long as the file has the default extension (.TEL). Alternatively, you can press any ARROW key to display a full-page listing of files and select the script file you want from the listing. (Refer to Chapter 1, "System Manager," for more information about using full-page listings.)

After making a valid entry, press RETURN to execute the SCRIPT command. The SCRIPT command screen will be displayed. If you are creating a script, the upper area of the screen will be blank, ready to accept the phrases you enter. If you are modifying a script, the script's phrases will be displayed in the upper area of the screen. In either case, you can use the commands on the SCRIPT command submenu to enter phrases in the script. Use the ARROW keys to select the point at which phrases will be inserted and to select one or more phrases to delete (using the DEL key). When you create a phrase, it is inserted into the script just before the currently selected phrase. When you use the DEL key, the currently selected phrase or phrases are erased.

SESSION

PURPOSE

Use the SESSION command to save your script and return to the SESSION command screen.

EXPLANATION

The SESSION command is available only from the SCRIPT command screen.

When you execute the SESSION command, the script on which you were working is saved, the screen clears, and then the SESSION command screen is displayed as shown in Figure 17.2. If you made changes to an existing script, this command will save the script in its modified form. In any case, the script file is saved under the name you specified at the SCRIPT command name: prompt.

Executing the SESSION command is the only way that you can save a script file without quitting Telcom. If you press the QUIT key while the SCRIPT command screen is displayed, the script will be saved just as a work file is saved when you quit any other Works program.

Once you have saved a script, it can be run with the Telcom RUN command or from the System Manager screen if you specify (or select) the file for execution of the System Manager RUN command.

The SESSION command has no command prompts. To execute the SESSION command:

1. From the command line on the SCRIPT command screen, select Session and press RETURN, or enter S.
2. As your script file is saved, the command line displays:
SESSION:
3. The screen clears, and then the SESSION command screen is displayed as shown in Figure 17.2. You can then select and execute commands from the SESSION command screen.

```
> Answer Connect Disconnect Modify Options Run Script Transfer  
Select option or type command letter  
Telcom Session: OFFLINE
```

Figure 17.2. SESSION Command Screen

TRANSFER

PURPOSE

Use the TRANSFER command to display a submenu from which you can select commands to send files to and receive files from a host computer system.

EXPLANATION

The ZP-150 has the ability to exchange files with a host computer system using XMODEM protocol or no protocol. XMODEM is recommended, as it ensures that the file will be transferred error-free. However, if the other computer system does not also support XMODEM, you have the option of transferring files with no protocol.

The TRANSFER command is available from both the SESSION command screen and the SCRIPT command screen. When you execute a TRANSFER command from the SESSION command screen, it will be executed immediately. When you execute a TRANSFER command from the SCRIPT command screen, it will be entered into the script you are creating or modifying and executed when the script is run.

COMMAND SUBMENU

Whenever you invoke TRANSFER, the following command submenu is displayed:

TRANSFER: Receive Send

When this submenu appears, the message line displays Select option.

From the TRANSFER command submenu, you can select either the TRANSFER RECEIVE or the TRANSFER SEND command. You select a command from this submenu just as you select a command from the SESSION or SCRIPT command lines. That is, either enter the first letter of your selection (such as S for send) or use SPACE BAR or TAB to highlight the command you want and press RETURN. Receive, for the TRANSFER RECEIVE command, is always the default selection on the TRANSFER command submenu.

Each of the commands that can be selected from the TRANSFER command submenu produces command prompts. Each command and its associated prompts are described on the following pages.

TRANSFER RECEIVE

PURPOSE

Use the TRANSFER RECEIVE command to receive files from a host computer system.

EXPLANATION

The ZP-150 has the ability to receive files from a host computer system using XMODEM protocol or no protocol. The use of XMODEM protocol is recommended because it ensures that the file will be received error-free. However, if the remote system does not support XMODEM protocol, you have the option of transferring the file with no protocol.

The TRANSFER RECEIVE command is available from both the SESSION command screen and the SCRIPT command screen. When you execute TRANSFER RECEIVE from the SESSION command screen, it will be executed immediately. When you execute TRANSFER RECEIVE from the SCRIPT command screen, it will be entered into the script you are creating or modifying and executed when the script is run.

If you are using TRANSFER RECEIVE from the SESSION command screen, you should establish your communications connection before invoking the command to transfer a file.

To execute the TRANSFER RECEIVE command:

1. Select Transfer and press RETURN, or enter T. The TRANSFER command submenu is displayed:
TRANSFER: Receive Send
2. Receive is the default selection on this submenu. Simply press RETURN or enter R. The TRANSFER RECEIVE command prompts are displayed:
TRANSFER RECEIVE to: protocol: None(Xmodem) timeout: 10
3. Make appropriate entries and selections at the prompts (described in the following section).
4. Press RETURN to execute the TRANSFER RECEIVE command.

COMMAND PROMPTS

The TRANSFER RECEIVE command has three command prompts. Following is a description of each prompt, the message that is displayed when the prompt is active, and the entries and selections you can make.

to:

When this prompt is active, the message line displays **Enter file name**. At this prompt, you must specify the file in which you want to store incoming data. There is no default entry at this prompt.

Enter the primary file name and extension of the file. You should enter a unique file name. If you enter the name of a file that already exists, it will be overwritten when the file is received from the host. If you want to make sure that you do not enter the name of a file that already exists, you can use the ARROW keys to display a full-page listing of files.

You cannot use wildcard characters in the file name you enter at this prompt. If you wish to receive more than one file, the TRANSFER RECEIVE command must be executed once for each file.

After making a valid entry, press **TAB** to advance to the next prompt.

protocol:

When this prompt is active, the message line displays **Select option**. Your selection at this prompt specifies whether the file you will be receiving will be transferred with XMODEM protocol or no protocol. Valid selections are **None** and **Xmodem**. The default selection at this prompt is the selection you made the last time you executed either the TRANSFER RECEIVE or the TRANSFER SEND command.

If the file will be transmitted under XMODEM protocol, select **Xmodem**.

If the file will be transmitted with no protocol, select **None**. You should select this option *only* if the system from which you will be receiving the file does not recognize XMODEM protocol.

After making a selection at this prompt, press **TAB** to advance to the next prompt.

timeout:

When this prompt is active, the message line displays **Enter number of seconds**. If you selected **None** at the **protocol:** prompt, your entry at this prompt specifies the length of time, in seconds, that Telcom should allow the communications line to remain idle before terminating the file transfer. (If you selected **Xmodem** at the **protocol:** prompt, any entry at this prompt will be ignored.) Telcom uses an idle line timeout interval to determine when file transfer is

complete. A line is considered *idle* when no characters are being transmitted or received.

Valid entries at this prompt are from the range of 1 through 3,600 seconds. The factory-set default is 10 seconds. Otherwise, the default entry is the entry you made the last time you executed the TRANSFER RECEIVE command. If you make *no* entry at this prompt (if you leave the prompt blank), the factory-set default will be used.

Enter the idle line timeout interval from the range of 1 through 3600 seconds.

After making a valid entry at this prompt, press RETURN to execute the TRANSFER RECEIVE command.

TRANSFER SEND

EXPLANATION

The ZP-150 has the ability to send files to a host computer system using XMODEM protocol or no protocol. The use of XMODEM protocol is recommended because it ensures that the file will be transmitted and received error-free. However, if the remote system does not support XMODEM protocol, you have the option of transferring the file with no protocol.

The TRANSFER SEND command is available from both the SESSION command screen and the SCRIPT command screen. When you execute TRANSFER SEND from the SESSION command screen, it will be executed immediately. When you execute TRANSFER SEND from the SCRIPT command screen, it will be entered into the script you are creating or modifying and executed when the script is run.

If you are using TRANSFER SEND from the SESSION command screen, you should establish your communications connection before invoking the command to transmit a file.

To execute the TRANSFER SEND command:

1. Select Transfer and press RETURN, or enter T. The TRANSFER command submenu is displayed:

TRANSFER: Receive Send

2. Select Send and press RETURN, or enter S. The TRANSFER SEND command prompts are displayed:

TRANSFER SEND from: protocol: None Xmodem

3. Make appropriate entries and selections at the prompts (described in the following section).
4. Press RETURN to execute the TRANSFER SEND command.

COMMAND PROMPTS

The TRANSFER SEND command has two command prompts. Following is a description of each prompt, the message that is displayed when the prompt is active, and the entries and selections you can make.

from:

When this prompt is active, the message line displays Enter file name. At this prompt, you must specify the file you want to send to the remote system.

The file must be resident in memory. (You cannot transfer a file from an external device to another system.) There is no default entry at this prompt.

Enter the primary file name and extension of the file that you want to transfer. You cannot use wildcard characters in the file name you enter at this prompt. If you wish to send more than one file, the TRANSFER SEND command must be executed once for each file.

Alternatively, you can select the file you want to send from a full-page listing of files. For more information about full-page listings, refer to Chapter 1, "System Manager."

After making a valid entry, press TAB to advance to the next prompt.

protocol:

When this prompt is active, the message line displays Select option. Your selection at this prompt specifies whether the file will be transmitted with XMODEM protocol or no protocol. Valid selections are None and Xmodem. The default selection at this prompt is the selection you made the last time you executed either the TRANSFER SEND or the TRANSFER RECEIVE command.

If the file will be transmitted under XMODEM protocol, select Xmodem. Generally, text files created with Works applications' PRINT commands do not require XMODEM protocol, but it is recommended that you select Xmodem whenever possible. This protocol helps ensure the integrity of the files you transfer.

If the file will be transmitted with no protocol, select None. You should select this option *only* if the system from which you will be receiving the file does not recognize XMODEM protocol. It is recommended that only text files be sent using no protocol.

After making a selection at this prompt, press RETURN to execute the TRANSFER SEND command.

ERROR MESSAGES

Following are error messages that can display as you use Telcom. After each message is a brief description of the probable cause for the error and what you are to do to recover from it.

All comm lines are in use

EXPLANATION: The using modem: prompt in either the CONNECT or ANSWER command line is set to Yes, and all communication lines that can be used with the modem are currently being used by other programs. Run the appropriate application and disconnect the communication line.

Already connected: script line n

EXPLANATION: While you are running a script, a Connect: phrase is encountered when a connection already exists. n is the line number of the Connect: phrase in your script. Select DISCONNECT from the SESSION menu and run your script again.

Comm line in use

EXPLANATION: The using modem: prompt in either the CONNECT or ANSWER menu is set to No, and the communication line specified is currently being used by some other program. Run the appropriate application and disconnect the communications line.

Communication error

EXPLANATION: This message is displayed when Telcom encounters a general communication error condition. Disconnect and reestablish your communications connection.

Data lost

EXPLANATION: Some data was lost because it was coming in too fast for Telcom to process. Enable XON/XOFF flow control in the MODIFY menu. The host computer system must recognize XON/XOFF flow control for this to be effective.

Disconnected due to carrier loss

EXPLANATION: During a communications session, the host computer system disconnected prematurely. Check your telephone line or communications cable to make sure it is securely fastened. Dial the host computer again. If the problem persists, you may either have a bad telephone connection or the host computer system may not be operating properly.

Disconnected due to no activity

EXPLANATION: The number of minutes specified at the disconnect after: prompt of the OPTIONS menu expired before any keyboard character was pressed and/or before any character was transmitted or received over the communications line. If the timeout interval seems to be too short, execute the OPTIONS command and enter a larger value at the disconnect after: prompt.

File already exists

EXPLANATION: This error displays only during Answer mode. It is sent to the remote system if the operator tries to overwrite an existing file. The remote system operator must enter another file name and attempt the operation again.

Host cancelled

EXPLANATION: The host computer system canceled a file transfer. Retry the file transfer. If the problem persists, contact systems personnel at the host computer system site.

Host doesn't respond

EXPLANATION: The host computer being called via the CONNECT command does not answer. Check to see if you are dialing the number you intended. Make sure that the phone line or external modem is connected properly. If the problem persists, check with the host computer personnel to make sure that the remote system is up and running.

Host doesn't respond during file transfer

EXPLANATION: This message is displayed if you were executing the TRANSFER RECEIVE or the TRANSFER SEND command, and no response was received from the host system. If the host system is operating correctly, the probable cause is a faulty connection. Make sure that the phone line or external modem is connected properly. Then terminate and reestablish the communications connection.

Illegal dialing string

EXPLANATION: The dialing string entered at the number: prompt of the CONNECT menu has an invalid character in it. Reenter the string using only valid characters.

Illegal phrase

EXPLANATION: An invalid phrase was encountered while you were running a script. Select the SCRIPT command to edit your script and delete the invalid phrase.

Invalid baud rate for modem

EXPLANATION: An invalid value was entered at the baud rate: prompt of the MODIFY command. Use a value of 300 if you are using the internal modem. If you are using an external modem, consult your modem manual for valid baud rates.

Invalid comm line setting

EXPLANATION: An invalid communications parameter was specified in the phonebook or in the MODIFY menu. For example, you might have specified a baud rate of 1200 and then tried to establish a connection with the internal modem, which is a 300-baud modem.

Invalid phonebook file

EXPLANATION: The file specified at the OPTIONS command phonebook: prompt is not in the File database format. This message will also be displayed if an attempt is made to access an invalid file using the CONNECT or MODIFY command.

Invalid script file

EXPLANATION: The file you specified at the RUN or SCRIPT command prompt was not in the proper script file format. Enter the name of a valid script file at the command prompt.

Name, Number, or Settings column missing

EXPLANATION: This error message is displayed under either of the following conditions.

- A database file that does not have one or more of the required fields was specified at the phonebook: prompt of the OPTIONS command.
- When using the CONNECT or MODIFY command, an attempt was made to access a phonebook missing one or more of the required fields.

In either case, check the database file you specified to ensure that it has the three required column headings. Make sure that each field name begins with a capital letter.

Number outside allowable range

EXPLANATION: A number that is too large or too small was entered as a response to one of Telcom's command prompts. Enter a valid value.

Operation cancelled: script line n

EXPLANATION: This message is displayed if you terminated execution of a script by pressing BREAK. In this message, *n* is the line number of the phrase that was being executed when BREAK was pressed.

Parity error
Framing error
Overrun error

EXPLANATION: These are communication line error indicators. These errors most often occur if you have a bad or noisy connection. When you see any of these messages, data has probably been lost or garbled. These error messages display only upon return to Command mode from Terminal mode. Make sure the parity settings agree between the ZP-150 and the host computer system. If the problem persists, reestablish the phone connection.

Phonebook entry not found

EXPLANATION: A name that does not exist in the phonebook was entered at the CONNECT command *to:* prompt or at the MODIFY command *name:* prompt. Check your phonebook for valid names and reenter a correct name. A simple way to check for valid names is to press any ARROW key when the command prompt requiring the entry of a name is active.

Phonebook file not found

EXPLANATION: This error message is displayed when the name of a nonexistent file is specified at the OPTIONS command *phonebook:* prompt or when a name is entered for execution of the CONNECT or MODIFY command and a phonebook was not previously specified with the OPTIONS command. Enter a valid phonebook file name at the OPTIONS command *phonebook:* prompt.

CHAPTER 18

INTRODUCTION TO WORD

OVERVIEW

Most of us approach writing in the same way. We prefer to spend our time choosing the right words rather than struggling with how to make them look their best on the page. Word lets you do just that with fast, simple ways to enter and revise text. Then when you have finished composing, Word's simple formatting techniques help you quickly organize your text into its final form.

This chapter gives you an idea of some of the text development you will be able to do with Word, familiarizes you with Word's screen, and leads you through a step-by-step practice session during which you'll learn how to:

- enter text,
- edit text,
- format text in a document, and
- print a document.

Then you will learn how to customize the screen to suit your particular needs.

In Chapter 19, "Word Reference," the various keys and their usage specific to Word are described. Chapter 19 also includes an alphabetical listing of Word's commands, including the submenus or command prompts that appear when you choose the command and a description of each command prompt.

The next few pages introduce you to some of Word's major features, describe your working environment (the screen), and discuss the basics of entering, editing, formatting, and printing documents.

FEATURES

Of all the programs your ZP-150 offers, you may find yourself using Word most often simply because much of our everyday lives involves written communication of some kind. After all, why should all of your communications—letters to friends and memos to bosses alike—not receive the same level of attention and polish that Word provides?

Word allows you to perform many written communication tasks easily and efficiently.

Introduction to Word

In many ways, you will find that using Word is similar to using a typewriter. But in most ways, Word far outpaces a typewriter, both in speed and in ease of use. Word frees you from the drudgery and frustration that comes with revising, so that you can spend your time on more important things.

- With word-wrap, you do not have to press RETURN at the end of each line; Word automatically starts a new line where you need it. If there is not enough room at the end of a line to finish a word, Word moves the entire word to the next line.
- The scrap enables you to easily copy or move text within a document or between documents.
- With the SEARCH and REPLACE commands, you can look for names, words, and phrases wherever they occur in your document and change them automatically.
- Word makes controlling the physical appearance of your documents (the formatting) uncomplicated. You will have a wide range of options available to you, and you will be able to apply them and judge how they make your document look before you print the document.
- With Word, you have control over such elements as paragraph alignment, indentation, and justification; and page layout—including spacing, page length, and margin width. Word has some of the same features found on dedicated word processors and professional typesetting equipment.

Once you get the feel of moving text around on the screen, the basics of writing, revising, formatting, and printing will become second nature. Then you will be ready to explore some of Word's more advanced features.

RELATED APPLICATIONS

Word can be used with many of the other applications in Works. The following list illustrates some of these.

BASIC—Word can be used to write or edit BASIC programs. (See Editing BASIC Programs in Chapter 8 for further details.)

File—Data from File's database can be inserted into a Word document.

Plan—Worksheets or tables created in Plan can be inserted into a Word document.

Telcom—Telcom can transfer any of your Word text files to another computer system. Alternately, Word files created on another system, such as a Z-100 PC, can be downloaded to the ZP-150.

TUTORIAL

Word's features let you achieve the basics—typing, revising, formatting, and printing text—as easily and efficiently as possible. The main objective is to simplify these processes as much as possible, so you can concentrate on composing your document. The following exercise will give you a general idea of how easy and flexible Word's basics are.

Starting Word

When you first start your computer, the System Manager screen appears. If you are working with another program, press **CTRL-F10** to return to the System Manager.

WORD is in the upper left-hand corner of the System Manager screen and should be highlighted, indicating that it is the currently selected program. In addition, at the bottom of the screen in the command line, the RUN command will be highlighted.

To create a file with Word, complete the following procedure.

1. Since Word is already the selected application and RUN is the default command selection, press **RETURN**. The RUN command line appears:

RUN application: WORD file:

The RUN application: prompt contains the program to be run, Word. The next prompt, file:, is asking for a file name.

2. Press **TAB** to move to the file: prompt.
3. Enter **PRACTICE** and press **RETURN**.

If you do not type in a file name, Word will automatically name your file WORK. If you already have a Word file named WORK, Word will automatically load the existing file.

The Word screen appears as shown in Figure 18.1. It consists of a text window, and the command, message, and status lines.

