



Z80 SYSTEM SOFTWARE

USER'S MANUAL

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PREFACE

This manual is for users and integrators of systems based on AMPRO Z80-based single board computers using the CP/M operating system. It describes the software contained on the AMPRO Z80 System Software diskette. The optional AMPRO Z80 Hard Disk Software is available separately, on the Z80 Hard Disk Software diskette, and is described in the Z80 Hard Disk Software User's Manual. This manual includes:

- Chapter 1 - GENERAL INFORMATION - Descriptions of the types of software available from AMPRO for the Z80A-based single board computers and systems. Conventions used in program operation descriptions.
- Chapter 2 - OPERATING SYSTEM DESCRIPTION - Description of the AMPRO enhanced CP/M operating system, and the features provided by ZCPR3. Brief descriptions of the utilities and programs.
- Chapter 3 - SOFTWARE INSTALLATION - Information on customizing the standard system software diskette for unique system requirements.
- Chapter 4 - AMPRO UTILITY PROGRAMS - Detailed descriptions and operating instructions for the AMPRO-specific system utility programs.
- Chapter 5 - ZCPR3 PROGRAMS - Detailed descriptions and operating instructions for the ZCPR3 programs and utilities on the system diskette.
- Chapter 6 - PUBLIC DOMAIN PROGRAMS - Detailed descriptions and operating instructions for the public domain software included.

Chapters 4, 5, and 6 provide a user reference with the programs in each group are arranged alphabetically. The program names appear on the bottom of each page so that you can find them easily.

Each AMPRO program has a version number, and revision level. For example "Version 2.3" represents program Version 2, Revision 3. The version number is changed when a new program description is required. Most programs display their version number when you run them so that you can tell which version you are using.

PLEASE NOTE

Specifications and descriptions are subject to change without notice. Updates are available from AMPRO at a nominal charge. The contents of this document are believed to be accurate. If errors are found, please notify AMPRO at the address shown on the title page of this document.

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MULTIDSK	Read/write of non-AMPRO formats	
MULTIFMT	Format of non-AMPRO formats	
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	MCOPY	Copies files between directories (DU)
	MENU	System menu shell program
	PATH	Modifies command search path
	TCMAKE	Creates custom termcap file
	TCSELECT	Selects standard termcap file
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CHAPTER 1

GENERAL INFORMATION

1.1 INTRODUCTION

This chapter primarily describes the four types of software available for the AMPRO Z80-based single board computers and computer systems. Conventions to be used in program operating instructions are defined, and references for further information are listed.

1.2 SOFTWARE TYPES

There are four types of software available from AMPRO for its Z80-based products. Brief descriptions of each of the following appear in Chapter 2, while detailed descriptions and instructions for use are contained in Chapters 4, 5, and 6.

Operating System - CP/M 2.2 operating system and utilities, AMPRO custom Basic I/O System (BIOS), and the ZCPR3 CP/M enhancement.

AMPRO-Specific Utility Programs - Programs specifically developed to support the AMPRO single board computers and computer systems. Used for disk formatting and copying, disk format translation, system configuration, etc.

ZCPR3 Utility Programs - Programs useful in gaining the full value of the ZCPR3 CP/M enhancement. Included are utilities for: directory, file copy, file management, multi-command file generation, command search path, batch facility, and a powerful menu program.

Public Domain Programs - Several valuable programs, including communications, single drive copying, bad sector lockout, etc.

These programs are provided on the system software diskette. The optional hard disk software utilities are available separately on the Z80 Hard Disk Software diskette, and are covered in the Z80 Hard Disk Software User's Manual. One AMPRO program not described in this manual, the FRIENDLY Integrated Operating Environment, is also available separately.

1.3 CONVENTIONS

In the descriptions of the use of software utilities, terminal keyboard inputs which you will make to the system are shown underlined. This has been done to make it easy for you to distinguish between the computer's prompts and the operator's keystrokes. For example:

A0>DIR <RETURN>

Also, certain keys on your terminal's keyboard have special uses. The control key, generally labeled CTRL, is meant to be pressed at the same time as one other key. The required control key combination will be represented as follows: <CTRL-C> = control key pressed along with C key.

Two other special keys are the "escape" key, indicated by <ESC> and the "return" key (also called the "carriage return" or "enter" key), indicated by <RETURN>. In general, all commands you enter from the CP/M (or ZCPR3) command prompt require you to press <RETURN> key to begin the operation, as in the example above.

1.4 REFERENCES

Whenever a software utility is mentioned, it will either be called an AMPRO utility, a CP/M utility, or a ZCPR3 utility. This way you will know where to obtain further information on the program's use.

CP/M References

CP/M Handbook, by Rodney Zaks (Sybex Inc.)

CP/M Primer, by Stephen M. Murtha and Mitchell Waite (Howard W. Sams)

CP/M Revealed, by Jack D. Dennon (Haydon Publishing)

The Programmer's CP/M Handbook, Andy Johnson-Laird (Osborne/McGraw-Hill)

ZCPR3 Reference

The definitive ZCPR3 reference manual is:

ZCPR3: The Manual, by R. L. Conn (Echelon Inc. - Phone: 415/948-3820)

This manual is available from Echelon Inc. - Phone: 415/948-3820 or New York Zoetrope, Suite 516, 80 East 11th St., New York, N.Y., 10003.

User's Bulletin Boards

In addition, there are many CP/M and ZCPR3 user's groups and bulletin board systems, which can provide much useful information and software, including:

AMPRO1: AMPRO USER'S BULLETIN BOARD

(408) 258-8128

24 hrs/day, 7 days/week, 300/1200 baud

AMPRO2: AMPRO USER'S BULLETIN BOARD

(415) 962-9023

24 hrs/day, 7 days/week, 300/1200 baud

Z-NODE CENTRAL

ZCPR3 User's Bulletin Board

(415) 489-9005

300/1200 baud

CHAPTER 2

OPERATING SYSTEM DESCRIPTION

2.1 INTRODUCTION

This chapter provides a description of the AMPRO enhanced CP/M operating system, along with brief descriptions of each of the utilities and programs available through AMPRO on the Z80 System Software diskette. The optional AMPRO Z80 Hard Disk Software and the unique and powerful FRIENDLY Integrated Operating Environment, available separately from AMPRO, are covered in other user's manuals.

Detailed descriptions and operating instructions for the utilities and programs are provided in Chapter 4 (AMPRO Utility Programs), Chapter 5 (ZCPR3 Programs), and Chapter 6 (Public Domain Programs). Further information on the CP/M 2.2 operating system and the ZCPR3 CP/M enhancement may be obtained from the references listed in the introduction to Chapter 1.

The hard disk software utilities necessary to format and install hard disk drives in your system are available on the optional Z80 Hard Disk Software diskette.

2.2 OPERATING SYSTEM FEATURES

The operating system included with the your system is an enhanced version of standard CP/M version 2.2. One major difference is that the user command line interface (Console Command Processor, CCP) is replaced by an enhanced Z80 Command Processor Replacement called ZCPR3. The AMPRO CP/M operating system consists of three portions:

- CP/M 2.2 BDOS: Standard CP/M file and device management facility
- AMPRO Custom BIOS: Enhanced Basic I/O System
- ZCPR3 CCP: Z80 Command Processor Replacement version 3

In addition, a powerful replacement for the CP/M 2.2 BDOS, called "ZRDOS", is available in the optional AMPRO ZRDOS Distribution Disk. ZRDOS provides a number of enhancements relative to the CP/M BDOS. Contact your dealer or distributor for additional information.

2.2.1 CP/M 2.2 BDOS

The heart of the AMPRO CP/M operating system is the Basic Disk Operating System (BDOS), which is the normal CP/M 2.2 BDOS. This is the part of the operating system that interacts with programs. Because this is completely standard CP/M 2.2, all software programs designed to work with CP/M 2.2 will run without modification, provided they do not contain hardware-dependant routines.

2.2.2 AMPRO Custom BIOS

The CP/M Basic I/O System (BIOS) takes care of all hardware-dependant operating system functions. Many features of the AMPRO CP/M operating system are the result of a highly flexible, sophisticated BIOS implementation. Here are a few:

Automatic Format Sensing - Single- and double-sided, 40- and 80- track disks and drives may be intermixed freely. The BIOS senses which format is present, and adjusts accordingly. 40-track (48 tpi) diskettes may even be read (but not written) in 80-track (96 tpi) drives. (NOTE: CP/M requires that you use a <CTRL-C> keystroke when you change diskettes.) You can also boot a double-sided 48 tpi system disk in a double-sided 96 tpi drive.

Alien Format Support - One disk drive can be assigned as an "emulating" drive, so that you can read from or write to your choice of non-AMPRO format.

Hard Disk Support - You can add one or more hard disk controllers and drives to your system. The BIOS contains generic SCSI (SASI) support, making it compatible with a wide variety of devices, and has been structured to maximize the flexibility of this function. The hard disk software utilities necessary to format and install hard disk drives in your system are available on the optional Z80 Hard Disk Software diskette.

Power-up Port Defaults - You can easily alter the system power-up I/O port defaults (console baud rate, printer port assignment and setup, etc.) using the AMPRO configuration utility.

Power-up Auto-Command - A single command can be specified to run automatically on system power-up or reset. This is one of the options available through the AMPRO configuration utility.

IOBYTE Implementation - The IOBYTE can be changed by the CP/M STAT utility, to reassign logical I/O devices to physical I/O devices. Table 2-1 shows the standard CP/M logical-to-physical device assignments and choices, as supported in the AMPRO BIOS.

As implemented, the IOBYTE allows two choices for console port (Serial Port A or Serial Port B), and three choices for printer port (Serial Port A, Serial Port B, or Parallel Printer Port).

In addition, the AMPRO CONFIG utility program allows you to set the IOBYTE either temporarily, or in the cold-boot defaults on the system tracks of a disk.

Table 2-1. Logical-to-Physical I/O Assignments

Logical Device	Physical Device Choices	Default
CON: RDR: PUN: LST:	CRT: or TTY: TTY: (input) TTY: (output) CRT: or TTY: or LPT:	CRT: TTY: TTY: LPT:
Where:	CRT: = Serial Port A TTY: = Serial Port B LPT: = Parallel Printer Port	

2.2.3 ZCPR3 Command Processor

The normal CP/M console command processor (CCP) has been replaced with the more powerful Z80 Command Processor Replacement, version 3 (ZCPR3). As indicated in Table 2-2, the ZCPR3 implementation differs slightly from standard CP/M, but can be used in much the same way you would use standard CP/M. If you wish to eliminate the ZCPR3 enhancement, you can do so through the use of the AMPRO MOVCPM utility. Refer to the Chapter 3 for information on how to do this.

Your system software includes only part of the full power of the ZCPR3 System; the full ZCPR3 System occupies several megabytes of disk! The following paragraphs cover the ZCPR3 features that are present in the standard AMPRO CP/M operating system software. Additional ZCPR3 options can be easily added, as discussed in Chapter 3. Contact Echelon Inc. (Phone: 415/948-3820) for additional ZCPR3 information and support. ZCPR3 utilities and information are also available at no charge through many CP/M and ZCPR3 user groups and bulletin board systems.

Sub-Directories

Each floppy disk has a directory of files; each directory can contain up to 16 sub-directories (also called user areas), numbered 0 through 15. Normal CP/M uses the USER command to change between the 16 possible sub-directories, with the default being 0. ZCPR3 uses a directory label formed from the combination of the drive letter (A, B, etc.) and user area (0,1, etc.). This is called a drive-user, or "DU" expression. For example, A0 represents drive A user area 0, while B15 corresponds to drive B user area 15.

Using ZCPR3, the current drive and user area are displayed in the command prompt. Instead of using CP/M's USER command to change user areas, you do it in the same way that you change drives. In addition, whenever you use the DU expression, you may omit either the letter or number portion, if that part of the expression is the same as the current one. For example:

```
A0>B15:<RETURN>
B15>0:<RETURN>
B0>A:<RETURN>
A0>
```

In addition, functions such as directory (DIR), erase (ERA), rename (REN), etc., allow the DU form as destination and source directory designations.

Another powerful feature of ZCPR3 is the option of "named" sub-directories. When the named directory option is present, a directory name can be substituted for the DU expression in all command line inputs. This feature is not present in the AMPRO system software as shipped, but can be easily added. Please refer to the above-mentioned software references for further information.

Table 2-2. ZCPR3/CCP Command Comparison

Function	ZCPR3 Command	CCP Command
Display all files	DIR	DIR
Display files in specific DU	DIR DU:	No equivalent
Erase specified file	ERA DU:afn	ERA D:afn
Erase with verify	ERA DU:afn V	No equivalent
Rename file	REN DU:ufn=ufn2	REN D:ufn=ufn2
Rename file over existing file	REN DU:ufn=ufn2	No equivalent
Print file on console Without paging	TYPE DU:ufn P	TYPE D:ufn
Print file on console With paging	TYPE DU:ufn	No equivalent
Save memory into file	SAVE n DU:ufn	SAVE n D:ufn
Save memory into file and specify size in hex	SAVE nH DU:ufn	No equivalent
Save memory into file and specify number of blocks	SAVE n DU:ufn S or SAVE nH DU:ufn S	No equivalent
Change disk	D:	D:
Change user	U:	USER n
Change disk and user at same time	DU:	No equivalent
DU: - Drive number, User number (e.g., A0:, B15:, C:, 13:) ufn - Unambiguous file name (e.g., MYFILE.TXT, DIR.COM) afn - Ambiguous file name (e.g., *.COM, MYFILE.*, M??ILE.T?T)		

Directory Utility

In AMPRO's ZCPR3 implementation, the DIR utility is not an "intrinsic" (internal) function, but requires the presence of the ZCPR3 DIR.COM utility on disk. As you will notice as soon as you use this command, the DIR utility has quite a few nice features, such as alphabetical file sorting and direct access to any directory. For example

```
A0>DIR B5:<RETURN>
```

displays the directory of drive B, user area 5 (sorted alphabetically!).

Also, since the directory utility is disk-based rather than internal, you can select from a large assortment of public domain directory utilities -- simply rename your favorite one "DIR.COM".

Multiple Commands per Line

With ZCPR3, multiple commands may be given on a single command line, with semi-colons (;) used as separators. For example, the sequence

```
A0>DIR;ERA *.BAK;DIR<RETURN>
```

runs the directory program, erases all files with the .BAK type, and then runs the directory program a second time.

Command Search Path

ZCPR3 also uses an automatic command search path. This means that programs referenced on the command line may be located anywhere along a pre-defined command search path. You can be logged onto drive B, and execute a program on drive A, without typing the drive prefix for the program drive. The default search path is:

```
current drive, current user  
current drive, user 0  
drive A, current user  
drive A, user 0  
drive A, user 15  
current drive, user 15
```

Since the search path covers both different drive letters and different user area numbers, you can "hide" programs and utilities in different user areas. This results in cleaner looking directories. A common practice is to "hide" COM files (programs) in user 15. Such files will not be visible from user 0, but will execute from user 0.

NOTE

Some application programs must be run from the same drive letter and user area as the files they will be used with, or require additional programs, overlays, or files to be present in the same directory (drive and user area) as the program itself.

The ZCPR3 DISK7 and MCOPY, and the AMPRO FRIENDLY utilities can be used to copy files directly between user areas. The ZCPR3 PATH utility allows you to easily change the search path as needed.

Intrinsic Commands

With the exception of the DIR and USER commands noted above, all standard CP/M version 2.2 intrinsic commands are implemented, as well as some additions. Table 2-2 lists the ZCPR3 commands versus those of the standard CP/M CCP.

Aliases

One of the most powerful features of ZCPR3 is the use of aliases. This feature is made possible by the multiple command line capability. An "alias" is a disk-resident multiple command line. The alias has a command file name, such as FUNCTION.COM, but represents a pre-programmed set of commands. Whenever you run the alias, you get the set of commands. It is like a fast, memory-based submit, or batch, facility. By using an alias (usually STARTUP.COM) as the CONFIG auto-command, you can have a complex sequence of functions automatically initialize your system on power-up or reset.

Shells

ZCPR3 also provides shell support. A "shell" is a substitute operating environment. Examples of ZCPR3-compatible shells are ZCPR3 MENU, VMENU, and VFILER, and AMPRO FRIENDLY. A shell is a program that always reloads following the execution of any program, rather than returning you to the command prompt. Once a shell is loaded, you might never see the A0> prompt again! ZCPR3 shells provide varying levels of isolation of the user from the operating system, and can even completely replace the CCP interface. The powerful MENU shell program is included on your system diskette.

