NEC 85 30PK062
D41256C-15

NEED (24) 16 PIN CHIPS

256 K RAM CHIPS 200 NS OR faster

CO-POWER SYSTEM GUIDE

BOARD IS NO 8690

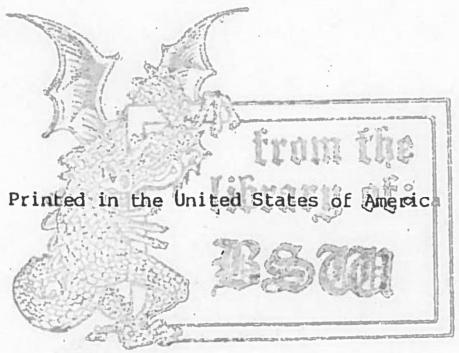
For: KAYPRO Models
2X
2/84
4/84
10

August 20, 1985

SWP Microcomputer Products, Inc., reserves the right to make hardware, software and pricing changes without notice.

ORIGINAL INSTALLED CHIPS

NEC 8530 PK062
D41256C-15 256K X1
200 NANOSECONDS OR FASTER



Printed in the United States of America

Product	Author	Version	Code	Requirements
DATABASE MANAGEMENT				
Formula II	DMA	2.22	D004.C6	
dBase II	Ashton-Tate	2.4	D018.C6	
Condor 20-1	Condor	2.11	D022.C6	* J
Condor 20-3	Condor	2.11	D024.C6	* J
Infostar	MicroPro		D038.C6	
DataStar	MicroPro	1.41	D009.C6	
MISCELLANEOUS				
Electronic Circuit	Tatum Labs	1.73	E002.C6	
EM80/86	DMA	1.6	M011.C6	
Conv/MS	DMA	1.3	M002.C6	
SuperSort 86	MicroPro	1.65	M001.C6	
TypeQuick 86	AID	3.14	M014.C6	
BackRest	Stok		M015.C6	D
DEVELOPMENT TOOLS				
Display Manager	DRI	1.0	T052.C6	
Access Manager	DRI	1.1	T037.C6	
Assembler + Tools	DRI	1.0	T002.C6	
Vedit	CompuView	1.38	T009.C6	
WORD PROCESSING				
WordStar	MicroPro	3.30	W003.C6	
MailMerge	MicroPro	3.30	W004.C6	+W003.C6
SpellStar	MicroPro	3.30	W009.C6	+W003.C6
WordStarProfessional	MicroPro	3.30	W010.C6	
StarIndex	MicroPro	1.01	W001.C6	+W003.C6
WordMaster 86	MicroPro	1.07	W002.C6	
Spellguard 86	Sorcim	2.0	W008.C6	
The Final Word	Mark of Unicorn	1.15	W022.C6	J
PLANNING & ANALYSIS				
ProFin	Business Soft	3.12	P067.C6	+L006+M002.MS
PlanFin	Business Soft	3.12	P066.C6	+L006+M002.MS
RealEstate Analys	Real Data	1.1B	P156.C6	+P052.C6
RE Comm/Industrial	Real Data	1.1B	P155.C6	+P052.C6
StatPak	NWA	3.1	P002.C6	J+L006+M002.MS
T/Maker III	T/Maker	3.02A	P036.C6	*
CalcStar 86	MicroPro	1.4	P019.C6	
SuperCalc 2	Sorcim	2.0	P052.C6	
Milestone 86	Organic	1.08	P003.C6	
Minimodel 86	FPA	1.43	P001.C6	

Notes: (*) low-cost demo available (I) 132-column printer required
(+) another product required (J) 80-column printer required
(D) hard disk required

Product	Author	Version	Code	Requirements
IAR/XLIB	IAR	1.0	L035.MS	
IAR/XLINK	IAR	1.0	L030.MS	
C Compiler MS	Microsoft	1.04	L067.MS	
M2CBASIC	Buzzwords	1.3	L004.MS	*
BASIC Compiler	Microsoft	5.35	L007.MS	
Business BASIC	Microsoft	1.0	L066.MS	
COBOL MS	Microsoft	1.07	L029.MS	
FORTRAN MS	Microsoft	3.13	L028.MS	
Janus/ADA	RR Software	1.47	L044.MS	
Pascal MS	Microsoft	1.0	L059.MS	
CB-86 Compiler	DRI	2.0	L039.IP	
Pascal/MT+86	DRI	3.2	L005.IP	
PL/I-86	DRI	1.0	L002.IP	
muLISP/muSTAR	Microsoft	2.15	L032.MS	
muMATH/muSIMP	Microsoft	2.15	L031.MS	
Macro-MS	Microsoft	1.25	L034.MS	
C86	Comp Innovations	1.32D	L047.MS	
DATABASE MANAGEMENT				
R:base 4000	MicroRim		D015.MS	*
Formula II	DMA	2.22	D004.MS	
dBase II	Ashton-Tate	2.4	D018.MS	
Condor 20-1	Condor	2.11	D022.MS	* J
Condor 20-3	Condor	2.11	D024.MS	* J
Infostar	MicroPro		D038.MS	
DataStar	MicroPro	1.41	D009.MS	
MISCELLANEOUS				
Electronic Circuit	Tatum Labs	1.73	E002.MS	
EM80/86 MS	DMA	1.6	M011.MS	
Conv/CP	DMA	1.3	M002.MS	
SuperSort MS	MicroPro	1.65	M001.MS	
TypeQuick MS	AID	3.14	M014.MS	
DEVELOPMENT TOOLS				
Display Manager	DRI	1.0	T052.IP	
Access Manager	DRI	1.1	T037.IP	
Quick Code	Fox & Geller	2.2	T005.PC	+D018.MS
Assembler + Tools	DRI	1.0	T002.IP	
Vedit	CompuView	1.38	T009.MS	
WORD PROCESSING				
WordStar	MicroPro	3.30	W003.MS	
MailMerge	MicroPro	3.30	W004.MS	+W003,MS
SpellStar	MicroPro	3.30	W009.MS	+W003.MS
WordStarProfessional	MicroPro	3.30	W010.MS	
StarIndex	MicroPro	1.01	W001.MS	+W003.MS
The Final Word	Mark of Unicorn	1.15	W022.MS	J
PLANNING & ANALYSIS				
MicroGANTT	Earth Data	1.94A	P018.MS	
Multiplan	Microsoft	1.10	P034.MS	
ProFin	Business Soft	3.12	P067.MS	+L006.MS
PlanFin	Business Soft	3.12	P066.MS	+L006.MS
RealEstate Analys	Real Data	1.1B	P156.MS	+P034.MS
RE Comm/Industrial	Real Data	1.1B	P155.MS	+P034.MS
StatPak	NWA	3.1	P002.MS	J+L006.MS
T/Maker III	T/Maker	3.02A	P036.MS	*

Notes: (*) low-cost demo available
(+) another product required
(D) hard disk required
(I) 132-column printer required
(J) 80-column printer required

TABLE OF CONTENTS

DOCUMENT LIST

You should have received two documents with your CO-POWER:

- The SWP CO-POWER System Guide
- Installation Instructions

DISKETTES

You should have received two diskettes with your CO-POWER:

- Load Files and RAMDISK Software Diskette
  (a single-sided Kaypro formatted disk)
- SWP's DOS Utility Diskette
  (an IBM PC formatted disk. To use this you must also have a PC-DOS system disk, which we do not provide.)

(This page intentionally left blank.)

SPECIAL CONSIDERATIONS

A. The Kaypro 10 Universal Board and the Universal ROM

Each CO-POWER is packaged for a particular computer. The Z80 Adapter Board is configured for your specific computer and the MS-DOS and RAMDISK software is also specific to your computer.

Kaypro Corporation has manufactured several versions of the Kaypro 10. The default configuration for SWP CO-POWERs supports the 1984 version.

The Kaypro 2x, 2/84 and 4/84 have what is called the Universal Board as the motherboard in the computer. Lately Kaypro has been making Kaypro 10s with this board in place of the old Kaypro 10 motherboard. The Kaypro 10 with the Universal Board requires a different set of CO-POWER components than the original Kaypro 10s.

You can tell if you have a Universal Board by removing the Kaypro case and looking at the main circuit board. Locate J9 (a 50-pin hard disk cable connector). If you have the Universal Board, J9 will be on the extreme right edge of the motherboard. If you have the old Kaypro 10 Board, J9 is towards the center of the motherboard.

If you have the Universal Board, then you need to follow the rest of these instructions. If you have the other Kaypro 10 motherboard, then skip this section.

Step 1 CO-POWER's Z80 Adapter Board contains a 20-pin programmed PAL chip. This chip is labeled in white letters as SWPKAY10, SWPKP10 or SWPKAY4E. Universal boards need the SWPKAY4E chip. If you have the incorrect one, you can order the correct PAL from SWP for $10, or you can send the incorrect chip back in exchange for the correct one. The $10 fee can be charged to MasterCard or Visa and includes shipping by U.S. Mail. Shipping by another means may require additional fees.

If the CO-POWER package was ordered for the Universal Board, then your Z80 Adapter Board should have the proper PAL chip, SWPKAY4E.

Step 2 The Universal Board uses a different PC-DOS load file and a different RAMDISK file than the old Kaypro 10 board does. These different files are located on your PC-DOS Load Files and RAMDISK Software Disk. To change the disk (we recommend changing a copy of the disk), do the following:

- Confirm that you have the following files

PCDOS.COM	MODIFY.M
RAMDISK.COM	MODIFY.R

The PCDOS.COM and RAMDISK.COM files are for the old Kaypro 10 motherboard. The MODIFY.M and MODIFY.R files are the modified files for the Kaypro 10 with the Universal Board. Rename the files as follows:

- Rename the PCDOS.COM file to another name. Example:

```
REN K10.DOS=PCDOS.COM
```

renames PCDOS.COM to K10.DOS.