18.4

Introduction to Word



```
> Copy Delete Edit Format Insert Jump Merge Options Print Replace Search
Copyright (1984, 1985) Microsoft Corp.
Word: PRACTICE {}
```

Figure 18.1. The Word Screen

The diamond-shaped character in the upper left-hand corner of the text window is the *end-of-document* marker. It is highlighted by the cursor to indicate the location for the next entry.

The three lines at the bottom of the screen are the command, message, and status lines. The command line contains a menu of available Word commands. (Refer to Word Commands in Chapter 19, "Word Reference," for more information on the individual commands.) The message line initially contains copyright information, but once you begin using the application, this line displays prompts and error messages. The status line contains the name of the application that is running, the document name, the contents of the scrap enclosed in braces ({}), and any status line indicators.

Refer to Table 1.1 for a complete list of possible status line indicators. The *ot* indicator is specific to Word and appears if you have activated the Overtype mode. The Overtype mode allows text that is entered to write over any existing text. If the Overtype mode is not on, text is inserted immediately to the left of the cursor. You can activate the Overtype mode by pressing SHIFT-F5. You can terminate this mode by pressing the SHIFT-F5 key a second time, as this key toggles between on and off.

Entering Text

Entering text is one of the first steps in creating a document with Word. When you work with Word, you are either typing text (in Text mode) or choosing a command (in Command mode). When you start Word, you are using the Text mode—anything you type becomes text in your document. The ESC key switches from the Text mode to the Command mode, and the EDIT command returns Word to the Text mode. In the following lesson, you will use these two modes.

1. Enter the following boldface text exactly as it appears. Notice that at the end of each line, Word automatically starts a new line for you using word wrap, so you do not have to press RETURN at the end of

each line. Press RETURN twice after free and know to start new paragraphs. If you make any typing mistakes, press the BACK SPACE key to erase and reenter the correct text.

I have rescheduled the meeting for Wednesday, November 27, at 4:30 pm in my office. Agenda items will include a report on the Costin contract and a short review of R.R.'s fact-finding study on the Thompson mine in South Dakota. Incidentally, Joan won't be able to attend this one—but she's in Seattle this week—but she's sending Jeff Egan in her place. Bring Mark if he's free.

In addition, there will be a seminar on time management offered to all employees at 10:30 am on Monday, December 2. Be sure to let all your staff know.

Notice the marks that appear on the screen after the words free and know. These are called *paragraph marks*. You will learn more about paragraph marks later.

You entered these two paragraphs while using the Text mode. Now, delete the second paragraph. You will have to switch to the Command mode to delete it. Before you can do that, you have to select the paragraph.

2. Press the UP ARROW key to move the cursor into the paragraph to be deleted. The cursor should be highlighting the B in Be. Do not worry if it is not; as long as the cursor appears somewhere in the paragraph to be deleted, you can complete this procedure.
3. Press F10. The entire second paragraph is selected. The selected text always appears in reverse video. Now you can switch to the Command mode.
4. Press ESC to exit from the Text mode and to enter the Command mode. The selection highlight appears on the EDIT command. The EDIT command is the default command selected since it is the command that brings you back to the Text mode; it is also the command you will use most frequently.

In the message line, notice the Select option or type command letter prompt. This prompt appears only if you are in the Command mode.

You are ready to select the DELETE command to erase the paragraph.

You enter commands either by pressing the key for the initial letter of the command name or by pressing the TAB, BACK TAB (SHIFT-TAB), SPACE BAR, or BACK SPACE key to highlight the command name.

5. Press D to select the DELETE command. The second paragraph disappears and the cursor is automatically returned to the Text mode.

Introduction to Word

Look at the message line. The Edit document or press Esc to use menu prompt appears. This prompt appears only if you are using Text mode. Also, take a look at the scrap. The first 42 characters of the paragraph you deleted are visible between the scrap's braces. The ellipses (...) indicate there is more text in the scrap than is visible on the screen. The DELETE command erased the paragraph from your document and placed it in the scrap. You will find out more about the scrap and how to use it later in this chapter.

Editing Text

The method you use to revise text depends on any number of factors. For example, the kind of revisions you need to make, the length of your document, whether you are erasing and typing in new information or deleting and inserting information from the scrap, all contribute toward determining how you go about revising. The deciding factor is often based upon personal style. Some people like to revise as they type, others like to work on successive drafts.

There are two major ways to revise:

- erase and retype as you compose, or
- select and revise after you have a draft.

ERASE AND RETYPE

When you typed the sample paragraph, you were told to correct any errors you made by using BACK SPACE to erase the error and then retype the correct text. But, since BACK SPACE erases every character in its way, you would only use this method to revise text if it were the last or close to the last word you typed. For example, change the last word free to available as follows:

1. Press BACK SPACE twice. Notice how the highlight moved to just after free.
2. Press BACK SPACE five more times to erase free.
3. Type available. (Do not forget the period.)
4. Press RETURN.

Overtyping

Word can help you speed up making changes by replacing existing text with new text as you type it. This is known as *overtyping*. However, Word is designed to insert new type between existing type unless you specify otherwise. If you prefer to overtype while editing, you must specify so.

To turn on overtyping, press **SHIFT-F5** (the **OVERTYPE** key). The **O** indicator appears in the status line, indicating Overtype mode is active. Press **SHIFT-F5** again to turn off Overtype mode.

There are four things to notice about overtyping:

- New characters replace the ones at the beginning of the current selection instead of being inserted before it.
- BACK SPACE moves the cursor left without deleting the characters in its path.
- If the selected character is a paragraph mark, an end of document mark, a new line break, or a page break, the character you type is inserted before the selection.
- If the new character is a paragraph mark, hard line break (SHIFT-RETURN), or hard page break (CTRL-RETURN), it is inserted before the selection.

SELECT AND REVISE

To edit a document you have already drafted:

- select the text, and
- revise the text by erasing, inserting, replacing, or moving it.

Text can be selected in a number of ways, with a variety of keys, depending on the location and the size of what you want to select. You already selected text when you deleted the second paragraph.

A selection can be any size, from as small as one character to as large as an entire document. Before continuing the discussion of selecting text, review the way in which Word views text. Here is a quick summary of the fundamental units of text:

Character—any letter, number, space, tab, symbol, or punctuation mark in the character set.

Word—any group of characters separated by spaces, tabs, or punctuation. A word includes all trailing spaces, but not trailing punctuation.

Sentence—any group of characters between terminal (sentence-ending) punctuation (period, question mark, or exclamation point). A sentence includes the terminal punctuation and trailing space, if any.

Paragraph—any group of characters between paragraph marks. A paragraph includes the trailing paragraph mark, which holds the formatting for its paragraph.

Introduction to Word

Word has various keys that select text. The key you use usually depends on the text you want to select and where it is located. Tables 19.1–19.5 in Chapter 19 list and describe the keys that select text in Word.

Try selecting and revising the text. Erase the word **but** in the phrase **but she's in Seattle this week.**

1. Press the **UP ARROW** key until the cursor appears in the line containing **but**.
2. Press the **F8 (WORD RIGHT)** and/or **F7 (WORD LEFT)** keys until the word **but** is selected.
3. Press **ESC** to enter the Command mode.
4. Press **D** to select the **DELETE** command. The word **but** disappears and you are automatically returned to the Text mode.

Word automatically adjusts the paragraph.

Selecting Text with the EXTEND SELECT Key

When you want to select a piece of text that is not one of the convenient sizes—such as a character, word, or line—you can extend the size of the selection. A guideline for extending the selection is select the first character, press the **EXTEND SELECT** key (**F6**), and select the last character. You can use any of the keys and commands that select text.

Extend the selection by using this guideline; select **in South Dakota** for deleting.

1. Use the **ARROW** keys to select the **i** in the word **in**.
2. Press **F6** to activate the Extend Selection feature. **Ex** appears on the status line.
3. Press **F8** three times. The entire phrase will be selected.

Now you are ready to erase the phrase. You have already used the **DELETE** command to erase text. Now, use the **DEL** key to erase text.

4. Press **DEL**.

The **DEL** key put the phrase **in South Dakota** into the scrap.

Sometimes, you will simply want to delete text. Other times, you will need to insert new text after you delete the old. You can insert text by typing it in or inserting it from the scrap.

Add the word **acquisition** to replace the deleted phrase. Remember that new text will appear to the left of the highlight. Since the period is currently highlighted, the new text will be entered to the left of the highlight.

5. Type acquisition.

To insert text from the scrap, you can use the INS key (SHIFT-DEL).

For example, to move **Incidentally**, to between **place**. and **Bring**:

1. Press **F8** twice to highlight the word **Incidentally**.
2. Press **F6** to activate the Extend Selection mode.
3. Press the **RIGHT ARROW** key twice to highlight the comma and space following the word **Incidentally**.
4. Press **DEL** to delete **Incidentally**, to the scrap.
5. Press the **ARROW** keys until the **B** in **Bring** is selected.
6. Press **INS (SHIFT-DEL)**. **Incidentally**, now appears in the paragraph.

To change the letter **B** of **Bring** to lowercase:

7. Make sure the highlight is over the **B** (select it, if necessary).
8. Press **DEL**.

NOTE: The uppercase **B** replaces the previous contents of the scrap. Every time you send something to the scrap it replaces whatever is there, unless **Ap** or **Ns** is displayed on the status line. When you insert the contents of the scrap, a copy of it remains in the scrap until you copy or delete something to replace it.

9. Type **b**.

That is how easy it is to move existing text. So far, you have revised text by deleting and inserted new and existing text. All these procedures are based on selecting, deleting (if necessary), and inserting existing text or entering new text. There is an additional way to revise text—through the REPLACE command, which you will learn about later.

Now that the document says exactly what you want it to, save the file you just created.

Saving a Word File

Word automatically saves your file and quits the Word session simultaneously. This means that whenever you end a Word session, any open file is saved; and whenever you save a Word file, the Word session ends. Save the **PRACTICE** file you just created.

Introduction to Word

Press **CTRL-F10** (the QUIT key). The PRACTICE file is saved and you are returned to the System Manager.

Formatting

The *format* of a document is its appearance. Even the simplest document has a format that consists of many individual measurements for the shape, size, and placement of text on a page. *Formatting* is the arrangement of lines in paragraphs (such as flushed left or full-justified) and the arrangement of a page (margins and page length).

On a typewriter, you can choose line spacing (single-, double-, or triple-spaced; on some, even half-line-spaced) and the width of the platen, which affects the width of paper you can use.

With Word, you can specify the shape and placement you want for lines in paragraphs, where tab stops are located, and where to place text on a page. Word gives you a lot of formatting control but does not burden you. Word comes with a preset (default) format for documents, so even if you only type and print, you get a document with a readable and presentable format.

You may prefer to rely on Word's preset format, which is set for 8.5-inch by 11-inch paper. This preset format can be changed via the System Manager SET PRINTER command. However, be advised that the System Manager SET PRINTER command sets the format not only for Word documents, but for all documents in the system. Also, the System Manager SET PRINTER command sets the format for all documents you write from that moment on; it has no effect on the documents already written. If you want to set a different format for a specific Word document, do so by using the FORMAT DOCUMENT command. For further information on setting a format for a document, refer to the FORMAT DOCUMENT command in Chapter 19.

Word's preset format includes the following:

- all lines flushed left (left-justified), single-spaced;
- tab stops every 5 columns;
- no lines between paragraphs;
- paper size: 8.5-inches by 11-inches; and
- margins: 6 lines top and bottom respectively; 13 and 12 columns left and right, respectively.

You can see the format of an individual Word document's text by selecting it, choosing the appropriate FORMAT command, and looking at the default responses in the prompts. For example, to see a paragraph's format, select the paragraph, press ESC to enter Command mode, and choose the FORMAT PARAGRAPH command. To see the document's page layout, choose the FORMAT DOCUMENT command.

It is useful to know from the beginning that you can do all the document formatting with the FORMAT commands. Since the FORMAT commands have prompts for every formatting possibility, you do not have to remember formatting codes. You can always look at, and choose from, a menu of formatting choices.

FORMATTING TEXT

All formatting follows these basic steps:

1. Select the text you want to format.
2. Choose the appropriate FORMAT command.
3. Enter the appropriate responses.
4. Execute the command.

Try formatting your PRACTICE file paragraph to illustrate how the FORMAT commands work. First, load and take a look at your paragraph.

1. Use the ARROW keys to select the PRACTICE file in the Word application row of the System Manager screen.
2. Press R to run the file. The PRACTICE file appears on the screen.

Word gives you the choice of how the left and right edges of paragraphs are shaped. In Word this is called *alignment*. Notice how the end of each line on the right-hand side ends in a different column, while the left-hand side begins in the same column. The paragraph is *left adjusted* (justified only on the left margin) and *ragged right*.

Change the alignment of your example paragraph from left (ragged right) to justified.

3. Press F10 to select the paragraph.

You do not need to select the entire paragraph to format it. Word assigns the paragraph formatting instructions to the paragraph mark of the paragraph containing the selection.

4. Press ESC to enter the Command mode.
5. Press F to choose the FORMAT command. The FORMAT command displays the following menu:

FORMAT: Paragraph Tabs Document Repaginate

6. Press P to select the FORMAT PARAGRAPH command. (You can also just press RETURN, since PARAGRAPH is the default response.)

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7. The FORMAT PARAGRAPH command displays a line across the top of the screen called a *rule line*. The rule line indicates the width of text in inches (10 marks per inch). At the bottom of the screen is a set of prompts, the first of which is:

alignment: Left Centered Right Justified -

Change the response in the alignment: prompt. The current response, Left, is highlighted.

8. Press J to choose Justified.
9. Press RETURN. The paragraph is changed from left adjusted to justified.

NOTE: Executing the command returns the cursor to Text mode. You must press ESC to switch back into Command mode before you can choose another command.

LINES AND PARAGRAPHS

What is a paragraph? This may be tough to answer when you are composing, but Word regards a paragraph simply as text between two paragraph marks. Each time you press RETURN, a paragraph mark is entered.

A paragraph also includes the mark at the end of the paragraph. You will see this and any other marks unless you change the default response in the visible: prompt of the OPTIONS command to off.

The paragraph mark is special because it contains the formatting instructions for its paragraph. When you press RETURN, Word creates a new paragraph by making a duplicate paragraph mark. This means that until you set a new format, each new paragraph is formatted like the one from which it was split.

When do you begin a new paragraph? Apart from doing so because you think it is time for one in the course of your writing, you start a paragraph to make the following formatting changes:

- add a heading for a section of a document;
- split a paragraph in two;
- change line spacing (amount of space between lines of text);
- change margins temporarily (temporary margins are called *indents* in Word);
- change justification, for example, from flushed left to center, flushed right, or full-justified; or
- change spacing between paragraphs, which can be done separately from line spacing.

Be aware that tab stops are considered part of a paragraph's format in Word.

You control line and paragraph formats with the FORMAT PARAGRAPH command.

You can change the format of paragraphs either as you type the text or later as you revise. Paragraph formatting is cumulative: you can choose responses in more than one prompt for the same paragraph.

Line Spacing

Line spacing is the space between lines. While typing a document, you can press RETURN to begin new lines and to double space as you would on a typewriter. Pressing RETURN at the end of every line can be tedious, especially since Word has the word-wrap feature. So that you only have to press RETURN to start a new paragraph, you can specify that your paragraphs be double-spaced with the FORMAT PARAGRAPH command.

Change the line spacing of the PRACTICE paragraph to double spacing.

1. Make sure the selection highlight appears in the paragraph.
2. Press ESC to change from Text mode to Command mode.
3. Press F to choose the FORMAT command.
4. Press P to choose the PARAGRAPH command.
5. Press TAB five times to advance to the line spacing: prompt.

You can set line spacing to any number of lines. Typical settings are single, double, and triple space. But, you can enter larger numbers if you want.

6. Press 2 to indicate double spacing.
7. Press RETURN to execute the command.

The paragraph automatically becomes double-spaced.

What if you want to change the line spacing between paragraphs? Many letters and reports insert a blank line between paragraphs that are single-spaced. Titles often have two or three blank lines following them. And section titles might have a couple of lines above them to set them off from the surrounding paragraphs.

You can press RETURN to insert blank lines between paragraphs as you would on a typewriter. However, Word gives you a convenient way to leave blank lines between paragraphs. The FORMAT PARAGRAPH command will let you specify this characteristic, also.

Add one line before and two lines after your PRACTICE paragraph.

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1. Press **ESC** to change from Text mode to Command mode.
2. Press **F** to choose the **FORMAT** command.
3. Press **P** to choose the **PARAGRAPH** command.
4. Press **TAB** six times to advance to the **space before:** prompt.
5. Press **1** to enter one blank line before the paragraph.
6. Press **TAB** once to advance to the **space after:** prompt.
7. Press **2** to enter two blank lines after the paragraph.
8. Press **RETURN** to execute the command.

The PRACTICE paragraph is now formatted to have one blank line before and two blank lines after it. This will not necessarily appear on the screen. To see the spacing, you will have to at least press **RETURN** at the end of the paragraph. In the future, be careful when you specify blank lines before and after your paragraphs. A blank line before and after each paragraph will actually give you two lines between paragraphs.

Review the following points for making changes in command prompts:

- In a listing of options, press the initial letter of the response (as in **J** for **Justified**).
- For a fill-in prompt, move to the prompt and enter the new response (as in **1** for **space before:**).
- **TAB** moves the cursor forward and **SHIFT-TAB** (called **BACK TAB**) moves the cursor backwards through prompts.
- Press **RETURN** to execute the command.

Changing Paragraph Margins (Indents)

Changing margins temporarily is a common practice. "Temporarily" is the key because you do not necessarily want to change the margins for the whole document, but rather just for a few lines. To accommodate both permanent margins for the whole document and temporary margins for part of the document, Word provides two ways to control margins—called *margins* and *indents*.

Margins are the general, permanent margins for the whole document. You will learn how to change the margins later in this chapter. Indents are the temporary margins. You might think of indents as paragraph margins. They are called *indents* because the first lines of paragraphs are often indented. Whole paragraphs are called *indented paragraphs* when their margins are set in farther than the document margins.

So, an indent in Word is the amount of white space between the document margins and the beginning and end of each line.

The lines of each paragraph have three indents: left, right, and first-line. *Left indent* is the distance from the left document margin to the beginning of lines (left paragraph margin). *Right indent* is the distance from the right margin to the end of lines (right paragraph margin). *First-line indent* is the distance from the left indent to the beginning of the first line.

Take a look at the indents for the PRACTICE paragraph. You can review the indents for a paragraph by selecting text within that paragraph and then studying the responses in the indent prompts of the FORMAT PARAGRAPH command, or by studying the positions of the symbols in the rule line.

1. Press ESC to enter the Command mode.
2. Press F to choose the FORMAT command.
3. Press P to choose the PARAGRAPH command. The FORMAT PARAGRAPH command line appears and the rule line appears in the top border of the screen.

Take a look at the three indent prompts. They read as follows:

left indent: 0

first line: 0

right indent: 0

Also, notice where the [(left indent) and] (right indent) symbols appear in the rule line.