Termcap Facility

ZCPR3 adds another powerful feature to CP/M which is lacking in most microcomputer operating systems: a termcap facility. The AMPRO CP/M implementation contains a special buffer area in memory which is used by ZCPR3 to standardize terminal display control codes. This allows application programs to be terminal-independent, providing the software is written to take advantage of the ZCPR3 termcap. The ZCPR3 utilities TCSELECT and TCMAKE are used to create a termcap file, usually called MYTERM.Z3T. The ZCPR3 utility LDR is used to load the appropriate termcap file into memory, for use by compatible programs.

Extended ZCPR3 Support

ZCPR3 is a highly configurable system. Additional ZCPR3 configurations and utilities are available in the optional AMPRO Extended ZCPR3 Support Package. This package includes several alternative ZCPR3 configurations which are easily installed using a utility provided.

2.3 STANDARD CP/M UTILITIES

Included on your system software diskette are all the standard CP/M utility programs. Consult the references listed in the introduction of Chapter 1 for further information on their use.

ASM.COM - Standard assembler for 8080 instructions. May be used to assemble AMPRO source code.

DDT.COM - Dynamic Debugging Tool: standard CP/M debugger.

DUMP.COM - Permits display of a file in hexadecimal values.

ED.COM - Standard CP/M line editor. May be used to edit AMPRO source code.

LOAD.COM - Converts .HEX file output of the ASM program to an executable .COM file.

PIP.COM - Permits single or multiple disk-to-disk file transfers. Also port-to-port and port-to/from-disk transfers.

STAT.COM - Status of disk and other I/O devices. Also may be used to set file attributes.

SUBMIT.COM - Permits execution of multiple commands and parameters stored in a disk file.

XSUB.COM - For use with SUBMIT.COM, to allow passing of parameters direct to programs.

2.4 AMPRO-SPECIFIC UTILITIES

The following programs are specific to AMPRO hardware, and used for system customization, disk formatting, disk format translation, etc. Source code is available from AMPRO at nominal cost. Detailed descriptions and instructions appear in Chapter 4.

The hard disk software utilities necessary to format and install hard disk drives in your system are available on the optional Z80 Hard Disk Software diskette.

AMPRODSK.COM - Used to copy, format, and verify AMPRO-format disks.

CONFIG.COM - Used to modify or set your system's current or powerup default peripheral port characteristics according to your particular requirements. Lets you set serial port A and B baud rates, data characteristics, and handshaking, floppy drive step rates, printer port choice (serial or parallel), and command for power-up or reset automatic execution.

DOS.COM - Used to read and write files on PC-DOS format disks. Also used to read the directory and erase files.

DOSFMT.COM - Used to format PC-DOS disks in all standard formats.

ESET.COM - Permits reading and writing of data to and from disk formats other than those available with the MULTIDSK.COM utility. (See MULTIDSK.COM)

MOVCPM.COM - Configures the operating system for a user-definable memory size. Same as ZMOVCPM.COM, except contains the standard CP/M CCP. Used as part of the procedure for generating a hard disk system, if ZCPR3 is not desired.

MULTIDSK.COM - Provides compatibility with other computers' disk formats. After MULTIDSK is run, you can read from or write to the selected alien format by using the drive letter "E" instead of the drive's normal designation (A, B, etc.).

MULTIFMT.COM - Permits formatting (and verifying) disks using non-AMPRO formats.

SET.COM - Allows setting of current serial port characteristics (baud rate, data characteristics, hand shaking) and assignment of printer port (serial or parallel). Similar to CONFIG.COM, but all parameters are given from the command line, thus allowing use with ALIASes, MENU lines, etc.

SWAP.COM - Re-assigns CP/M disk drive letters, swapping them in pairs.

SYSGEN.COM - Used to write the AMPRO CP/M operating system tracks onto a disk. Allows source of the system tracks to be either another disk's system tracks, a disk file, or a memory image (generally placed in memory by MOVCPM or ZMOVCPM).

ZMOVCPM.COM - Configures the operating system for a user-definable memory size. Same as MOVCPM.COM, except contains the ZCPR3 CCP replacement. Used as part of the procedure for generating a hard disk system.

2.5 ZCPR3 UTILITIES

The following ZCPR3 utilities are included on the system software diskette. Source code is available from ECHELON Inc. (415/948-3820) at nominal cost. Detailed descriptions and instructions appear in Chapter 5. Consult the references listed in the introduction to Chapter 1 for additional information on these and other ZCPR3 utilities.

ALIAS.COM - Used to create or modify multiple command line files (aliases).

CRC.COM - Generates Cyclic Redundancy Check (CRC) values for files.

DIR.COM - Displays contents of disk directories. Allows direct drive/user area (DU) access.

DIFF.COM - File compare utility. Checks two files for differences.

DISK7.COM - Easy to use disk file management utility. Includes a menu of single-keystroke commands for Copy, Rename, Delete, Length, and drive Status.

LDR.COM - Used to load terminal definition files (e.g. MYTERM.Z3T), system environments, and other system-resident ZCPR3 files.

MCOPY.COM - General purpose file copying program. Allows direct file movement between directories (e.g. A0 to B15).

MENU.COM - Powerful system menu shell program.

PATH.COM - Used to temporarily alter command search path.

TCMAKE.COM - Used to create non-standard terminal definition files (e.g. MYTERM.Z3T).

TCSELECT.COM - Used to select a standard terminal definition file from a menu of standard terminals.

UNERASE.COM - Recovers deleted disk files. Inverse of the ERA (erase) command.

Z3INS.COM - ZCPR3 installation utility. Installs other ZCPR3 utilities for your operating system configuration. AMPRO-supplied ZCPR3 utilities do not require installation prior to use with the standard AMPRO-supplied operating system.

ZEX.COM - Memory-resident batch processor, similar to CP/M's SUBMIT utility, but more powerful.

2.6 PUBLIC DOMAIN PROGRAMS

Several valuable public domain programs have also been included. Source code for these programs is available through CP/M user groups and bulletin board systems. Brief descriptions and instructions for these programs are included in Chapter 6.

MDM740.COM - General purpose, powerful communication program. Modified for use with the AMPRO serial port B. (AMPRO-specific overlay is contained in the file, M7-LB.ASM.) Allows direct computer-to-computer file transfer over RS232, or may be used with a modem. Features include ASCII transfer or XMODEM protocol, auto dialing, stored phone library, and more.

SD.COM - Directory display utility alternative to DIR.COM. Options you may specify in the command line allow printing the directory, creating a file containing the directory, and inclusion of multiple user areas.

SWAPCOPY.COM - Single drive disk-to-disk copy utility. Modified for use with AMPRO foreign formats (allows copying from A to A, A to E, and E to A).

2.7 GENERATING DIFFERENT SYSTEMS

There are several reasons why you may wish to generate an alternate operating system:

- (1) Use of hard disk drives
- (2) Alternate ZCPR3 system configurations
- (3) Memory requirements of a modified BIOS or custom software
- (4) Substitution of standard CP/M CCP for ZCPR3 CCP
- (5) Generation of a larger TPA system, using the Version 1 BIOS

In the first three cases, additional buffer areas are required in high memory, above the operating system. This requires moving the operating system **down** in memory, and leaving room for the required functions. In the fourth case, the use of CP/M results in less memory required for the operating system, allowing the operating system to be moved **up** in memory. In the fifth case, slightly more program area is made available by using a BIOS with a few less features.

The AMPRO utilities MOVCPM.COM or ZMOVCPM.COM are used to relocate or regenerate the operating system. Refer to the Chapter 3 for additional information on the generation of alternate CP/M configurations.

CHAPTER 3

SOFTWARE INSTALLATION

3.1 INTRODUCTION

This chapter provides information on generating a custom system software diskette. The modifications which you may wish to make to your system software fall into several categories. If you plan to add hard disk support, you will require the optional Z80 Hard Disk Software and Hard Disk Software User's Manual, available through AMPRO.

Here are some ways your system can be customized:

- Changing system initialization parameters
- Customizing the terminal characteristics file
- Adding hard disk support
- Installing alternate ZCPR3 environments
- Substitution of standard CP/M CCP for ZCPR3 CCP
- Generation of a larger TPA system, using BIOS Version 1

This chapter describes the procedures required to customize your system software in these ways, except for addition of hard disk support which is covered in the Z80 Hard Disk Software User's Manual. For further details on the operation of the utility programs referenced in this chapter, consult the program descriptions in Chapter 4 (AMPRO Utilities), Chapter 5 (ZCPR3 Programs), and Chapter 6 (Public Domain Programs).

There are two things it is recommended that you do immediately:

1. Make a backup copy of the disks included with your system.
2. Customize your system disk boot parameters.

NOTE

Any modifications to the system parameters should only be performed using your backup disks. **Do not** use the disks shipped with your system.

3.2 MAKING BACKUP DISKS

It is always a good idea to have at least one backup copy of all floppy disks. This is especially true of your master system disks. The exact procedure you use to make backup disks depends on your system configuration. Here are three methods:

Method 1: Two identical format types. - When making a backup in which the source and destination disks will be the same floppy format (i.e., 48 to 48 tpi, or 96 to 96 tpi), the backup can easily be made with the Copy function of the AMPRO AMPRODSK utility. The only catch is that AMPRODSK requires the source and destination to be the same floppy format and drive type. One exception is that double-sided drives can be used to copy from or to single-sided floppy formats. The AMPRODSK Copy function even formats the destination disk for you. Simply follow the instructions given by the program when you run it.

NOTE

AMPRODSK can not read 48 tpi disks in 96 tpi drives. Use Method 2.

Method 2: Two different drive types. - You can backup a source disk onto a different floppy format (e.g. 96 tpi backup of 48 tpi disk or visa versa), as follows:

1. Use the AMPRODSK utility's Format function to format a fresh disk having the desired destination format, in the destination drive.
2. Use a file copy utility (CP/M PIP, ZCPR3 DISK7, ZCPR3 MCOPY, AMPRO FRIENDLY, etc.) to copy all files from the source to the destination disk.
3. If the source disk is a system disk, use the AMPRO SYSGEN utility to copy the source system tracks to the destination system tracks.

Method 3: Single-drive Systems. - If you have a system with only one disk drive, you can do nearly anything that can be done with two or more drives. For example, a backup of your system software diskette can be made as follows:

1. Use the AMPRO AMPRODSK utility's Format function to format a blank disk. The program will indicate what you need to do.
2. Use the AMPRO SWAPCOPY utility to copy all files from the source system disk to the backup disk. The required command is:

```
A0>SWAPCOPY *.* <RETURN>
```

3. Use the AMPRO SYSGEN utility to copy the system tracks from the source disk to the backup disk. The program will indicate what to do.

3.3 SYSTEM INITIALIZATION PARAMETERS

When using your system for the first time, some of the system initial default values are probably not perfect for your system configuration. The AMPRO CONFIG utility allows you to easily modify the serial port setups (baud rates, handshaking, etc.), printer port assignment (serial or parallel), floppy drive step rates, and automatic powerup/reset command.

As shipped, the CP/M system diskette's default boot parameters are as shown in Table 3-1.

Table 3-1. System configuration defaults.

Parameter	Default Value
Terminal Port:	Serial Port A
Printer Port:	Parallel Port
Max. Drives:	4
Step Rate:	6 mS, 6 mS, 6 mS, 6 mS
Autocommand:	startup
Serial Port A configuration:	data bits 8 stop bits 1 parity none baud rate 9600 hand shake no
Serial Port B configuration:	data bits 8 stop bits 1 parity none baud rate 300 hand shake no

One important parameter to be sure to set correctly is the floppy disk drive step rate. Initially, the system disk is set up for, and boots with, a step rate of 6 mS. Check your drive's step rate specification, and set the default step rate to the one that is closest to the drive's specification. The CONFIG utility will guide you through its use.

3.4 TERMINAL CHARACTERISTICS FILE

As mentioned in Chapter 2, ZCPR3 provides a terminal characteristics facility, or "termcap," which allows programs and utilities to take advantage of your terminal's specific control codes. The termcap data is contained in a file having the "Z3T" extent (normally MYTERM.Z3T), and is loaded with the ZCPR3 system segment loader, LDR.COM (see Chapter 5).

As shipped, your system software diskette contains a generic MYTERM.Z3T file which is usable only with the ZCPR3 MENU program. You will probably wish to customize MYTERM.Z3T for your terminal. Once you do, you will find the MENU screen looks nicer, and writes to the screen faster.

Use either the ZCPR3 TCSELECT or TCMAKE utilities to create a version of MYTERM.Z3T appropriate for your system. The file on your system disk called STARTUP.COM contains the command line:

```
LDR MYTERM.Z3T; MENU
```

which invokes the ZCPR3 system segment loader utility (LDR.COM) to load your MYTERM.Z3T termcap into memory, and then runs the ZCPR3 MENU program. STARTUP is run automatically on powerup or system reset, as long as it is the "autocommand" set with the AMPRO CONFIG utility.

3.5 ALTERNATE ZCPR3 CONFIGURATIONS

As mentioned previously, the ZCPR3 CP/M enhancement provides a great many features and options. The normal AMPRO system diskette includes but one of many possible ZCPR3 configurations. For each possible ZCPR3 system configuration, there is a specific a ZCPR3 Environment Descriptor, along with a set of system segments which must be loaded into the proper memory locations.

Normally, changing ZCPR3 configurations requires reassembly of the system BIOS, and rebuilding of the system. The AMPRO operating system contains a default environment within the BIOS buffer area (located at FE00H), which is loaded and initialized by the BIOS on cold boot. This allows a subset of ZCPR3 features to be immediately available on powerup. More importantly, if the environment base address (FE00H) is kept invariant, it is possible to change ZCPR3 configurations without having to reassemble the BIOS, providing that the system segments required by each configuration are loaded immediately after cold boot, prior to any other system operation. (By having the default environment loaded with the BIOS at cold boot, the ZCPR3 multiple command line can be used to load alternative environments and system segments, etc.)

When available, alternative ZCPR3 configurations will be contained in files on your system diskette. The files associated with each configuration have a common file name (Z1, Z2, etc.), and an appropriate file type (extent). The number used to identify the configuration (1,2,...) will indicate how many extra K bytes of BIOS buffer space is required for use with that configuration. For example, the files associated with configuration 1 are called:

```
ZAMPRO1.DOC  DOCumentation for installing and using configuration 1.
ZAMPRO1.ENV  ENVironment descriptor file for configuration 1.
ZAMPRO1.FCP  Flow Command Package for configuration 1.
ZAMPRO1.IOP  Input/Output Package for configuration 1.
ZAMPRO1.RCP  Resident Command Package for configuration 1.
ZAMPRO1.COM  Alias to load configuration 1.
```

The DOC file describes the corresponding ZCPR3 Configuration's features, installation, and use. When making space (using ZMOVCPM) reduce the "CP/M size" by the number of K bytes indicated in the configuration's file name. For example ZAMPRO1 files correspond to a configuration which requires 1K additional space. In that case, since a 20 megabyte storage hard disk system requires a "59K CP/M" system, a ZCPR3 configuration based on the ZAMPRO1 files would require a 58K CP/M system. In this case "58" is the parameter you give ZMOVCPM.COM in preparation for system installation.

3.6 CP/M CCP OPTION

If, for some reason, you do not wish to use the ZCPR3 feature of the AMPRO CP/M operating system, you can create a system version which has the normal CP/M 2.2 Console Command Processor (CPM) instead. This is easily done by means of the AMPRO MOVCPM.COM utility, as follows:

NOTE

This must be performed from the CP/M command prompt, not from a shell as provided in the ZCPR3 environment.

```
A0><u>MOVCPM 60 *</u><RETURN>
```

MOVCPM will respond with:

```
CONSTRUCTING 60K CP/M vers 2.2  
READY FOR "SYSGEN" OR  
"SAVE 41 CPM60.COM"  
A0>_
```

Then run the AMPRO SYSGEN utility. Give <RETURN>, and no drive letter, in response to SYSGEN's source drive prompt. Then specify the destination drive letter on which you wish the CP/M system (without ZCPR3) to be placed.

NOTE: Some useful functions are not available without the ZCPR3 option. One such lost feature is the autocommand set using the AMPRO CONFIG utility.