- Rename MODIFY.M to PCDOS.COM. For example:

```
REN PCDOS.COM=MODIFY.M
```

- Rename the RAMDISK.COM file to another name. Example:

```
REN K10.RAM=RAMDISK.COM
```

renames RAMDISK.COM to K10.RAM.

- Rename MODIFY.R to RAMDISK.COM. For example:

```
REN RAMDISK.COM=MODIFY.R
```

Now the files on the MSDOS Load Files Disk are redone for the Universal Board. Read this Guide to learn how to use them.

INTRODUCTION

The SWP CO-POWER board is a high speed 16 bit microprocessor with up to one million bytes of random access memory. It comes with a special adapter card that enables it to be interfaced to a Z80 based CP/M computer, which enables that computer to then run IBM PC-DOS, CP/M 86 and RAMDISK.

CO-POWER's RAMDISK feature helps speed up CP/M job operation time. If you purchased the CO-POWER-Plus board, then this RAMDISK is expandable all the way to 1024k, giving you a fast, simulated disk drive large enough to process even enormous database files.

By merging the SWP DOS Utility Disk with a copy of PC-DOS, you can run PC-DOS programs on CO-POWER. Information on making an MS-DOS Master for your computer is in Section Two of this document.

If you haven't already done so, install your CO-POWER following the instructions in the enclosed Installation Instructions. Then use this Guide to learn how to use your new system.

NOTE: You must have the CO-POWER package for your specific computer. If you do not have the correct CO-POWER, you can order a conversion package from SWP Sales.

PART 1. CO-POWER'S CP/M RAMDISK

When you are not using CO-POWER as an PC-DOS processor, you can use it's memory as a high-speed simulated disk drive for CP/M! RAMDISK can greatly speed up the time it takes to do disk-bound applications like sorting large databases, recalculating spreadsheets or moving around in large word processing files.

The best way to use RAMDISK is to transfer both the application program files and your data files to RAMDISK, then run the program. If you do not have enough space to hold both the program files and the data files, you can still speed up your job time by using RAMDISK for one of them. Experiment to find out if it is quicker to have the program or the data files in RAMDISK.

The RAMDISK can be set up to be any of the possible CP/M drivenames, Drive A - Drive P, including the names of 'real' drives on your computer. (If you name the RAMDISK to the same name a 'real' drive has, like Drive A, the 'real' drivenames will be renamed alphabetically. I.E., 'real' Drive A becomes Drive B, 'real' Drive B becomes Drive C, and so on.) This enables you to run programs in RAMDISK that are configured so they must be run from Drive A.

A. Running RAMDISK

RAMDISK has four prompts that set it up. Once you learn how to set RAMDISK for your needs, you can use a shorthand method of running the program, described after this section.

RAMDISK is started by running the RAMDISK.COM program found on the PC-DOS LOAD FILES AND RAMDISK SOFTWARE disk. When run (type RAMDISK from the system prompt), four prompts will appear:

Drivename (A thru P) to assign to ramdisk .....

Enter the letter for the name you want to use. If you press <return> here, the default drive, M:, is used. Again, if you name the RAMDISK to a drivename that is used by a 'real' drive, the 'real' drivenames will shift accordingly.

Erase contents of ramdisk file directory (Y/N?) .....

Normally enter Y or press <return> to use the Y default. This will erase the contents of the file directory so it can be initialized for use (this is something that CP/M floppy disk formatting programs do). SAFETY FEATURE: By answering N to this prompt you can sometimes recover your data files if you accidentally reset the computer before transferring files back to a real disk.

Ramdisk driver load address or <CR> to use default ...

Normally press <return>. More on the use of this feature is in the Tech Notes section.

CO-POWER-88 port address or <CR> to use default .....

Normally press <return>. More on the use of this feature is in the Tech Notes section.

A1. The Shorthand Way to Run RAMDISK

Once you are familiar with the RAMDISK program prompts you can bypass them by using the following 'shorthand' method of running RAMDISK.

Simply enter a space after the command RAMDISK and enter the parameters separated by commas. If you enter less than four parameters, or if two commas in a row are entered, then the default value is taken for the undefined one.

For example, this CP/M command:

```
A>RAMDISK A
```

starts RAMDISK and names it Drive A. The directory is erased and the default parameters for load address and I/O port setting are used.

For example, this command:

```
A>RAMDISK A,N
```

names the RAMDISK Drive A, does not erase the file directory, and uses the other default settings.

For example, this command:

```
A>RAMDISK B,,FC00
```

installs RAMDISK as Drive B, erases the directory, and loads the software in the top 1k of Z80 memory starting at FC00 hex.

One last example:

```
A>RAMDISK *
```

starts RAMDISK with all the default settings. (Drivename is M:.)

B. Copying Files to RAMDISK

Once RAMDISK is set up, use PIP, DISK or another file copy program to transfer files to it. Refer to the RAMDISK drive like a normal drive in the copy program formulas. If you name the RAMDISK to the same drivename that a 'real' drive normally has, be sure to remember the "new" drive names. (I.E. If RAMDISK is A:, then 'real' A: is B: and so on).

B1. Using SUBMIT Files

If you use RAMDISK to regularly work on a specific program, consider creating a CP/M SUBMIT file to automatically move the program and related files to the RAMDISK. SUBMIT is described in your CP/M Owner's Manual. Following is an example of using it.

Situation: Moving WordStar into RAMDISK and running it. When WordStar is exited, copy the WordStar data files back to a real disk. In this case RAMDISK is Drive A:, the WordStar master disk is copied from Drive B: ('real' Drive A), and the data files are written back to Drive C: ('real' Drive B).

First create the file to be used by SUBMIT: (Enter this exactly as shown.)

NEEDED ONLY WHEN CPM GD1

TYPE THIS	THEN	THEN
A>PIP SETUP.SUB=CON:	<RETURN>	
PIP A:=B:WS*.*[V]	<RETURN>	<LINE FEED>
WS	<RETURN>	<LINE FEED>
B:PIP C:=A:*.DOC[V]	<RETURN>	<LINE FEED>

SEE PG #11 ALSO,

End the input by entering <CTRL><Z> and <RETURN>. There is now a file on your disk called SETUP.SUB. To test the above file:

In Drive A have a disk with these files:

WS.COM
WSOVL1.OVR
WSMSGS.OVR
RAMDISK.COM
SUBMIT.COM
PIP.COM

In Drive B place a formatted disk for WordStar data files to be written to. (It can already contain files.) The SETUP.SUB file requires that all data files have the .DOC extent.

Now that everything is set up, you can easily start RAMDISK, transfer WordStar, and transfer .DOC files when you exit. Start the process by:

```
A>RAMDISK A
A>B:
B>SUBMIT SETUP
```

NOTE: If you do not set up the RAMDISK as Drive A, i.e. B-P, then you can also include the RAMDISK command in the SUBMIT file. Using the same example altered so that RAMDISK is Drive C:, the SETUP.SUB file is:

TYPE THIS	THEN	THEN
A>PIP SETUP.SUB=CON:	<RETURN>	
RAMDISK C	<RETURN>	<LINE FEED>
PIP C:=A:WS*.*[V]	<RETURN>	<LINE FEED>
C:	<RETURN>	<LINE FEED>
WS	<RETURN>	<LINE FEED>
A:PIP B:=C:*.DOC[V]	<RETURN>	<LINE FEED>
<CTRL><Z><RETURN>		

To run this, simply enter:

```
A>SUBMIT SETUP
```

C. Saving Data When Using RAMDISK

RAMDISK is an electronic disk drive. When the computer is powered down the files in RAMDISK are erased. Before you reset or power down the system, copy any new or modified files back to a real disk.

You can use PIP, DISK or another copy program to do this. Unless a program is modified, there is no need to recopy this type of program since it already exists on the disk it was copied from.

If you frequently use the same data files you may want to create a SUBMIT file to easily copy data for you. More on this is described in the previous subsection.

SAFETY FEATURE: If you accidentally reset the computer before saving files back to disk or if you 'lock up' the computer, you may be able to recover your files. In this situation, rerun RAMDISK making sure to name RAMDISK to the same drivename you were using and answering N to the erase directory prompt. Look at the RAMDISK file directory. Your data should be there and you can now save it to a floppy disk.

The above method should usually recover your data. This does not work if you powered down the system and may not work if the reset button is held down too long. Nonetheless, it is always worth a try!

D. Running PC-DOS or CP/M-86 After Running RAMDISK

Once RAMDISK is run, you must reset the computer before entering PC-DOS or CP/M-86. This resets the 8088 chip so the boot loader can be executed again.

Remember RAMDISK's safety feature. If you accidentally reset the computer before saving files in RAMDISK, you may be able to save them. In this case, rerun RAMDISK, name it the same drivename and answer N to the second prompt. Check the RAMDISK directory to see if the files are still there.

When the power is turned off, all data in RAMDISK is erased.

TOR IS USED.

E. Technical Notes

This section describes the RAMDISK program prompts and possible answers in detail. It also details error codes. This is provided for technically-oriented users.

E1. User Definable Parameters

1. Drivename (A thru P) to assign to ramdisk .....

RAMDISK can be installed with any of the 16 possible drive ID's allowed in CP/M, including one already taken by a 'real' drive. The default drivename, used if you press <return>, is M:. If you assign RAMDISK to a currently existing drivename, then that drive and all others after it are moved in sequence to the next name.

For example if you have a two drive system with Drives A: and B: and you name RAMDISK to B:, then Drive A: does not change, RAMDISK is Drive B: and the 'real' Drive B is now named Drive C:. This assignment of drivename is done purely in software and in no way requires any of the physical disk drive select hardware to be changed.

If RAMDISK is named to Drive A:, the other drivenames are moved as described above, plus RAMDISK has a copy of your CP/M operating system written to it. This happens so that all future warm boots (CTRL Cs) are done from the RAMDISK. This speeds up normal operation and frees you from always having to keep a 'sysgened' disk in physical Drive A:. Because of the extra space taken for CP/M, RAMDISK set up as A: will have slightly less storage space than when it is set up for Drives B: through P:.