Change these values to read 2, 7, and 5, respectively.

4. Press TAB twice to advance to the left indent: prompt and enter 2.
5. Press TAB once to advance to the first line: prompt and enter 7.

The first line indent is measured from the left indent, not the left margin. The measurement for the first line: prompt can be either a positive or negative number. A positive number means the first line is indented more than the left indent. A negative number means the first line is indented less than the left indent.

6. Press TAB once to advance to the right indent: prompt and enter 5.
7. Press RETURN to execute the command.

Notice how the paragraph has changed. Check the rule line to see if it reflects these changes.

8. Press ESC to enter the Command mode.
9. Press F to choose the FORMAT command.
10. Press P to choose the PARAGRAPH command. The screen will look similar to Figure 18.2.

Notice the | in the rule line? This is the first line indent symbol. Also, if any tab stops were set, their symbol (T) would also appear in the rule line. You will learn about setting, clearing, and moving tab stops later in this chapter.

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0 [|1 2 3 4 5] 6 7

attend this one-she's in Seattle this week-but she's
sending Jeff Egan in her place. Incidentally, bring
Mark if he's available.

FORMAT PARAGRAPH alignment: Left Centered Right Justified - keep: Yes(No)-
left indent: 2 first line: 7 right indent: 5
line spacing: 2 space before: 1 space after: 2
Select option Word: PRACTICE {B}

Figure 18.2. Rule Line with Indents

11. Press ESC to cancel this command and return to the command line.
12. Press CTRL-F10 to save the file.

So far, you have formatted an existing document. You can also format paragraphs as you type. The FORMAT PARAGRAPH command displays all the possible paragraph formatting options, so you do not need to memorize them.

In the next section, you will learn how to format paragraphs as you type.

TAB STOPS

Tab stops are positions preset to line up text in columns, as in lists or tables of names or numbers. In Word, every paragraph can have its own tab stop settings. So, you can change tab stop settings from paragraph to paragraph. Word has tab stop settings preset every five columns. These preset tab stops are like typewriter tabs. When you press TAB, the selection jumps to the next tab stop.

TAB inserts a tab character, which Word expands so that the text aligns properly at the next tab stop, whether it is a preset tab stop or one you set yourself. The tab character might appear to be several spaces wide, but it is always treated as a single character.

The preset tab stops work well if your table columns are about equal width. Sometimes though, you will find you need to change the tab stops. If you need to change them, you set, clear, and move tab stops with the FORMAT TABS command.

Tables are columns of text formatted with tab stops. Create the table of current assets shown in Figure 18.3 and format it as you enter the information. But first, you must open a new Word file.

ACCOUNT	DESCRIPTION	2	3	T	4	T	5	6	7
			DEBIT		CREDIT				
1010	PETTY CASH			412.61					
1021	BANK ACCOUNT 1			13742.85					
1022	BANK ACCOUNT 2			435.62					
1025	SAVINGS ACCOUNT			240.00					
1110	ACCOUNTS RECEIVABLE			6850.00					
1120	PREPAID INSURANCE			6.32					
1130	EMPLOYEE ADVANCES			496.00					
1150	INVENTORY			28360.00					

> Copy Delete Edit Format Insert Jump Merge Options Print Replace Search
 Edit document or press Esc to use menu
 Word: TABLE {B}

Figure 18.3. Table of Current Assets

1. Make sure Word is the application selected on the System Manager screen and press RETURN.
2. Press TAB to advance to the file: prompt.
3. Enter TABLE and press RETURN. The Word screen appears.

Before actually entering the table, turn on the rule line. The rule line appears in the top line of the screen and indicates the positions of the tab stops and the indents (paragraph margins) of the selected paragraph. The rule line will temporarily appear when you use the FORMAT TAB and FORMAT PARAGRAPH commands, but it disappears once you execute the command. Turn the rule line on with the OPTIONS command.

1. Press ESC to enter the Command mode.
2. Press O to select the OPTIONS command. The OPTIONS command line appears:

OPTIONS ruler: Yes No overtype: Yes(No) visible:(Yes)No

3. Press SPACE BAR to select the Yes option in the ruler: prompt.
4. Press RETURN to execute the command.

The rule line appears at the top of the screen. For further information on the OPTIONS command, refer to Word Commands in Chapter 19.

Next, you will enter the heading names for the columns in your table.

1. Enter ACCOUNT and press TAB.
2. Enter DESCRIPTION and press TAB.
3. Enter DEBIT and press TAB.
4. Enter CREDIT.

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At this time, decide if you want to be able to give each line of a table its own tab stops. If you do, press RETURN at the end of each line of the table. If you want to be able to select the whole table as one paragraph, or if you want to ensure that parts of the table have the same tab stop format, then end each line by pressing SHIFT-RETURN to start a new line. The new line mark (a downward pointing arrow) appears. For this example, the table will be one paragraph.

5. Press SHIFT-RETURN twice. A blank line will appear between the headings and the actual data.

It is time to format the tab stop settings.

1. Press F10 to select the paragraph.
2. Press ESC to enter the Command mode.
3. Press F and then T to select the FORMAT TABS command.

The table is using default tab stop settings of 1, 2.5, and 3.5. The DESCRIPTION tab stop setting (1) is acceptable, but since the entries in this column are long, the next column (DEBIT) must be moved further right. Set tab stops for the DESCRIPTION, DEBIT, and CREDIT columns.

4. Press the RIGHT ARROW key. The cursor in the rule line moves to the right. Continue pressing the RIGHT ARROW until the cursor appears at the 1 rule line position.
5. Press INS to set the DESCRIPTION tab stop. The tab stop symbol (T) appears in the rule line.
6. Press the RIGHT ARROW key 23 times so that the cursor appears in the 3.3 rule line position.

The longest description is 19 characters long, and you want at least 3 blank spaces between columns.

7. Press INS to set the tab stop.
8. Press the RIGHT ARROW key 12 times so that the cursor appears in the 4.5 rule line position.

The longest debit entry is 8 characters long, and you want at least three blank spaces between columns.

9. Press INS to set the tab stop.
10. Press RETURN. All the heading fields appear where you have set the tab stops.

Now you are ready to enter the first line of data.

Table 18.1. Current Assets Data

ACCOUNT	DESCRIPTION	DEBIT	CREDIT
1021	BANK ACCOUNT 1	13742.85	
1022	BANK ACCOUNT 2	435.62	
1025	SAVINGS ACCOUNT	240.00	
1110	ACCOUNTS RECEIVABLE	6850.00	
1120	PREPAID INSURANCE	6.32	
1130	EMPLOYEE ADVANCES	496.00	
1150	INVENTORY	28360.00	

1. Press the DOWN ARROW key to unselect the paragraph.
2. Enter 1010 and press TAB.
3. Enter PETTY CASH and press TAB.
4. Enter 412.61 and press SHIFT-RETURN.
5. Repeat steps 2 through 4 for each line of data in Table 18.1.
6. Press RETURN to start a new paragraph. Your screen will look like Figure 18.3.
7. Press CTRL-F10 to save the TABLE file and exit to the System Manager.

Clearing and Moving Tab Stops

Clearing tab stops is very similar to setting tab stops. To clear a tab stop:

1. Use the ARROW keys to select the TABLE file in the Word application row of the System Manager screen.
2. Press R to run the file. The TABLE file appears on the screen.
3. Press the UP ARROW key until the cursor appears in the paragraph containing your table.
4. Press F10 to select the paragraph.
5. Press ESC to enter the Command mode.
6. Press F to select the FORMAT command.
7. Press T to select the FORMAT TABS command.
8. Press the RIGHT ARROW key 33 times so the cursor appears on the tab stop setting in the 3.3 rule line position.
9. Press DEL to clear the setting.
10. Press the RIGHT ARROW key 12 times so the cursor appears on the tab stop setting in the 4.5 rule line position.
11. Press DEL to clear the setting.
12. Press RETURN to execute the command. Your screen will look like Figure 18.4.

To move a tab stop:

- Delete the old tab stop setting, and
- Insert the new tab stop.

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ACCOUNT	DESCRIPTION	DEBIT	CREDIT
1010	PETTY CASH	412.61	
1021	BANK ACCOUNT 1	13742.85	
1022	BANK ACCOUNT 2	435.62	
1025	SAVINGS ACCOUNT	240.00	
1110	ACCOUNTS RECEIVABLE	6850.00	
1120	PREPAID INSURANCE	6.32	
1130	EMPLOYEE ADVANCES	496.00	
1150	INVENTORY	28360.00	

> Copy Delete Edit Format Insert Jump Merge Options Print Replace Search
 Select option or type command letter
 Word: TABLE {B}

Figure 18.4. TABLE with Revised Tab Settings

For further information on tab stops, refer to the FORMAT TABS command in Word Commands in Chapter 19.

SETTING UP PAGES

You set up the characteristics of pages with the FORMAT DOCUMENT command. These characteristics include:

- Page size
- Margins
- Page numbers

Because the document format affects how pages look when they are printed, only a few parts of the document format affect what you see on the screen:

PROMPT AFFECTS

page width:	width of display
page length:	number of lines per page
right:	right margin

The left margin on the screen always appears on the left side of the screen, but the location for printing depends upon your settings.

Any changes you make in the FORMAT DOCUMENT prompts affect the entire document.

Page Size

Word uses the page size to determine how much text fits on a page. The System Manager preset printer settings are based on a paper size of 8.5 inches by 11 inches. You will need to adjust the measurements for page length and width if the paper you will print on is not 8.5 inches by

11 inches. The preset measurements can be altered system-wide via the System Manager SET PRINTER command.

Margins

In Word, margins refers to page margins that stay the same for all pages of a document. Adjust the margin settings if you want more or less white space around the text than Word's preset format provides. Word is preset to give top margins of 6 lines from the top of the sheet to the top of the document text, and bottom margins of 6 lines from the bottom of the sheet to the bottom of the document text. Left and right margins are preset at 13 and 12 columns, respectively. These margins are wide enough to allow the document to look good when it is bound in a 3-ring binder, for example.

If your document will be bound as a book, you can make the left margin wider so that the binding does not interfere with the text.

Printing

Now you will learn about printing. The ZP-150 can be used with a serial or parallel printer. If you have a serial printer, your ZP-150 must be configured. Refer to Chapter 4, "External Devices," for information on configuring your ZP-150 for a serial printer. The following discussion of printing is divided into routine printing, previewing and adjusting pages, printing parts of documents, and printing documents to files.

If you do not know how to connect or operate your printer, read your printer manual before attempting to print documents produced by Word.

Check to see that the:

- printer is plugged in,
- printer cable is plugged into the printer and into the ZP-150 printer port located on the rear panel,
- printer is on and on-line (if it is a serial printer, it should be configured), and
- printer has paper and ribbon installed correctly. Paper must be lined up so that the top edge of each page is at the bottom of the print head.

ROUTINE PRINTING

Once your printer is set up, you can print your document.

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To print a document:

1. If necessary, use the **ARROW** keys to select the Word file on the System Manager screen you want to print and press **RETURN** to run the file.
2. Press **ESC** to enter the Command mode.
3. Press **P** to choose the **PRINT** command.
4. Fill in the appropriate responses in the prompts.
5. Press **RETURN** to execute the command.

Word will start printing your document, in this case the **TABLE** file.

PREVIEWING AND ADJUSTING PAGES

For each page, Word makes many calculations and measurements based on your formatting choices. These calculations are made during printing or repagination, during which page breaks (that is, where one page ends and another begins) are calculated.

Word can take care of page breaks automatically. Single words or lines of paragraphs are never left alone at the bottom or top of a page. That means if a page break should occur in the last line of a paragraph, Word will either put an additional line on the new page or move the entire paragraph to the new page.

The automatic page breaks will be acceptable for almost every occasion. However, for those instances where the page break is not acceptable (such as a page break in the middle of a table), Word gives you control of page breaks. You can tell Word to start a new page wherever you want one by inserting a hard page break.

To insert a hard page break, press **CTRL-RETURN** or **CTRL-SHIFT-RETURN**. Word inserts a line of dots across the screen to show you where the new page starts and to show you that this is a page break you inserted, rather than a page break Word inserted during printing.

NOTE: Word also keeps all the parts of one paragraph together, if you have directed it to (by selecting the paragraph(s) and choosing **Yes** in the **keep:** prompt of the **FORMAT PARAGRAPH** command).

Because Word breaks pages only during printing, you would normally have to print the document to see where pages start. This could be time consuming and expensive. Word has a command that shows page breaks without printing the document.

To find out where the pages start without actually printing, choose the FORMAT REPAGINATE command and press RETURN.

FORMAT REPAGINATE tells Word to calculate page breaks but not to print the document. The *Formatting page n* message shows you the number of the page Word is formatting. After FORMAT REPAGINATE is finished, you will see the page break mark (>>) in the leftmost column of the screen. The mark indicates the first line on that page.

If the page break occurs at the wrong place, you can insert a hard page break, choose PRINT REPAGINATE again, and then recheck the new page breaks. This is faster and less expensive than printing the document.

Finding the Page Breaks

Scrolling to find page breaks can be tedious, particularly if your document is long. Word can jump to the beginning of any page in the document, provided the document has been printed or repaginated already.

To jump to the beginning of a page:

1. Choose the JUMP PAGE command.
2. Enter the number of the page you want to move to.
3. Press RETURN to execute the command.

NOTE: If you have never printed or repaginated the document, JUMP PAGE will select the first character of the document.

If you want to jump to the beginning of the last page but you cannot remember its page number, enter a page number you are sure is higher than the last page number. Word interprets any number higher than the actual last page number as a request to jump to the beginning of the last page.

PRINTING PART OF A DOCUMENT

In addition to routine printing and repagination, you can print parts of documents. Although Word is preset to print whole documents, Word also has options for printing specific pages and the selection.

Both of these options are specified with the PRINT command. To print specific pages:

1. Choose the PRINT command.
2. Choose Pages in the range: prompt.
3. Enter the number(s) of the pages to be printed in the page numbers: prompt.
4. Press RETURN to execute the command.

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Valid page numbers include:

Individual page numbers—Put a comma with no extra space between each one (1,4,8,11).

Group of page numbers—Put a colon or hyphen between the first and last page numbers of the group (8:12 prints pages 8 through 12; 17–20 prints pages 17 through 20).

Combination of groups or individual pages (6–9, 11, 15:18).

Or, if you want to print the selection (the text that appears in reverse video):

1. Select the text.
2. Press **ESC** to enter the Command mode.
3. Choose the **PRINT** command.
4. Choose **Selection** in the range: prompt.
5. Press **RETURN** to execute the command.

NOTE: When the selection option is chosen, the entire page on which the selection occurs is printed. If the selection crosses a page boundary, both pages that contain the selection are printed.

PRINTING A DOCUMENT TO A FILE

There are three circumstances for which you would want to print a Word document to a file with the **PRINT** command:

- to merge one Word document into another,
- to print the file through the System Manager **PRINT** command, and
- to transfer or upload a Word document with Telcom.

In order to incorporate one Word file into another Word file, the file that is to be added must first be printed to a file whose name has an extension other than those reserved for the applications (.BMI, .DAT, .PLN, .TXT, or .WRD). You might use .PRN. Then the file is incorporated by using the **MERGE** command.

Incorporate your **TABLE** file into the **PRACTICE** file.

1. Use the **ARROW** keys to select the **TABLE** Word document from the System Manager screen and press **RETURN**. The **TABLE** file appears on the screen.
2. Press **ESC** to enter the Command mode.
3. Press **P** to select the **PRINT** command.

4. Enter TABLE.PRN in the PRINT to: prompt. TABLE.PRN is the name for the table's new text file.

5. Make sure Yes is the response selected in the formatted: prompt, since you want the table to retain its formatting, and press RETURN.

The table is printed to the TABLE.PRN file. Since you retained formatting, the printed file contains the top and bottom page margins and a page number. You can delete these extra lines after merging the file.

NOTE: Whether the file is printed formatted or unformatted, you will have to make some modifications when you merge the file. For example, if the file is printed unformatted, you have to reset the tab stops. In most cases, though, you will print the file unformatted.

6. Press CTRL-F10 to exit to the System Manager.

The extension .PRN appears in the application column with the TABLE file in its row.

7. Use the ARROW keys to select the PRACTICE Word document from the System Manager screen and press RETURN. The PRACTICE file appears on the screen.

8. Use the ARROW keys to position the cursor after the last paragraph mark.

9. Press ESC to enter the Command mode.

10. Press M to select the MERGE command.

11. Enter TABLE.PRN in the MERGE from: prompt and press RETURN.

The table stored in the text file is incorporated into the document file. There are paragraph marks before and after the table—these marks represent the top and bottom page margins from the TABLE file. Notice the number 1 appears in one of the paragraphs before the table. This is the page number from the TABLE file. You will want to delete these extra paragraph marks and the page number.

In addition, since you changed the margins on the PRACTICE file, the table has a tab before each line. Delete the tabs, and your table will conform to the PRACTICE file.

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NOTE: The tabs within the table in the PRACTICE file are no longer treated as one space, but rather as multiple spaces. You could run into difficulty if you try reformatting the table in the PRACTICE file. To eliminate this problem and preserve the tabs, create the table in Plan, copy the table to scrap, and close the Plan file. Then open the Word document, place the selection highlight wherever you want the table to appear, and insert the scrap.

12. Press CTRL-F10 to save the new PRACTICE file.

Preparing a File for Use with Telcom

To send a Word document file with the Telcom application, it must first be printed to a file with an extension other than those reserved for the applications. There are two ways you can print the Word file to a new file.

The first way is to print the file unformatted to a new file, specifying No in the formatted: prompt of the PRINT command. To print the file unformatted, you must first modify it. Because Word has a word-wrap feature, you usually only press RETURN at the end of a paragraph. However, when you send this file through Telcom, other computers interpret each paragraph as one line. With each paragraph viewed as one line, this file would obviously be very difficult to read. To avoid this problem, press RETURN at the end of each line of a file that you plan to use with Telcom.

The second way is to print the file formatted to a new file. To print the file formatted, you must first modify it. Use the FORMAT DOCUMENT command to change all the margin settings (top, bottom, left, and right) of the file to zero and change the page width to accommodate the system to which you are uploading the file. (Since most systems have an 80-column screen width, you might want to change the page width to 70.) Then print the file, specifying Yes in the formatted: prompt of the PRINT command. However, when a file is printed formatted to another file a hard RETURN is included for each blank line on a page. For example, the default entry in the page length: prompt of the FORMAT DOCUMENT command is 66. If you transmit a file that is 15 lines long, there will be 51 hard RETURNS at the end of the file. To avoid this problem, change the page length to accommodate the file length before printing the file formatted.

For further information on printing a document to a file, refer to the PRINT command in Chapter 19.

Customizing Your Word Screen

Each time you create a document with Word, the screen is automatically set up with certain formatting characters or marks visible—marks that indicate the ends of paragraphs, for example. If you prefer not to see these marks, however, you can customize your screen so that they will not appear.

Turn the formatting marks off in the PRACTICE file.