3.7 BIOS VERSION 1 OPTION

An alternative AMPRO BIOS is also available on your system software diskette. It is the floppy-only BIOS Version 1, and has a few less features than the current BIOS version, but provides an additional 1K bytes of TPA space. Limitations of the Version 1 BIOS are:

- All floppy drives step at the same rate
- No automatic reading or booting of 48 tpi formats in 96 tpi drive (reading can, however, be done with the AMPRO 48TPI.COM utility)
- No drive letter re-assignment
- No hard disk support

This is how to install the Version 1 BIOS on a system diskette:

NOTE

This must be performed from the CP/M command prompt, not from a shell as provided in the ZCPR3 environment.

- (1) Run ZMOVCPM (or MOVCPM), to create a temporary 61K system image file:

```
A0>ZMOVCPM 61 *<RETURN>  
CONSTRUCTING 61K CP/M vers 2.2  
READY FOR "SYSGEN" OR  
"SAVE 41 CPM61.COM"  
A0>SAVE 41 ZCPM61.COM<RETURN>
```

You have now created a file containing the system image for a 61K CP/M system (with ZCPR3).

- (2) Combine the Version 1 BIOS with the 61K system image:

```
A0>DDT ZCPM61.COM<RETURN>           ...loads 61K system  
DDT VERS 2.2  
NEXT PC  
2A00 0100  
-IV1BIOS.HEX<RETURN>           ...file name to overlay  
-R3180<RETURN>                 ...overlays Version 1 BIOS  
NEXT PC  
4F80 0100  
-G0<RETURN>                   ...exits to CP/M  
A0>SAVE 41 V1SYS.COM<RETURN>     ...saves Version 1 system
```

- (3) Finally, install the new system by writing it to a diskette:

```
A0>SYSGEN V1SYS.COM<RETURN>  
Enter Destination Drive? (A thru P)           B  
Place Destination on B, then type <RETURN>    <RETURN>  
Enter Destination Drive? (A thru P)           <RETURN>  
A0> _
```

3.8 BIOS CUSTOMIZATION

Finally, you may wish to modify the standard AMPRO BIOS. BIOS source code is available from AMPRO for a nominal charge. The MSIZE constant in the BIOS determines the resulting system's "CP/M size" (60K CP/M, 59K CP/M, etc.) and should be set according to the memory requirements of your customized BIOS. This is what you need to do:

- (1) Edit and assemble your modified BIOS.

NOTE

The following steps must be performed from the CP/M command prompt, not from a shell as provided in the ZCPR3 environment.

- (2) Run ZMOVCPM (or MOVCPM), to create an unmodified system image corresponding to the required CP/M size. For example:

```
A0>ZMOVCPM 60 *<RETURN>
CONSTRUCTING 60K CP/M vers 2.2
READY FOR "SYSGEN" OR
"SAVE 41 CPM60.COM"
A0>SAVE 41 ZCPM60.COM<RETURN>
```

You have now created a file containing the system image for a 60K CP/M system, with the ZCPR3 CCP replacement. The number of pages to save is always 41.

- (3) Combine your new BIOS with the moved (unmodified) system image:

```
A0>DDT ZCPM60.COM<RETURN>           ...loads unmodified system
DDT VERS 2.2
NEXT PC
2A00 0100
-IBIOS.HEX<RETURN>                 ...identifies "BIOS.HEX"
-R3580<RETURN>                     ...overlays your BIOS.HEX
NEXT PC
4F80 0100
-G0<RETURN>                         ...exits to CP/M
A0>SAVE 49 NEWSYS.COM<RETURN>     ...saves modified system
```

In this case, the overlay "offset" of 3580(hex). This is the right number for a 60K CP/M system. The other choices are:

<u>CP/M SIZE</u>	<u>LOAD OFFSET</u>	<u>SAVE PAGES*</u>
61K CP/M	3180	41
60K CP/M	3580	45
59K CP/M	3980	49
58K CP/M	3D80	49
57K CP/M	4180	49
56K CP/M	4580	49

- (4) Finally, test the new system by writing it to a diskette:

```
A0>SYSGEN NEWSYS.COM<RETURN>
Enter Destination Drive? (A thru P)   B
Place Destination on B, then type <RETURN>  <RETURN>
Enter Destination Drive? (A thru P)   <RETURN>
A0>__
```


CHAPTER 4

AMPRO UTILITY PROGRAMS

4.1 INTRODUCTION

This chapter contains detailed information on each of the AMPRO-specific utility programs supplied on the standard AMPRO system software diskette, as well as those supplied on the optional hard disk software diskette. Each program's description explains what the program does and how it is used. The utilities are covered in alphabetical order, so this material can serve as a handy operator's reference.

Each program description is identified with a version number. When the utility program is run, its version number (and a revision level) appear in the program's sign-on message, for example:

```
AMPRO Copy/Format/Verify Utility
Copyright (C) 1984 AMPRO Computers, Inc.
Version 1.6
```

In this case the program is Version 1, Revision 6. Revisions of a utility program having the same version number operate in the same manner. If a future version of a particular utility program requires a new description, its version number will be changed, to indicate that the old description is no longer accurate. Program descriptions for the new program version will be available, so that you can update this manual.

4.2 PROGRAM DESCRIPTIONS

The following pages contain the program descriptions of the AMPRO Z80 system utilities, alphabetically arranged.

The utilities for formatting and installing hard disk drives, are available on the optional AMPRO Z80 Hard Disk Software diskette, are described in the Hard Disk Software User's Manual.

AMPRODSK

(Version 3)

Description

AMPRODSK is a multi-purpose utility program that provides three functions:

Copy - copies the contents of one floppy disk to another, using two drives. (Formats the destination floppy while copying.)

Format - initializes diskettes with AMPRO's format scheme.

Verify - verifies diskette data integrity.

The AMPRODSK copy function is used for making a complete duplicate of a floppy diskette. This is the fastest way to make a backup copy of an entire floppy disk, but not always the most valuable way. One requirement is that both the source and destination drives must be either 40-track or 80-track. You can also use FRIENDLY, DISK7, PIP, MCOPY, etc., to back up individual files between 40- and 80- track drives.

AMPRODSK supports only the four AMPRO formats:

1. Single Sided, Double Density, 40-track (48 tpi)
2. Double Sided, Double Density, 40-track (48 tpi)
3. Single Sided, Double Density, 80-track (96 tpi)
4. Double Sided, Double Density, 80-track (96 tpi)

Use the MULTIFMT utility, for formatting and verification of non-AMPRO formats. Use SWAPCOPY for file backup using a single drive.

Operation

The program will display a sign-on message, then the following:

```
COPY, FORMAT or VERIFY? (C, F or V)
Press <ESC> or ^C to quit.  __
```

You can make your selection of which function to use by pressing one of the keys indicated (C, F, or V). Pressing ESC or CTRL-C returns to CP/M.

AMPRODSK Copy Function

To select the AMPRODSK disk Copy function, press the **C** key, without carriage return. The Copy function automatically formats the destination disk to match the source disk, so you do not have to use the Format function prior to using the Copy function.

NOTE

The AMPRODSK Copy (backup) function does not require that the Destination be formatted prior to use.

WARNING!

The contents of the **destination** disk will be completely lost -- written over by the COPY operation.

After you select the Copy function (choice C), the program responds with a list of available floppy drive letters, according to their current assignments, and other prompts which lead you through the process. The program will display appropriate status messages, showing the track numbers being read, written, and verified. In the event read or write errors occur, a suitable error message will be displayed.

The Copy function checks the Source diskette to see what type format it is, and creates a Destination diskette identical to the source (even if the Destination diskette was either unformatted or formatted differently). At the end of the copy process, the Destination disk will be an exact copy of the Source disk. You need not run the Format function prior to the Copy function, or the Verify function afterwards; the Copy function does both of these for you.

AMPRODSK Format Function

Before data can be written on a new, blank floppy diskette, it needs to be "formatted." The Format function actually fills the diskette with blank data fields which are later over-written with data as needed by your applications or utilities programs. If you try to write data onto an unformatted disk, you will probably see the error message: "BDOS ERR ON B."

Select the Format function by pressing the **F** key. The program responds with a choice of drives, according to your system's current drive letter assignments. After you indicate the drive letter you wish to use, you are asked to choose which format type, from among the four AMPRO formats:

1. Single side 48 tpi
2. Double side 48 tpi
3. Single side 96 tpi
4. Double side 96 tpi

At this point, you need to decide which type of format you want. Select the format type (1,2,3,4) which matches the disk drive you are using. 48 tpi drives have 40 tracks of data per side, while 96 tpi drives have 80. If you have an AMPRO Model 122 or 121, with double-sided 48 tpi disk drives, you should select number 2. If you have a Model 142, with double-sided 96 tpi disk drives, select number 4. The only reason to use other types would be if you have added external drives of a different type than those normally supplied with your system. You cannot use 48 tpi formats with 96 tpi drives, or visa versa. These four formats may also be used with micro floppy drives. Select a 48 tpi format type for 40-track drive, and a 96 tpi format for a 80-track drive.

The program displays a running status of the process, followed by a completion message if successful, or an appropriate error message if the format attempt fails. You need not use the Verify function following Format, as this is automatically done for you.

AMPRODSK Verify Function

This function reads a floppy disk and checks for data integrity. If some part of the disk has been damaged in some way, disk verification should catch it. This operation only reads data from the disk, and **does not alter** the disk's contents. You can use this function any time, without harming the contents of a disk.

To select the Verify function, press the **V** key. If the verification is successful, a message will indicate "VERIFY complete." If Verify fails, an appropriate error message will be displayed.

CONFIG

(Version 2)

Description

CONFIG is mainly used during first time system installation. This utility allows you to set serial and parallel port powerup configurations, and to specify an "auto-command" to be run automatically on powerup or reset.

You can also use this program to temporarily modify some of the operating characteristics of your system, such as baud rate, serial port values, console and printer ports. The AMPRO SET utility provides an alternate means for changing or initializing serial and printer port characteristics.

Operation

When you run CONFIG the program will respond with:

With this utility you may view and change the various parameters of your AMPRO system. You will be asked to choose to view the current parameters now in memory or to view the parameters on a system disk. You will be asked for any changes you might make. After any changes you will be asked whether to install the new parameters in memory or on a system disk.

View parameters from Memory or from Disk? (M or D) D
Press <ESC> to quit.

Viewing the parameters from "Memory" shows how your system is currently operating. Viewing them from "Disk" shows how the parameters are set on a particular disk, but does not change the parameters in use by your computer until a later step of the program.

When you type **D**, the program will present a choice of disk drive letters, based on your system's current drive assignments. After you respond with the disk drive letter, CONFIG will display a Configuration Table, similar to the one on the following page. There are seven categories of system characteristics that can be altered by CONFIG. The parameter assignments and values shown are typical.

Configuration Table:

Parameter:	Currently:
1. Terminal	Serial Port A
2. Printer	Parallel Port
3. Max. Drives	4
4. Step Rate	6 mS, 6 mS, 6 mS, 6 mS
5. Autocommand	
6. Serial Port A configuration	data bits 8 stop bits 1 parity none baud rate 9600 hand shake no
7. Serial Port B configuration	data bits 8 stop bits 1 parity none baud rate 9600 hand shake yes

Any (more) changes? (1 through 7 or No)

The seven parameters which CONFIG allows you to alter are defined as follows:

1. **Terminal** - You can specify whether your system's terminal port will be Serial Port A or Serial Port B. The only difference between these two choices is that Serial Port A allows faster data transfer rates if your terminal can use 19,200 or 38,400 baud. The normal configuration (default) is Serial Port A. This determines the CP/M "CON" device.
2. **Printer** - You can specify one of three choices for your system's printer port -- Serial Port A, Serial Port B, or the Centronics (parallel) port. The normal use is Serial Port B for a serial printer, or Parallel Port for a Centronics-compatible printer. The default is Parallel Port. This determines the CP/M "LST" device.

3. **Maximum Drives** -

BIOS Version 3 or later: this is fixed at 4 drives.

BIOS Versions 1 and 2: you can specify 1, 2, 3, or 4, as the number of floppy disk drives in your system. With these BIOS versions, the system can "hang up" if you accidentally attempt to access a non-existent disk drive, unless you have this parameter set to the number of drives present.

4. **Step Rate** -

BIOS Version 3 or later: you can specify 2, 3, 6, or 12 milliseconds as the disk drive step rate. Most 48 tpi (40-track) drives can step at 6 mS, while most 96 tpi (80-track) can step at 3 mS. When you select number 4, you will be prompted for four step rates, one per drive.

BIOS Versions 1 and 2: only the first value you specify has any effect. All four drives step at this rate.

NOTE

These step rates assume your floppy disk controller IC is a 1772 device. If it is a 1770, the 2 and 3 millisecond selections result in 20 and 30 millisecond step rates.

5. **Autocommand** - You can specify a single command to be executed when your system is reset or first powered up. Up to 8 characters may be entered, followed by a <RETURN>. NOTE: You can use a ZCPR3 alias (see ALIAS.COM) as the autocommand, to allow the autocommand to be a series of commands, or a command with additional parameters. This feature does not apply if you are not using ZCPR3 in place of the CP/M CCP.
6. **Serial Port A Configuration** - You can customize the number of data and stop bits, the parity, the baud rate, and the handshake characteristics of each of the serial ports. The default values are those shown in the sample Configuration Table below. Serial Port A can operate at a maximum of 38,400 baud.
7. **Serial Port B Configuration** - Same as Serial Port A, with the exception of the baud rate. The maximum baud rate for Serial Port B is 9600 baud.

One parameter, "hand shake," could use a word of explanation. When enabled ("yes"), handshaking allows your computer to send data to your terminal (or printer) at the fastest possible rate, by allowing the terminal (or printer) to stop and start the data stream coming from the computer using a handshake signal wire. The AMPRO system supports hardware, or "DTR," handshaking. Hardware handshaking makes use of a special signal wire between your terminal (or printer) and your computer. If hardware handshaking is not supported by your terminal (or printer), don't answer "yes" here -- if you do, your system will hang up!

Most terminals do **not** require hardware handshaking at 9600 baud, so in most cases you can specify "no" for this parameter. Most serial printers, on the other hand, **do** require hardware handshaking.

After you set the desired parameters, you can write your changes on the system tracks of a diskette (make sure the disk is not write-protected), or they can be installed temporarily in the computer's memory. If you save any changes in memory only, this doesn't change the way the disk is set up, but will change the way the system is operating immediately after you press **M**. On the other hand, if you save your changes on the diskette, this doesn't change the way the system is currently set up; the changes will, however, take place the next time the system is turned on and rebooted from the re-configured diskette.

DOS

(Version 1)

Description

The AMPRO DOS utility allows one of your system's floppy drives to emulate a PC floppy drive. Once you specify the PC-emulating drive, you can transfer files to and from a PC-DOS diskette. The DOS utility also allows you to see the PC-DOS diskette's directory, view the contents of text files on the PC-DOS diskette, and erase files on the PC-DOS diskette.

The DOS utility allows your system to read and write PC-DOS diskettes having all four standard PC-DOS formats: single- and double-sided, 8 and 9 sectors per track. In addition, a 96 tpi drive can be used to read, but not write, a PC-DOS diskette. (Writing is permitted, but not recommended.)

One restriction of the DOS utility is that it only allows access to the PC-DOS diskette's "root" directory.

Operation

The DOS "SET" command must be used first, to select one of your system drives as the PC-DOS emulating drive. Other DOS commands are then used to display the PC-DOS diskette's directory, transfer or erase files, and view text. File names may contain the standard CP/M "wild cards" (* and ?).

DOS has five commands: SET, DIR, GET, PUT, and ERA. The following examples show how each of these commands is used.

A0><u>DOS SET B:<RETURN>	...specifies the PC-DOS drive as B: (the drive is 48 tpi)
A0><u>DOS SET B:96<RETURN>	...specifies the PC-DOS drive as B: (the drive is 96 tpi)
A0><u>DOS DIR<RETURN>	...displays the PC-DOS diskette's directory
A0><u>DOS GET MYFILE.TXT C:<RETURN>	...copies MYFILE.TXT from the PC-DOS diskette to CP/M drive C:
A0><u>DOS PUT C:MYFILE.TXT<RETURN>	...copies MYFILE.TXT from CP/M drive C: to the PC-DOS diskette
A0><u>DOS ERA OLDFILE.BAK<RETURN>	...erases OLDFILE.BAK from the PC-DOS diskette.
A0><u>DOS<RETURN>	...displays a help screen

DOSFMT

(Version 1)

Description

The AMPRO DOSFMT utility allows your system to format PC-DOS diskettes having all four standard PC-DOS formats: single- and double-sided, 8 and 9 sectors per track.