2. Erase contents of ramdisk file directory (Y/N ?) .....

The file directory of a CP/M disk must be initialized to a known state before the disk can be used. Floppy disk formatting programs usually do this for floppies and a similar process must be performed on the RAMDISK. The default for this prompt is Y. Answer Y to this prompt whenever you are loading the software for the first time since powering up the computer, or whenever you load the RAMDISK after previously running DOS or CP/M-86.

SAFETY FEATURE: The directory can be left intact by answering N. Use this if you need to reload the RAMDISK software without losing any of the data in the 8088's memory. This situation could arise if you needed to get out of a lock-up situation by pressing the computer's reset button.

3. Ramdisk driver load address or <CR> to use the default....

This prompt allows you to define where in the Z80's memory the ramdisk driver will be loaded. Use the default option (press

<return>) if you do not know the location of any free space in high memory for the software to use. With the default, the RAMDISK driver will be automatically relocated just below CP/M's console command processor, and the size of the TPA (free memory for user programs) will be reduced by 3k bytes to make room.

If you cannot tolerate the loss of 3k from the TPA, a place for the RAMDISK driver can usually be created by generating a smaller CP/M system using the utility programs 'MOVCPM' and 'SYSGEN'. The precise operation of these programs varies between manufacturers, so consult your system's documentation on how to generate a new CP/M system. Having done that, you can specify the address of a 1k byte block of memory starting on an even 256 byte boundary as the load address of the RAMDISK driver. This address is specified in hexadecimal notation.

4. CO-POWER-88 port address or <CR> to use default ....

The CO-POWER board communicates with the Z80 processor in your Kaypro computer through a pair of jumper-selectable I/O ports. The provided RAMDISK software for your computer has been set for the correct address of your machine, so you will usually respond to this prompt by pressing <return>.

If you are using CO-POWER in a computer not specifically supported by SWP, you will need to enter the starting address of the two ports being used. The input is in hexadecimal with valid values ranging from 0 to FE.

There are two styles of CO-POWER Z80 Adapter Boards. On one, the I/O port addresses are defined by 4 jumpers on the CO-POWER Z80 adapter board. On the other, they are determined by a PAL chip on the Z80 Adapter Board. On the jumper style board, the jumpers allow us to define the value of the upper 4 bits of the port address being decoded. The lower 4 bits are fixed permanently as 1110 ('E' in hexadecimal). This gives 16 possible sets of port addresses in the form 0E, 1E, 2E, etc. through FE. Some custom daughter boards may have hardwired port addresses with different values.

E2. Error Conditions

After loading, displaying the signon message and getting input from either the command buffer or direct from the console keyboard, the ramdisk software will take a moment to communicate with the 8088 processor and then exit back to CP/M. Upon exit a summary of the settings assigned for drivename, directory fill, load address and port number is displayed. If you get to here you are in business, otherwise some kind of error condition exists.

Most of the time this is due to invalid input data. When the program cannot make sense of what you typed in the direct input mode, the prompt is simply reissued and the input must be

repeated. If the data was all included on the command line as described in the previous section, then the program simply displays the following message and terminates:

*** invalid parameter in command line ***

Here is the current list of errors that will get you in trouble in this respect.

a) Drivename outside the range A through P.

b) Response other than Y,N or <CR> to directory fill prompt.

c) Load address not valid hexadecimal, that is not composed of the digits Ø through 9 or A through F.

d) Load address below BIOS start or not on even 256 byte boundary.

e) I/O port address not valid hexadecimal.

f) I/O port address greater than FE hex.

A couple of other conditions may exist that will make it impossible to load the ramdisk software. One possibility is that the I/O port address for CO-POWER is not really correct for the actual system being used. It is also possible to get the 8088 stuck in a situation where it will not respond. In both cases you will get the following error message:

*** cannot load, 8088 does not respond ***

If you see this message, you should check to see that you are using the correct CO-POWER Z8Ø Adapter Board for your system, and that CO-POWER is correctly connected to the computer. After doing that, press the Z8Ø's reset button, reboot CP/M and try running RAMDISK.COM again.

Another error can occur when using ramdisk as logical Drive A:. In this case the ramdisk software must locate your copy of CP/M in memory and transfer it to the ramdisk for use by subsequent warm boots. A special mechanism called a CRC check is used by the software to insure that a valid copy of CP/M is present in memory. If this check fails to verify, you will see the following message:

*** not standard CP/M system, cannot load ***

If this happens you will not be able to use the ramdisk as Drive A: unless you can find what is causing the CRC to fail. The most likely causes are listed below:

a) The operating system is not CP/M version 2.2, but rather some look alike such as CDOS, TPM, TurboDOS, CP/M+ or MP/M. Consult SWP on the availability of ramdisk software for these systems.

b) The operating system is CP/M 2.2 but the code has been altered in some way for use on your machine. Also call SWP for help.

c) The operating environment of your system has been altered by an applications program that was run previously. Any program that alters the BIOS jump table or the BDOS vector at location 5 should be loaded after you load the ramdisk driver, not before. Even if you reverse the load sequence there may be some such programs that will not work with the ramdisk.

PART 2. Using DOS on CO-POWER

The software included with your SWP board makes it possible to run IBM PC-DOS version 2.1 on your CO-POWER. To do this you will also need to obtain a PC-DOS boot disk and (hopefully) a DOS user's manual. A standard, un-modified IBM boot disk will load and run on the CO-POWER. Nothing special has to be done to initially load PC-DOS. By combining the standard IBM software with some of the files from the SWP DOS utility disk, you can create an enhanced PC-DOS with a number of special features. These include file transfer programs to copy data files between CP/M and PC-DOS, multiple PC-DOS screen drivers so you can run lots of different software (like LOTUS and Turbo Pascal), and an extended disk driver so you can use hard disks (on the Kaypro 10) and quad density floppies.

This PC-DOS section details those features that are specific to SWP's system. Information on standard DOS features are in the IBM 'Disk Operating System' Manual. Thoroughly read the following pages to learn about your system and find out how to take advantage of CO-POWER's special features. Be sure to read about the screen driver features in Section C. The driver you use must match the installation of your PC-DOS software.

NOTE: Prior to August 1, 1985, CO-POWERs included the MS-DOS operating system. MS-DOS is no longer available from SWP due to excessive OEM price increases from Microsoft. The new software included with CO-POWER makes it possible to run IBM PC-DOS on the CO-POWER while retaining most of the features of the June 10, 1985, version of MS-DOS from SWP.

A. Booting PC-DOS

You received two disks with the CO-POWER, an SWP PC-DOS Utility Disk and a disk with PC-DOS Load Files and RAMDISK Software. The Load Files disk is a single-sided CP/M disk. The other disk is an IBM PC formatted disk.

PC-DOS is booted in two stages. The first step is done by running the CP/M program PCDOS.COM. This loads the Z80 software that provides all the CO-POWER's input/output functions and transfers control to the 8088 in preparation for loading PC-DOS. The second step is to remove the CP/M disks and place a bootable PC-DOS disk (not provided by SWP) drive A:. This enables the PC-DOS load to be completed.

A1. Making A Master DOS System Disk

Before booting DOS for the first time, please make a backup copy of the SWP PC-DOS Load Files disk. You should also PIP the contents of the SWP disk onto one of your CP/M system disks (or onto the hard disk if you have a Kaypro 10).

To boot DOS for the first time you need:

- a PC-DOS 2.1 system disk

- a copy the PCDOS.COM file from SWP ona CP/M disk.

To boot:

#1 Turn on the computer and boot CP/M using the system disk you have previously copied the SWP files onto.

#2 Run the DOS boot loader by typing;

PCDOS<return>

#3 In a few seconds the screen will show:

```
... Ready to load DOS ...

Insert a DOS system disk in the boot drive
and type any key when ready to begin loading

?
```

Put a PC-DOS 2.1 system disk in Drive A: (forfloppy disk Kaypros) or in drive C: (for Kaypro 10's). Then press any key to continue.

#4 The screen will show the messages listed below and then begin loading DOS from the boot drive.

```
**********************************
**                              **
** SWP Microcomputer Products **
** 1000 West Fuller             **
** Fort Worth, Texas 76115      **
** copyright 1983,84,85         **
** 20-August-85                 **
**                              **
**********************************

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

Enter the date in the format shown (month,day,year) or press

<return> to bypass. (PC-DOS files are time and date stamped in the directory so this can be a very useful feature.)

Next the screen shows:

```
Current time is:  0:00:00.05
Enter new time:
```

Again, either answer or press <return> to bypass. Next the screen shows the IBM sign-on message and the logged drive prompt. (on Kaypro 10's the floppy drive is called drive A: and B: by PC-DOS, the hard drive will be C: and D:)

```
The IBM Personal Computer DOS
Version 2.10

A>
```

#5 The initial boot is now done. To take advantage of SWP's MS-DOS utility programs, you'll make a Master DOS disk that will combine the PC-DOS files and the SWP files.

First make a copy of the PC-DOS disk by doing the following: With the PC-DOS system disk that we booted from in drive A:, type the command:

```
A>FORMAT B:/S
```

The screen will say:

```
Insert new disk for drive B:
and strike any key when ready
```

Now put a blank diskette in drive B: and press any key to start formatting.

*** SPECIAL NOTE FOR KAYPRO 10 USERS ***

Since you folks do not normally have a second floppy disk drive, we have configured PC-DOS for single drive operation on the Kaypro 10. This means that PC-DOS 'pretends' that there are two floppies in the system but actually does all it's work in the single drive. Whenever DOS needs to change to a different drive it issues a message to the screen saying to put the diskette for drive B: (or A: as the case may be) into the drive and press a key when ready.After you press a key DOS continues doing it's thing until another disk change is needed. Therefore in the following discussion whenever there is a refererence to B:, you will be asked to 'insert disk for B: and strike any key when ready'. Please bear with us and do as the prompts ask. After the system is set up you will be able to put files on the hard disk and

this disk changing nuisance will go away.

The FORMAT program will now run and show the following:

```
Formatting . . . Format complete
System transferred

     362496 bytes total disk space
      40960 bytes used by system
     321536 bytes available on disk

Format another (Y/N) ?
```

Answer N. (Note: if you have single sided disk drives, the disk space shown will be about half this amount.)

#6 Now we'll copy all files from the PC-DOS disk to the new disk. With the PC-DOS disk still in Drive A and the new disk in Drive B, enter:

```
A>COPY *.* B:/V
```

When the copy is completed, remove the PC-DOS disk from Drive A and store it. Place the new disk from Drive B into Drive A. Put the SWP PC-DOS Utility Disk in Drive B. Log onto Drive B with the command:

```
A>B:<return>
```

Now we'll run a program on the SWP disk that will copy some of SWP's files to the disk in Drive A and will remove files that do not pertain to the CO-POWER system. The resulting disk will be your Master DOS disk. Type:

```
B>SETUP<return>
```

When the program is done, you will return to the B> prompt. Label the disk in Drive A the "Master DOS" disk. Set aside the SWP PC-DOS Utility disk.

#7 For SWP's PC-DOS features to become part of DOS we must reboot PC-DOS using the Master DOS disk in place of the PC-DOS disk. Log onto Drive A (A:<return>) and run the Z80 program to return to CP/M:

```
A>Z80<return>
```

A screen message tells you when to put a CP/M system disk in Drive A. Use the bootable disk containing PCDOS.COM.

#8 Now let's go back to PC-DOS. From CP/M A> type PCDOS and

<return>. When prompted for the DOS disk, use the Master DOS disk we just made.

The screen will show the same SWP sign-on message and then the following:

```
CPM: device driver installed
Multi-mode console driver installed
( Device driver for 2 winchesters installed )
Current time is:  0:00:00.0
Enter new time:
```

note: The line shown in parentheses is present only on Kaypro 10 systems. Floppy disk based Kaypros do not need this driver.

SPECIAL NOTES: To make a PC-DOS system disk that will boot the SWP system, it must be sysgened with the FORMAT /S command and it must contain, at a minimum, the following files;

CONFIG.SYS

File to define system set-up parameters and to load user writtem extensions to PC-DOS. Read about this in the DOS user's manual from IBM.

CONSOLE.SYS

Loadable driver for multi-mode console device to replace the standard IBM console.

MULTFMT.SYS

OPTIONAL module. This is a loadable driver for non-standard disk devices. Include the statement DEVICE=MULTFMT.SYS in the CONFIG.SYS file only if you have a hard disk or quad density five inch drives. These extra drives will appear as drives numbered C: and higher.

XCPM.SYS

Loadable driver to provide for the DOS <--> CP/M file transfer capability.

A2. Setting up space on the Kaypro 10 hard disk for PC-DOS

CO-POWER for the Kaypro 10 includes a number of special features that allow the hard disk to be used as a PC-DOS drive. Two programs are included to make this possible, a CP/M program called DEFDSK.COM that creates PC-DOS disk partitions on the hard disk, and a PC-DOS loadable disk driver called MULTFMT.SYS that utilizes these partitions. During the set up procedure you select how much of CP/M drives A: and B: to reserve for PC-DOS. This portion of the hard disk will be seen in CP/M as a data file named MSDOS.DAT. When you boot PC-DOS with the master boot disk created in the last section, the hard disk will then become accessible from DOS. You can use it to store files and run programs from just like any other disk drive, although it will always be necessary to boot PC-DOS from the master floppy disk.

We discussed how to create the PC-DOS master system disk in the previous section, so now let's go back to CP/M and run DEFDSK.COM to set aside hard disk space for PC-DOS. The set up process may take as long as thirty minutes. We advise that you don't start this if you don't have enough time to finish it in one sitting.

You will need:

- the SWP DOS utility sofware disk
- the figures for the amount free space left on Drive A and on Drive B (Run STAT or D to get this information.)

After determining how much free space you have on Drive A and Drive B, decide how much of the space you'd like to be used for PC-DOS. As in CP/M, it is handy to have PC-DOS areas on both drives so you can store more data, although this is not essential for operation. If you only reserve PC-DOS space on one of the CP/M hard disk units, that portion will be refered to by PC-DOS as drive C:. If two partitions are created then you will have a PC-DOS drive C: and D:, where C: is contained in the file A:MSDOS.DAT and D: is contained in B:MSDOS.DAT. It is also perfectly ok to come back at a later date and create a second PC-DOS partition on the other drive if your single drive PC-DOS file gets filled up. Just be sure not to destroy either MSDOS.DAT file by accident while you are running CP/M. If this happens, ALL the data in PC-DOS will be lost forever. A good way to prevent this is to periodically make copies of the MSDOS.DAT file onto floppies using the MUFBACK utility program provided by Kaypro with all KP-10 computers.

Step 1 First we'll allocate part of the hard disk for PC-DOS. Insert the PC-DOS Load Files disk into Drive C. Log onto Drive C (from A> type C:<return>).

Step 2 Type DIR and make sure that this disk contains these files:

PCDOS.COM MODIFY.M

RAMDISK.COM . MODIFY.R
DEFDSK.COM

NOTE: You should have already read the Special Considerations at the start of this document. If you have not, do so. If your Kaypro 10 is a 1983 version, you may need an altered version of PCDOS.COM.

Step 3 From C> run DEFDSK. The screen will show:

```
S W P Microcomputer Products
Copower 88 hard disk Setup Program
    release date 13-August-85

Select one of the following:

    1 - Create MSDOS area on drive A
    2 - Create MSDOS area on drive B
    3 - Delete MSDOS area on drive A
    4 - Delete MSDOS area on drive B
    5 - Exit program

Enter your selection:
```

Here you will have to choose for your needs. The example will show selection of Drive A.

We'll select 1 to create room on Drive A. Enter 1 and <return>. The screen now shows:

```
You may select an MSDOS size of 86 to 1118 blocks.
Each block is 4096 bytes if data storage. If
you select 1118 blocks, you will make the drive
ALL MSDOS. Enter an "X" if you wish to return
to the start of the program.
Input MSDOS size:
```

Don't let this scare you! The Kaypro 10's hard disk has a total of 9 megabytes of formatted storage area, 4.5M for each Drive A and B. We'll reserve approximately 2000K of Drive A. To get the number of blocks we want, divide 2000 by 4.096. To make it easy we'll call it 2000 / 4 or 500 blocks.

Enter 500 and <return>.

(If you try to select more space than there is free, DEFDSK will not accept the input.)

As DEFDSK is working it will draw rows of asterisks across the screen. When it is done, the DEFDSK menu shows on the screen.

If you also want to use part of Drive B for MSDOS, select 2 and answer the prompts. NOTE: Sometimes DEFDSK

is finicky. Sometimes it will not reserve a portion of the other drive until you exit DEFDSK and reenter.

Step 4 When finished setting up A: and/or B: for DOS, select option #5 of DEFDSK to exit to CP/M. Now boot PC-DOS with your master DOS diskette and check the operation of drives C: (and optionally D:). The first thing to do would probably be to copy the contents of the PC-DOS boot floppy drive C:. To do this type;

```
COPY A:*.* C:/V
```

You should see the list of files being copied as the program progresses. Then log on to drive C: just as you do in CP/M, that is by typing;

```
C:<return>
```

Verify the contents of the hard disk by running CHKDSK, the DOS equivalent of CP/M's STAT program. Type;