1. Use the ARROW keys to select the PRACTICE file on the System Manager screen and press **R** to run the program.
2. Press **ESC** to enter the Command mode.
3. Press **O** to select the OPTIONS command.
4. Press **TAB** twice to advance to the **visible:** prompt.
5. Press **SPACE BAR** to select the **No** response.
6. Press **RETURN**. All the formatting marks in the document are now invisible.

You customize your screen to meet your needs on a document-by-document basis with the OPTIONS command. For example, when you were setting indents (paragraph margins) and tab stops, you used the OPTIONS command to turn on the rule line. Each new document uses the default OPTIONS settings. This means the prompt responses have to be changed in each document.

Turn the formatting marks back on in the PRACTICE file.

1. Press **ESC** to enter the Command mode.
2. Press **O** to select the OPTIONS command.
3. Press **TAB** twice to advance to the **visible:** prompt.
4. Press **SPACE BAR** to select the **Yes** response.
5. Press **RETURN**. All the formatting marks on the screen are now visible.

NOTE: If you do not customize a document, Word will use its default responses. For further information, refer to the OPTIONS command in Chapter 19.

STARTING A NEW LINE

While you are entering text, you often need to start new paragraphs, new lines, new pages, or new columns at specific places. You learned how to start new paragraphs when you were entering text, how to start new pages in the section on printing, and how to start new columns in the section on formatting tab stops.

Word wrap starts new lines automatically when you reach the right margin. But you can start a new line before reaching the right margin without starting a new paragraph. To do so:

Press **SHIFT-RETURN**.

SHIFT-RETURN does not insert a paragraph mark; it inserts a new line mark (a downward pointing arrow) instead. The new line is part of the same paragraph, even though it may look like a separate paragraph.



ADVANCED FEATURES

The following section describes the SEARCH and REPLACE commands and using the scrap in Word. You may want to explore these features as you become more experienced with Word.

SEARCH and REPLACE Commands

The SEARCH and REPLACE commands let you quickly find and/or change specific pieces of text.

The SEARCH command finds the next or previous instance of a piece of text in the document and selects that text. This command can be used to locate where specific text occurs in a document. Once you arrive at the location, you can revise the text by any of the means already discussed. The SEARCH command always starts looking for the text after the selection. So, if you want to search the entire document, be sure the selection highlight is at the beginning of the file.

Think of the REPLACE command as an expanded version of the SEARCH command. The REPLACE command finds all instances of a piece of text in the document, then exchanges it for another piece of text. You have the option of having all occurrences automatically replaced with the specified text or being prompted at each occurrence for permission to replace the text.

To replace text in a document, perform the following procedure:

1. Press ESC to enter the Command mode.
2. Press R to select the REPLACE command.
3. Enter the text you want to locate in the REPLACE text: prompt and press TAB. The cursor advances to the with text: prompt.
4. Enter the text you want to occur in the document and press TAB. The cursor advances to the confirm: prompt.
5. Select Yes if you want to be asked at each occurrence of the text if a replacement should occur, or No if you want all occurrences automatically replaced.
6. Press RETURN to execute the command.

Thus, use SEARCH to find and select the text, use REPLACE to find the text and replace it with new text.

When you choose the SEARCH or REPLACE command, whatever text you last asked Word to look for or to replace will appear in the text: prompt.



To limit the scope of a replacement (but not a search), you can select a piece of text by highlighting it in the document, and Word will act only on the text in the selection. (With REPLACE, a selection is considered to be anything more than one character. Thus, if you selected one word and then executed REPLACE, only the one word would be acted upon.)

Using the Scrap

The scrap is a temporary storage place that holds "scraps" of text you take from a document. The scrap is used for deletions, insertions, and moves. It can hold any amount of text within the limitations of the system memory.

Scrap has a feature that allows you to change the mode of operation. The SCRAP key (F5) is initially in the Blank Scrap mode; this means storage in the scrap is temporary. Any text you send to the scrap replaces any existing text. The bits of text you send to the scrap do not accumulate, unless you are using the Append Scrap mode.

To enter the Append Scrap mode, press the F5 key until the Ap indicator appears in the status line. This mode allows data copied or deleted to the scrap to be added to the existing contents.

Press the F5 key once while using the Append Scrap mode and the scrap changes to the No Scrap mode. The Ns indicator appears in the status line. This mode inhibits the DELETE command from interacting with the scrap. Thus, if you delete text while using the No Scrap mode, it cannot be retrieved.

Since the scrap is used by other applications, the No Scrap mode can come in handy. For example, you want to move something from Plan to a Word document. If you are in Blank Scrap mode and delete the Plan data to the scrap, exit Plan, and enter Word to do some editing in Word before you insert the text, you may permanently erase the Plan data from the scrap. If you are in the No Scrap mode and try to delete something to the scrap before inserting the Plan data, the text is deleted but not written over the Plan data in the scrap.

The COPY and DELETE commands send text to the scrap, and the INSERT command retrieves text from the scrap. You have the option of deleting text to the scrap or deleting text without sending it to the scrap.

Instead of merging the TABLE file into the PRACTICE file, you could have copied the TABLE file to scrap (keeping all the paragraph's formatting) and inserted the scrap in the PRACTICE file.

DELETING TO SCRAP

Since the scrap is the primary means for moving text or copying it to new places, you may find yourself deleting to the scrap quite often. However, the **DELETE** command and **DELETE** key replace the contents of the scrap with the latest material. As such, you should only use them if you do not mind losing the existing contents of the scrap.

To delete to the scrap and lose the existing scrap contents:

1. Select the text, using the **ARROW** keys and **F6** as needed.
2. Press **F5** until you are using the Blank Scrap mode (neither **Ns** nor **Ap** appears on the status line).
3. Press **ESC** to enter Command mode.
4. Delete the text, using the **DELETE** command or the **DEL** key.

The deleted text, or part of it, will appear between the {} on the status line. If you want to retain the existing contents of the scrap, use the **F5** key, in Append Scrap mode, in conjunction with the **DELETE** command to append material to the scrap in the following way.

To append material to the scrap (add it to the existing scrap):

1. Select the text, using the **ARROW** keys and **F6**.
2. Press **F5** once (or however many times it takes to display **Ap** on the status line).
3. Press **ESC** to enter Command mode.
4. Choose the **DELETE** command.
5. Press **RETURN** to execute the command.

DELETING, NOT TO THE SCRAP

To delete text permanently, use **F5** set to No Scrap mode in conjunction with the **DELETE** command. Used as shown, **F5** will *not* replace the scrap with the latest deletion. Instead, it will simply delete whatever you have selected without sending it to the scrap.

If you want to delete and not send the selection to scrap:

1. Select the text, using the **ARROW** keys and **F6** as needed.
2. Press **F5** twice (or however many times it takes to display **Ns** on the status line).
3. Press **ESC** to enter Command mode.
4. Press **D** to select the **DELETE** command.
5. Press **RETURN** to execute the command.

NOTE: Once the text is selected, **CTRL-DEL** will perform the same function; the selection is deleted and *not* sent to the scrap.

INSERTING THE SCRAP

The scrap is an important part of revising. Once you send text to the scrap, you can insert it in as many places and in as many documents as you want. The contents of the scrap can be added to a file with the INSERT command or the INS key.

To insert the scrap:

1. Select the place where the scrap is to be inserted, using the ARROW keys.
2. Press ESC to enter Command mode.
3. Insert the text, using the INSERT command or INS.

The text remains in the scrap, too, so you can select another place, even in another document, and insert it again as many times as you want. The scrap is not erased, even if you move to another document or turn off the ZP-150. Remember, however, that deleting any new text to the scrap in the Blank Scrap mode will replace existing scrap text. For remedies, Refer to Deleting, Not to the Scrap in this chapter.

REPLACING WITH SCRAP

There is an additional way to use the scrap—to replace the selection with the text in the scrap. To exchange what is in the scrap for what is currently selected, press CTRL-INS.

CONCLUSION

Before you proceed to Chapter 19 or another application, delete all the files you created during this chapter. Use the DELETE command from the System Manager screen. For further information on the System Manager DELETE command, refer to Chapter 2, "System Manager Reference."



CHAPTER 19

WORD REFERENCE

In this chapter you will find the details specific to operating your ZP-150 Word application. This chapter includes a description of the function keys that implement Word's features, an alphabetical list of Word's commands, and list of error messages that can occur while you are using Word.

FUNCTION KEYS

Word makes use of the following sets of keys:

- Selection Keys
- Scrolling Keys
- Program Function Keys
- Special Purpose Keys

Selection Keys

The ARROW keys (UP, DOWN, LEFT, and RIGHT ARROW) move the selection highlight to the designated character position. For example, the UP ARROW key selects the character one line above the currently selected character, while the RIGHT ARROW key selects the next character. Table 19.1 describes the ARROW keys.

Once you have selected a particular character, you can extend the selection to include any grouping of characters using the selection keys in combination with the EXTEND SELECT key (F6). See Program Function Keys later in this chapter for more details.

Table 19.1. ARROW Key Functions

KEY	ACTION
UP ARROW	Moves the selection up one line.
DOWN ARROW	Moves the selection down one line.
LEFT ARROW	Moves the selection one character to the left.
RIGHT ARROW	Moves the selection one character to the right.

Scrolling Keys

You can also use the ARROW keys to scroll the display. When the selection highlight is on the last visible line on the screen, the DOWN ARROW key scrolls the display forward one line at a time. When the selection highlight is on the first visible line on the screen, the UP ARROW key scrolls the display backward one line at a time.

USING THE ARROW KEYS WITH THE SHIFT KEY

By holding down the SHIFT key and pressing the appropriate ARROW key, you display the next or previous screen of text. SHIFT-modified ARROW keys operate as described in Table 19.2.

NOTE: When the display is scrolled with SHIFT-DOWN ARROW, the new selection highlight is on the same relative line of the new screen.

USING THE ARROW KEYS WITH THE CTRL KEY

By holding down the CTRL key and pressing the UP or DOWN ARROW, you display the first or last line of the document. CTRL-modified ARROW keys operate as described in Table 19.3.

Program Function Keys

Word contains two sets of program function keys. The first set consists of F2, F5, F6, and the Edit keys, F7 through F10. Their functions are described in Table 19.4. The second set employs the SHIFT key and is shown in Table 19.5.

Table 19.2. SHIFT-Modified ARROW Keys

KEY	ACTION
SHIFT-UP ARROW	Moves the selection up one window's worth.
SHIFT-DOWN ARROW	Moves the selection down one window's worth.
SHIFT-LEFT ARROW	Moves the selection one word to the left.
SHIFT-RIGHT ARROW	Moves the selection one word to the right.

Table 19.3. CTRL-Modified ARROW Keys

KEY	ACTION
CTRL-UP ARROW	Moves the selection to the first character of the document.
CTRL-DOWN ARROW	Moves the selection to the last character of the document.
CTRL-LEFT ARROW	Moves the selection to the first character of the line.
CTRL-RIGHT ARROW	Moves the selection to the last character of the line.

Table 19.4. Program Function Keys

FUNCTION	KEY	ACTION
INSERT	F2	Copies the contents of the scrap to the left of the current selection.
SCRAP	F5	<p>Works in conjunction with the DELETE and COPY commands and the scrap. Specifically, it offers you three choices:</p> <ol style="list-style-type: none"> 1. Press F5 once (or until Ap appears on the status line) and whatever you have selected to go to the scrap is appended to the existing contents of the scrap. 2. Press F5 again (or until Ns appears on the status line) and whatever you have selected is erased, without going to the scrap. (Works with the DEL key and the DELETE command only; the COPY command will copy to the scrap regardless.) 3. Press F5 once more (or until nothing appears on the status line) and whatever you have selected to go to the scrap replaces the existing contents of the scrap.

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Table 19.4 (continued). Program Function Keys

FUNCTION	KEY	ACTION
EXTEND SELECT	F6	Turns on the Extend Selection feature. This feature, used in combination with the other keys, allows you to expand the current selection to include any grouping of text. Press F6 once more to turn off the Extend Selection feature and cause the selection keys to again select individual characters or words.
WORD LEFT	F7	In Text mode, selects the word to the left of the cursor. Or, used to edit entries at command prompts.
WORD RIGHT	F8	In Text mode, selects the word to the right of the cursor. Or, used to edit entries at command prompts.
SENTENCE or CHARACTER LEFT	F9	In Text mode, expands the current selection to include the entire sentence. In Command mode, selects the character to the left of the currently selected character in the command prompt responses.
PARAGRAPH or CHARACTER RIGHT	F10	In Text mode, expands the current selection to include the entire paragraph. In Command mode, selects the character to the right of the currently selected character in the command prompt responses.

NOTE: You can select large portions of your text by pressing the EXTEND SELECT key (F6) and then using SHIFT-modified ARROW keys or CTRL-modified ARROW keys. When you scroll the display after pressing the EXTEND SELECT key, Word extends the selection highlight from the starting point to the ending point of the scrolling action. (Use of any command except JUMP and SEARCH turns the Extend Selection feature off once the command has been carried out.)

USING THE PROGRAM FUNCTION KEYS WITH THE SHIFT KEY

You use the second set of Word's Program Function keys by holding down the SHIFT key and pressing F2 through F5 or F7 through F10. Their functions are described in Table 19.5.

Table 19.5. SHIFT-Modified Program Function Keys

FUNCTION	KEY	ACTION
REPLACE W/SCRAP	SHIFT-F2	Replaces selected text with the contents of the scrap.
SEARCH UP	SHIFT-F3	Searches the text before the current selection for whatever you have specified via the SEARCH command.
SEARCH DOWN	SHIFT-F4	Searches the text after the current selection (beginning with the sentence containing the current selection) with whatever you have specified via the SEARCH command.
OVERTYPE	SHIFT-F5	Activates and deactivates Overtype mode which lets you type over existing text.
PREVIOUS SENTENCE	SHIFT-F7	Selects the previous sentence.
NEXT SENTENCE	SHIFT-F8	Selects the next sentence.
SELECT LINE	SHIFT-F9	Expands the current selection to include the entire line.
SELECT DOCUMENT	SHIFT-F10	Expands the current selection to include the entire document.

Special Purpose Keys

There are a few additional keys that perform important functions in Word. These additional keys are described in Table 19.6.

Table 19.6. Special Purpose Keys

KEY	ACTION
ESC	In Text mode, switches Word from Text mode to Command mode. In Command mode, cancels a command if you have not yet pressed RETURN.
INS	Inserts the contents of the scrap.
CTRL-INS	Replaces the current selection with the contents of the scrap.
DEL	Deletes the selection to the scrap. When editing a command prompt entry, deletes the current selection.
CTRL-DEL	Deletes the selection, but does NOT send it to the scrap.
RETURN	Starts a new paragraph.
SHIFT-RETURN	Starts a new line without starting a new paragraph.
CTRL-RETURN or CTRL-SHIFT-RETURN	Starts a new page.
BACK SPACE	Deletes the character that precedes the selected character without effecting the scrap.
TAB	In Text mode, advances to the next tab stop. In Command mode, selects the next command or command prompt.
SHIFT-TAB	In Command mode, selects the previous command or command prompt.

WORD COMMANDS

Table 19.7 lists each Word command with a brief description. Following the table is an explanation of each command. This explanation includes:

- the command submenu or command prompts that appear when you choose the command, and
- a description of each command prompt.

Table 19.7. Word Command Summary

COMMAND	DESCRIPTION
COPY	Places a duplicate of the selection in the scrap.
DELETE	Removes the selection from the document.
EDIT	Switches from Command mode to Text mode.
FORMAT	Accesses the submenu of commands for designing layout of text.
DOCUMENT	Determines the layout of pages.
PARAGRAPH	Determines how lines of text (grouped as a paragraph) are placed.
TABS	Sets and clears tab stops within paragraphs.
REPAGINATE	Displays where new pages will occur in printing.
INSERT	Places a copy of the scrap in the document.
JUMP	Accesses the submenu of commands for moving within a document.
PAGE	Moves to the first line of the specified page.
%	Moves to a point that is the specified percentage through the document.
MERGE	Incorporates a text file into a Word work file.
OPTIONS	Sets the rule line; Overtype mode; and visibility of paragraph, new line, and new page marks.
PRINT	Sends a copy of a document to the printer, to a text file, or to a data cassette recorder.
REPLACE	Locates and deletes the specified text while inserting other specified text.
SEARCH	Locates nearest occurrence of the specified text.

Using Commands

In Word, you enter, revise, format, and print your document by using commands from command menus. Specifically:

- before you choose a command, in many instances you must select the text you want the command to act on.
- after choosing a command, you sometimes must supply additional information in command prompts.

Choose a command either by typing the initial letter of the command name or by pressing TAB or SPACE BAR to position the selection highlight over the command and pressing RETURN. For example, if you wanted to choose the PRINT command, you would either press P, or you could press SPACE BAR until the selection highlight is positioned over PRINT in the command menu and then press RETURN. (You may need to press ESC to enter Command mode first.)

For commands with command prompts, you must select responses or make entries (assuming that the default responses do not suit you) before Word can execute the command. If commands do not have command prompts, Word executes the command as soon as you choose it.

At command prompts you must either make an entry or make a selection from a list of valid responses. The responses in command prompts reflect the choice you made (in a menu), the response you filled in the last time you used the command, or the built-in response Word will use if you do not specify one. Either way, they are called *default selections* or *entries*. If all the responses are acceptable, you simply press RETURN.

If a response is unacceptable, either make a new selection or enter a different response.

To choose a selection in a command prompt, either:

- press the initial letter of the option, or
- press SPACE BAR to highlight your choice.

NOTE: Use SPACE BAR to move from option to option within a command prompt. Do not press TAB—within command prompt listings, TAB moves you from prompt to prompt and SPACE BAR moves you from option to option.

To enter a different response, either type a new entry or change the existing entry by using the keys shown in Table 19.8.

Table 19.8. Key Entries in Command Prompts

KEY	ACTION
F7	Moves highlight one word to the left.
F8	Moves highlight one word to the right.
F9	Moves highlight one character to the left.
F10	Moves highlight one character to the right.
DEL	Erases the highlighted character(s).
BACK SPACE	Erases one character to the left of the highlight.

Once you have completed answering the command's prompts, you are ready to tell Word to execute the command or to cancel it. To execute commands, press RETURN. To cancel a command before you have pressed RETURN, simply press ESC. To cancel a command, such as PRINT, after RETURN has been pressed, simply press the BREAK key.

COPY

PURPOSE

Use the COPY command to place a duplicate of the selection in the scrap.

EXPLANATION

The COPY command does not have associated submenus or command prompts. To execute the COPY command:

1. Select the text to be copied.
2. Press **ESC** to switch from Text mode to Command mode.
3. Select the COPY command.

The selection is copied to the scrap. How the data is copied to the scrap depends on the status of the SCRAP key (F5). Table 19.9 lists the SCRAP key modes and how the selection is copied in each of the modes.

Once you have copied a selection to the scrap, you can:

- insert the selection in another location of the document, or
- transfer the selection to another document or application.

When text is used repeatedly throughout a document, the COPY command can be used with the INSERT command. The text to be repeated is highlighted, copied to the scrap, and inserted wherever necessary. Thus, you only have to actually type the text once.