Once a diskette is formatted using DOSFMT, you must still use the DOS utility program to prepare one of your system's drives to read or write data from or to the disk. Unlike AMPRODSK, DOSFMT does not have a disk-to-disk copy function.

Operation

Once you have entered DOSFMT, the program will display a sign-on message then request:

```
FORMAT or VERIFY? (F or V)
Press <ESC> or <^C> to exit. ___
```

To format a disk, enter "F". The program will prompt you for a destination drive letter, which determines the drive on which the formatting will occur. The program will respond with a list of available formats similar to the following:

```
- FLOPPY DISK ASSIGNMENTS -
CP/M drive      Floppy disk
-----
F               First
G               Second
H               Third
I               Fourth
```

```
Destination Drive? (A-P) ___
```

The program will then prompt you for which version of PC-DOS you wish to format the disk. After you enter your selection, the program will prompt you to put the destination disk in the selected drive and press <RETURN> to write or <ESC> to quit.

The diskette in the Destination drive will first be formatted then verified. If for some reason verification fails, an appropriate error message will be displayed. You do not have to use the Verify function after Format, because this is done automatically for you.

As in AMPRODSK, the Verify function checks for disk data integrity, and is non-destructive of disk data.

DOSFMT NOTES

1. **96tpi** drives cannot be used to generate **48tpi** formats, and visa versa.
2. You must also run the DOS utility prior to attempting to read or write data from, or to, the diskette.

ESET

(Version 3)

Description

The ESET utility allows you to define disk parameters for disk formats other than those available with MULTIDSK. This permits read and write operations to be performed on many non-AMPRO format disks, provided you can supply ESET with the required parameters.

NOTE

This program requires some technical knowledge about CP/M's disk format conventions. Certain types of disk formats are not readable due to requirements which may not be supported by the AMPRO CP/M BIOS. AMPRO does not provide customer support relating to the use of ESET, other than clarification regarding the program's instructions. In other words:

Use ESET at your own risk!

Operation

When you run ESET, the following will be displayed:

ESET prepares your AMPRO system to read, write, diskettes formatted for many other computers not supported by MULTIDSK

Which drive do you wish to use as the "E" drive? (A,B,C or D)

Defining TYPE byte for drive "E"

- A) single sided, single density
- B) single sided, double density
- C) double sided, single density
- D) double sided, double density

Select a FORMAT or <ESC> to start over: _____

After you answer A, B, C, or D (followed by <RETURN>), ESET continues with a series of prompts as follows:

- A) Continuous sector numbers --
first sector on side 1 = last sector on side 0 + 1
- B) Same sector numbers on both sides
(normal method)

Select the way sectors are numbered
or <ESC> to start over: _

Answer A or B to this question. ESET then asks for the size of the allocation blocks:

- A) 1k allocation blocks
- B) 2k allocation blocks

Select the size of the allocation blocks or type <ESC> to start over: ____

- A) 128 byte sectors
- B) 256 byte sectors
- C) 512 byte sectors
- D) 1024 byte sectors

Select the sector size or <ESC> to start over: ____

Defining Disk Parameter Block for drive "E"

# of logical sectors per track	(SPT):	____
block shift factor	(BSH):	____
block mask	(BLM):	____
extent mask / DB alloc. size	(EXM):	____
maximum data block number - 1	(DSM):	____
maximum directory entries - 1	(DRM):	____
directory group allocation 0	(AL0):	____
directory group allocation 1	(AL1):	____
check size	(CKS):	____
number of reserved tracks	(OFF):	____

Are all entries in the dpb ok? ____

Answer yes or no to this question. Then, ESET displays the following list of skew table choices:

- A) 1,2,3,4,5
- B) 1,3,5,2,4
- C) 1,4,2,5,3
- D) 1,2,3,4,5,6,7,8
- E) 1,2,3,4,5,6,7,8,9
- F) 1,3,5,7,9,2,4,6,8
- G) 1,4,7,2,5,8,3,6,9
- H) 1,2,3,4,5,6,7,8,9,10
- I) 1,3,5,7,9,2,4,6,8,10
- J) 0,1,2,3,4,5,6,7,8,9
- K) 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
- L) 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18
- M) 1,3,5,7,9,11,13,15,17,2,4,6,8,10,12,14,16,18
- N) 1,5,9,13,17,3,7,11,15,2,6,10,14,18,4,8,12,16
- O) 1,6,11,16,3,8,13,18,5,10,15,2,7,12,17,4,9,14
- P) 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17
- Z) none of the above

Select a skew table: ____

If the required skew table is not covered by any of the choices, selection of "Z" results in ESET prompting for a sequence of sector numbers. Enter a sector number each time ESET requests one. When no more sectors are needed for the desired format, enter 0's in response to ESET's requests until ESET stops requesting sector numbers.

When the skew table definition is complete, ESET exits to CP/M with the message:

Drive B is now the new format drive when you call it "E".

If you are using BIOS Version 3, ESET next prompts:

Do you wish to set the double step bit? (Y/N) ___

Answering "Y" sets the BIOS Version 3 double step bit for the E-drive, allowing you to read a 48 tpi format in a 96 tpi drive.

Finally, if you are using BIOS Version 3, ESET prompts:

Do you wish to set the double speed bit? (Y/N) ___

Answering "Y" sets the BIOS Version 3 double speed bit for the E-drive, a function which theoretically allows a Little Board/PLUS to read and write single-density eight inch floppy formats.

WARNING

The 1770/2 floppy disk controller IC is not currently rated to operate properly in the double-speed mode, so the use of this option is not recommended at this time.

MOVCPM and ZMOVCPM

(Version 1)

Description

MOVCPM is a utility used to regenerate the AMPRO CP/M operating system for custom configuration purposes. This is required as part of the procedure for installing hard disk software, extended ZCPR3 support, etc. The system is contained within MOVCPM.COM itself, along with a relocating table which allows the program to create various size CP/M systems according to your requirement. MOVCPM.COM contains the standard CP/M Console Command Processor, while ZMOVCPM.COM performs the same function, substituting the ZCPR3 command processor replacement. Otherwise, MOVCPM and ZMOVCPM behave identically.

Before you use MOVCPM, you need to understand the convention used to specify "CP/M size". A minimal CP/M operating system (two single-sided, single-density disk drives) occupies 8k bytes of memory, and is known as "64k CP/M". AMPRO's extended operating system requires several additional K bytes of memory, resulting in a CP/M system which is several K bytes smaller. For example, BIOS version 3 provides the following:

CP/M size	TPA bytes	Hard disk capacity
61K CP/M	57094	0
60K CP/M	56070	0
59K CP/M	55046	1-10MB
58K CP/M	54022	11-42MB
57K CP/M	52998	43-74MB
56K CP/M	51974	75-88MB

NOTE

The largest usable system possible with BIOS Version 3 is a 60K CP/M system. This is a floppy-only configuration, and must be obtained from the system tracks of your system diskette. Alternatively you can use the Version 1 BIOS to create a 61K floppy-only system as described in Chapter 3.

NOTE

MOVCPM.COM contains a specific BIOS version, along with a default system configuration. Be sure to use the CONFIG utility to set your desired system defaults.

NOTE

The MOVCPM utility must be used from the CP/M command prompt, not from a shell as provided in the ZCPR3 environment.

Operation

When you run MOVCPM, you indicate the CP/M size which you wish to create as part of the command line. For example,

```
A0>MOVCPM 59 *<RETURN>
```

will generate a 59K CP/M system, with the standard CP/M CCP. MOVCPM will respond with:

```
CONSTRUCTING 59k CP/M vers 2.2  
READY FOR "SYSGEN" OR  
"SAVE 41 CPM59.COM"  
A0>
```

At this point, the system image is present in memory. As indicated, you have two choices:

1. Using the AMPRO SYSGEN utility program, you can write the system memory image on the disk system tracks as follows:

```
A0>SYSGEN<RETURN>
```

When SYSGEN requests the Source drive, respond with <RETURN>, only.

When SYSGEN requests the Destination drive, enter the appropriate drive designator (refer to the SYSGEN utility description).

2. Another method that you can use is to save the system image on disk as a file. In this case, after using MOVCPM as shown above, type:

```
A0>SAVE 41 NEWSYS.COM
```

Installing this system on a diskette's system tracks from this file is done from the command:

```
A0>SYSGEN NEWSYS.COM<RETURN>
```

SYSGEN will respond only with a request for the Destination drive.

MULTIDSK

(Version 2)

Description

Nearly every type of 5-1/4" disk based CP/M computer system uses a unique floppy disk format. As a result, it is not normally possible to take a disk with data written by one type of computer and read it on another type of computer. The MULTIDSK utility program allows your AMPRO system to read and write diskettes formatted in over thirty different ways. MULTIDSK is very easy to use: all you do is select the drive you wish to use and pick the type of computer whose disks you need to access from one of three format lists (menus).

MULTIDSK does have a few limitations. They are:

1. MULTIDSK only allows your AMPRO to access **pre-formatted** disks of non-AMPRO style. If you need to create a non-AMPRO format disk, several computers' formats **can** be created on your system, using another AMPRO utility, called MULTIFMT.
2. MULTIDSK only temporarily alters a drive's format compatibility. You must run MULTIDSK each time you power-up or RESET your system.
3. **48 tpi** (40 tracks per side) drives **cannot** be used to read or write **96 tpi** (80 tracks per side) diskette formats. **96 tpi** drives **can** be used to read -- but not write -- 48 tpi diskettes however. MULTIDSK gives you an opportunity to specify this option.
4. **CP/M-86** single-sided 48 tpi format (IBM, etc.) may only be used to transfer **files** or **data**; IBM **software** (either CP/M-86 or PC-DOS) will **not** work on your AMPRO system. IBM PC-DOS formats are not usable. The data organization (file structure) on these disks is incompatible with CP/M.

MULTIDSK permits the assignment of any system floppy drive as a special emulating drive (called drive "E"). Once set as the "E" drive, a drive will emulate the non-AMPRO CP/M computer's disk drive when you use the label "E" to reference the drive, instead of its normal drive letter. However, the drive will continue to act like an AMPRO disk drive when you use the drive's normal designation (A, B, C, etc.). For example, suppose you use MULTIDSK to setup drive B to emulate a Televideo format. From then on, you refer to drive B as "E" instead of B, to access (read/write) Televideo format disks.

MULTIDSK has two modes of use: Menu mode, and Command Line mode.

Menu Mode Operation

The easiest way to use MULTIDSK is in its Menu mode. Run it using its name, without any added parameters, at the CP/M command line, for example

```
A0>MULTIDSK<RETURN>
```

The program displays a brief introduction, then prompts you to select a floppy drive as the "E" drive. Next MULTIDSK's main menu is then displayed:

MULTIDSK MAIN MENU

- 1 - Single Sided 48 TPI Menu
- 2 - Double Sided 48 TPI Menu
- 3 - 96 TPI Menu

Entering 1, 2, or 3 results in menus similar to the following three menus. If a 48 tpi menu is selected, you will be asked whether a 96 tpi drive is to be used in reading diskettes with the selected 48 tpi format. NOTE: You can not write to a 48 tpi format on a 96 tpi drive.

SINGLE SIDED 48 TPI MENU

- | | |
|------------------------|---------------------------------|
| A - ACTRIX (ACCESS) | K - MORROW MD2 |
| B - DEC VT180 | L - NEC PC8001A |
| C - HEATH/ZENITH 100 | M - OSBORNE 1 |
| D - HEATH/ZENITH 89 SD | N - OSBORNE 2 |
| E - HEATH/ZENITH 89 DD | O - TI Pro (CP/M 86) |
| F - HEATH/ZENITH 89 XD | P - TRS80-1 w/OMIKRON |
| G - HEATH w/MAGNOLIA | Q - TRS80-3 w/MEM MERCHANT CP/M |
| H - IBM (CP/M 86) | R - TRS80-4 w/MONTEZUMA CP/M |
| I - KAYPRO II | S - XEROX 820-I |
| J - LOBO MAX80 | T - XEROX 820-II |

DOUBLE SIDED 48 TPI MENU

- A - HEATH/ZENITH 100
- B - HEATH/ZENITH 89 DD
- C - HEATH/ZENITH 89 XD
- D - KAYPRO 4/10
- E - LOBO MAX80
- F - MORROW MD3
- G - PMC-101 MICROMATE (Type "A")
- H - SANYO MBC 1000/1100
- I - TELEVIDEO 802/803

96 TPI MENU

- A - DEC RAINBOW (CP/M)
- B - EAGLE IIE-2 SSDD
- C - HEATH/ZENITH 89 SSDD
- D - HEATH/ZENITH 89 DSDD
- E - HEATH/ZENITH 89 SSXD
- F - HEATH/ZENITH 89 DSXD

After you select the letter of a 48 tpi format, MULTIDSK will prompt:

Are you using a 96 tpi drive (Y/N)? ___

If a 48 tpi format is to be accessed in a 96 tpi drive, respond with "Y"; otherwise respond with "N".

Finally, MULTIDSK will display a message indicating what has been done, and then exit to CP/M.

Command Line Mode Operation

MULTIDSK also provides the option of using it in a command line mode, rather than responding to menus and prompts. This has the advantage of allowing you to create aliases (see ZCPR3 ALIAS.COM) which permit very easy "E" drive reconfiguration. You can even include a MULTIDSK "E" drive spec in your system initialization commands, so that a particular drive can be automatically configured to the format of your choice on powerup or reset.

Using the Command Line Mode is very simple: simply run MULTIDSK first in the Menu Mode, and keep a record of your exact sequence of keystroke inputs. These letters and numbers are placed on the command line following the program's name. For example

A0>MULTIDSK B2DN<RETURN>

indicates:

B drive B is defined as the "E" drive
2 format is from menu 2 (double-sided 48 tpi)
D selects choice D from the menu (Kaypro 4/10)
N 48 tpi format is on a 48 tpi drive

MULTIFMT

(Version 2)

Description

MULTIFMT is similar to AMPRODSK, except that it is used to format or verify disks having formats other than the AMPRO format. Once a diskette is formatted (using MULTIFMT) in a foreign format, you must still use the MULTIDSK utility program to prepare one of your system's drives to read or write data from or to the disk. Unlike AMPRODSK, MULTIFMT does not have a disk-to-disk copy function. Unlike MULTIDSK, MULTIFMT does not allow the use of 48 tpi formats in a 96 tpi drive.

Operation

Once you have entered MULTIFMT, the program will display a sign-on message then request:

```
FORMAT or VERIFY? (F or V)
Press <ESC> or <^C> to exit.____
```

To format a disk, enter "F". The program will prompt you for a destination drive letter, which determines the drive on which the formatting will occur. The program will respond with a list of available formats similar to the following:

48 TPI FORMATS

(48 tpi Drive Required)

A - H/Z 89 SSDD	H - MORROW MD2 SSDD
C - H/Z 89 SSXD	I - MORROW MD2 SSDD
D - H/Z 89 DSXD	J - OSBORNE 2 SSDD
B - H/Z 89 DSDD	K - PMC-101 MICROMATE DSDD
E - H/Z 100 SSDD	L - SANYO MBC 1000/1100 DSDD
F - H/Z 100 DSDD	M - TRS80-3 w/MEM MERCH CP/M SSDD
G - KAYPRO II SSDD	N - TRS80-4 w/MONTEZUMA CP/M SSDD

96 TPI FORMATS

(96 tpi Drive Required)

O - DEC RAINBOW SSDD	R - H/Z 89 DSDD
P - EAGLE IIE-2 SSDD	S - H/Z 89 SSXD
Q - H/Z 89 SSDD	T - H/Z 89 DSXD

The diskette in the Destination drive will first be formatted then verified. If for some reason verification fails, an appropriate error message will be displayed. You do not have to use the Verify function after Format, because this is done automatically for you.

As in AMPRODSK, the Verify function checks for disk data integrity, and is non-destructive of disk data.

MULTIFMT NOTES

1. **96tpi** drives cannot be used to generate **48tpi** formats, and visa versa.
2. You must also run the DOS utility prior to attempting to read or write data from, or to, the diskette.