```
CHKDSK /V
```

You should see a list of all the files on the disk followed by a display of the amount of free space on the disk and in the main memory of the CO-POWER. If this goes well you are ready to proceed with whatever you wish to do with the PC-DOS system. If you have a collection of DOS software on floppies, you may want to copy them all to the hard disk(s) for use.

B. Backing Up The SWP Master Disks

Before learning how to use your new CO-POWER system, it's a good idea to make copies of the SWP Master Disks and to store the originals.

The PC-DOS Load Files and RAMDISK Software Disk is a single-sided CP/M disk. If you have not already done so, make a backup copy of this disk like you would any CP/M disk.

The SWP PC-DOS Utility disk is an IBM PC format disk. Backup up this disk by booting PC-DOS and doing the following:

1. Run FORMAT and format a new disk.

   FORMAT X:

   where X: is the drive (ie. A,B,C or D) to be used.

   (PC-DOS's FORMAT automatically formats single-sided disks if the drive is single-sided, and double-sided disks if the drive is double-sided.)

2. COPY all files from A> to another drive by:

   A>COPY *.* X:/V

   (COPY is an internal command, not a disk file. X: is the destination drive and /V verifies the transfer.)

For better protection: Be sure that your master disks are write-protected before you store them.

More about formatting and copying disks is described later in this section and in your PC-DOS Manual.

C. Selecting and Using PC-DOS Screen Drivers

SWP's multi-mode console driver has a feature that lets you dynamically select different screen formats. With this feature you have can select between an a) 24 and 25 line ANSI terminal emulation, b) the native display of your Kaypro and c) an IBM PC display emulation.

ANSI control codes are used in many PC-DOS applications programs that are intended to be adaptable to different types of machines, rather than being just for the IBM PC. Among the ANSI features are highlighting (or inverse video), cursor positioning, clearing portions of the screen and other functions.

The IBM PC display is based on the functions provided by the interrupt 10 subroutine in the IBM rom bios. This routine is not strictly a terminal driver, but rather provides functions such as setting the display mode, writing characters and attributes to the screen, scrolling and clearing regions of the screen, etc.

Not all PC-DOS programs will run under all drivers. The default for your system is the ANSI25 driver. If a program doesn't run correctly under ANSI25, it may work under another driver. Experiment and keep track of what driver each of your programs needs.

These drivers will not make IBM-PC programs that are screen or keyboard dependent run. They will allow installation of other programs for your system.

To change screen drivers, simply run the .COM file of the desired one. Below is a description of each driver.

24-lines:	ANSI24.COM	- a 24-line ANSI display emulated using the native CP/M console
	NATIVE.COM	- the unadorned CP/M console
25-lines:	ANSI25.COM	- a 25-line ANSI display using SWP custom screen driver
	INT10.COM	- a 25-line SWP screen that uses IBM interrupt 10 calls

C1. ANSI25.COM

This is the default driver for your computer. It provides a 25-line ANSI display using an SWP custom video driver on the Z80 side. This code takes advantage of some hardware features of the Kaypro video display not normally used by Kaypro software, and provides the functions necessary to run Lotus 1-2-3 and other IBM

related software.

Many programs can be installed for a variety of screens. An example is MS-DOS Multiplan. Installed for a Lear Siegler ADM-3A (Kaypro), it runs on CO-POWER. However, installed for an ANSI screen it runs with enhanced display features like highlighting and inverse video.

Another MS-DOS program that can be installed for an ANSI25 screen with better results is MS-DOS WordStar 3.3. This installation is listed later in this section. Not only does the WordStar display look better (you get the same inverse sections that you do in CP/M WordStar), the screen scrolls much faster than it does when installed for a Lear Siegler screen (Kaypro). The ANSI codes make a big difference.

ANSI features are documented in the IBM "DOS Technical Reference Manual". We have also added two control codes not used by IBM. These are handy for Turbo Pascal and Wordstar. They are the following;

Insert Line = ESC [1 L

Delete Line = ESC [1 M

C2. INT10.COM

This 25-line custom SWP driver uses the same code on the Z80 side as ANSI25, but does not check for ANSI control sequences. Use this one if you need total compatibility with the IBM PC rom bios INT 10 video driver. Either 25 line driver can be used for most PC compatible software however.

C3. ANSI24.COM

This driver mates the ANSI crt control sequences together with your standard Kaypro display. Use ANSI24 if you need an ANSI compatible display but still want to use the CP/M video driver.

C4. NATIVE.COM

This driver makes the standard Kaypro display accessible to PC-DOS. In other words, it makes PC-DOS and CP/M have exactly the same dislay driver. Use this if you wish to have total compatibility with the Kaypro screen or if you have some custom display software and/or hardware in CP/M that you wish to access in PC-DOS. This driver is also useful if your Kaypro has a sluggish 6845 video chip that sometimes puts out double characters when operated in the 25 line mode.

C5. Changing the Default Screen Driver

Changing screen drivers is done by running the .COM file for the one you want to use. For example, to change to the INT10 driver, you would run INT10.

If you will not be using the ANSI25 default driver most of the time, you can make the system boot up with a different driver by putting a new AUTOEXEC.BAT file on the Master DOS disk. (AUTOEXEC is a file that MS-DOS automatically loads when the operating system is booted. It is described in your PC-DOS manual.)

The following example shows how to make an AUTOEXEC.BAT file that loads the INT10 driver on boot up. (Type <return> after each line.)

```
A>COPY CON:=AUTOEXEC.BAT
  DATE
  TIME
  INT10
  <ctl-Z>
  <return>
```

You will be back at the A> prompt. Type DIR and list the directory. AUTOEXEC.BAT should be there. You can doublecheck the contents by using the TYPE feature:

```
A>TYPE AUTOEXEC.BAT
```

It should show:

```
  INT10
```

You cannot modify an AUTOEXEC.BAT file made like above. To change it, delete (ERASE) the old one and make a new one. To work, the AUTOEXEC.BAT file must be on the DOS disk used to boot the system.

D. IBM PC Function Keys

SWP PC-DOS reconfigures your Kaypro numeric keypad for IBM function keys. This feature is supported under all SWP screen drivers. Using this feature, you can use the 90+ special function keys found on the keyboard of the PC. A few keys have special meanings under the PC-DOS operating system, but most are used from applications programs that were written for the PC.

D1. Function Keys From the Operating System

The following keystrokes have the listed effect when used from the operating system:

Keypad Key	Effect
1	Used in the command line: Single character repeat from last input template. For example, if the last command issued was "DIR", pressing <1> on the keypad will cause the "D" to appear in the command line, another <1> will bring the "I" and a third <1> the "R". After your entry is typed, you will have to press <return> to execute it.
3	Used in the command line: Repeat of the entire last entered command line. For example, if you are doing a multiple copy of a disk and are using the command line: COPY *.* B:/V, entering <3> will repeat the command for you. You must press <return> to execute the command.
6	Causes a CONTROL Z. Can be used in making batch files.

D2. Function Keys from Programs

These keystrokes work in programs that use the IBM keyboard interrupt call (INT 16H) or the DOS console input function calls. They will not work with programs that bypass the keyboard software interfaces and access the keyboard hardware directly.

Following is a list of the IBM key and the equivalent key(s) to use on the Kaypro. You must use the exact sequence shown, ie. if it says to use a key on the keypad, you cannot use the same key on the regular pad, if the keypad is not indicated, use the key on the main pad. Also, you must follow lowercase vs. uppercase in input. The Kaypro arrow keys will respond like the IBM arrow keys.

IBM KEYSTROKE	EQUIVALENT KAYPRO KEYSTROKE First	Second (if needed)
F1	keypad 1	
F2	keypad 2	
F3	keypad 3	
F4	keypad 4	
F5	keypad 5	
F6	keypad 6	
F7	keypad 7	
F8	keypad 8	
F9	keypad 9	
F10	keypad 0	
Page Up	keypad -	
Page Down	keypad ,	
Home	keypad .	
END	keypad ENTER	keypad ..
INS	keypad ENTER	.
DEL	keypad ENTER	/
CTRL	keypad ENTER	[
CTRL	keypad ENTER	]
CTRL END	keypad ENTER	a
CTRL Page Down	keypad ENTER	b
CTRL HOME	keypad ENTER	c
CTRL Page Up	keypad ENTER	d
F11 (uppercase F1)	keypad ENTER	keypad 1
F12 (uppercase F2)	keypad ENTER	keypad 2
F13 (uppercase F3)	keypad ENTER	keypad 3
F14 (uppercase F4)	keypad ENTER	keypad 4
F15 (uppercase F5)	keypad ENTER	keypad 5
F16 (uppercase F6)	keypad ENTER	keypad 6
F17 (uppercase F7)	keypad ENTER	keypad 7
F18 (uppercase F8)	keypad ENTER	keypad 8
F19 (uppercase F9)	keypad ENTER	keypad 9
F20 (uppercase F10)	keypad ENTER	keypad 0
F21 (CTRL F1)	keypad ENTER	SHIFT 1
F22 (CTRL F2)	keypad ENTER	SHIFT 2
F23 (CTRL F3)	keypad ENTER	SHIFT 3
F24 (CTRL F4)	keypad ENTER	SHIFT 4
F25 (CTRL F5)	keypad ENTER	SHIFT 5
F26 (CTRL F6)	keypad ENTER	SHIFT 6
F27 (CTRL F7)	keypad ENTER	SHIFT 7
F28 (CTRL F8)	keypad ENTER	SHIFT 8
F29 (CTRL F9)	keypad ENTER	SHIFT 9
F30 (CTRL F10)	keypad ENTER	SHIFT 0
F31 (ALT F1)	keypad ENTER	q
F32 (ALT F2)	keypad ENTER	w
F33 (ALT F3)	keypad ENTER	e
F34 (ALT F4)	keypad ENTER	r
F35 (ALT F5)	keypad ENTER	t
F36 (ALT F6)	keypad ENTER	y

IBM KEYSTROKE	EQUIVALENT KAYPRO KEYSTROKE First	Second (if needed)
F37 (ALT F7)	keypad ENTER	u
F38 (ALT F8)	keypad ENTER	i
F39 (ALT F9)	keypad ENTER	o
F40 (ALT F10)	keypad ENTER	p
ALT A	keypad ENTER	A
ALT B	keypad ENTER	B
ALT C	keypad ENTER	C
ALT D	keypad ENTER	D
ALT E	keypad ENTER	E
ALT F	keypad ENTER	F
ALT G	keypad ENTER	G
ALT H	keypad ENTER	H
ALT I	keypad ENTER	I
ALT J	keypad ENTER	J
ALT K	keypad ENTER	K
ALT L	keypad ENTER	L
ALT M	keypad ENTER	M
ALT N	keypad ENTER	N
ALT O	keypad ENTER	O
ALT P	keypad ENTER	P
ALT Q	keypad ENTER	Q
ALT R	keypad ENTER	R
ALT S	keypad ENTER	S
ALT T	keypad ENTER	T
ALT U	keypad ENTER	U
ALT V	keypad ENTER	V
ALT W	keypad ENTER	W
ALT X	keypad ENTER	X
ALT Y	keypad ENTER	Y
ALT Z	keypad ENTER	Z
ALT 1	keypad ENTER	1
ALT 2	keypad ENTER	2
ALT 3	keypad ENTER	3
ALT 4	keypad ENTER	4
ALT 5	keypad ENTER	5
ALT 6	keypad ENTER	6
ALT 7	keypad ENTER	7
ALT 8	keypad ENTER	8
ALT 9	keypad ENTER	9
ALT 0	keypad ENTER	0
ALT -	keypad ENTER	-
ALT =	keypad ENTER	=
CTL-BREAK	keypad ENTER	keypad ENTER (see note)

note: Ctl-break is not really character in the usual sense. When it is detected an INT 1BH (keyboard break interrupt) is generated. With the multi-mode console driver installed, this causes the keyboard buffer to be flushed and puts a ctl-C into

the buffer. Think of this as a sort of 'super' ctl-C key. Use it when you want to stop a running program and regain control of the computer.

D3. Changing the Numeric Keypad Back to Its Original State

If you wish to use the Kaypro keypad for entering numbers rather than as function keys, simply type

<CTL> 3 (ie. hold down the CTRL key and then type the number 3 on the main part of the keyboard)

This will turn the function keys off. A beep lets you know that the computer has acknowledged. The four arrow keys still keep their function key definitions so spreadsheet programs are not too akward to use.

Another <CTL> 3 turns the function keys back on. It also beeps. This mechanism works at all times, regardless of what program you are running.

E. Transferring Files Between PC-DOS and CP/M

This is a new CO-POWER PC-DOS feature. You can transfer files from CP/M to PC-DOS and vice versa. Also, while you are in PC-DOS, you can look at a CP/M disk directory. CP/M files can be transferred to the screen or to disk!

Technical Aspects:
To create this feature we added a new a character device called CPM:, which can be accessed with DOS system calls to read and write data. DOS function #44 hex (I/O control for devices) can be used to send commands to CPM to open, search or create files. Source code for the transfer files is included on your disk. If you make any interesting changes, please let us know!

E1. CPMDIR.COM

This program lets you look at a CP/M disk directory from PC-DOS. You can specify the drive, and use the * and ? wildcards. You can even specify CP/M user areas! This is done with a / tag that tells the user area number.

Examples of use:

CPMDIR B:	shows the CP/M directory of the disk in Drive B.
CPMDIR A:*.DOC	shows all the .DOC files in the CP/M directory of Drive A.
CPMDIR A:/3	shows the directory of the files in user area 3 of Drive A.

E2. CPM2DOS.COM

This PC-DOS program transfers a CP/M file to PC-DOS. The file can be transferred to the screen or to disk. The file may be taken from any user area.

The syntax of this program is like the PC-DOS COPY function. It follows the general form:

CPM2DOS A:TEST.DOC B:

where the file TEST.DOC is copied from Drive A (CP/M) to Drive B (PC-DOS). If the destination drivename is not specified, the file is displayed on the console (screen). Example:

CPM2DOS A:TEST.DOC

SWP, 1000 W. Fuller, Ft. Worth, TX 76115-3301 USA. 817-924-7759

SP?

JOHN MORISSEE - ENGINEER WITH SWP

GREG - OWNER OF PEOPLE TALK

As with CPMDIR, the / tag can be used to specify a CP/M user area number. For example:

```
CPM2DOS A:TEST.DOC B: /3
```

gets the CP/M file TEST.DOC from user area 3.

CAUTION: when using this program be sure to keep track of what type of disk each drive contains. The CP/M portion of this program uses the CP/M BDOS for disk I/O. Some systems will hang up if a PC-DOS disk is accidentally in the specified CP/M drive.

E3. DOS2CPM.COM

This PC-DOS file transfers an PC-DOS file to CP/M. This program follows the PC-DOS COPY format of source,destination. Both drives must be specified.

Example:

```
DOS2CPM B:NEW.DOC A:
```

copies the file NEW.DOC from Drive B (PC-DOS) to Drive A (CP/M). As with CPM2DOS be careful to have the right disks in the specified drives. You can specify the CP/M user area the file will be written to by using a / tag:

```
DOS2CPM B:NEW.DOC A:/4
```

Transfers the PC-DOS NEW.DOC file from Drive B to user area 4 of the CP/M disk in Drive A.

F. Formatting PC-DOS Disks

The PC-DOS manual contains instructions on how to format disks with FORMAT.COM. This program will only create disks in the IBM PC formats, namely five inch, 9 sector per track, single and double sided/double density. With the SWP loadable disk driver MULTFMT.SYS, it is possible to operate with non-IBM disk formats such as five inch quad density. In order to initialize disks in these formats it is necessary to use the SWP supplied format program DISKINIT.COM instead of FORMAT.COM. The DISKINIT program works quite a bit differently from IBM's FORMAT. Instead of using a list of format options on the command line, DISKINIT simply shows a menu of formats available and asks you to select which format and physical disk drive to use. It does not have the capability to make system's disks or to make disks with a volume label. It is strictly meant to be used to create diskettes for use with the MULTFMT.SYS driver. (ie. for drive C: or greater).

G. Differences With the PC-DOS Manual

The following items in the PC-DOS Manual do not apply to CO-POWER PC-DOS.

1. CO-POWER PC-DOS does NOT run hardware dependent IBM-PC programs. These are programs that require 100% IBM compatibility to run.

2. CO-POWER cannot run IBM-PC BASIC or BASICA. These BASICs make calls to the IBM ROM. Microsoft MSBASIC 5.28 and COMPAQ BASICA 1.13 run on the CO-POWER.

3. CO-POWER does not do IBM screen graphics. Disregard all references to graphics.

4. CO-POWER PC-DOS does not support hard disks except on the Kaypro 10.

5. CO-POWER PC-DOS includes our own ANSI screen drivers. Do not attempt to use the ANSI.SYS driver from IBM. It does not work with CO-POWER and will lock up the system if loaded.

H. Using PC-DOS Software

This section gives you some tips on using PC-DOS and PC-DOS programs. Together with the PC-DOS Manual, this will teach you how to make the most of your new system.

H1. Buying Software for CO-POWER

Many 16-bit programs are distributed in both MS-DOS and PC-DOS versions. CO-POWER allows you to run some programs from both. We recommend that you first try MS-DOS versions of software, even though the CO-POWER is running PC-DOS. This is because MS-DOS software is usually less IBM hardware dependent that PC-DOS, and hardware incompatibility is the prime cause of programs not working. SWP's software list lists programs that SWP has tested to work with CO-POWER. When obtaining other programs to use with CO-POWER follow these guidelines:

PC-DOS
(limited compatibility)

CO-POWER boots PC-DOS and allows you to run PC-DOS programs that are not hardware dependent. Steer away from PC-DOS programs that require graphics, use IBM BASIC, or that do direct writes to an IBM-PC screen. MS-DOS programs that SWP has tested and found to be compatible are in the software list. They are marked with the "IP" and "PC" codes. This list is not conclusive, there are other non-hardware dependent programs that will run.

CO-POWER PC-DOS is data compatible with the IBM-PC. It formats disks in the IBM-PC disk format. Data disks from a CO-POWER system can be used in an IBM-PC and vice versa. Programs that use IBM BASIC will not run because this BASIC resides in the on-board rom chips of the IBM PC and is highly propriatary to IBM. Lastly, remember to get software on single sided diskettes if your system has only single sided disk drives.

H2. Running LOTUS 1-2-3

Your SWP MS-DOS Utility disk disk contains TD.DRV, a file that lets you run LOTUS 1-2-3 version 1A with CO-POWER if your computer has double-sided disk drives. (Kaypro 2/84 owners who upgrade to double-sided 40-track drives can run LOTUS.)

LOTUS will run on CO-POWER like it does on an IBM-PC with a monochrome display. You cannot view graphs on the screen, but you can print them. LOTUS runs under both the ANSI25 and INT10 screen drivers. (Described in Section C) Before purchasing LOTUS, we recommend that you read the LOTUS 1-2-3 license agreement.

Kaypro 2X and 4/84 users: Install LOTUS for a monochrome monitor per their instructions. The installation will generate a file called TD.DRV. Erase that TD.DRV file and replace it with the SWP TD.DRV file. That's it!

Kaypro 10 users: To run LOTUS from hard disk Drive C, install LOTUS for a monochrome monitor following the instructions for using a hard disk. Then replace the generated TD.DRV file with the SWP TD.DRV file. LOTUS requires that you have the LOTUS system disk in Drive A while the program is being run.

Notes: When running the LOTUS TUTOR some of the screen graphics will display with 'funny' characters. This is rare and does not cause any problems. Also, due to a lack of keys, the STOP key is not implemented; this function can be done with other keys. The CAPS key sign always shows on the LOTUS screen whether or not your CAPS lock key is on. Again, this does not cause any problems.

H2A. Tips for Kaypro 10 LOTUS 1-2-3

One of the advantages of running LOTUS 1-2-3 on the Kaypro 10 is the availability of the DOS formatted portion of the hard disk. The following is a suggestion for how to make the most out of your CO-POWER system.

MS-DOS has a subdirectory feature that helps you organize hard disk files. If you put major programs and their data files in a specially defined subdirectory it will be easy to keep track of the related files.

Before copying the LOTUS master disks to your hard disk, make a subdirectory for it by typing:

```
A>MD 123
```

Then change to the new directory using the command:

```
A>CD 123
```

Now copy the LOTUS master disks to the hard disk and install the program following the MONO instructions and the SWP utility instructions above.

You must be in the 123 directory to run LOTUS and you must have a LOTUS system disk in the floppy drive. To make it easy to run LOTUS, you can create a MSDOS batch file by typing this:

```
C>COPY CON START.BAT
  C:
  CD 123
  LOTUS
  CD \
  ^Z        (or press F6)
```

When you press <return> after ^Z, MSDOS will have made the file START.BAT on Drive A>. Because we will be changing the definition of Drive A while this file is being used, you must also have an exact copy of this START.BAT file on your LOTUS System disk.

Remove the write protect tab from your LOTUS system disk and place it in the floppy drive. Copy START.BAT to this disk by typing:

```
A>COPY START.BAT C:/V
```

AS SOON AS THE FILE IS COPIED TO THE LOTUS DISK, REMOVE THE DISK FROM THE DRIVE AND PUT A WRITE PROTECT TAB ON IT.

You can now easily run LOTUS by doing the following:

1. Boot MSDOS and answer the time and date stamps.

2. Place the LOTUS system disk in the floppy drive. From the main Drive A directory (A\), type:

   A>START

3. The batch file will:

   1. Change the logged directory to the LOTUS directory.
   2. Run LOTUS.

4. When you exit LOTUS, the batch file will:

   Put you back at the root directory where you were before you ran START.BAT.

   NOTE: Sometimes when you run LOTUS for a long period of time, when you exit it the PC-DOS system will tell you to insert a disk with COMMAND.COM in the drive and to press return. If this happens, go ahead and insert a PC-DOS system disk and then the batch file will continue.

Experiment with batch files. They can help make your MS-DOS operations simple to use and easy to show another person how to run one of your programs. Batch files and subdirectories are described in your PC-DOS Manual.

If you have both a hard disk Drives C and D for MS-DOS, and you have data files for several programs on D>, you can create a subdirectory for the LOTUS data files on Drive D>. (Ex: D>MD 123, CD 123) If so, you can alter the above START.BAT file to suit your needs.

H3. MS-DOS Public Domain Disks Available From SWP

SWP is now offering three MS-DOS disks to CO-POWER users. The programs are all public domain or freeware. Each disk is $10, including postage, disk and handling. (Disks are 5 1/4" DSDD unless otherwise specified.) The disks are:

#1 Public Domain files sent to SWP by the Capitol ATR Peripheral Micro-Users Group. This disk has several utility programs (with document files) that run on CO-POWER. Some are:

MEMBRAIN.EXE - a RAMDISK program for MS-DOS! This is a terrific program. Use part of CO-POWER's RAM as operating RAM and the rest as a RAMDISK. Works with both CO-POWERs.
SDIR26.COM - An enhanced directory program.
CWEEP1.EXE - A utility similar to CP/M's DISK76. Good for file copying, specified file deleting, viewing text and hex files.
NEWDATE.COM - Changes the date on a file.
VOLSER.COM - Changes the volume label on a disk.
KEY.EXE - Displays the code a keystroke produces.

#2 Public Domain and Freeware files submitted by CO-POWER users. This disk contains lots of useful utilities and a freeware database program, PC-FILE. [Freeware means that you can have a free copy of the program. If you like it, there is a suggested contribution.] Among the files are:

LU-DOS.EXE - The library utility program that lets you build, examine, extract, etc., files.
SQUNSQPC.LBR - Contains SQueeze and UNSQueeze. Utilities that let you compress and uncompress files for easier storage and transfer.
PC-FILE.LBR - A library containing PC-FILE, a freeware database, and related files. A file with the manual is included. Suggested contrib.: $35.
SD.LBR - A library with a sorted directory program and complete documentation.

#3 Freeware program, Genealogy ON DISPLAY, submitted by a CO-POWER user.

GENEOLGY.LBR - A library containing the freeware program Genealogy ON DISPLAY and related files. Suggested contribution is $35. Requires BASICA (Compaq version 1.13 works).
LU-DOS.EXE - Library utility program to use with above.

These programs are provided as a service to SWP CO-POWER users. These programs are not supported by SWP Technical Support. Most programs list an author that can be contacted for information and help.

SWP, 1000 W. Fuller, Ft. Worth, TX 76115-3301 USA. 817-924-7759

H4. Installing MS-DOS WordStar 3.3 for a 25-Line ANSI Display

These instructions tell how to create a 25-line ANSI screen WordStar with the WINSTALL program. With this installation, the MS-DOS WordStar will display similarly to the Kaypro CP/M WordStar. This installation also makes the screen scroll much faster than non-ANSI installed WordStar.

1. Run WordStar's installation program, WINSTALL. Select what the source and destination files for the install will be. From the installation menu choose "B", custom installation of terminals.

2. From the TERMINAL INSTALLATION MENU choose "A" for Automatic installation of all features. You will be asked to answer several questions about the terminal. Following is a list of how to respond.

Q. Terminal Name.
R. Enter C to change. Then name the terminal ANSI25.

Q. Screen Size. Default is 24 x 80.
R. Enter C to change. Screen height is shown as 24, enter C to change, enter 25. Screen width is shown as 80. Do not change, press <return> to accept.

Q. Cursor Positioning.
R. Enter C to change.
Q. Function Code Sequence
R. Enter C to change. Type in these values as shown:

Current Value	New Value	
1Bh	<return>	leaves it unchanged
3Dh	:[	
00h	.	

If you entered this correctly, the screen lists it as 1Bh 5Bh. Press <return> to accept.

Q. Are there characters after the line # and before the other dimension?
R. Enter C to change. Type in these values as shown:

Current Value	New Value
00h	:;
00h	.

If you entered the above correctly, the screen lists it as 3Bh. Press <return> to accept.

Q. Are there characters after the line and column #s?
R. Enter C to change. Type in these values:

Current Value	New Value
00h	:H
00h	.

If you entered the above correctly, the screen lists it as 48h. Press <return> to accept.

Q. Is the line # sent before the column #. Currently no.
R. Do not change this. Press <return> to accept.

Q. What character is sent for line 1? Default is 20h.
R. Enter C to change.

New Value: ,1

If you entered this correctly it will list it as 1h. Press <return> to accept.

Q. What character is sent for column 1? Default is 20h.
R. Enter C to change.

New Value: ,1

If you entered this correctly it will list it as 1h. Press <return> to accept.

Q. What types of codes are sent to show line or col #s. Default is Single byte BINARY value.
R. Enter C to change to Multi Character ASCII.

Q. The # of ASCII characters sent to represent line or column #s is 1.
R. Enter C to change. Enter 2. Press <return> to accept.

Q. Terminal Start-up. Default is empty.
R. Press <return> to accept.

Q. Terminal Exit. Default is empty.
R. Press <return> to accept.

Q. Highlighting. Currently empty.
R. Enter C to change. Enter C to change Highlight-on and input these values:

Current Value	New Value
00h	,1B
00h	:[
00h	:7
00h	:m
00h	.

If you entered this correctly, the screen lists it as 1Bh 5Bh 37h 6Dh. Press <return> to accept.

Q. Highlight-off sequence. Currently empty.
R. Enter C to change. Input these values:

Current Value	New Value
00h	,1B
00h	:[
00h	:0
00h	:m
00h	.

If you entered this correctly, the screen lists it as 1Bh 5Bh 30h 6Dh. Press <return> to accept.

Q. Erase to End of Line. Default is empty.
R. Enter C to change. Input these values:

Current Value	New Value
00h	,1B
00h	:[
00h	:K
00h	.

If you entered this correctly, the screen lists it as 1Bh 5Bh 4Bh. Press <return> to accept.

Q. Delete Line. Default is empty.
R. Enter C to change. Input these values:

Current Value	New Value
00h	,1B
00h	:[
00h	:1
00h	:M
00h	.

If you entered this correctly, the screen lists it as 1Bh 5Bh 31h 4Dh. Press <return> to accept.

Q. Insert Line. Default is empty.
R. Enter C to change. Input these values:

Current Value	New Value
00h	,1B
00h	:[
00h	:1
00h	:L
00h	.

If you entered this correctly, the screen lists it as 1Bh 5Bh 31h 4Ch. Press <return> to accept.

Q. Handling of Last Character on Screen. Default is Yes for scroll command.
R. Press <return> to accept.

3. Now you are back at the TERMINAL INSTALLATION MENU. Select X to Exit this menu.

4. You are now back at the main INSTALLATION MENU. If you need to install a printer do so. Once any other selections are done, select X to exit the installation.

Choose option A to save your changes in your preselected filename.

That's it. This ANSI version of MS-DOS WordStar will display like the Kaypro 10's CP/M version does.

H5. Installing dBASE II Version 2.4 for CO-POWER

The following tells how to patch dBASE II to work properly with CO-POWER. The patch is to fix an incompatibility with MS-DOS 2.11, NOT with the CO-POWER software.

Have DEBUG.COM on a disk in Drive A and have dBASE II in Drive B. In these instructions <cr> means press the <RETURN> key. XXX indicates the segment that debug is using.

The screen shows:	You type:
A>	B:<cr>
B>	A:DEBUG DBASE.COM<cr>
Both dBASE and debug will load into memory. When done:	
-	A53F8<cr>
XXX:53F8	NOP<cr>
XXX:53F9	NOP<cr>
XXX:53FA	<cr>
-	
You have now made the patch and need to save the patched dBASE onto disk. Do this:	W<cr>
-	
When done, exit dBASE	Q<cr>
B>	

dBASE is now patched and saved. During the installation, when you select the type of terminal, we recommend that you choose the IBM-PC terminal. An alternate is Lear Siegler ADM-3A.

H6. Using Subdirectories

In CP/M data can be organized on a disk by using different user areas. In PC-DOS this can be done by using subdirectories. While this is most useful for Kaypro 10 users with the hard disk, all Kaypros can use this.

By making a subdirectory, you can create an area to store specific files. This is described in the PC-DOS Manual. The following is one example of using a subdirectory.

Situation: The main directory on Drive A contains utility files and you want to make a directory for WordStar. Do the following:

1. To make the directory, we'll call it WS for WordStar, do this:

```
A>MD WS
```

2. To change the directory to the new one:

```
A>CD WS
```

3. You are now in the new directory. Type DIR and you will see that there are no files (other than the dir files) in the directory. To copy the WordStar files from Drive C to this directory:

```
A>COPY C:*.* A:/V
```

To change out of a subdirectory back to the main directory, use the command "CD \". If you use subdirectories, read about the CD,MD, RMDIR and PATH commands in the PC-DOS Manual.

NOTE: COPY and other utilities access the logged directory of a drive. The DIR command shows what directory is active, in the second line of it's display:

```
Volume in drive A has no label
Directory of B:\
```

\ is the main directory.

H7. Batch Files

Batch files are a PC-DOS feature similar to SUBMIT files in CP/M. A batch file executes a series of commands. Following is one example of a batch file. For more information read about BATCH and AUTOEXEC.BAT in the PC-DOS Manual.

In section H6 the example shows how to make a subdirectory for WordStar. A batch file can be used to easily change from the main directory to the new directory, to run WordStar and to exit back to the main directory.

In the main directory of Drive A, type the following with <return> at the end of each line: (If you are in a subdirectory use CD \ to return to the main directory)