For more information on transferring selections of a document to another document or program, refer to Transferring Data between Applications in Chapter 3, "ZP-150 Applications."

Table 19.9. COPY and the Scrap Modes

MODE	RESULT
Append Scrap (Ap)	The selection is added to the existing scrap.
Blank Scrap	The selection replaces the contents of the scrap.
No Scrap (Ns)	The selection replaces the contents of the scrap.

DELETE

PURPOSE

Use the DELETE command to remove the selection from the document.

EXPLANATION

The DELETE command does not have associated submenus or command prompts. To execute the DELETE command:

1. Select the text to be removed.
2. Press ESC to switch from Text mode to Command mode.
3. Select the DELETE command.

The selection is removed. How the data is removed depends on the status of the SCRAP key (F5). Table 19.10 lists the SCRAP key modes and how the selection is removed in each of the modes.

Once you have deleted a selection to the scrap, you can:

- insert the selection in another location of the document, or
- transfer the selection to another document or application.

When you want to move text from one place in the document to another location, the DELETE command can be used with the INSERT command. The text to be moved is highlighted, deleted to the scrap, and inserted wherever necessary. Thus, you do not have to retype the text in the new location.

For more information on transferring selections of a document to another document or program, refer to Transferring Data between Applications in Chapter 3, "ZP-150 Applications."

Table 19.10. DELETE and the Scrap Modes

MODE	RESULT
Append Scrap (Ap)	The selection is added to the existing scrap.
Blank Scrap	The selection replaces the contents of the scrap.
No Scrap (Ns)	The selection is deleted and is <i>not</i> sent to the scrap.

EDIT**PURPOSE**

Use the EDIT command to switch from the command line (called Command mode) and reenter the document (called Text mode). The EDIT command is the default command selection whenever you enter Command mode.

EXPLANATION

The EDIT command does not have associated submenus or command prompts. To execute the EDIT command, simply select the command while you are using the Command mode.

For example, suppose you had just entered a document and begun formatting it, only to discover you needed to add additional text. You would press ESC to exit any FORMAT submenu and choose the EDIT command to return from the command line to the document.

FORMAT

PURPOSE

Use the FORMAT command to access a submenu of commands that are used to format documents.

EXPLANATION

There are four commands available with the FORMAT command submenu. To execute the Word FORMAT command:

1. Press ESC to switch from Text mode to Command mode.
2. Select the FORMAT command.

The FORMAT command submenu appears:

FORMAT: Paragraph Tabs Document Repaginate

Each of the four submenu commands are explained in full on the pages that follow.

FORMAT DOCUMENT

PURPOSE

Use the FORMAT DOCUMENT command to view and set the definition for page layout.

EXPLANATION

To execute the FORMAT DOCUMENT command:

1. Press ESC to switch from Text mode to Command mode.
2. Select the FORMAT command.
3. Select the DOCUMENT command from the FORMAT submenu; the FORMAT DOCUMENT command line appears:

```
FORMAT DOCUMENT page width: 85
    margin top: 6           bottom: 6          left: 13          page length: 66
    page numbers: (Yes) No      start at: 1          right: 12
```

4. Make the appropriate responses to the command prompts (described in the following section).
5. Press RETURN.

COMMAND PROMPTS

There are eight FORMAT DOCUMENT command prompts. Following is a description of each FORMAT DOCUMENT command prompt, the message that appears when you use the prompt, and the possible responses.

Before you read these descriptions you should know:

- Columns are associated with the width of a page; a page, from end to end, is a maximum of 132 columns wide.
- Lines are associated with the length of a page; a page, from top to bottom, is a maximum of 132 lines long.

page width:

The Enter measurement in columns message appears in the message line. Enter the desired number of columns (or characters) for the width of pages. A valid entry is any number from 10 up to, and including, 132. The default value is 85, the width of 8.5-inch paper.

page length:

The Enter measurement in lines message appears in the message line. Enter the desired number of lines for the length of pages. A valid entry is any number from 1 up to, and including, 132. The default value is 66, the length of 11-inch paper.

margin top:

The Enter measurement in lines message appears in the message line. The margin top is the measurement, in lines, from the top of the sheet to the top of the document text. Enter the desired number of lines for the top margin. A valid entry is any number from 0 to 131 inclusive, as long as the number is less than the value in the page length: prompt. In addition, the sum of the values in the margin top: and bottom: prompts cannot be equal to or greater than the value in the page length: prompt. The default value is 6.

NOTE: Since the page number prints in the top right-hand corner of the page, the margin top: prompt must contain a value greater than zero in order for the page number to print.

bottom:

The Enter measurement in lines message appears in the message line. The margin bottom is the measurement, in lines, from the bottom of the sheet to the bottom of the document text. Enter the desired number of lines for the bottom margin of pages. A valid entry is any number from 0 to 131 inclusive, as long as the number is less than the value in the page length: prompt. In addition, the sum of the values in the margin top: and bottom: prompts cannot be equal to or greater than the value in the page length: prompt. The default value is 6.

left:

The Enter measurement in columns message appears in the message line. The left margin is the measurement, in columns, from the left edge of the sheet to the document text. Enter the desired number of columns (or characters) for the left margin of pages. A valid entry is any number from 0 up to 131 inclusive, as long the number is less than the value in the page width: prompt. In addition, the sum of the values in the left: and right: prompts cannot be equal to or greater than the value in the page width: prompt. The default value is 13 columns from the edge of the page.

right:

The Enter measurement in columns message appears in the message line. The right margin is the measurement, in columns, from the right edge of the sheet to the document text. Enter the desired number of columns (or characters) for the right margin of pages. A valid entry is any number from 0 to 131 inclusive, as long as the number is less than the value in the page width: prompt. In addition, the sum of the values in the left: and right: prompts

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cannot be equal to or greater than the value in the `page width:` prompt. The default value is 12 columns from the edge of the page.

`page numbers:`

The `Select option` message appears in the message line. Word can number pages automatically as it prints the pages. Choose the `Yes` option if you want page numbers to be printed on the hard (or printed) copy of the document. Choose `No` if you do *not* want page numbers to be printed.

Page numbers do not appear on the screen. The placement of page numbers on the printed copy is fixed; page numbers are printed in the top right-hand corner of the page.

NOTE: Since the page number prints in the top right-hand corner of the page, the `margin top:` prompt must contain a value greater than zero in order for the page number to print.

`start at:`

The `Enter page number` message appears in the message line. The value entered in this prompt is the starting page number of the document. This means the first page of the file is assigned whatever number appears in this prompt. For example, you have a document consisting of 30 pages of text, and you have split the document into two files. The first file ends on page 16. In the second file, you would enter 17 at this prompt. When the pages are printed or even repaginated, the first page of the file is assigned page number 17. Enter the desired starting page number for the document. A valid entry is any positive number from 1 to 32767. The default value is 1.

FORMAT PARAGRAPH

PURPOSE

Use the FORMAT PARAGRAPH command to view and set the attributes that determine how lines of text are placed within a paragraph (or paragraph's format).

EXPLANATION

To execute the FORMAT PARAGRAPH command:

1. Press ESC to switch from Text mode to Command mode.
2. Select the FORMAT command.
3. Select the PARAGRAPH command from the FORMAT submenu, and the rule line appears in the top border and the FORMAT PARAGRAPH command line appears:

```
FORMAT PARAGRAPH alignment:(Left)Centered Right Justified -      keep: Yes(No) -
left indent: 0           first line: 0       right indent: 0
line spacing: 1          space before: 0    space after: 0
```

4. Make the appropriate responses to the command prompts (described in the following section).
5. Press RETURN.

Once a paragraph's format is set, it remains permanently attached to the paragraph (or paragraphs) in the selection, until you:

- change the format of the paragraph with FORMAT PARAGRAPH, or
- merge the paragraph in question with the paragraph that follows it.

NOTE: When two paragraphs are merged together, the resulting paragraph *always* takes on the formatting characteristics (including tab stop settings) of the succeeding paragraph. For example, if you merge two paragraphs (the first named A and the second named B), the resulting paragraph retains the formatting of paragraph B.

COMMAND PROMPTS

There are eight FORMAT PARAGRAPH command prompts. Following is a description of each FORMAT PARAGRAPH command prompt, the message that appears when you use the prompt, and the possible responses.

Word Reference



Before you read these descriptions you should know:

- Columns are associated with the width of a page; a page, from end to end, is a maximum of 132 columns wide.
- Lines are associated with the length of a page; a page, from top to bottom, is a maximum of 132 lines long.

If you selected a single paragraph, or several paragraphs with an identical format, the response to each command prompt is the same. Each paragraph attribute is shown as the default entry or selection in its corresponding command prompt. A change to any of the default entries or selections will affect all the paragraphs you have selected.

If you selected paragraphs that each have different formatting (for example, some paragraphs are indented, but others are not), the attributes that the paragraphs share will have default entries in the appropriate command prompts. Attributes that the paragraphs do not share will be indicated by a blank in all prompts, except for the `alignment:` and `keep:` prompts, which highlight the - (dash) response. The dash indicates that the responses to the `alignment:` and `keep:` prompts are different for the paragraphs selected.

NOTE: If the dash or blank is changed in any of the command prompts, all selected paragraphs are reformatted according to the change. To retain the mixture of formatting, leave the blank entries or dash as is.

Tab stops are also part of a paragraph's format. Refer to the FORMAT TABS command for information on the setting of tab stops.

`alignment:`

The Select option message appears in the message line. The *alignment* is how the left and right edges of the paragraph are shaped. Word can align paragraphs in any one of four ways, as described in Table 19.11.

`keep:`

The Select option message appears in the message line. This prompt helps you specify whether page breaks can occur in the middle of a paragraph. That is, if the paragraph falls on a page boundary (a new page begins in the middle of a paragraph) do you want the paragraph to be split between the pages, or to keep the paragraph whole?

- | | |
|-----|---|
| Yes | Do <i>not</i> print any paragraphs in the selection across a page boundary. |
| No | Print paragraphs across a page boundary. |
| - | Retains the current mix of formatting. |



Table 19.11. Paragraph Alignment

ALIGNMENT	RESULT	COMMON USES
Left	Lined up on the left, ragged on the right (left-justified, flush left)	Letters, reports
Centered	Centered text between line indents	Titles, headings, bylines, dates
Right	Lined up on the right, ragged on the left (right-justified, flush right)	Posters, brochures
Justified	Lined up both left and right (full-justified)	Letters, reports, books

NOTE: The - response retains the current mix of formatting.

left indent:

The Enter measurement in columns message appears in the message line. The left indent is the measurement between the left margin and the left edge of text. Enter the desired number of columns (or characters) for the left indent. A valid entry is any number from 0 to 127 inclusive, as long as the number is less than the value in the FORMAT DOCUMENT page width: prompt. In addition, the sum of the values in the left indent: and right indent: prompts cannot be equal to or greater than the sum of the values in the FORMAT DOCUMENT page width:, left:, and right: prompts. The default value is 0.

first line:

The Enter measurement in columns message appears in the message line. The first line indent is the measurement from the paragraph's left indentation to the first line's left indentation. Enter the desired number of columns (or characters) for the indentation of the first line. A valid entry is any number, positive or negative, from 0 to 127 inclusive, as long as the number will not extend the first line beyond the left or right margin of the page. The default value is 0.

A positive measurement indents the first line. A negative measurement (entered with a minus sign before the number) moves the first line to the left, beyond the left indentation. When a negative number is entered, the results are called a *hanging indent*. For example, in a numbered list or an outline, a hanging indent allows all the text to line up and the number or letter of the item to be emphasized.

In addition, the first line indentation must be consistent with the margin settings in the FORMAT DOCUMENT command. If the first line indentation measurement pushes the text beyond the margins, Word displays an error message indicating so.

right indent:

The Enter measurement in columns message appears in the message line. The right indent is the measurement between the right margin and the right edge of text. Enter the desired number of columns (or characters) for the right indent. A valid entry is any number from 0 to 127. In addition, the sum of the values in the left indent: and right indent: prompts cannot be equal to or greater than the sum of the values in the FORMAT DOCUMENT page width: left:, and right: prompts. The default value is 0.

line spacing:

The Enter measurement in lines message appears in the message line. Enter the desired number of lines for the spacing between lines within a paragraph. A valid entry is any positive number from 1 to 127 inclusive. An entry of 1 causes single spacing, an entry of 2 causes double spacing, and so on. The default value is 1.

space before:

The Enter measurement in lines message appears in the message line. Enter the desired number of lines that will always precede the paragraph. A valid entry is any number from 0 to 127. The default value is 0.

space after:

The Enter measurement in lines message appears in the message line. Enter the desired number of lines that will always follow the paragraph. A valid entry is any number from 0 to 127. The default value is 0.

NOTE: The space between paragraphs is always the sum of the entry in the space after: prompt of the first paragraph and the entry in the space before: prompt of the second paragraph.

FORMAT REPAGINATE

PURPOSE

Use the FORMAT REPAGINATE command to determine where page breaks occur in the document (where new pages will occur when the document is printed), without printing.

EXPLANATION

The FORMAT REPAGINATE command does not have associated submenus or command prompts. To execute the FORMAT REPAGINATE command:

1. Press **ESC** to switch from Text mode to Command mode.
2. Select the **FORMAT** command.
3. Select the **REPAGINATE** command from the **FORMAT** command submenu.

The **Formatting page n** message (where *n* is a number) appears in the message line. This message is displayed to indicate the progress of pagination by the FORMAT REPAGINATE command.

Page breaks indicate where new pages start when a document is printed. There are two types of page breaks; soft and hard. A *soft page break* is generated by printing or repagination and its location can change at printing time. The marking that indicates a soft page break is a double greater than sign (**>>**) on the left-hand side of the screen. A *hard page break* is generated by pressing **CTRL-RETURN** and its location will not change at printing time. A hard page break is indicated by a dotted line across the entire length of the screen.

The page breaks are changed only if a document is printed or the FORMAT REPAGINATE command is chosen. Therefore, if you edit a document and add new text, the document will still display page breaks from the last printed document. You must either print the document or use the FORMAT REPAGINATE command to show the new page breaks. This command allows you to review page breaks and see how your changes have affected the page and document layout.

The FORMAT REPAGINATE command changes all the page breaks without actually causing you to print the document. All page breaks are changed to reflect the current document instead of the last printed version.

FORMAT TABS

PURPOSE

Use the FORMAT TABS command to set and clear tab stop settings for a paragraph.

EXPLANATION

The FORMAT TABS command has one command prompt. To execute the FORMAT TABS command:

1. Press **ESC** to switch from Text mode to Command mode.
2. Select the **FORMAT** command.
3. Select the **TABS** command from the **FORMAT** command submenu.
The rule line appears in the top border, the **FORMAT TABS** command line appears, and the **Move right or left, set tab (insert), or clear tab (delete)** message appears in the message line.
4. Set or clear the appropriate tab stop settings (described in the following sections).
5. Press **RETURN**.

Tab stops are positions preset to line up text in columns, as in lists or tables. Word has tab stops preset every five columns. Every paragraph has its own tab stops. The FORMAT TABS command allows you to change tab stop settings from paragraph to paragraph.

Setting a Tab Stop

To set a tab stop, press the **RIGHT** or **LEFT ARROW** key to move the cursor to the desired tab stop position in the rule line. Press the **INS** key (**SHIFT-DEL**) or **F2** (the **INSERT** key) to enter the tab stop. If you have more than one tab stop to enter, repeat the procedure of highlighting the desired tab stop and pressing **INS** for each tab stop. Eighteen is the maximum number of tab stops that can be set for each paragraph.

Once a tab stop is set, it remains permanently attached to the paragraph (or paragraphs) in the selection, until you:

- change the format of the paragraph with **FORMAT TABS**, or
- merge the paragraph in question with the paragraph that follows it.

NOTE: When two paragraphs are merged together, the resulting paragraph *always* takes on the formatting characteristics (including tab stop settings) of the succeeding paragraph.

Clearing a Tab Stop

To clear a tab stop, press the **RIGHT** or **LEFT ARROW** key to move the cursor to the tab stop to be deleted. Press **DEL** to clear the tab stop. If you have more than one tab stop to clear, repeat the procedure of highlighting the desired tab stop and pressing **DEL** for each tab stop to be deleted.

INSERT

PURPOSE

Use the INSERT command to insert a copy of the scrap into a document.

EXPLANATION

The INSERT command does not have associated submenus or command prompts. To execute the INSERT command:

1. Select the location where the scrap will be copied.
2. Press ESC to switch from Text mode to Command mode.
3. Select the INSERT command. The scrap is copied to the location selected.

The INSERT command can move material from the scrap into a new location within the document or into another Word work file. It can also be used in transferring material from another program into a Word document. Refer to Transferring Data between Applications in Chapter 3, "ZP-150 Applications," for more information on this subject.

For example, you want to move a paragraph from the beginning of your document and place it at the end. First, select the paragraph and delete it to the scrap. Next, place the cursor at the position in the document where you want the paragraph to appear. Press ESC to exit Text mode, and press I to insert the paragraph.

The text in the document moves right, and if necessary, down, to make room for the inserted material.

JUMP

PURPOSE

Use the JUMP command to access a submenu of commands that are used to move to specified areas within a document.

EXPLANATION

There are two commands available with the JUMP command submenu. To execute the JUMP command:

1. Press ESC to switch from Text mode to Command mode.
2. Select the JUMP command.

The JUMP command submenu appears:

JUMP: Page %

Each of these two submenu commands are explained in full on the pages that follow.

JUMP PAGE

PURPOSE

Use the JUMP PAGE command to jump to the first line of the specified page number.

EXPLANATION

To execute the JUMP PAGE command:

1. Press ESC to switch from Text mode to Command mode.
2. Select the JUMP command.
3. Select the PAGE command from the JUMP submenu, and the JUMP PAGE command line appears.
4. Make the appropriate response to the command prompt (described in the following section).
5. Press RETURN.

COMMAND PROMPT

Following is a description of the JUMP PAGE command prompt, the message that appears when you use the prompt, and the possible responses.

number:

The Enter page number message appears in the message line. Enter the number of the page to which you want to move the cursor. This number can be any number from 1 to 32767. The default entry is 1 or the page you were editing before the last JUMP command.

The pages correspond to the page breaks at the last printing of the document or the last time you used the FORMAT REPAGINATE command. If you are editing a file from a hard copy, then you might want to keep the old page breaks for jumping to pages by the old page numbers. Whereas, if you want to check page layout and where page breaks occur, then repaginate the document for jumping to the new page numbers. You can update page breaks without actually printing by using the FORMAT REPAGINATE command.

If the document has not been printed or repaginated, JUMP will move the cursor to the first character in the document, regardless of the page number entered.

NOTE: Specifying a page number greater than the last page of the document is not considered an error; Word interprets this as a request to go to the last page of the document.

JUMP %

PURPOSE

Use the JUMP % command to move the cursor to a point that is a specified percentage of the way through the document.

EXPLANATION

To execute the JUMP % command:

1. Press **ESC** to switch from Text mode to Command mode.
2. Select the JUMP command.
3. Select the % command from the JUMP submenu, and the JUMP % command line appears.
4. Make the appropriate response to the command prompt (described in the following section).
5. Press **RETURN**.