SET

(Version 1)

Description

SET is somewhat like CONFIG, in that it allows you to modify your serial and parallel port setup configurations. Unlike CONFIG, it only permits you to change the parameters temporarily, and does not allow writing of the new parameters to disk. But unlike CONFIG, it uses a command line format; that is, you specify the desired setup specs directly on the command line. This makes SET a valuable utility for use in a ZCPR3 ALIAS, for the purpose of changing baud rates and other serial port parameters, switching between serial and parallel printer operation, etc.

Operation

You can obtain a convenient help screen by simply typing SET's program name as a command, with no added parameters:

```
A0><u>SET</u><RETURN>
```

To view the current port settings, add a question mark:

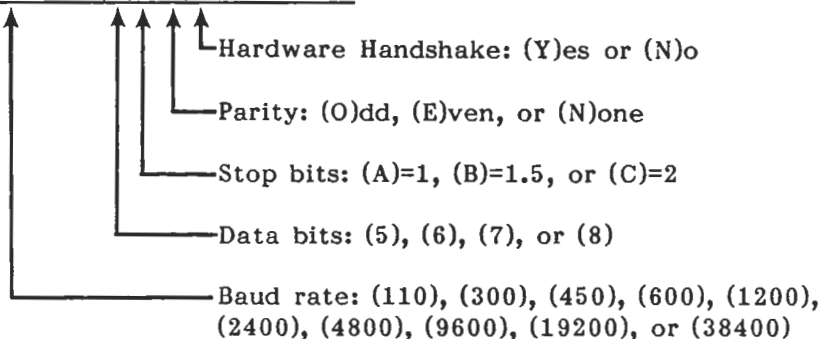
```
A0><u>SET ?</u><RETURN>
```

To alter port settings, use one of the following command forms:

```
A0><u>SET TERMINAL=PORT A</u><RETURN>     ...or <u>=PORT B
```

```
A0><u>SET PRINTER=PORT A</u>             ...or <u>=PORT B, or =PARALLEL
```

```
A0><u>SET PORT A=9600,8,A,N,Y</u><RETURN>
```



```
A0><u>SET PORT B</u>=(same as for port A, except no 19200 or 38400 baud)
```

SWAP

(Version 1)

Description

SWAP lets you alter your system's drive labels. When you use SWAP, you indicate a pair of drive letters you wish to have swapped. SWAP is mostly used to reassign floppy and hard disk drive letters so that application programs designed to use drive letters A, B, C, and D can operate exclusively using hard disk. Using SWAP you can create any drive letter arrangement you wish. Only the special emulating drive letter (drive "E") cannot be changed.

SWAP only changes drive letters **temporarily**. It must be run each time you powerup or reset your system. You can use a ZCPR3 ALIAS (Chapter 5) containing a SWAP command as part of your system startup, so that your system automatically reconfigures itself to operate primarily from the hard disk. A special hard disk boot EPROM (available from AMPRO) is needed to "cold boot" directly from hard disk.

SWAP has two modes of operation: a Menu Mode, and a Command Line Mode.

Menu Mode Operation

SWAP's Menu Mode is entered by running the program in the following way:

```
A0><u>SWAP</u><RETURN>
```

SWAP prompts you for a drive letter to swap:

```
Which drive do you want to swap (A-D, F-P, ? for list, <ESC> to quit): ___
```

After you respond with a drive letter, for example A, SWAP prompts you for the drive letter to swap with:

```
Swap A: with which drive (A-D, F-P, ? for list, <ESC> to quit): ___
```

After you respond with the drive letter to swap with, SWAP indicates what it has done, and then returns to the first of these two questions, so that you can swap another pair, if you wish. Pressing ? produces a display of the current drive letter assignments. After you have created the desired arrangement, use the <ESC> key to exit the program.

NOTE

Whenever you SWAP drive A with any other CP/M drive partition, the new A drive must have a system on the system tracks, placed there using the AMPRO SYSGEN utility. In addition, the system on the system tracks of both the old drive A and the new drive A must have the same CP/M system size. If not, your system will hang up when you exit SWAP.

Command Line Mode

SWAP also allows you to specify all program inputs directly from the command line. The required command line can be part of a ZCPR3 ALIAS. In specifying program inputs from the command line, use the same characters which you use during Menu Mode operation, except substitute a comma for the <RETURN> key and a period for the <ESC> key. For example:

A0><u>SWAP AFBGCHDI.</u><RETURN> ...swaps drive letters A and F, B and G, C
and H, and D and I.

A0><u>SWAP ?.</u><RETURN> ...displays current drive letter assignments

A0><u>SWAP AB?.</u><RETURN> ...swaps letters, then shows assignments

SYSGEN

(Version 3)

Description

SYSGEN is used to write the CP/M operating system onto an area specially reserved for this purpose on each formatted floppy diskette. The destination diskette must already be formatted (see AMPRODSK) before SYSGEN can be used with it. Any time after a disk has been formatted, you can use SYSGEN to make that disk into an AMPRO system disk. Normally, SYSGEN obtains the required system tracks from your master or working system disk. Since each disk has some storage space (two system tracks) reserved for the operating system, you do not lose any data space by writing the system to a disk.

NOTE

SYSGEN is not required when a disk is copied from another system disk by AMPRODSK. The AMPRODSK Copy function copies all tracks, including the system tracks.

Normal Operation - The most common use of SYSGEN is without a file name on the command line. This is how you copy the system tracks of one drive onto those of another. This is normally done when you format a new diskette and wish to make it a system disk. In this use of the SYSGEN program, simply enter the program's name on the CP/M command line, for example:

```
A0>SYSGEN<RETURN>
```

SYSGEN will prompt you for Source and Destination drives, for example

```
Source Drive? (A, B, C or D)           A
Place source on A, then type <RETURN>
Destination Drive? (A, B, C or D)      B
Place destination disk on B, then type <RETURN>
Destination Drive? (A, B, C or D)      <RETURN>
A0>
```

After each operation, SYSGEN will request a new destination disk. As many destination disks as desired can be SYSGENed. When finished, then simply type <RETURN> only, and no drive letter.

Options

SYSGEN uses a portion of memory as a temporary location for the system image. When you specify a Source disk, SYSGEN reads the system tracks and stores the system image in this memory location; when you specify a Destination disk, SYSGEN obtains the system image from this memory location and writes it to the system tracks of the destination disk. SYSGEN allows several options:

Using a File Name on the Command Line - If you include a file name on the command line, SYSGEN loads the system image from the file indicated, and skips the request for Source Drive. You can include a drive letter with the file name (e.g. A:SYSTEM.COM), but not a user number. This is how you can copy the system from a system image file to the system tracks of a drive:

```
A0>SYSGEN A:SYSTEM.COM<RETURN>  
Destination Drive? (A, B, C or D) B  
Place source on B, then type <RETURN>  
A0>
```

Skipping the Source Drive Letter - In response to SYSGEN's prompt for Source Drive letter, you can answer with a <RETURN> only, and no drive letter. If you do this, SYSGEN will use the memory image present in memory prior to running SYSGEN, and will prompt you for a Destination Drive letter. This allows you to write a memory system image prepared by another program (e.g. MOVCPM or ZMOVCPM) to a desired Destination Drive.

Skipping the Destination Drive Letter - In response to SYSGEN's prompt for a Destination Drive letter, you can respond with a <RETURN> only, and no drive letter. If you do this, SYSGEN will exit to CP/M, leaving the system memory image in memory. At this point, if you perform a SAVE, you will create a system image file. For example:

```
A0>SYSGEN<RETURN>  
Source Drive? (A, B, C or D) A  
Place source on A, then type <RETURN>  
Destination Drive? (A, B, C or D) <RETURN>  
A0>SAVE 49 SYSTEM.COM<RETURN>
```

NOTE

This must be performed from the CP/M command prompt, not from a shell as provided in the ZCPR3 environment.

Including all Inputs on the Command Line - Finally, SYSGEN allows you to include all inputs directly on the command line. In doing so, you must represent the <RETURN> key by a comma, and a slash (/) must precede the characters that represent operator keystrokes.

Here is how you might copy the system tracks of a floppy in drive A to the system tracks of a floppy in drive B:

```
A0>SYSGEN /A,B,<RETURN>
```

Here is how you might copy the system from a system image file to the system tracks of the diskette in drive B:

```
A0>SYSGEN SYSTEM.COM/B,<RETURN>
```

These command line techniques are especially useful with ZCPR3 aliases (Chapter 5: ALIAS), or with batch files (controlled by ZEX or SUBMIT).

48TPI

(Version 1)

NOTE: This program is not required with BIOS Version 3 or later.

Description

48TPI.COM allows you to read 48 tpi disks using a 96 tpi drive. It is intended for use with the AMPRO BIOS Versions 1 and 2 only.

The read/write heads of 96 tpi drives are narrower than those of 48 tpi drives. As a result, a 96 tpi drive can be used to reliably read 48 tpi disks, but not write them. As with MULTIDSK, one of your system drives must be assigned as the "E" drive. Only system RESET returns the system to normal operation.

Here are some features of this program:

- Permits READS ONLY from the "E" drive.
- When using non-AMPRO 48 tpi formats, run MULTIDSK.COM after 48TPI.COM, not before.
- Reduces the TPA size by about 2K.
- Indicates the presence of 48TPI operation whenever you warm boot.
- Not compatible with the copy function of FRIENDLY.COM, DISK7, and a few other disk utilities; use PIP.COM to transfer files.
- This program should only be used for file transfer. Some applications programs may not run with the 48TPI utility resident in memory.

Operation

To use the 48TPI utility, type:

```
A0><u>48TPI</u><RETURN>
```

The program will display a sign-on message, and then:

```
Writing to the "E" disk is not permitted.  
You must RESET your system to restore normal operation.
```

```
Which drive do you wish to use as the "E" drive? (A,B,C or D)  
Press <ESC> to quit.      B
```

```
Drive B is now the 48 tpi "E" drive (Read Only).  
A0>
```

Your system is now ready to read a 48 tpi disk in the 96 tpi **E** drive.

CHAPTER 5

ZCPR3 PROGRAMS

5.1 INTRODUCTION

This chapter contains detailed information on the ZCPR3 programs and utilities which are supplied on the AMPRO operating system software diskette. Each program's description explains what the program does and how it is used. The utilities are covered in alphabetical order, so this material can serve as a handy operator's reference.

The ZCPR3 utilities included with the AMPRO system software are just a few of the rich and powerful set of software available in the full "ZCPR3 System." In addition, the descriptions in this chapter are brief and, in some cases, incomplete. They are intended to assist you in obtaining the basic functions required for use with the AMPRO operating system software. Full documentation on all of the ZCPR3 programs is contained in **ZCPR3: The Manual**, available through ECHELON INCORPORATED (415/948-3820).

5.2 PROGRAM DESCRIPTIONS

The following pages contain the program descriptions of the ZCPR3 programs and utilities included on the AMPRO Z80 system software diskette, alphabetically arranged.

Nearly all of the ZCPR3 utilities share a common feature: they display a brief help screen if you type the program name followed by a double slash, like this:

```
A0>ZEX // <RETURN>
```

ALIAS

(Version 1)

Description

ALIAS is one of the most important ZCPR3 utility programs. An "alias" is a file which contains a ZCPR3 command line. When the alias is invoked, the command line stored within the alias is automatically run. Since the ZCPR3 command line may contain a large number of chained commands (separated by semicolons), the alias feature allows you to simplify complex commands or command sequences. For example, a single alias may contain the command line:

```
SET PRINTER=PORT B; SET PORT A=9600,8,A,N,Y
```

This would use the AMPRO SET.COM utility to initialize your system to print using Serial Port B, and would also set Port B's data characteristics for your printer. You might call this alias SERPRINT.COM, so that you can automatically configure your system for using a serial printer using the command:

```
A0><u>SERPRINT</u><RETURN>
```

Similarly, you could switch back to a parallel printer with an alias which contains:

```
SET PRINTER=PARALLEL
```

The ZCPR3 ALIAS utility can be used to modify an existing alias file, or to create a new one. ALIAS also allows you to include parameters within the alias command line by including parameter symbols (\$1, \$2, etc.) in the command file, in the same manner as CP/M SUBMIT and ZCPR3 ZEX. Several additional symbols can be included in the alias command to represent the current drive letter, user area, etc., for additional power and flexibility.

Operation

To create a new alias, simply type the command:

```
A0><u>ALIAS</u><RETURN>
```

ALIAS will prompt you to type the desired command line. Simply type the set of commands in the same way you would at the ZCPR3 (CP/M) command line prompt, using semicolons to separate multiple commands. Here is an example

```
A0><u>ALIAS</u><RETURN>
ALIAS, Version 1.1
Input Alias (RETURN to Abort)
--><u>HARDINIT; SWAP AFBGCHDI.;LDR MYTERM.Z3T;MENU</u><RETURN>
Name of ALIAS Command (RETURN to Abort)? <u>HSTART.COM</u><RETURN>
Alias Created
A0>
```


To modify an existing alias (e.g. FILENAME.COM), type the command:

```
A0><u>ALIAS FILENAME.COM</u><RETURN>
```

ALIAS will display the current contents of the existing alias (FILENAME.COM), and prompt you for changes.

Alias Variables

ALIAS allows you to include a number of variables within the alias command line. The variables allowed are given in the following list. Consult the ZCPR3 references listed in the introduction to this chapter if you need more information.

Summary of Alias Variables

- \$0 - name of alias
- \$n - parameter from command Line (1 to 9)
- \$D - home disk Drive letter
- \$U - home User
- \$Fn - FILENAME.TYP of ZCPR3 system file n (1 to 4)
- \$Nn - fileNAME of system file n
- \$\$ - the character '\$'
- \$* - tail of command line (everything after the command name)

A common programmer's function is to assemble and then load the source code for a program. This can be done with an alias containing the following multiple command line:

```
ASM $1.BBZ; LOAD $1
```

If this Alias is named MYASM.COM, then typing

```
A0><u>MYASM TEST</u><RETURN>
```

will be equivalent to the following individual steps:

```
A0><u>ASM TEST.BBZ</u><RETURN>
```

```
A0><u>LOAD TEST</u><RETURN>
```

CRC

(Version 2)

Description

CRC stands for: Cyclic Redundancy Check. A complex mathematical formula is used to calculate CRC values for the contents of a file. You can be sure two files are identical if they have the same CRC value.

The CRC utility calculates Cyclic Redundancy Check (CRC) values for one or more files, as specified on the command line. The program uses a complex mathematical formula to compute the CRC values for the files you specify, and either displays the results on your terminal screen, or writes them to a disk file.

Using CRC values, you can verify that two files are identical, or monitor file validity over time. When two files are both available to your system at the same time, it is easier to use the ZCPR3 DIFF utility to compare them. But with CRC, you can check two files at separate times or locations for equality. You can also generate a disk file or a printout, which contains CRC values of a number of files for future reference or archive purposes. When files are transferred from one system to another using a modem, data integrity can be verified by generating CRC values at each end.

Operation

CRC is normally used in one of the following ways:

```
A0><u>CRC WS.COM</u><RETURN> ...calculates CRC for WS.COM
```

```
A0><u>CRC *.TXT</u><RETURN> ...calculates CRC for all files with TXT extent
```

```
A0><u>CRC B15:*. *</u><RETURN> ...calculates CRC for all files in directory B15
```

Several command line options are also available. They are:

D - Disk output. Send output to a disk file called "CRC.CRC".

P - Printer output. Send output to the printer.

C - Comment output. Add comments to output listing on disk or printer.

I - Inspect files. Prompt for approval before output is produced.

L - Line count. Include number of lines counted in output.

These options may be used together. For example:

```
A0><u>CRC *.* DP</u><RETURN>
```

Computes CRC's of all files, and generates both printer and disk file output.

DIFF

(Version 2)

Description

DIFF is used to compare two files. You can use DIFF to simply state if the two files are different (stopping immediately after the first difference is located) or to list all of the differences between two files on a byte-for-byte basis.

Operation

The normal way to run DIFF is by typing a command like:

```
A0><u>DIFF B0:FILE1.TYP,C5:FILE2.TYP
```

This compares the file FILE1.TYP in directory B0 with the file FILE2.TYP in directory C5: The usual ZCPR3 convention of allowing you to skip the drive letter or user number holds. Here are some more examples:

```
A0><u>DIFF FILE1.TYP,FILE2.TYP      ...both files are in A0
```

```
A0><u>DIFF B:FILE1.TYP,C5:FILE2.TYP ...FILE1.TYP is in B0
```

```
A0><u>DIFF FILE1.TYP,15:FILE2.TYP  ...FILE1.TYP is in A0, FILE2.TYP is  
                                     in A15
```

```
A0><u>DIFF B10:FILE.TYP           ...compares file in B10 to file in A0  
                                     having same name
```

Two options may also be included on the command line:

C - stop at first difference

M - multiple runs: when a comparison is complete, prompt for new disks

DIR

(Version 1)

Description

DIR might be the most commonly used ZCPR3 utility. In the AMPRO operating system, the directory function is based on a disk-based utility, rather than being internal within the operating system itself. As a result, what you get when you type the command

```
A0><u>DIR</u><RETURN>
```

Depends on the features of the disk-based program with the name "DIR.COM".

The ZCPR3 DIR utility has a number of useful features, including alphabetical arrangement of file names, inclusion of file lengths (in K bytes), and display of how much space is available on the disk drive.

Operation

Like most ZCPR3 utilities, DIR allows you to specify the desired directory drive and user area, and to use "wildcards" in the file name specifier. Some variations are:

```
A0><u>DIR B12:</u><RETURN>      ...includes all files in directory b12
A0><u>DIR B12:*.COM</u><RETURN>  ...includes files matching *.COM in B12
A0><u>DIR B12:A????.*</u><RETURN> ...includes files matching A?????.* in B12
A0><u>DIR 15:</u><RETURN>        ...includes all files in directory A15
A0><u>DIR B:</u><RETURN>         ...includes all files in directory B0
```

In addition, you can include the following DIR options on the command line:

```
A0><u>DIR B15:*.*</u><RETURN> S  ...display "System" files only
A0><u>DIR B15:*.*</u><RETURN> A  ...display "All" files (includes system
                             and non-system files)
A0><u>DIR B15:*.*</u><RETURN> T  ...sort by file Type (extent)
```

DISK7

(Version 7)

Description

DISK7 is a valuable disk housekeeping utility. The program provides a menu from which you can select the operation you wish to perform. All commands consists of single keystrokes. You can copy, delete, rename, view, and print files easily using DISK7.

Operation

You start DISK7 like most other programs.

A0>DISK7<RETURN>

The program then displays its menu of options:

```
                DISK 7.7 -- File Manipulation Program -- 02/11/84
C - Copy file   | D - Delete file | F - Forward 22 | G - Group copy
J - Jump to fn.ft | L - Length of file | N - New DIRectory | P - Print text
R - Rename file  | S - Stat of disk  | T - Tag file    | U - Untag file
V - View text    | X - Exit to CP/M  | <SP> advances cursor -- B backs up
```

238k bytes free on DIRectory A:

A: AMPRODSK.COM : ___

In the above display, AMPRODSK.COM is known as the DISK7 "current file". If you press the spacebar (<SP> key) the current file indication will move to the next file (alphabetically) in directory A0. These are DISK7's commands:

- C** - Copies the current file to another disk or user area, or the same disk or user area.
- D** - Deletes the current file. You are prompted to answer **Y** or **N**. If you enter **Y**, the file will be deleted. An **N** response cancels this command.
- F** - Moves the file pointer Forward 22 files from current file name. If there are fewer than 22 files on the disk, this command will wrap around.
- G** - Group copy of all tagged files. Tagged files are indicated with a lower-case "t" next to the filename. Destination for this command is the same as for the Copy command.
- J** - Jumps to the file specified by "filename.ext". You must use the entire filename. Wild-card specifiers "?" and "*" cannot be used.

- L** - Displays the Length in kilobytes used by the current file.
- N** - Selects a New file directory. This can be the same or different disk or different user area.
- P** - Prints a text file on the LST device (usually the system printer).
- R** - Renames the current file.
- S** - Displays the number of kilobytes of Space remaining in the directory of a specified drive. Enter the desired drive designator, followed by <RETURN>.
- T** - Tags the current file for use with the Group copy function.
- U** - Untags the current file.
- V** - Allows you to View the contents of the current file. Text files will be displayed as characters on the screen. This command will not permit you to display a .COM file.
- X** - EXit to CP/M.

When DISK7 requests a "DIRectory" you may specify a drive letter only, or a letter/number combination, followed by a <RETURN>. For example:

Copy to DIRectory:B<RETURN>

new DIRectory:A15<RETURN>

LDR

(Version 1)

Description

LDR is used to load ZCPR3 system segments, and your system's terminal definition file (MYTERM.Z3T, etc.). It has no options other than the name of the file you wish to load.

Operation

Uses of LDR include:

A0> <u>LDR MYTERM.Z3T</u> <RETURN>	...loads terminal definition file
A0> <u>LDR MYSYS.FCP</u> <RETURN>	...loads Flow Command Package
A0> <u>LDR MYSYS.IOP</u> <RETURN>	...loads I/O Package
A0> <u>LDR MYSYS.RCP</u> <RETURN>	...loads Resident Command Package
A0> <u>LDR MYSYS.ENV</u> <RETURN>	...loads system ENVironment descriptor
A0> <u>LDR MYSYS.NDR</u> <RETURN>	...loads Named Directory

As with most ZCPR3 utilities, the directory (drive/user) from which LDR is to obtain the file named in the command line can be included in several ways:

A0> <u>LDR MYTERM.Z3T</u> <RETURN>
A0> <u>LDR B15:MYTERM.Z3T</u> <RETURN>
A0> <u>LDR B:MYTERM.Z3T</u> <RETURN>
A0> <u>LDR 15:MYTERM.Z3T</u> <RETURN>

MCOPY

(Version 4)

Description

MCOPY is a powerful file copy program with many of the copy features of the CP/M PIP program. Both unambiguous (e.g. JULY.TXT) and ambiguous (J???.*) file names can be used. In addition, MCOPY can transfer files from one user to another, since the ZCPR3 drive/user spec (A0, B5, etc.) is included directly in the source and destination file specs. MCOPY verifies unless told otherwise.

Here are some features of MCOPY which are not provided by PIP:

- Easy movement from one user area to another
- Automatic verification (does not require [v])
- Multiple file copy options

On the other hand, PIP does some things MCOPY does **not** do:

- Copy to/from non-disk system devices (CON:, LST:, etc.)
- File modification during copy (i.e., PIP options: [B,D,E,F,...])
- File concatenation
- File renaming during copy

Operation

MCOPY is typically used in a manner similar to PIP. For example:

```
A0><u>MCOPY B12:=A3:*. *</u><RETURN>
```

copies all files from user area 3 on drive A to user area 12 on drive B. Both astericks and question mark "wild cards" may be used to specify the names of files to be transferred. You can also transfer several files for example:

```
A0><u>MCOPY B12:=A3:FILE1,A2:FILE2</u><RETURN>
```

copies the two files (from the two different user areas) to B12.

Other MCOPY options are also available. They are:

E Existence test. Checks to see if a file will be over-written:
Replace -- (Y/N)?. If E not used, replaces without asking.

I Inspect files. As each file name is displayed, the message **(Y/N/S)?** is displayed, meaning:

Y - Yes, replace - copy this file
N - No, do not replace - skip this file
S - Skip all files from this one to end of file list

M Multiple copy permits copying the same group of files to several disks. Pauses after completion for change of disks.

Q Quiet toggle turns off copying messages.

V Verification off.

MENU

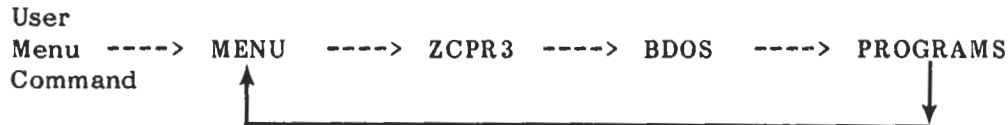
(Version 3)

Description

MENU is one of the ZCPR3 "shell" programs. The purpose of a shell is to temporarily replace or enhance the normal system command line environment. MENU replaces the "A0>" appearance of your system with a full screen display, and substitutes powerful pre-programmed single-keystroke options instead of the normal CP/M or ZCPR3 commands.

MENU is a true shell, in that it automatically reloads itself after any operations invoked from the menu are finished. The best part about MENU is that you can easily create a custom screen display with custom single-keystroke command options, according to your system needs. You can create a variety of MENU's for a variety of applications.

The following diagram shows how MENU works:



The User Menu Command is a single character that you enter, which instructs MENU to perform a function. As MENU processes the selected function, it builds a command line for ZCPR3, optionally requesting input (i.e., filename, drive/user, etc.). MENU then passes the command line to ZCPR3 through the ZCPR3 Command Line Buffer. ZCPR3 in turn passes the command to the BDOS which ultimately interacts with programs. When program execution is complete, ZCPR3 returns control to MENU.

Operation

Once a MENU is set up for a system, it is extremely easy to use. In fact, a system with MENU running is usually much easier to use than without it! As distributed, the AMPRO operating system diskette contains a typical menu, ready for use. All you have to do to run MENU is type the command

A0>MENU<RETURN>

The specific menu appearance and choices depend on the contents of the file MENU.MNU, present on the disk. Modifying the menu is not very hard, and can be done with most any word processing or text editing program. This is discussed below.

One other point: if you plan to use MENU, be sure to customize the terminal characteristics file, MYTERM.Z3T. The system disk contains a "generic" MYTERM.Z3T, which allows immediate use of MENU with any ASCII terminal having an 80 X 24 character display. However, fast screen clearing and screen highlighting are not included. Use one of the two ZCPR3 terminal character-

istics customization utilities -- TCSELECT or TCMMAKE -- to customize the MYTERM.Z3T file for your terminal.

Customizing the MENU File

The nature of each MENU environment depends on the contents of a special MENU file, called MENU.MNU. The MENU file contains up to 22 text lines to be displayed on the screen as a command menu, followed by definitions of the available single-keystroke commands. Here is a sample menu file:

```
-dpx
#
      ^A. . . . .
      :^B C - Copy a file      ^A:
      :^B D - Directory      ^A:
      :^B E - Erase a file   ^A:
      :^B M - Modem communications ^A:
      :^B S - Status of a disk ^A:
      :^B W - run WordStar   ^A:
      :^B Z - manual command ^A:
      :. . . . . : ^B
#
C!mcopy "Destination Disk? "!="Source Disk? ":"Filename.typ? "
D!dir "Directory of which Drive/User? ":
E! era "Drive/User? ":"Filename.typ? "
Mmdm740; set port a=9600,8,a,n,y
S! stat "Status of which drive? ":
Z! "Enter command > "
Wws
##
```

Display Options Line

The first line of the file begins with a hyphen. This is the display options line, in this case: -dpx. The characters may be upper or lower case. The choices are:

- d - If present, causes MENU to display the screen text which follows.
- p - If present, causes MENU to scroll the screen before display.
- x - If present, allows exit from MENU with <CTRL-C>.
- c - (Debugging option.) If present, displays command lines as they run.

When MENU is running, a prompt at the bottom of the screen indicates its presence. This prompt varies according to the display options. For example, the prompt:

Command (<CR>=Menu,^C=ZCPR3) -

indicates that the X option is present, while the prompt

Command (<CR>=Menu) -

indicates that the X option is not present.

Screen Display Lines

The display portion begins and ends with a # character. It can be up to 22 characters in length. The contents of these lines can be any printable ASCII characters. In addition, two control characters, ^A and ^B, can be embedded in the text to control the video highlighting attribute on terminals which provide it. ^A turns highlighting on, while ^B turns it off. An editor such as Wordstar can be used to create text files with embedded control characters.

Command Lines

MENU command lines have the general format:

<command character><option><command>

where:

<Command character> - a single character used to invoke the command. Alphanumeric characters can be upper- or lower-case. The following characters may not be used as the command character:

<SPACE> # % , . < > * ...or any character less than <SPACE>

<option> - an opening option consisting of:

:nn - goto menu nn

! - have MENU wait when the command in this line is finished

<command> - a command line as it would be entered from the keyboard at the normal ZCPR3 command prompt. The line can include a prompt, within double quotes. If so, the string inside the quotes is displayed as a prompt, and the user's response to the prompt is substituted for the quote in the resulting command line.

Here are some fine points regarding the construction of command lines:

The ! Option

If the command line begins with !, MENU waits for a key to be pressed before redisplaying the MENU screen text. In this case, after the menu command completes, MENU prompts the user to "Strike Any Key". Any displayed information remains on the screen until a key is pressed. Without a ! preceding a command line, MENU will clear the screen and display the menu text. This is important in commands which produce a display which must be read, for example:

```
D!dir
```

Without the ! option, the directory would be displayed, but immediately written over by MENU's text.

User Input Prompt Option

The prompt feature allows user input to assist in building a particular command. More than one prompt string can be used in a given command line. Each prompt string is enclosed in double quotes within the command line text, for example:

```
D!dir "Drive/User? (A0,B,15,...) ":"."Type of file? "
```

When the D key is pressed, MENU will prompt with the first message (Drive/User?). After you type your response to the first prompt (followed by a <RETURN>), MENU will prompt with the contents of the second pair of quotes. Your responses to the two prompts are used to build the actual DIR command.

Command Line Variables

The menu command lines can also contain several embedded variables. The variables are defined as follows:

\$D	Current Disk
\$U	Current User
\$Fn	FILENAME.TYP for ZCPR3 System File n
\$Nn	FILENAME for ZCPR3 System File n
\$Tn	fileTYPe for ZCPR3 System File n
\$\$	place a single \$ in command line

The :nn Option

A single menu file can contain several sub-menus (up to 255!). The first menu is number 1. The others follow sequentially, each separated by a # character. The :nn option allows one sub-menu to call up the others. The example given above has only one menu. Here is a highly simplified menu file containing three sub-menus:

```

-dpx
#
                - 1st Menu -
                A - Goto Menu 2    3 - Goto Menu 3
#
a:2
3:3
#
                - 2nd Menu -
                T - Goto Menu 1    3 - Goto Menu 3
#
3:3
T:1
#
                - 3rd Menu -
                2 - Goto Menu2
#
2:2
##

```

Built-in Commands

There are also several built-in commands recognized by MENU at its command prompt, regardless of the contents of the specific menu file. They are:

<RETURN>	Refresh Menu Display
<CTRL-C>	Exit to ZCPR3 (Only if enabled with -x option)
*	Jump to the First Menu
< (or ,)	Jump to the Previous Menu
> (or .)	Jump to the Next Menu
\$	Jump to the System Menu (Password Required)

PATH

(Version 3)

Description

PATH is a utility that allows you to temporarily alter the ZCPR3 command search path. This is especially useful in hard disk systems, when various types of programs and files are divided into separate user areas. PATH can be used to re-define the command search path so that appropriate utilities and programs are available when needed.

Operation

The use of PATH is illustrated by the following example:

```
A0><u>PATH A15:B15:$0:A$</u><RETURN>
```

which sets the path to:

- (1) drive A, user 15
- (2) drive B, user 15
- (3) current drive, user 0
- (4) drive A, current user

The dollar signs stand for "current." The path actually always starts with current drive, current user; this never changes, and need not be included in the PATH command.

To find out what the current path is, use the PATH command, but without any parameters:

```
A0><u>PATH</u><RETURN>
```

TCMAKE

(Version 1)

Description

One of the most powerful features of ZCPR3 is its terminal characteristics definition facility, or "termcap." Programs designed to take advantage of ZCPR3's termcap feature do not require installation for individual terminals, once the ZCPR3 termcap is installed for the particular terminal in use. Instead of installing each program you run, you simply create a termcap file for your terminal; then, all of the programs designed to use ZCPR3's termcap can be run without any installation. The ZCPR3 MENU, VFILER, VMENU, and AMPRO FRIENDLY programs all utilize this feature.

If your terminal is one of the "standard" terminals supported by the TCSELECT utility, then creating your termcap file is simply a matter of selecting the terminal you are using from one of TCSELECT's menu screens. If your terminal is not included in TCSELECT, you must create a custom termcap file using TCMAKE instead.

Operation

These are the terminal functions defined through TCMAKE:

1. Clear Screen Sequences - Byte sequence to clear the screen of your terminal. You can enter from 1 through 255 bytes in this sequence.
2. Cursor Motion Sequence - Determines whether your terminal is Row/Column or Column/Row addressing, requests data for row and column addressing, permits setting three sequences, each up to 255 bytes long -- prefix, middle, and suffix bytes.
3. Clear to end of line sequence - Sequence of bytes that clear the line from the cursor position to the end of the line. This, too can be a sequence of up to 255 bytes.
4. Standout Mode Sequences - Two sequences, standout mode on and standout mode off. Each can be up to 255 bytes in length.
5. Terminal Init/Deinit Sequences - Two sequences, terminal initialization for entry to FRIENDLY, and a de-initialization sequence sent to the terminal when you eXit FRIENDLY. Each can be up to 255 bytes long.
6. Arrow Keys - Permits setting a single-byte character for each keyboard Arrow key. If your terminal outputs a single character when each Arrow key is pressed, simply press each arrow key as requested.
7. Terminal Name - A text string to identify the terminal being installed.