COMMAND PROMPT

Following is a description of the JUMP % command prompt, the message that appears when you use the prompt, and the possible response.

percentage:

The Enter percentage message appears in the message line. Enter the number that represents the percentage point of the document to which you want to move the cursor. This number can be any whole number from 0 to 100. The default entry is 50, or the midpoint of the document.

MERGE

PURPOSE

Use the MERGE command to incorporate a text file into a work file.

EXPLANATION

To execute the Word MERGE command:

1. Select the place in the Word document where the text file will be incorporated.
2. Press ESC to switch from Text mode to Command mode.
3. Select the MERGE command and the MERGE command line appears.
4. Make the appropriate response to the command prompt (described in the following section).
5. Press RETURN.

COMMAND PROMPT

Following is a description of the MERGE command prompt, the message that appears when you use the prompt, and the possible responses.

from:

The Enter file name message appears in the message line. Enter the name of the text file to be incorporated into the Word work file. A *text file* is a file that contains only ASCII characters, spaces, tabs, line feeds, and carriage returns. A text file can have any name, but its extension cannot be one of those reserved for the applications (.BMI, .DAT, .PLN, .TXT, or .WRD). Press any ARROW key, and a full-page listing of existing files is displayed.

The file to be incorporated can be one created by Word or by another built-in program—the only requirement is that it be a text file. However, the MERGE command was designed for reading in external files such as those created from a Telcom session. By using the scrap, you can merge Word files and retain the original formatting.

NOTE: You cannot merge one Word work file into another Word work file (a Word work file has a .WRD extension), because these files contain formatting information that would be displayed incorrectly on the screen.

The PRINT command can be used from within any application, except TELCOM and BASIC, to create a text file. Refer to the PRINT command for more information on creating text files.

A Word work file can be merged if it is first printed unformatted using the PRINT command to another file whose name contains an extension other than an application work file default extension. The resulting text file can then be merged into the Word file, taking on the characteristics of the Word file. Remember though, merging Word files in this manner is not recommended since using the scrap will retain the original formatting.

OPTIONS

PURPOSE

Use the OPTIONS command to review and set options for Word operations.

EXPLANATION

To execute the Word OPTIONS command:

1. Press **ESC** to switch from Text mode to Command mode.
2. Select the OPTIONS command and the following OPTIONS command prompts appear:
OPTIONS ruler: Yes (No) overtype: Yes (No) visible:(Yes) No
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press **RETURN**.

COMMAND PROMPTS

There are three OPTIONS command prompts. Following is a description of each command prompt, the message that appears when you use the prompt, and the possible responses.

ruler:

The **Select option** message appears in the message line. The ruler (called a rule line) indicates the width of text in inches (10 marks per inch). The rule line is displayed across the top of the screen. If you choose:

- Yes** The rule line is displayed at all times.
No The rule line is displayed only during the DOCUMENT, PARAGRAPH, and TABS commands from the FORMAT command submenu.

overtypE:

The **Select option** message appears in the message line. The OvertypE mode allows you to replace characters by typing directly over them. If you choose:

- Yes** Any characters typed will replace, one for one, the characters already there. The **O** indicator appears in the status line.
No Any text typed will be inserted in front of the selection.

visible:

The Select option message appears in the message line. This prompt allows you to determine whether or not the new line and paragraph marks are displayed. If you choose:

- Yes The paragraph and new line marks (downward pointing arrow) are displayed throughout the document.
- No The paragraph and new line marks are not displayed on the screen.

Word records in the command prompts the settings for the current work document only. The next work document you use will use the default settings.

After you execute the OPTIONS command, the Free work space: message appears on the message line. The amount displayed is the memory available, in bytes, within the Word application or within the ZP-150, whichever is less.

PRINT

PURPOSE

Use the PRINT command to send a document to the printer, to a text file, or to the data cassette recorder.

EXPLANATION

To execute the Word PRINT command:

1. Press **ESC** to switch from Text mode to Command mode.
2. Select the PRINT command, and the following PRINT command line appears:

PRINT to: PRN:	formatted: (Yes) No	Copies: 1
feed: (Continuous) Sheet		
range: (All) Selection Pages	page numbers:	

3. Make the appropriate responses to the command prompts (described in the following section).
4. Press **RETURN**.

The ZP-150 can be used with a parallel or serial printer. If you do not know how to connect or operate your printer, read your printer manual before attempting to print documents produced by Word. Refer to the Parallel Printer and/or Serial Printer sections in Chapter 4, "External Devices," for further information on printing with the ZP-150.

COMMAND PROMPTS

There are six PRINT command prompts. Following is a description of each command prompt, the message that appears when you use the prompt, and the possible responses.

to:

The **Enter file name** message appears in the message line. This prompt is asking for the destination of the printing. Enter PRN: (for a parallel printer) or COM1: (for a serial printer) to print a hard copy or the name of a file to create a text file. The default is PRN:.

formatted:

The **Select option** message appears in the message line. This prompt is asking whether you want the printed hard copy or text file to retain the Word work file formatting. If you choose:

- Yes** The document is sent to the printer or text file with all of its Word formatting.
- No** The document is sent to the printer or text file without any of its formatting.

NOTE: Unformatted documents do not print well to a printer.

Printing an unformatted file is useful when preparing text for use by other programs. A file *must* be printed unformatted for uploading to desktop Word.

copies:

The **Enter number** message appears in the message line. Enter the number of copies you want to print. This number can be any number from 1 to 32767. The default is 1.

feed:

The **Select option** message appears in the message line. This prompt is asking how your printer loads paper. If you choose:

- Continuous** The printer prints continuously until the end of the document.
- Sheet** The printer stops at the end of every page. Word waits for you to insert another sheet of paper and press Y to continue.

The **Enter Y to continue or ESC to Cancel** message appears before the start of each page if the **Sheet** option is specified in the **feed:** prompt. The sheet feed option allows you to place a sheet of paper in the printer.

range:

The **Select option** message appears in the message line. This prompt is asking how much of your document you want to print. If you choose:

- All** The entire document is printed.
- Selection** Only the page(s) on which the selection occurs is printed.
- Pages** The pages specified in the **page numbers:** prompt are printed.

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Word Reference

page numbers:

The Enter list of page numbers message appears in the message line. Enter the number(s) of pages to be printed. The valid entries for this prompt include:

- Individual page numbers—separate pages with a comma (1,4,8,11).
- Group of page numbers—separate the first and last page numbers of a group by a colon or hyphen (8:12 prints pages 8 through 12; 17–20 prints pages 17 through 20).
- Combination of groups or individual pages (6–9, 11, 13, 15:18).

When the PRINT command is executed, the Formatting page n (where n is a number) message appears in the message line. This message indicates the progress of the PRINT command.

To cancel printing, press BREAK (SHIFT-PAUSE). Word stops printing and displays the Enter Y to continue or ESC to Cancel message. If you press Y, printing continues where it left off. If you press ESC, Word returns to the command menu and you must reset the printer and align the paper before attempting to print again.

Word can automatically print page numbers on the document as it prints. Refer to the FORMAT DOCUMENT command to turn on the page numbering option.

REPLACE

PURPOSE

Use the REPLACE command to locate, delete, and replace specified text.

EXPLANATION

To execute the REPLACE command:

1. Press ESC to switch from Text mode to Command mode.
2. Select the REPLACE command and the following REPLACE command prompts appear:

REPLACE text:
confirm: (Yes) No

with text:

3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

The REPLACE command searches for and deletes the text specified in the text: prompt and inserts the text specified in the with text: prompt.

Where the REPLACE command searches depends upon the current selection. If the currently selected text is a single character, then Word searches from the beginning of the document toward the end of the document. If the selection is more than one character, then Word searches only within the selection.

COMMAND PROMPTS

There are three REPLACE command prompts. Following is a description of each command prompt, the message that appears when you use the prompt, and the possible responses.

text:

The Enter text message appears in the message line. Enter the text to be searched for. A valid entry may be up to 40 characters long, and the characters * and ? are not allowed if they are serving as wildcards. The default entry is the text for the most recent SEARCH or REPLACE command.

Word Reference

with text:

The Enter text message appears in the message line. Enter the new text that should appear in place of the text specified in the text: prompt. A valid entry can be up to 40 characters long, and the characters * and ? are not allowed if they are serving as wildcards. The size of the replacement text and that of the original text need not be the same. The default entry is the text for the most recent REPLACE command.

confirm:

The Select option message appears in the message line. This prompt is asking whether you want to sanction each replacement. Choose:

- Yes Confirm each replacement.
- No Replace text without interrupting for confirmation.

If you choose to confirm the replacement, Word asks you to agree to each replacement. When the specified text is found, the Enter Y to replace, N to ignore, or press Esc to cancel message appears in the message line. Press Y to replace. Press N to prevent replacement and to search for the next occurrence. Press the ESC key to cancel.

When you execute the REPLACE command the Searching... message appears in the message line to indicate that the REPLACE command is looking for the specified text.

When the replacements have been made, Word returns to the text that was selected when the REPLACE command was executed. The total number of replacements appears in the message line. For example:

12 replacement(s) made

SEARCH

PURPOSE

Use the SEARCH command to search a document for the nearest occurrence of specified text.

EXPLANATION

To execute the SEARCH command:

1. Press ESC to switch from Text mode to Command mode.
2. Select the SEARCH command and the following SEARCH command prompts appear:
SEARCH text: direction: (Down) Up
3. Make the appropriate responses to the command prompts (described in the following section).
4. Press RETURN.

The SEARCH command looks for text that matches the entry in the `text:` prompt and highlights the matching text. The search begins after the current selection for a Down search and searches forward in the document, or before the current selection for an Up search and searches backward in the document.

NOTE: Unlike desktop Word, Works Word will not search within the current selection.

When the command is executed, it finds only the first occurrence of the specified text. To repeat the SEARCH command, press the SEARCH UP key (SHIFT-F3) or the SEARCH DOWN key (SHIFT-F4) to find the next or previous occurrence of the specified text.

You can also use the SEARCH command to extend a selection. Move the cursor to the place where you want to begin the selection and press the EXTEND SELECT key (F6). Next, choose the SEARCH command and enter the text with which you want to end the selection in the `text:` prompt.

COMMAND PROMPTS

There are two SEARCH command prompts. Following is a description of each command prompt, the message that appears when you use the prompt, and the possible responses.

Word Reference

text:

The Enter text message appears in the message line. Enter the text to be searched for. A valid entry may be up to 40 characters long, and the characters * and ? are not allowed if they are serving as wildcards. The default entry is the text for the most recent SEARCH or REPLACE command.

direction:

The Select option message appears in the message line. Choose the direction in which you want the search to take place. If you choose:

- Down It indicates you want to search forward in the document.
- Up It indicates you want to search backward in the document.

When you execute the SEARCH command the Searching... message appears in the message line to indicate that the SEARCH command is looking for the specified text.

ERROR MESSAGES

Following are error messages that can occur as you use Word. After each message is a brief description of the probable cause for the error and what you are to do to recover from it.

Cannot open file

EXPLANATION: The file name entered has been misspelled or does not exist. Check the spelling and reenter the file name.

Command field requires response

EXPLANATION: The currently selected prompt cannot be left empty; you must supply a response.

Inconsistent values

EXPLANATION: This message is displayed when the parameters of a FORMAT PARAGRAPH or FORMAT DOCUMENT command are inconsistent. For example, when the left margin plus the right margin is greater than or equal to the paper width, this message is displayed. The cursor appears in the first prompt where the inconsistency occurs. Check the parameters and enter a new number.

Invalid file name

EXPLANATION: This message is displayed when a prompt that requires an entry is left blank, when the file does not exist, when there are more than eight characters in the primary name or more than three characters in the extension, or an invalid character is in the name. Check the file name and enter a new name.

Invalid number

EXPLANATION: This message is displayed when a prompt that requires a numeric entry contains text or is left blank, or the number is larger than the maximum allowed. Erase the existing response and enter a valid number for the prompt.

Invalid page list

EXPLANATION: The page list specified in the PRINT command is invalid. Lists of page numbers can be separated by a comma (,), a colon (:), a dash (-), or a combination of these three delimiters. Enter a valid list of pages. Refer to the Command Prompts section of the Word PRINT command for further information on page list formats.

Word Reference

Invalid scrap

EXPLANATION: This message is displayed when the INSERT command was attempted and the scrap could not be accessed or did not contain an entry. If you already copied or deleted a value to the scrap, then the scrap file might be damaged.

No room for page numbers

EXPLANATION: This message is displayed if 0 (zero) was specified for the margin top and page numbers were specified in the FORMAT DOCUMENT command. The margin top: prompt is highlighted and this message is displayed. Since page numbers automatically print in the upper right-hand corner of the page, there must be at least 1 line of top margin in order for the page numbers to be printed. Either increase the top margin or disable page number printing.

No such page

EXPLANATION: This message is displayed when an attempt was made in the JUMP PAGE command to go to a page that does not exist. Either:

- the page number was less than the first page of the document (as specified by the FORMAT DOCUMENT command), or
- the contents of the page had been deleted since the last PRINT or FORMAT REPAGINATE command was executed.

NOTE: Specifying a page number greater than the last page of the document is not considered an error; Word interprets this as a request to go to the last page of the document.

Search text not found

EXPLANATION: This message is displayed when the specified text in a SEARCH or REPLACE command cannot be found. Check that you correctly entered the text to be searched for and the direction of the search. Enter the new text or direction for the search.

Too many tab stops

EXPLANATION: This message is displayed when an attempt is made to set more than 18 tab stops for a paragraph. Check that all the tabs entered are necessary and restructure the paragraph to contain no more than 18 tab stops. You may need to start another paragraph.

GLOSSARY

abort—To interrupt and terminate the execution of a command or function; for example, to halt the printing of a file. You abort a command or function by pressing BREAK (SHIFT-PAUSE). *See cancel.*

absolute reference—In Plan, a reference to a cell that uses specific row and column numbers; for example, R17C12 represents the cell in row 17, column 12. *See also reference and relative reference.*

acoustic coupler—One of the two types of modems; a device you can connect between a standard telephone handset and a computer to communicate with other computers. A modem translates the normal digital signals of the computer into tones that are transmitted over standard telephone lines, and it translates tones back into digital signals. By using an acoustic coupler modem, you can use any telephone with a standard handset on a temporary basis and avoid a permanent connection to the telephone lines. *See also direct-connect modem and modem.*

active—The highlighted or selected area of the screen. The next command you enter will affect this area. Highlighted areas can be a file name, a single field, a rectangular group of adjoining fields, one or more adjoining columns, one or more adjoining records, or an entire database or document.

Active also describes the status of certain keys that operate like an on/off switch. For example, pressing the EXTEND SELECT key (F6) in Word, File, or Calendar allows you to use the ARROW keys to expand the current field selection to any rectangular group of adjoining fields. When the EXTEND SELECT key is active, Ex appears on the status line. Pressing the EXTEND SELECT key a second time deactivates it.

active cell—In Plan, the cell that is highlighted on the screen. The contents of the active cell (either text, a value, or the formula that produced a value) appear on the status line. You can change the contents of the active cell with the EDIT command.

active prompt—The prompt that is highlighted when command prompts are displayed.

active window—In Plan, the window containing the active cell, marked on the screen by a highlighted window number. *See also window.*

alarm—A feature that is automatically set each time you create a new Calendar appointment record. The alarm will sound at the time you enter in the START field if you set the tone in the System Manager. You can set a secondary alarm by responding to the R (for reminder) field. Calendar will not set an automatic alarm for a task; you must specify an alarm time in the R field instead. *See also reminder.*

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alignment—The position of text or data within the width of a cell in Plan or the line in Word. Text can be set all the way to the left, to the right, or in the center. In Word, text can be justified to fill the line. *See also format.*

Answer mode—A functioning condition in Telcom during which an incoming call creates a communication connection. Telcom will assume the characteristics of Answer mode once you choose the ANSWER command from the SESSION menu. The ANSWER command transfers control to the other computer.

application—A program or set of programs designed to accomplish a specific task, such as word processing.

appointments—Calendar activities that have a time, as opposed to a date, in the START field. *See also tasks.*

arithmetic operator—A symbol, such as + or -, used to indicate calculations in formulas or functions. *See also comparison operator.*

ARROW keys—The UP ARROW, DOWN ARROW, LEFT ARROW, and RIGHT ARROW keys. These keys can be used to move the cursor or to make a selection. For example, in Plan the ARROW keys are used to select a cell or group of cells on the worksheet; in File and Word they are used to select data; and in Telcom they are used to select lines of text or different phrases. In addition, at a command prompt that requires a file name to be entered, any of the ARROW keys can be used to display a list of files stored in memory.

ASCII (American Standard Code for Information Interchange)—The industry standard code used by most computers to transmit information to printers, other computers, and other peripheral devices.

BASIC (Beginner's All-Purpose Symbolic Instruction Code)—A high-level programming language consisting largely of English words and terms.

baud rate—Describes the speed of data transmission between two computer systems. The speed is measured in bits per second (bps). *See also bit.*

binary—A numbering system based on twos rather than tens (decimal). The individual element (or digit) can have a value of 0 or 1 and in computer memory is known as a bit.

bit—A single binary element or digit; the smallest element in computer storage capability. Baud rates are measured in bits per second (bps).

boilerplate—In File, any character or characters (such as \$ or %) other than standard text, number, or date/time format characters that you include in fields of the FORM record. Boilerplates allow you to clearly identify the nature of your data. For example, \$ distinguishes dollar amounts from decimal fractions in hundredths.

break—A place where the text is deliberately stopped and a new start follows in Word. Examples of breaks are word breaks, line breaks, paragraph breaks, and page breaks. *See also hard break and soft break.*

buffer—A temporary data storage area in your computer's memory that holds incoming information.

byte—A unit of measurement for data storage. A byte is equivalent to eight bits or one character.

cable—One or more conductors used to transmit power or data from a source to a destination and, in some cases, vice versa.

Calc window—The box that appears on the far right of the screen when you press the CALC system function key (CTRL-F2). All mathematical calculations appear in this window.

cancel—An instruction to your computer to ignore the command you have chosen before you have pressed RETURN. For example, if you cancel a command in the middle of making entries at a series of prompts, your computer will ignore the entries you have already made. You cancel a command by pressing ESC. *See also abort.*

capture—The ability to save incoming text in Telcom. The text is captured in a buffer.

case—The forms of letters, either capitals (uppercase) or small letters (lowercase).

cell—One position on the worksheet; a place where data or a formula can be stored. A cell has a location (absolute reference) and can also be referred to by a relative reference or by one or more names. The contents of a cell determine its value; the cell's format determines how its value is displayed.

cell pointer—A highlighted pointer (the selection highlight) that selects one cell from all the cells in the worksheet. That cell becomes the active cell. The cell pointer is moved from cell to cell with the ARROW keys.

character—A letter, number, punctuation mark, symbol, or special mark (for example, @, :, *, %, or \$) that a computer may read, store, or process.

column—A vertical arrangement of items as opposed to a row, which is a horizontal arrangement of items. In File, a database can contain up to 64 columns (or fields). In Plan, there are 63 columns, designated by the numbers 1 through 63 for each worksheet. *See also row.*

command—An instruction to the System Manager, BASIC, or application. Some commands produce a submenu and/or one or more prompts. *See also command prompt.*

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command line—The third line from the bottom of the screen, just under the window area. The command line displays command menus, submenus, and prompts.