TCMAKE prompts you for what it needs. In answering TCMAKE's questions, you can respond by pressing the keyboard key that corresponds to the value for a byte. For example, pressing an ASCII "A" will store the corresponding character value (41H) for that key. However, it is usually easiest to enter values as a hexadecimal (00H - FFH), or decimal number (0-255). TCMAKE allows you to do this as follows: when the program requests an input, first press the period (.) key, and then enter the value to be stored. For example:

Char #1 - Type Char,.=Number,or <CR>=Done: EnterNumber: 1BH<RETURN>

A period was pressed, followed by 1BH<RETURN>. The hex value "1BH" is the ESC key code, which is the same as 27 decimal. Hexadecimal values must end with "h" or "H". In this case, pressing the ESC key, without pressing a period, would have had the same effect as entering 1BH.

NOTE: Due to space limitations, not all strings can simultaneously be 255 bytes long in the same terminal definition file. It is rarely necessary to have long string sequences, anyway.

Cursor Addressing

Terminal direct-cursor addressing is accomplished in many different ways, depending upon the particular terminal. In each case, the computer sends a string or sequence of characters to the terminal. Usually, there is a lead-in sequence (Prefix Byte sequence), a Row address, and a Column address contained in this string of characters. There may also be a string preceding the Row and Column addresses (Middle Byte sequence), and an ending string (Suffix Byte sequence).

Following are some symbols used with TCMAKE to define the cursor addressing string. The majority of terminals use one of two different sequences. The symbols below must be preceded with a % symbol when used as inputs to TCMAKE. For example:

- d** - Output Row and Column data as decimal with no leading spaces or zeros (e.g., 1, 12, or 79).
- 2** - Output Row and Column data as 2 decimal digits, right-justified (e.g., 01, 09, or 79).
- 3** - Output Row and Column data as 3 decimal digits, right-justified, (e.g., 001, 009, or 131).
- .** - The period (.) outputs the Row and Column data as binary values.
- +**[n]**** - Add 'n' to Row and Column values. Many terminals use the SPACE character value (20 hex) for 'n'.
-]**[xy]**** - If the value of Row or Column is greater than "x", then add "y" to the Row or Column value.

- r** - Reverse the order of output sequence to: Column-Row, instead of Row-Column. Row-Column address order also can be determined with the second question of the Cursor Addressing installation process. This merely reverses the order selected. Default order is Row-Column.
- i** - Set the Row/Column home position to 1,1 rather than 0,0. (The default home position is 0,0).

Here are two examples of entering the cursor addressing data using TCMAKE. The first example is for the TeleVideo 925. To install the Heath/Zenith H/Z19, substitute "Y" in place of "=". An upper case "Y" must be used. This is the cursor addressing sequence:

```
Prefix Byte Sequence:  ESC=
Middle Byte Sequence:  none
Suffix Byte Sequence:  none
Row/Column Order:     Row-Column
Row Equation:         20H + Row value (ASCII character)
Column Equation:      20H + Column value (ASCII character)
```

The TeleVideo 925 cursor addressing sequence is:

```
ESC=%+<SPACE>%+<SPACE>
```

The following example shows how these values are entered with TCMAKE. User inputs are shown underlined.

Cursor Motion Definition

1. Timing Delay:
Enter Delay Time in Milliseconds: <RETURN> <-- Zero delay
2. Enter R if Row/Column or C for Column/Row: R <-- Row/Column addressing
3. Enter Equation for Row: %+ <RETURN> (Note the space after "+")
4. Enter Equation for Column: %+ <RETURN> (Note the space after "+")
5. Enter Prefix Byte Sequence
Char #1 - Type Char, .=Number, or <CR>=Done: Enter Number: 1bh<RETURN>
Char #2 - Type Char, .=Number, or <CR>=Done: Char =<RETURN>
Char #3 - Type Char, .=Number, or <CR>=Done: <RETURN>
6. Enter Middle Byte Sequence
Char #1 - Type Char, .=Number, or <CR>=Done: <RETURN>
7. Enter Suffix Byte Sequence
Char #1 - Type Char, .=Number, or <CR>=Done: <RETURN>

Note that only the Prefix Byte Sequence is required in this example.

The next example is for an ANSI terminal such as the DEC VT52, or the Heath/Zenith H/Z19 in the ANSI mode. The required cursor addressing sequence is:

```
ESC[%i%d;%dH
```

Here is how this information is given to TCMAKE:

Cursor Motion Definition

1. Timing Delay
Enter Delay Time in Milliseconds: <RETURN> <-- Zero delay
2. Enter R if Row/Column or C for Column/Row: R <-- Row/Column addressing
3. Enter Equation for Row: %d<RETURN>
4. Enter Equation for Column: %d<RETURN>
5. Enter Prefix Byte Sequence
Char #1 - Type Char, .=Number, or <CR>=Done: Enter Number: 1bh<RETURN>
Char #2 - Type Char, .=Number, or <CR>=Done: Char [<RETURN>
Char #3 - Type Char, .=Number, or <CR>=Done: %<RETURN>
Char #4 - Type Char, .=Number, or <CR>=Done: i<RETURN>
Char #5 - Type Char, .=Number, or <CR>=Done: <RETURN>
6. Enter Middle Byte Sequence
Char #1 - Type Char, .=Number, or <CR>=Done: ;<RETURN>
Char #2 - Type Char, .=Number, or <CR>=Done: <RETURN>
7. Enter Suffix Byte Sequence
Char #1 - Type Char, .=Number, or <CR>=Done: H<RETURN>
Char #2 - Type Char, .=Number, or <CR>=Done: <RETURN>

The Row/Column descriptors are constructed from information in a given terminal's technical manual. You need to know:

1. The sequence, if any, preceding, between, and following the Row/Column or Column/Row addressing equations,
2. Whether Row/Column or Column/Row addressing is used.
3. How the Row and Column addressing is implemented on the specific terminal.

A Typical Session with TCMAKE

The following is a terminal dialog with TCMAKE to install a TeleVideo Model 925 terminal. Some possible items were not installed, because some sequences were not needed or wanted.

Run TCMAKE by typing,

```
A0>TCMAKE_MYTERM<RETURN>
```

This will create a termcap file called MYTERM.Z3T when you exit TCMAKE. You can use another name for the file, but the extent should be left off, as the program will add the Z3T part.

The following will be displayed. In the interest of keeping it short, the automatic redisplay of the menu after each parameter entry is not shown.

TCMAKE, Version 1.0

** Z3TCAP Main Menu for File MYTERM.Z3T **

- Define:
1. Clear Screen Sequence
 2. Cursor Motion Sequence
 3. Clear to End of Line Sequence
 4. Standout Mode Sequences
 5. Terminal Init/Deinit Sequences
 6. Arrow Keys
 7. Terminal Name

Status: S. Print Status (Definitions so far) <-- This lets you see what has been entered to this point.

Exit: X. Exit and Write File <-- Leave TCMAKE.COM and write a file with the terminal definitions you have just entered!

Q. Quit and Abort Program without Writing File <-- Forget the whole thing, and quit.

Command? 1

Clear Screen Definition

1. Timing Delay

Enter Delay Time in Milliseconds: <RETURN> <-- RETURN only for zero

2. Clear Screen Byte Sequence

Char #1 - Type Char, .=Number, or <CR>=Done: Enter Number: 1bh<RETURN>

Char #2 - Type Char, .=Number, or <CR>=Done: Enter Number: 2bh<RETURN>

Char #3 - Type Char, .=Number, or <CR>=Done: <RETURN>

... This byte sequence is two characters: "ESC" and "+" (1BH and 2BH).

... You can also check what you have already done. Type an "S", then select from the resulting menu. Let's look at what has been set for the Cursor Motion Definition.

Command? S

** Z3TCAP Status for File MYTERM .Z3T **

- Review:
1. Clear Screen Definition
 2. Cursor Motion Definition
 3. Clear to End of Line Definition
 4. Standout Mode Definition
 5. Terminal Init/Deinit Definition
 6. Arrow Key Definition
 7. Terminal Name Definition

Exit: X. Exit to Main Menu

Command? 2

Review of Cursor Motion Data

1. Timing Delay = 0 Milliseconds
2. Row or Column First: R
3. Row Equation: -->%+ <--
4. Column Equation: -->%+ <--
5. Prefix Byte Sequence:
(1) ^[1BH (2) = 3DH
6. Middle Byte Sequence:
-- Empty --
7. Suffix Byte Sequence:
-- Empty --

Strike Any Key to Continue - <RETURN>

Command? X <---- This gets you back to the program menu.

... Now we'll set the sequence that clears the screen from the cursor position to the end of a line:

Command? 3

Clear to End of Line Definition

1. Timing Delay
Enter Delay Time in Milliseconds: <RETURN>
2. Clear to End of Line Byte Sequence
Char #1 - Type Char, .=Number, or <CR>=Done: Enter Number: 1bh<RETURN>
Char #2 - Type Char, .=Number, or <CR>=Done: Char t<RETURN>
Char #3 - Type Char, .=Number, or <CR>=Done: <RETURN>

... The byte sequence ESCt will be sent whenever there is a need to clear the screen to the end of a line.

... Next, we'll set the terminal Initialization & Deinitialization sequences:

Command? 5

Terminal Init/Deinit Definition

1. Terminal Initialization Byte Sequence
Char #1 - Type Char, .=Number, or <CR>=Done: Enter Number: 1bh<RETURN>
Char #2 - Type Char, .=Number, or <CR>=Done: Enter Number: 2eh<RETURN>
Char #3 - Type Char, .=Number, or <CR>=Done: Enter Number: 31h<RETURN>
Char #4 - Type Char, .=Number, or <CR>=Done: <RETURN>
2. Terminal Deinitialization Byte Sequence
Char #1 - Type Char, .=Number, or <CR>=Done: <RETURN>

... The Initialization sequence is ESC.1, which sets the screen cursor to a blinking rectangle. The Deinitialization sequence was left undefined.

... Next, we'll enter the terminal name as any alphanumerical text string, terminated by a <RETURN>.

Command? 7

Input Name of Terminal: tv925<RETURN>

Command? X <---- This exits TCMMAKE and writes the terminal definition file.

Selected Terminal is: tv925 -- Confirm (Y/N)? Y

File MYTERM .Z3T Created

The terminal definition file MYTERM.Z3T just created by TCMMAKE will provide satisfactory operation with the TeleVideo Model 925 CRT terminal. The actual filename is strictly a matter of personal preference; the filetype must be Z3T.

TCSELECT

(Version 1)

Description

One of the most powerful features of ZCPR3 is its terminal characteristics definition facility, or "termcap." Programs designed to take advantage of ZCPR3's termcap feature do not require installation for individual terminals, once the ZCPR3 termcap is installed for the particular terminal in use. Instead of installing each program you run, you simply create a custom termcap file for your terminal; then, all of the programs designed to use that feature of ZCPR3 can be run without any installation. The ZCPR3 MENU, VFILER, VMENU, and the AMPRO FRIENDLY programs all utilize this feature.

If your terminal is one of the "standard" terminals supported by the TCSELECT utility, then creating your termcap file is simply a matter of selecting the terminal you are using from one of TCSELECT's menu screens. If your terminal is unlisted, you can still create a custom termcap file, but will need to use the ZCPR3 TCMAKE utility instead.

Operation

TCSELECT is very easy to use. Before you run TCSELECT, be sure that the disk directory containing TCSELECT also contains a file called Z3TCAP.TCP; this file contains the terminal data required by TCSELECT. Run the program like this:

```
A0><u>TCSELECT MYTERM</u><RETURN>
```

The program will prompt you with instructions. Select the desired terminal from one of the available menus. If your terminal is not in any of the menus, you will need to use the ZCPR3 TCMAKE program instead.

This creates a file called MYTERM.Z3T, which holds the information regarding your terminal. You can use any name for the file, except that it must have the "Z3T" extent. Before you can use the termcap you have created, it must be loaded into memory by the ZCPR3 LDR utility. This is done with the command:

```
A0><u>LDR MYTERM.Z3T</u><RETURN>
```

Normally this is made part of the system startup aliases.

Another option available through TCSELECT is that you can run the program without specifying a filename on the command name, i.e.

```
A0><u>TCSELECT</u><RETURN>
```

In this case, no file is created when you exit TCSELECT; instead, the selected terminal definition is loaded directly into memory. This is helpful for testing terminal selections.

UNERASE

(Version 1)

Description

UNERASE permits recovery of accidentally deleted files. This program will work reliably only if no write operations have been performed since the file or files were accidentally deleted. ANY write operation can destroy the information used by UNERASE to restore deleted files.

Using UNERASE

UNERASE is easy to use. To restore a specific file, type:

```
A0>UNERASE FILENAME.TYP<RETURN>
```

You can also restore more than one file at a time. For example:

```
A0>UNERASE B5:*.BAK --> Recovers all .BAK type files in user area  
5 of drive B
```

```
A0>UNERASE C:MYFILE.* --> Recovers all MYFILE.TYP files, including  
MYFILE, without .TYP specifier
```

For a List of erased files, type:

```
A0>UNERASE *.* L<RETURN>
```

This will display a list of files that can be unerased, without actually performing the unerase function.

NOTE

In some cases there may be two "erased" files with the same name. Then, UNERASE may restore both versions of the file. It will indicate this has happened by listing the same filename twice when it indicates what it has done. If this occurs, erase the files again with the ERA command immediately.

Always check restored files for integrity!

UNERASE can sometimes "save the day" -- but use it at your own risk!

Z3INS

(Version 1)

Description

Z3INS is the ZCPR3 utility installer. All ZCPR3 utilities supplied on the AMPRO operating system software diskettes are pre-installed. ZCPR3 utilities which you obtain from a user group, bulletin board system, etc., will probably require installation. This is easy to do using Z3INS.

Operation

There are two ways you may use Z3INS to install ZCPR3 programs: you can install a single program, by name; and you can install a group of programs, based on a text file containing their names. In both cases, Z3INS requires the presence of a ZCPR3 "environment descriptor" file. The AMPRO Version 3 BIOS contains a built-in environment descriptor. However, for the purposes of ZCPR3 program installation, a duplicate of the built-in AMPRO environment is contained in the file called ZAMPRO0.ENV, present on the Z80 System Software diskette. This is the file to use with Z3INS.

The most common way to use Z3INS, is to install a single program, by name, as follows:

```
A0>Z3INS ZAMPRO0.ENV MENU.COM<RETURN>
```

Installation of a group of programs is similar, except you need to first create a text file which contains the names of the programs to be installed, and the file should have a file name ending with "INS" -- for example, the following file might be called Z3UTILS.INS:

```
MENU.COM  
MCPY.COM  
PATH.COM  
VFILER.COM  
VMENU.COM
```

Then, to install the five programs in the list, the command is:

```
A0>Z3INS ZAMPRO0.ENV Z3UTILS.INS<RETURN>
```

ZEX

(Version 3)

Description

ZEX is ZCPR3's powerful batch processing facility. In some ways, ZEX is like a combination of CP/M's SUBMIT and XSUB. However, Unlike SUBMIT, ZEX is memory-based. Its input source is located in memory, so that its execution speed is significantly greater. Also, ZEX obtains its command batch from a text file (ending in .ZEX or .SUB) anywhere along the ZCPR3 command search path.

Like XSUB, ZEX intercepts all calls to the BIOS Console Input (and Input Status) routine and provides an input character in its place. There are exceptions to this case, but they will be discussed later.

Operation

ZEX is normally used in much the same manner as the CP/M SUBMIT program. For example:

```
A0><u>ZEX ASSEMBLE</u><RETURN>
```

In this case, a command text file called ASSEMBLE.ZEX contains a sequence of command lines to be executed in batch mode. The command text file can also be called ASSEMBLE.SUB. The command file can be located anywhere along the ZCPR3 command search path.

During ZEX operation, a <CTRL-C> from the console will abort execution of the ZEX command stream. Also, if a command follows ZEX in a Multiple Command Line, ZEX appends this command to the command stream.

ZEX command files may not be nested. ZEX will simply abort if a ZEX command is encountered in the command stream it is processing.

ZEX supports many embedded commands. Combining the facilities of SUBMIT and XSUB in this case, the embedded commands of ZEX reflect the XSUB-like capabilities of ZEX as well as some new ideas.

Like SUBMIT, ZEX can be given parameters on the command line, for example:

```
A0><u>ZEX CMDFILE FILE1 FILE2</u><RETURN>
```

In this case, "FILE1" is substituted for \$1 and "FILE2" for \$2 in the command text file.

A summary of the control commands which may be placed in a ZEX command text file is displayed if you type the command

```
A0><u>ZEX //</u><RETURN>
```

Summary of ZEX Control Commands

Cmd	Meaning	Cmd	Meaning
	insert a <CR>	^	insert <CR><LF>
^:	rerun command file	^.	suppress of characters
^#	toggle ZEX messages	^\$	define default parameters
^?	wait for return key	^/	ring bell; wait for return key
^*	ring bell	^"	allow user input
^<	display chars only	^>	stop display chars
;;	ZEX comment	\$n	parameters (1-9)
\$\$	insert a \$	^	insert a
\$	insert a	^c	insert a control character, "c"

The **^*** command simply causes ZEX to ring the bell. It does not insert a BELL character into the command file like a **^G** sequence would. It simply rings the bell and continues processing.

The **;;** command is a ZEX comment. It and all characters following it up to and including the following <LF> are not included in the ZEX command stream. They are simply treated as a comment in the ZEX Command File and ignored. Unlike a conventional ZCPR3 comment, the ZEX comment does not take up space in the command stream and does not appear when the command stream is executed.

The **^<** and **^>** commands are used to bracket characters which are simply echoed by the ZEX monitor and not passed back to the calling program. This causes the characters between these commands to be echoed to the system console during execution but not processed by any program. This feature is very good for embedding strings to be displayed at execution time into the command stream. Unlike the ZCPR3 comment form, which is a line beginning with a semicolon, comments enclosed by **^<** and **^>** may appear anywhere, such as within an editor session.

The **^#** command toggles suppression of informative messages generated by ZEX.

The **^.** command causes console output to cease until the next **^.** is encountered. Character input from the ZEX Monitor continues, but the user does not see what it is.

\$n, where **n** is 1-9, will cause the indicated specified or default parameter to be substituted from the command line.

The **^\$** command is used to define or redefine the set of input command parameters. The rest of the line following the **^\$** is treated as a set of parameters separated by blanks.

^? causes ZEX to stop processing and wait for the user to strike either the space bar or the RETURN key before continuing. The user can take his time and examine the display, and, if he does not wish to continue, a **^C** will abort the command stream. The **^/** command is like **^?**, but it periodically rings the bell at the console, summoning the user in an alarm fashion.

Other ZEX options are available. For further information refer to the ZCPR3 documentation referenced elsewhere in this manual.

CHAPTER 6

PUBLIC DOMAIN PROGRAMS

6.1 INTRODUCTION

The programs listed in this chapter are "public domain" programs which are available for unrestricted free distribution. These programs have been included for your convenience on the the AMPRO operating system software diskette. Each program's description explains what the program does and how it is used. The utilities are covered in alphabetical order, so this material can serve as a handy operator's reference.

A large number of additional public domain programs are available through the many CP/M user groups and bulletin board systems.

6.2 PROGRAM DESCRIPTIONS

The following pages contain the program descriptions of the public domain programs included on the AMPRO Z80 system software diskette, alphabetically arranged.

MDM740

(Program Version 7 - AMPRO Overlay Version 2)

Description

MDM740 is one of the most popular public domain programs. It is a general purpose, powerful communication program, capable of both computer-to-computer and modem operation. It includes the popular "XMODEM" protocol, for error free data transfer, and also can support simple ASCII text transfer.

Supplied on AMPRO system disk are three files relating to MDM740:

1. **MDM740.COM:** the communications program itself.
2. **M7LIB.COM:** a utility program to customize the MDM740 phone list.
3. **M7LB.ASM:** the AMPRO-specific overlay source code.

As supplied on your disk, MDM740 is configured for auto-dialing with a Hayes Smartmodem, or Hayes-compatible, modem. If you have a modem which does not support auto-dialing, or which is not Hayes compatible, you can still use the program -- but with manual phone dialing.

NOTE

Modem control overlays to support other types of modems are available through CP/M user groups and bulletin boards. You can also modify the AMPRO overlay source file, M7LB.ASM, to make the program work with a different type of modem. (Instructions in how to perform this optional customization are contained in the file itself.)

Operation

Since MDM740 is such a powerful program, it naturally has quite a few commands and options. The discussion here will not attempt to explain all operations, but will hopefully help you get started. Contact a local CP/M user group if you need help.

There are two basic modes of operation:

Command - allows control of the modem program functions and parameters.

Terminal - allows your terminal to communicate with a remote computer.

To get started, type the program's name from the CP/M command line:

```
A0><u>MDM740</u><RETURN>
```

When you run MDM740, a message similar to the following will be displayed:

```
MDM740 modem pgm (type M for Menu)
Copyright (c) 1984 - Irvin M. Hoff
Initial baud rate set for 300
```

A>>COMMAND:

This is MDM740's command line (like CP/M's "A>"). From this command line you can dial a number, enter terminal mode, or modify the current communications setup. You can tell you are in the Command mode when you see the prompt:

A>>COMMAND:

MDM740 has three types of commands:

Single Letter Commands - Used in command mode to send or receive an XMODEM file, enter terminal mode, display help information, etc.

Three Letter Commands - used in command mode to set operating parameters, dial a number, exit to CP/M, etc.

Terminal Mode Commands - commands used only in the terminal mode, to turn the text buffer on and off, send or receive a text file, etc.

To display a menu of all command options, type:

A>>COMMAND:M<RETURN>

After you enter the M command, the program will display three screens of help information, representing the three groups of available commands:

Single Letter Commands

- ? - Display current settings
- Function key intercept character, then (0-9)
- M - Display the menu
- E - Terminal mode with echo
- L - Terminal mode with local echo
- T - Terminal mode
- For copying text to disk use T (E or L) FILENAME.TYP
- Start or Stop toggles described on subsequent screen.
- R - Receive CP/M file using Christensen Protocol
- S - Send CP/M file using Christensen Protocol
- A>>COMMAND: R (or S) FILENAME.TYP
- R and S can use the following subcommands:
 - B - Bulk transfer using wildcards (e.g., *.*)
 - D - Disconnect when done
 - Q - Quiet mode (no messages to console)
 - V - View <R> or <S> bytes on console
 - X - When done, disconnect, go to CP/M

The single letter commands may also be used on the command line when the program is initially executed.

Three Letter Commands

CPM -Exit from this program to CP/M
DIR - List directory and space free (may specify drive)
ERA -Erase file (may specify drive)
LOG -Change default drive/user no. (specify drive/user)
and reset disks. e.g. LOG A0: or LOG B:
SPD -Set file output speed in terminal mode
TCC -Toggle CRC/Checksum mode on receive
TLC -Toggle local command immediate or after CTL-
TLF -Toggle LF after CR in "L" or "T" mode for a disk file
TRB -Toggle rubout to backspace conversion
TXO -Toggle XOFF testing in terminal mode file output
SET -Set modem baud rate
BYE - Disconnect, then return to CP/M
CAL -Dial number
DSC -Disconnect from the phone line

The following are terminal text buffer commands:

DEL -Delete memory buffer and file
WRT -Write memory buffer to disk file

Local Commands while in Terminal Mode

CTL-@ -Send a break tone for 300 ms.
CTL-E -Exit to command mode
CTL-L -Send log-on message
CTL-N -Disconnect from the phone line
CTL-P -Toggle printer
CTL-Y -Start copy into buffer
CTL-R -Stop copy into buffer

Start & Stop may be toggled as often as desired.
A ";" at start of line indicates buffer is copying.
XOFF automatically used to stop input when writing
full buffer to disk, XON sent to resume.

CTL-T -Transfer ASCII file to remote
CTL-^ -Send local control character to remote

Using a Modem

A really nice feature of MDM740 is auto-dialing. With one simple command, you can access up to 36 predefined telephone numbers from MDM740's internal phone list. It is an easy matter to use the phone list customization program, M7LIB.COM, to enter the names and numbers you wish to use. To use M7LIB, type the following command from the CP/M command line (not from MDM740's command line):

```
A0>M7LIB MDM740.COM<RETURN>
```


M7LIB will guide you through the phone list modification process.

Using the AMPRO Bulletin Board System

The following example illustrates how you might log into the AMPRO user's bulletin board system. If you have a Hayes compatible modem, you can use the auto-dialing command, as follows

```
A>>COMMAND: CAL A<RETURN>
```

This assumes that the AMPRO BBS is programmed into your phone list as entry **A**. The modem will set the telephone "off-hook", dial the number, then wait for the remote bulletin board system "answer".

If you do not have a Hayes-compatible auto-dial modem, then simply dial the number of the AMPRO bbs -- (408) 258-8128 -- manually on your telephone.

When the remote device answers, you will hear a high-pitched "carrier" tone if your modem has a speaker. When auto-dialing, MDM740 automatically enters the Terminal mode when it senses the remote modem's carrier tone. Your screen will look like this:

```
A=AMPRO BBS.....408-258-8128 - try #1
```

```
CONNECTED
```

```
(in Terminal-mode now)
```

If you dial manually, you must use the **T** command to enter the Terminal mode, when you notice that the remote system has answered. You will know the remote system has answered by a high pitched tone (if your modem has a speaker, or through the phone earpiece), or if your modem's "carrier detect" light goes on.

```
A>>COMMAND: T<RETURN>
```

Once connected, you type whatever log-in sequence may be required. In the case of the AMPRO BBS, press the **RETURN** key one or two times. The AMPRO bbs will send a message:

```
How many nulls does your terminal require? (0-7)
```

Responding with **0** (zero) for "nulls required" is usually sufficient. The bulletin board system will send some messages and instructions, then prompt you for what to do next. The main BBS commands are:

- S - Summary of messages
- R - Read a message
- E - Enter a message
- G - Goodbye (leave BBS)
- C - Enter remote CP/M
- ? - Display command help

The G command is what you use when you are finished and ready to disconnect from the BBS. If you enter CP/M (C command), here are some common commands:

A0><u>USER 5</u><RETURN> ...to change user areas
A0><u>HELP</u><RETURN> ...for remote CP/M help info
A0><u>SYSMAP</u><RETURN> ...to display a map of program locations
A0><u>BYE</u><RETURN> ...to disconnect from BBS

Downloading and Uploading BBS Files

Downloading and uploading are done from the BBS remote CP/M command line (e.g., "A0>") Downloading a file means that you have the BBS send you a file. Uploading is when you send a file to the BBS.

Here is how you download a file from one of the BBS CP/M directories:

1. At the BBS remote CP/M command line, type:

A0><u>XMODEM S FILENAME.TYP</u><RETURN>

2. Wait for XMODEM to indicate its readiness for sending the file
3. Use <CTRL-E> to exit to MDM740's Command mode
4. At MDM740's command line, type:

A0><u>COMMAND:R FILENAME.TYP</u><RETURN>

Here is how to upload a file (from your system to the BBS):

1. At the BBS remote CP/M command line, type:

A0><u>XMODEM R FILENAME.TYP</u><RETURN>

2. Wait for XMODEM to indicate its readiness for receiving the file
3. Use <CTRL-E> to exit to MDM740's Command mode
4. At MDM740's command line, type:

A0><u>COMMAND:S FILENAME.TYP</u><RETURN>

Capturing ASCII Data

Another nice feature of MDM740 is the capability to "capture" data into a 16 kilobyte memory buffer. Try this:

1. Dial and connect as described earlier.

2. When you are connected and in the Terminal mode, enter <CTRL-E>
3. At the MDM740 command line type:

A>>COMMAND:T FILENAME.TYP<RETURN>

This returns you to Terminal mode, but with a memory buffer for storing text.

4. Now, when you wish to capture a particular set of information, enter a <CTRL-Y>.
5. Any characters displayed on your terminal screen will be stored in the memory buffer.
6. To close the memory buffer, type a <CTRL-R>.

This sequence of <CTRL-Y> and <CTRL-R> can be used at any time, in the Terminal mode, to capture any data you wish. If the buffer becomes filled, MDM740 will send a code to the remote system asking it to wait, while it saves the current contents of the buffer to disk. Each time you return to the Command mode (with <CTRL-E>), the available buffer space is displayed on your screen. To save the buffer contents to disk, return to the Command mode, and type:

A>>COMMAND:WRT<RETURN>

WARNING

If you exit MDM740 without saving the buffer on disk, the buffer data **will be lost!**

Sending ASCII Data

You can also send ASCII text data from a file in your system. When you do this, it appears to the remote system as though you are typing the text manually. Here is how it is done:

1. Dial and connect as described earlier.
2. When you are connected and in the Terminal mode, to send a text file, type <CTRL-T>. MDM740 will prompt you for the name of the file you wish to send, and whether you want delays after each line (some remote systems need this).
3. When the file has been sent, you will be back in normal Terminal mode.

SD

(AMPRO Version 2)

Description

This is the public domain "super directory" utility. It is an alternative to the ZCPR3 DIR utility, and provides some additional capabilities. Files can be specified as in standard CP/M: those in which you use the complete file names (called unambiguous filenames), and those in which you use only part of the filename (called ambiguous), with asterisks or question marks used to represent "wild cards." For instance, AMP* would call up the files AMPle, AMPlify, AMPro, and AMPs; and A???? would call up the files AMPRO, APPLE, ADAMS.

These examples illustrate the options you can use:

A0> <u>SD<RETURN></u>	Display all files.
A0> <u>SD *.ASM<RETURN></u>	Display all .ASM files.
A0> <u>SD *.* \$A<RETURN></u>	Display all files in all user Areas of current drive.
A0> <u>SD *.* \$D<RETURN></u>	Display all files on all Drives in current user area.
A0> <u>SD *.* \$U15<RETURN></u>	Displays the directory of user area 15 only.
A0> <u>SD *.* \$P<RETURN></u>	Send directory to LST: device (Printer)
A0> <u>SD *.* \$F<RETURN></u>	Create a File containing directory contents (The file will always be named SD.DIR).

In addition, the \$-suffixes can be combined to provide further usefulness, e.g.:

A0> <u>SD *.* \$ADFP<RETURN></u>	Create a file and a listing of all files.
--	---

One note: since the D option causes all drives to be searched, nonexistent drives may cause your system to hang up.

SWAPCOPY

(AMPRO Version 2)

Description

SWAPCOPY allows you to transfer files from one diskette to another using only one floppy disk drive. You can copy from A to A (both AMPRO format), or from A to E, or E to A (AMPRO to/from non-AMPRO format). The destination disk must already be formatted.

When you use SWAPCOPY, you must provide a file specification similar to that used with DIR.COM. The file specification can either be ambiguous (using the ? and * characters) or not. In addition, SWAPCOPY allows a few optional command line parameters which result in various display options. These are described below.

Operation

To copy an entire disk using a single drive (it must be A), type:

```
A0>SWAPCOPY *.*<RETURN>           ...copies all files
```

SWAPCOPY first prompts you to select A to A, A to E, or E to A. The second and third of these options allow you to copy to and from non-AMPRO formats.

SWAPCOPY next prompts you to insert the SOURCE disk, then press <RETURN>. The program then reads as much of the source file(s) into memory as possible.

SWAPCOPY then prompts you to insert the DESTINATION disk. You now remove the source disk and insert your destination disk.

CAUTION

Be sure to not accidentally mix the two disks! If you do, you may destroy the SOURCE disk. You may wish to use a write protect tape on your SOURCE disk to protect it in case you accidentally mix it up with the DESTINATION disk.

With your DESTINATION disk in the drive (double check), press <RETURN>. The program will now write the file(s) stored in memory onto the destination disk. This process of exchanging disks will continue until all files are copied. When the program is finished copying, it will prompt you for the SYSTEM disk.

These examples show some of the options you may use in specifying filenames:

```
A0>SWAPCOPY FILENAME.TYP<RETURN>       ...copies one file  
A0>SWAPCOPY *.COM<RETURN>              ...copies all COM files
```

For a help screen showing other SWAPCOPY options, type:

```
A0>SWAPCOPY<RETURN>
```