Command mode—The functioning condition in which you select commands and menus. In Telcom, Command mode is known as the "local mode." You can enter commands while communicating with another computer. *See also* Terminal mode and Text mode.

command prompt—Text on the command line followed by a colon and space where you specify further information about how a command should be executed. When first displayed, a command prompt usually displays a default entry; you can replace or edit this entry as required to meet your needs.

communication connection—Two computers connected to and communicating with each other either through the telephone lines or through a direct (hard-wired) cable.

communication settings—Parameters such as baud rate, word length, stop bits, and flow control that define the operating environment and establish agreement between two computers as to how they will communicate.

comparison—Any specification (such as =, >, or <) you can enter in a key field of a FIND record. *See also* FIND record and key field.

comparison operator—A symbol, such as > (greater than) or < (less than), used in functions performing logical comparisons between two or more values. You can also use a combination of symbols such as => or <= to make comparisons. *See also* arithmetic operator.

contents (of a cell)—In Plan, the data (text, value, or formula) that you enter in a cell, as well as any formatting characters (such as \$ or %) that you specify. If the cell contains a formula, the value produced by the formula is usually displayed.

control record—Control records determine the structure of a database. In File, any record of the set you use to name data (ID record), format data (FORM record), sort data (SORT record), or find data (FIND record).

copy—To create a duplicate; to reproduce text or data from one area of a work file in another area of the same work file; or to reproduce part of a work file in the scrap for transferring to another work file. *See also* scrap.

current settings—In Telcom, the parameters you used to establish your last communications connection.

cursor—A character, usually an underline or graphic block, used to indicate the position on a screen where any data you type will be displayed.

Daily Diary—The format of the daily Calendar screen. Commands available include COPY, DELETE, EDIT, INSERT, JUMP, OPTIONS, and PRINT.

database—A file (grid of fields) of information that is produced, updated, and manipulated by File or BASIC. DBCALLS.LIB is a library of database routines that allow BASIC to create and manipulate database files.

data file—A file containing data that can be used by more than one application.

data record—Any record or row, other than a control record, into which you enter data. Data records comprise the content of a database; control records determine the structure of a database (the organization and appearance of data records).

default—An entry or value supplied by the System Manager, BASIC, or application at a command prompt. A default entry is usually based on your most recent use of the command or the current status of the program or system. You can edit or replace a default entry with your own entry.

delete—To remove or eliminate. To erase a file from memory or from an external storage device; to erase data from a file; to remove data from a file by placing it in the scrap; or delete information on a command line. Data deleted to the scrap can be transferred to another file. *See also* erase and scrap.

direct-connect modem—One of the two types of modems; a device you can connect between a telephone line and a computer to communicate with other computers. A modem translates the normal digital signals of the computer into tones that are transmitted over standard telephone lines, and vice versa. By using a direct-connect modem, you avoid problems associated with high levels of room noise, and you make a more permanent connection to the telephone lines. *See also* acoustic coupler and modem.

download—To transfer information from another computer to your ZP-150. *See also* upload.

duplex—Full/half-duplex is a setting that tells Telcom either to echo the character it transmits to the screen (half) or not to echo (full). Many host programs are full-duplex because they echo what they receive back to the other terminal. In most cases, Telcom should be set to full-duplex.

edit—To revise or delete text in a record or file; to alter an entry at a prompt.

edit key—Any key used to alter an entry at a prompt, such as BACK SPACE and DEL, or the F7 through F10 System Manager function keys.

erase—To remove text permanently from the currently active document. Characters can be erased with the BACK SPACE key, by pressing CTRL-DEL, or by pressing the SCRAP key until N₈ appears on the status line and then using the DELETE command. Erased text does not go to the scrap and is, therefore, irretrievable.

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extend—The action of making the selection highlight include a larger area. For example, in File you can extend the highlight from a single field to the entire record containing that field by pressing SHIFT-F9 (the SELECT RECORD key). *See also* highlight and select.

extension—A sequence of up to three characters, preceded by a period, that is appended to a file name. Generally, you use extensions to identify a file's type. For example, when printing all or part of a database, document, or worksheet to a text file, you might give the text file a .PRN extension. *See also* file name.

field—A set of related characters that make up a piece of data. Each field has a name and a related value. In File, a field is the basic unit of information in a database. Vertically, fields form columns of data; horizontally, fields form records of data. In Calendar, a field is a column of the Daily Diary screen. Appointments and tasks have five fields: START (time or date), STOP (time or date), P (priority), R (reminder), and NOTE.

file—A unit of work storage for data created or read into memory. For example, in File each database you create is stored in a file in your computer's memory. Files can also be stored on an external medium, such as data cassette tape.

file name—The name you assign to any file you create or read into your computer's memory. File names consist of a name of up to eight characters, followed by an optional extension of up to three characters. Generally, you use the name to identify the contents of a file (for example, REPORT); you use the extension to identify the file's type (for example, you might assign an extension of .TXT to identify any data file containing text). The names of all files stored in your computer's memory appear on the System Manager screen. *See also* extension.

files display—The listing of files stored in your computer's memory as they normally appear on the System Manager screen, unless you specify otherwise. You can also display files in full-page format. *See also* full-page listing.

FIND record—The control record in which you enter comparisons instructing File to search a database for, and then display, a specific set of data records. *See also* comparison and key field.

flow control—Identified as XON/XOFF—this is one of six types of communications parameters most computers recognize and is, therefore, likely to require modification. Flow control is a means by which you can create a pause in data transmission.

format—The structure and appearance of contents of a cell, a field, text, and data. In File, you can format data as text, numbers, dates, or times. In Word, you can format text in paragraphs, tables, and documents. In Plan, you can format cells to be numeric, contain punctuation, and align text or values. *See also* alignment and preset format.

FORM record—In File, the control record in which you enter the format for each column of data in a database.

formula—A recipe for how a value is to be calculated. Whenever you change the contents of a cell, Plan recalculates all formulas on the worksheet affected by the change (unless you have chosen a response of No in the RECALC field of the OPTIONS command).

full-page listing—A listing of files in a format different from that of the normal System Manager screen's display of files. Files are grouped alphabetically by extension.

function—A built-in mathematical or statistical operation that Plan can perform on one or more values; for example, SUM or AVERAGE. In BASIC, a function is a predefined process or subprogram that takes one or more quantities as input and returns a single related quantity as output.

group of cells—A collection of cells on the worksheet within Plan that can be named (for example, SALES) with the NAME command. A group of cells can be any one of three types: range, union, or intersection.

hard break—The start of a new page or a new line in a document mode by pressing CTRL-SHIFT-RETURN or CTRL-RETURN (for a new page) and SHIFT-RETURN (for a new line). In a Word document you must insert the hard break character. The Word program only inserts soft breaks. Word will always observe these breaks. *See also soft break.*

hard copy—Printed characters on paper, produced by a printer.

hardware break—A signal, generated by pressing the BREAK key, used during a communication connection, which allows the user to interrupt the current action and tell the host to wait for a message.

hard-wired—A connection between two computer systems consisting of cables joining both systems without using modems.

highlight—Reverse video used as a means of emphasis on the screen to indicate the currently selected or active item (such as a file, command, command submenu, prompt, field, cell, record, or text). *See also select.*

home—The upper left-hand corner of the screen, and specifically, the first displayable character location/cell.

horizontal scroll—To move across a document that is wider than the display window so that parts of the document outside the window to the right or left come into view.

host—Any other computer, whether it is a personal computer or a large mainframe system, with which you are communicating.

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idle line—An established communication connection that is currently *not* transmitting characters.

idle time—The period during a communication connection when no characters are sent or received across the communication line.

ID record—In File, the control record in which you enter field names.

indent—In Word, the distance between the beginning or end of a line and the left or right page margins. Indents normally make text narrower than margins. Three indents are associated with each paragraph—left, right, and first line. The first line of each paragraph can be indented if you give it a positive measurement or make a hanging indent with the first line further left than subsequent lines. A 0 (zero) indent measurement aligns the first line with the other lines in the paragraph.

input line—The bottom line of the Calc window. Either your most recent input or the result of a calculation will appear on the input line, depending on whether you have requested a result to be calculated.

insert—The Word INSERT command takes text from the scrap and inserts the text in front of the selection. To insert new characters into a document, choose the EDIT command and type the characters. SHIFT-DEL (the INS key) can also be used to insert text from the scrap. In Word, pressing CTRL-INS replaces the selection with what is in the scrap.

insertion point—The place where text will be inserted when you type or use either the Word INSERT command or SHIFT-DEL (the INS key). The insertion point is always in front of the selection or cursor position.

intersection—The group of cells that form the overlapping area of a union of two other cell groups in Plan. The operator used to specify an intersection is a blank space between references to two ranges of cell groups. *See also range.*

justified text—Text whose right and left edges are flush with the right and left indents. Word enlarges spaces between words to make the text evenly fill the whole line. *See also ragged.*

keep—In Word, this FORMAT PARAGRAPH command option keeps all of the specified text together on one page (usually a paragraph or table), creating a page break, if necessary, and printing the text on the new page rather than splitting it between pages.

keyboard—A device used to enter information into a computer. It is made up of 75 keys—grouped as on a typewriter.

key field—A named file field upon which a function is performed, such as arranging the order of records for a sort. In File, the field of a SORT record in which you enter a sort specification or the field of a FIND record in which you enter a comparison. *See also* comparison, primary sort, and secondary sort.

keypad—A small section of the keyboard that contains a group of 10 numeric keys.

link—In Plan, use of the WINDOW LINK command to cause two windows to scroll together rather than independently. In Telcom, LINK establishes communications with another computer.

lock—Use of the LOCK command to protect cells in Plan or formulas from inadvertent alteration. When you lock the contents (value or formula) of a cell, Plan ignores any attempt to change the cell's contents with the EDIT command.

logon—Whatever character sequences are required to gain access to another computer.

margin—In Word, the area from the edge of the page to the edge of the text, without indents.

memory—A portion of the computer that is used to store information (either data or programs). The size of a microcomputer is often determined by the amount of user memory (measured in kilobytes) in the system. When using the Calc program, whatever is in memory will appear on the input line. *See also* RAM and ROM.

menu—The list of available commands displayed on the command line; a command menu or command submenu.

message—Text displayed on the message line to tell you what to do next (a prompt) or what is wrong (an error message). *See also* message line.

message line—The next to the last line on the screen where messages generated by the System Manager or application are displayed.

mode—Method of operation. For instance, Word has two modes of operation: Text mode and Command mode.

modem (MOdulator DEModulator)—A device that translates the digital signals coming from your computer into a form that can be transmitted over standard telephone lines. A modem also translates incoming signals into a form your computer can understand. *See also* acoustic coupler and direct-connect modem.

Monthly Calendar—A menu in the Calendar application. Commands available include COPY, DELETE, INSERT, JUMP, and PRINT.

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name (of a cell or group of cells)—In Plan, use of a descriptive term, rather than an absolute or relative reference, to refer to one or more cells. You can use the descriptive term (name) to refer to the cell, or cells, in formulas.

NEW column—In File and Calendar, the last column of a database. Initially, the NEW column contains blank fields in which you can enter data.

NEW record—In Calendar and File, the last record of a database. Initially, the NEW record contains blank fields in which you can enter data.

on-line—The state of having an active communication connection to a remote or host computer system; your system is *on-line* to that system.

operation—A defined action; the action specified by a single computer instruction.

overtype—A Word option that allows you to type new text directly over old text, by pressing SHIFT-F5 or choosing Yes at the *overtype:* prompt of the OPTIONS command.

paragraph—In Word, the text after one paragraph mark, including the trailing paragraph mark. Paragraph attributes control line layout and spacing. *See also* format and paragraph mark.

paragraph mark—In Word, a character that identifies the end of a paragraph. To insert a paragraph mark, press the RETURN key. While you are using Text mode, choose Yes or No at the *visible:* prompt of the OPTIONS command to make paragraph marks visible or invisible. *See also* format and paragraph.

parallel data—Information that is sent as a group, rather than serially. For instance, the eight bits of one byte are transmitted simultaneously over eight channels or wires. *See* serial data.

parity—A value that is used to check the validity of data that is stored, transmitted, or manipulated. Parity is used to improve the chances of characters being transmitted correctly.

peripheral—A device that is connected to the computer for the purpose of supplying input or output capability to that computer. A peripheral is not necessarily under direct control of the computer; it may be capable of some independent operation (such as a self-test). A data cassette recorder is an example of a ZP-150 peripheral.

phonebook—The file you create using File that contains three fields—NAME, NUMBER, and SETTINGS.

phrase—An element of a script. Telcom has eight different phrases: connect, disconnect, options, transfer, respond to, respond with, modify, and pause. *See also* script.

preset format—Format specifications affecting such characteristics as tab stops, page size, and margins that constitute the default format for all documents printed. This preset page format can be changed only with the System Manager SET PRINTER command. Unless format specifications for individual Word documents are set with Word's FORMAT DOCUMENT command (on a document-by-document basis), they will reflect the preset format.

primary sort—A specification you enter in a key field of the SORT record that tells File to reorder data records according to the content in the specified field before reordering them according to a specification in another key field. Primary sort specifications are *Iup* and *Idown*. The number *I* specifies a primary sort. *Up* tells File to rearrange records in ascending order; *down* tells File to rearrange records in descending order. *See also* key field and secondary sort.

printer—A device used for computer output in the form of characters and symbols typewritten or printed on paper. Such devices include dot matrix, ink jet, impact, and laser printers. The output of a printer is called *hard copy*.

P (priority)—One of the five fields of the daily Calendar screen. Assigning a priority is optional. You have a choice of priorities: urgent, high, moderate, and low. The default priority is moderate. *See field*.

program—A set of computer instructions within a programming language that, when followed, solves a problem or completes a task.

program function keys—A set of function keys used in the operation of a particular application. *See also* system function keys.

prompt—A message asking the user for information or a decision.

protocol—A collection of rules and procedures that define communications between two computers. Protocol ensures that a file is transferred from one computer to another intact. Enter the protocol requirements at the protocol: prompt when you are using the Telcom TRANSFER command.

ragged text—In Word, text with an uneven left (ragged left) or right (ragged right) margin. *See also* alignment and justified text.

RAM (Random Access Memory)—Computer memory to which data may be written (stored) or from which data may be read (retrieved) in any order.

range—Any rectangular group of cells on a Plan worksheet. The operator used to describe a range is a colon (:) between the reference to the cell in the upper left-hand corner of the rectangle and the reference to the cell in the lower right-hand corner of the rectangle. For example, the range R3:R8 defines the rectangular area containing rows 3 through 8 on the worksheet. *See also* intersection.

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record—A unit of information consisting of one or more fields that contain data. In File, a record is a horizontal group of fields within a database. Each database can contain up to 4,096 records. The number of records actually will be determined by the field size and the amount of memory available to the user. In Calendar, a record consists of a horizontal row of fields that contain the specific data for a given appointment or task. An appointment record typically includes a start time or date, stop time or date, priority, reminder, and a note. In BASIC, a record is the basic unit of which a file is composed. Each record contains a complete set of information about a single component of the file, such as the complete set of payroll information about one employee in a company's payroll file.

reference—The Plan designation of a cell or group of cells. An absolute reference describes the exact row-and-column location of a cell, for example, R9C7. A relative reference describes the location of a cell relative to the location of another cell; for example, R[-1]C. References to groups of cells can be entire row or column designations, for example, R6 or C5; a named area of a worksheet; or a designation specifying a range, intersection, or union of cells. *See also* absolute reference and relative reference.

relative reference—In Plan, the location of a cell relative to the location of another cell. For example, R[-1]C refers to the cell one row above (for example, minus one row) in the same column. Relative references are generally used in formulas. *See also* absolute reference.

R (reminder)—One of the five fields of the daily Calendar screen. Setting a reminder alarm is optional. If you fill in this field, an alarm will go off at the time you request in addition to the START time. *See also* alarm and field.

replace—In Word, the process of substituting one piece of text for another, either by using the REPLACE command or by pressing CTRL-SHIFT-INS to replace the selection with the text in the scrap.

reset—The process of restoring the equipment to its initial state, which was reached by applying power to the system and turning it on. If your ZP-150 is locked and no other key combination allows you to exit the screen, press the RESET button. Nothing previously created and saved will be destroyed. Data in open files will be destroyed.

ROM (Read Only Memory)—A type of memory similar to RAM, except that data cannot be written to it. Data can be read from it directly, as in the case of RAM, but ROM is nonvolatile; that is, it will retain the information stored in it whether power is applied or not. It is most often used for special programs such as the System Manager and applications. *See* RAM.

row—A horizontal group of adjoining cells across a worksheet. There are 255 possible rows, designated by the numbers 1 through 255. *See also* column.

running total—A portion of the Calc window. Specifically, the area between the top and bottom lines of the window. Your last calculation(s) will appear in this area.

save—The act of preserving your work in a file stored in your computer's memory. When you press the QUIT key, the data file with which you were working is saved automatically.

scientific notation—The exponential form of a number that is used to represent very large or very small values. For example, 1,000,000 is represented in scientific notation as 1.0E6; one millionth is represented as 1.0E-6.

scrap—A temporary storage area of your computer's memory that is primarily designed for transferring data between applications. Data is either copied or deleted to the scrap from a file and inserted to a file from the scrap.

script—A feature to automate all or a portion of a Telcom communications connection or session. Scripts commonly contain the logon and passwords that computer systems may require.

SCRIPT menu—A submenu of the SESSION menu in Telcom. It is displayed after you enter the SCRIPT command. The SCRIPT menu lists the commands available to you as you edit a script—CONNECT, DISCONNECT, MODIFY, OPTIONS, PAUSE, RESPOND, SESSION, and TRANSFER.

scroll—To move the contents of the screen up, down, left, or right so that all the data that may not be normally visible moves into view. *See also horizontal scroll, vertical scroll, and window.*

search—In Word, the process of scanning the contents of a file or part of a file for a group of characters, a word, or a phrase within a document with the SEARCH command.

search and replace—In Word, the process of finding and replacing one piece of text with another. *See also replace and search.*

secondary sort—The sort specification File carries out after having carried out a primary sort specification. Secondary sort specifications are *2up* and *2down*. The number 2 specifies a secondary sort. *Up* tells File to rearrange records in ascending order; *down* tells File to rearrange records in descending order. *See also key field and primary sort.*

select—The act of moving the selection highlight to choose an item on the screen or in the file, command line, submenu, or prompt. For example, on the System Manager screen, you select an application or file to work with; in Word you might select a paragraph to reformat; in File, you might select a particular record to edit. *See also highlight.*

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selection—The highlighted item on the screen that will be affected by the next command you choose. Also called current selection.

serial data—Data that have been broken down into their component parts (characters or bits), which are transmitted in a sequential manner.

SESSION menu—The main menu of Telcom; the list of commands available to you are ANSWER, CONNECT, MODIFY, OPTIONS, RUN, SCRIPTS, and TRANSFER.

settings—See communication settings.

soft break—A page or line break that is determined by page or line layout. Soft breaks may change after further editing of the document. You cannot enter soft breaks. They are automatically inserted by the Word application. *See also hard break.*

sort—To arrange or order data according to a predefined set of rules.

status line—The bottom line of the screen where the System Manager or application displays such specifics as the name of the program and file you are working with; the Ex indicator if the EXTEND SELECT key is active; the Ap indicator, if the SCRAP key is active and appending to the scrap; the Lo indicator, if memory is low; and various other symbols and letter combinations, depending on the application.

stop bits—Stop bits are transmitted at the end of each character to indicate the end of character.

system function keys—A set of function keys common to the System Manager and all applications. For example, by pressing the QUIT key in any program, you save your work in memory and return to the System Manager screen. *See also program function keys.*

tab stop—A position for aligning text in columns using tab characters. In Word, use the FORMAT TABS subcommand to set and clear tab stops.

tasks—Calendar activities that have a date, as opposed to a time, in the START field. *See appointments.*

terminal—In Telcom, selecting YES at the MODIFY command's terminal: prompt configures your ZP-150 to emulate an ANSI or VT52 terminal. If you select NO, ANSI and VT52 escape sequences are ignored.

Terminal mode—As opposed to Command mode, the Telcom Terminal mode is entered upon successful establishment of a communication connection. Characters typed at the keyboard are sent to the host computer system. *See also Command mode.*

text—Alphabetical and special characters that can be entered into a file.

text file—A file that stores data in text format only containing ASCII characters rather than binary code. In File, Calendar, and Plan you print selected data to a text file to store it for printing later or to prepare data to transfer to a Word document.

Text mode—A functioning condition in Word during which characters are entered into a file. When you are actually typing in a document, you are said to be using the Text mode.

upload—To transfer information from your ZP-150 computer to another computer. *See also download.*

value—The information content of a cell: a numeric value, if it contains a number; text, if it contains text; or, if it contains a formula, the result of calculating that formula.

vertical scroll—To move vertically within a document that is longer than the window so that parts of it formerly above or below the window come into view.

wildcard character—A symbolic character used as a substitute for other characters in an operation (such as a search, copy, or deletion). There are two wildcard characters: the asterisk (*) stands for all characters remaining in the name; and the question mark (?) stands for any single character in this specific position in the name.

In File, you use wildcards when searching the database for text entries. For example, an entry of =*son in a NAME field of a Find record will cause File to display all records containing a name ending with son (for example, Johnson, Thompson, Fredrickson). The question mark (?) represents text on a character-for-character basis. For example, an entry of =J???son will cause File to display all records containing names that are seven characters long, that begin with J, and that end with son (for example, Johnson, Jackson).

In Word, System Manager, and Plan, the asterisk can represent any file name or extension. For example, *.WRD represents any Word document (that is, any work file with a .WRD extension). The question mark (?) represents any single character in a file name or extension. For example, MEMO?.WRD represents any Word document to which you have given a name such as MEMO1.WRD, MEMO2.WRD, MEMO3.WRD, and so on.

window—A rectangular portion of the screen. In Plan, as many as eight windows can be open at once. *See also active window.*

word length—In Telcom, the size of the packet in which each character is transmitted and received.

word-wrap—Automatic placement of a word on the next line. When you are typing text and you reach the right margin, Word checks to see if the word you type fits completely on the active line. If not, Word automatically places the whole word on the next line.

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work file—Any file, such as a Word document or Plan worksheet, you create with a built-in program. Also, a file without a name; that is, a default file.

worksheet—A grid of cells displayed by Plan to store formulas and values.

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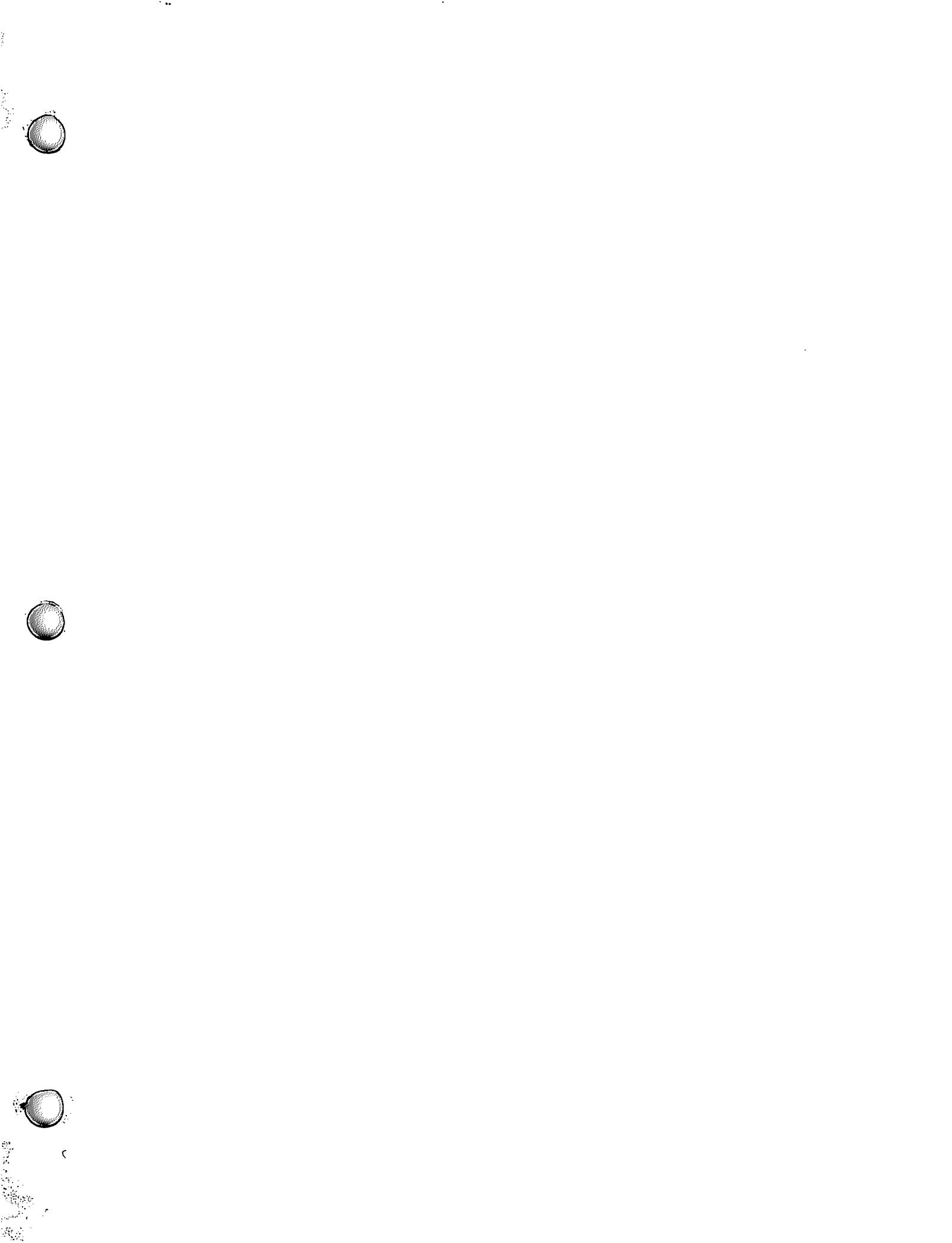
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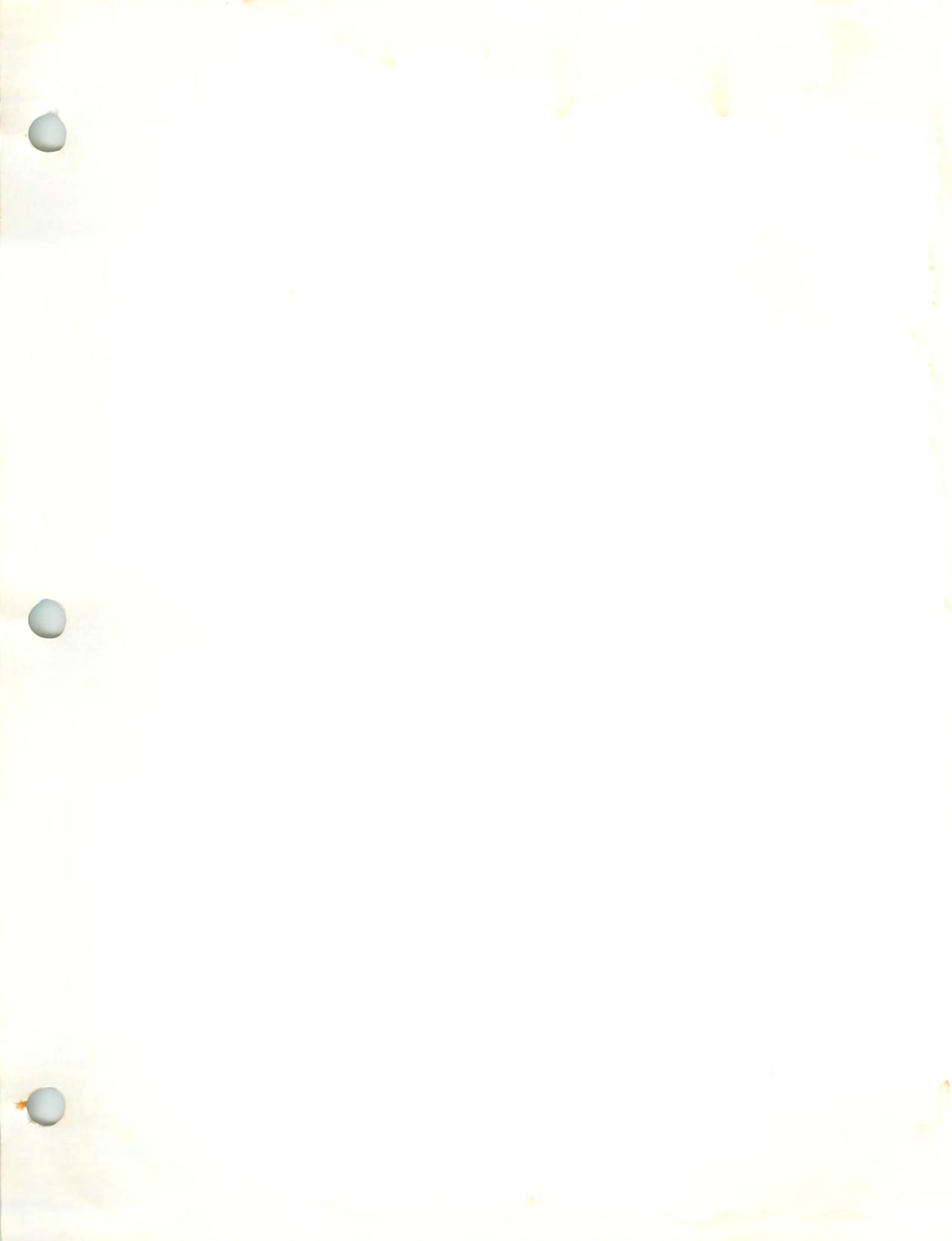
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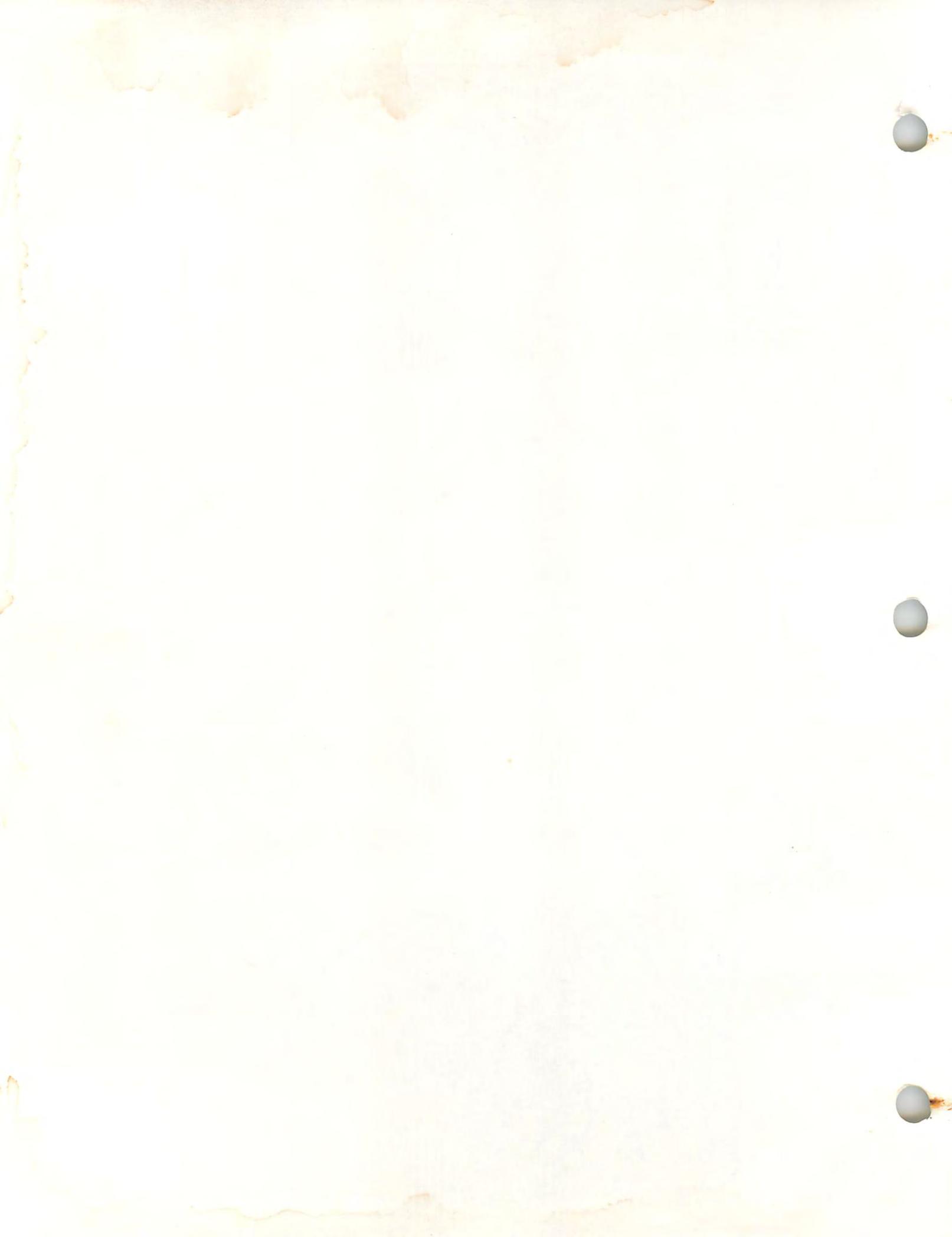
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SOFTWARE — ZDS IS NOT RESPONSIBLE FOR ANY SOFTWARE CARTRIDGE OR ANY SOFTWARE CONTAINED ON ANY CARTRIDGE RETURNED TO ZDS WITH THE PRODUCT. Please remove both software cartridges before returning unit for service.

APPLICABILITY OF WARRANTY — This warranty covers only ZENITH DATA SYSTEMS computer hardware products and is not extended to other computer hardware products or components that customer uses in conjunction with our products. This Warranty does not cover computer software products nor damage to computer hardware products caused by computer software products. This Warranty applies only to the first end-user of the ZENITH DATA SYSTEMS computer hardware product who becomes such either by purchase at retail or by lease. This Warranty is not assignable.

DAMAGES — UNDER NO CIRCUMSTANCES SHALL ZDS BE LIABLE IN ANY WAY TO THE USER FOR INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING BUT NOT LIMITED TO, ANY LOSS OF BUSINESS OR PROFITS, WHETHER OR NOT FORSEEABLE, AND WHETHER OR NOT BASED ON BREACH OF WARRANTY, CONTRACT, OR NEGLIGENCE IN CONNECTION WITH THE SALE OF SUCH COMPUTER HARDWARE PRODUCTS. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

OWNERS RESPONSIBILITY

EFFECTIVE WARRANTY DATE — Warranty begins on the date of purchase at retail by, or leased to, the first end user, as the case may be. For your convenience, keep the dealer's dated bill of sale or invoice as evidence of the sale. The proof of purchase must be provided when Warranty service is requested.

OPERATING MANUAL — Read Your Operating Manual Carefully so that you will understand the operation of your computer hardware products.

OWNER'S REGISTRATION — Please fill out your Owner Registration Card and return it by mail to ZDS.

WARRANTY SERVICE — For warranty service, and prior to returning any equipment for service, contact the HEATH/ZENITH repair facility at:

616-982-3309

Parts and service labor that are ZDS's responsibility under this warranty will be provided at no charge. Other service is at the owner's expense. It is the owner's responsibility to return the unit, transportation and insurance prepaid, in either the original or in a strong carton with at least THREE INCHES of resilient packing material (shredded paper, excelsior, etc.) on all sides. Seal the carton with reinforced gummed tape, tie it with a strong cord, and mark it "Fragile" on at least two sides. Remember, the carrier will not accept liability for shipping damage if the unit is insufficiently packed. Ship by prepaid express, United Parcel Service, or insured Parcel Post to:

HEATH/ZENITH
Personal Computer Repair
Hilltop Road
St. Joseph, MI 49085

Remember, attach a letter containing the following information directly to the unit:

- * Your name and address.
- * A copy of the purchase invoice showing date of purchase.
- * Copies of all correspondence relevant to the service of the product.
- * A brief description of the difficulty.
- * **IMPORTANT:** Remove both software cartridges before returning unit for service.

SERVICE INFORMATION

In the event service is required on the enclosed unit, please contact the HEATH/ZENITH repair center at:

616-982-3309

DO NOT ship your product without first contacting the above.

If there are any questions regarding software, you may contact either of the following telephone numbers:

SOFTWARE APPLICATIONS	—	616-982-3884
SOFTWARE CONSULTATION	—	616-982-3860

OUT OF WARRANTY SERVICE — If your unit is out of warranty, you may return the unit following the same steps as outlined above and ZDS will repair the unit at its then current labor charges plus parts. You must ship the unit transportation and insurance prepaid and ZDS will return the unit transportation and insurance prepaid by UPS where available or via equivalent shipping means.



**data
systems**

THE QUALITY GOES IN BEFORE THE NAME GOES ON
DESKTOP COMPUTER SYSTEMS

HEATH

RETURN THIS COPY TO ZENITH DATA SYSTEMS CORPORATION IN THE RETURN ENVELOPE PROVIDED

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Date _____

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City _____ State _____ Zip _____ Country _____

Name and Title _____

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Send by First Class Mail To:

Zenith Data Systems Corporation
Software Registration Department
P.O. Box 1000
St. Joseph, Michigan 49085

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