```
A>COPY CON WS.BAT
  CD WS
  WS
  CD \
  <CTRL><Z>    (or press F6)
```

There is now a file called WS.BAT in Drive A's main directory. You can verify the contents using the type command (TYPE WS.BAT). The .BAT file is an executible file. Test it by typing WS from the main directory. When you exit WordStar, the directory will change back to the main one.

I. Enhanced Communications Capabilities

The CO-POWER system attempts to fully emulate the functions of the RS-232 ports on the IBM PC. These are usually refered to as the COM1: and COM2: devices. As with any computer, a communications program must be adapted for the system used. This section tells programmers how to do this.

In computers with two RS-232 ports, COM1: is the port normally used for the modem and COM2: is the port used for the serial printer. Machines with only one port have COM1 and COM2 both going to the single port. These ports may be accessed by doing DOS calls to the devices, or by doing INT 14H calls to the IBM rom BIOS. Other methods, especially those that make direct reference to the 8250 chip in the IBM PC are absolutely GUARANTEED not to work, and will usually result in the following message appearing on the screen;

*** 8088 SYNC ERROR, PRESS 'R' TO RETRY OR ELSE ABORT ***

Information on the interrupt 14 calls follows. This can also be found in the IBM technical manual. The COM: devices are modeled on the IBM to the point that the PC-DOS MODE program can be used to set baudrates, parity and so on. Also the CTTY command can be used to switch the console over to the modem port so PC-DOS can be run remotely.

There are three ways to get a communications program going:

1. Find one that already uses non-hardware dependent mechanisms to do it's input/output. Before you buy such a program, make sure that:

   - the program uses interrupt 14 calls or DOS calls to access the RS-232 ports.
   - the part of the program that displays data on the screen must go through normal DOS or rom BIOS calls to operate. Programs that write directly to the video refresh buffer of an IBM PC will run but the display information will be lost.

2. Find one that allows you to write interface code for it, a common practice in communications programs. Many public domain modem programs are set up to facilitate end-user modifications, and the source code for these is also usually available.

3. Write your own program. Gee, what fun!

11. Interrupt 14 Calls

AH=0 INITIALIZE THE COMMUNICATIONS PORT

AL= FOLLOWING BIT DEFINITIONS

```
7       6       5       4       3       2       1       0
--- BAUD RATE ---     - PARITY -    - STOP BIT -    - WORD LNGTH -

 000 -   110            X0 - NONE      0 - 1        10 - 7 BITS
 001 -   150            01 - ODD       1 - 2        11 - 8 BITS
 010 -   300            11 - EVEN
 011 -   600
 100 -  1200
 101 -  2400
 110 -  4800
 111 -  9600
```

DX = WHICH COMMUNICATIONS PORT, 0 OR 1

```
CALL WITH   MOV     AL,init         ;bits defined as above
            MOV     DX,which        ;indicate which port to use
            MOV     AH,0
            INT     14H
```

RETURNS WITH CONDITIONS SET THE SAME AS IN THE STATUS CALL (AH=3)

AH = 1 SEND CHARACTER IN AL, AL IS PRESERVED

DX = WHICH COMMUNICATION PORT, 0 OR 1

```
CALL WITH   MOV     AL,character    ;character to send
            MOV     DX, which       ;indicate which port to use
            MOV     AH,1
            INT     14H
```

RETURNS WITH BIT 7 OF AH SET IF UNABLE TO TRANSMIT. THE REMAINDER OF AH IS SET THE SAME AS IN THE STATUS CALL (AH=3).

AH = 2 RECEIVE CHARACTER IN AL

DX = WHICH COMMUNICATION PORT, 0 OR 1

```
CALL WITH   MOV     AH,2
            MOV     DX, which       ;indicate which port to use
            INT     14H
```

RETURNS WITH CHARACTER IN AL, ERROR BITS 7,4,3,2,1, ARE SET IN AH AS DEFINED IN THE STATUS CALL (AH=3). AH BIT 7 INDICATES DATA SET READY WAS NOT RECEIVED. THUS, A NON ZERO AH ON RETURN INDICATES AN ERROR.

AH = 3 RETURNS STATUS IN AX

```
DX = WHICH COMMUNICATIONS PORT, Ø OR 1

CALL WITH    MOV     AH,3
             MOV     DX, which       ;indicate which port to use
             INT     14H

RETURNS WITH AH BITS SET AS FOLLOWS:

BIT 7 = TIME OUT
BIT 6 = TRANSMIT SHIFT REGISTER EMPTY
BIT 5 = TRANSMIT HOLDING REGISTER EMPTY
BIT 4 = BREAK DETECTED
BIT 3 = FRAMING ERROR
BIT 2 = PARITY ERROR
BIT 1 = OVERRUN ERROR
BIT Ø = DATA READY

AL BITS ARE SET AS FOLLOWS:

BIT 7 = RECEIVED SIGNAL DETECT
BIT 6 = RING INDICATION
BIT 5 = DATA SET READY
BIT 4 = CLEAR TO SEND
BIT 3 = DELTA RECEIVE SIGNAL DETECT
BIT 2 = TRAILING EDGE RING DETECTOR
BIT 1 = DELTA DATA SET READY
BIT Ø = DELTA CLEAR TO SEND
```

J. Using the MEMTEST Program

The SWP PC-DOS Utility disk contains a memory test program that performs an exhaustive test of CO-POWER's RAM chips. This program runs continuously and displays the addresses of any bad locations. If you think you may have some bad memory chips in the CO-POWER, run this test. Once MEMTEST is run, the only way to stop it is to reset the computer.

To run the program, type MEMTEST<return>.

If no errors are detected, a display like this will show on the screen:

```
0000 1.2.................3.4...5...................
```

The first number tells how many times the test has repeated. The other digits (and the dots between them) indicate which section of the test is currently in progress. The five tests performed are:

1. a rotating bit data pattern
2. an incrementing data pattern
3. a varying size checkerboard pattern
4. a memory data retention/refresh test
5. an address fault test

Each full cycle takes at least 10 minutes. After a pass is completed, the program relocates itself to a new place in memory and repeats. This makes it possible to test all memory including the area where the program is initially loaded. For this reason, allow at least one pass for each 64k of RAM to insure all memory is tested. This is a good program to leave running all night!

If any bad locations are found, an error message is displayed in this format:

```
(XXXXX=EE should=DD xor=BBBBBBBB)
```

where: XXXXX is the hex address of the bad memory
EE is the incorrect data read from that location
DD is the value that was supposed to have been there
BBBBBBBB is the binary (ie. ones and zeros) representation of the bits that are different between the values given by EE and DD.

The above information can be used to locate which chip is bad. If you get an instance where many locations are bad and the error message is coming out too fast to read, you can stop the display by typing any key on the keyboard. Typing another key restarts the program. Be sure to note the exact values of the error message if you have any questions about a CO-POWER board that fails MEMTEST.

K. Exiting PC-DOS

If you are going to power down your computer when you are done working in PC-DOS, simply remove any disks and turn off the power. If you want to go back to CP/M to do some work, or if you have a Kaypro 10 and want to run the SAFETY program, then do the following:

Your Master DOS disk contains a file called Z80.EXE. This program takes you back to CP/M by simply typing Z80<return>.

If you entered PC-DOS from a floppy disk, then in a moment the screen will show:

```
TYPE A CONTROL C TO RETURN TO MSDOS

PLACE A CP/M-80 SYSTEM DISK IN DRIVE A
TYPE ANY OTHER CHARACTER TO GO TO CP/M-80
```

Insert a bootable CP/M disk in Drive A and press any key.

Kaypro 10 users who have set up the hard disk for MS-DOS will bypass this prompt and automatically return to CP/M A0>.

PART 3. CP/M-86

CP/M-86 is an option for CO-POWERs. There are no hardware changes to the CO-POWER system to run CP/M-86, just the addition of the CP/M-86 operating disks.

CP/M-86 is the 16-bit version of CP/M. Many programs that you run in CP/M are also available in CP/M-86. The syntax of CP/M-86 is like CP/M's so it is very easy to learn.

Like MS-DOS, CP/M-86 is customized for CO-POWER. It is entered from a CP/M system file. CP/M-86 has your CP/M disk format. You can store files from CP/M and CP/M-86 on the same disks. Files are distinguished by a different extension: CP/M command files have the .COM extent, CP/M-86 command files have a .CMD extent.

Disks are formatted for CP/M-86 with your CP/M disk format program. Transferring the CP/M-86 operating system to a disk is done by using PIP or a copy program to move the entry files to it.

This section describes portions of CP/M-86 that are particular to CO-POWER. Information on using CP/M-86 in general is in the Digital Research CP/M-86 manual you received with CP/M-86.

We have added some files to the standard Digital Research CP/M-86 files on your system disk. These are:

CPM.SYS	contains the CP/M-86 operating system
Z88.COM	the command file that loads the CPM.SYS file
Z80.CMD	a CP/M-86 command file that exits CP/M-86 and returns the system to CP/M.

Before continuing, backup the CP/M-86 master disks and store the originals. Do this exactly like you backup CP/M disks.

A. Booting CP/M-86

To boot CP/M-86, do the following:

#1 Boot the computer with CP/M 2.2.

#2 Put a bootable CP/M 2.2 disk in Drive A that contains these files:

CPM.SYS Z88.COM Z80.CMD

#3 From the A> prompt, type:

Z88

and press <return>. This file loads CPM.SYS and CP/M-86 is booted.

CPM.SYS must be on the disk in Drive A when CP/M-86 is booted. Z88.COM can be run from any drive. For simplicity, we recommend that they both reside on Drive A. When CP/M-86 is booted it always logs onto Drive A.

B. Exiting CP/M-86

If you are done using the computer, remove any disks from the drives and power down. To return to CP/M 2.2 to do more work, do the following: (Kaypro 10 owners may want to go to CP/M to run SAFETY before powering down.)

Be sure the disk in Drive A is a bootable CP/M 2.2 disk. (You can make a disk that contains all CP/M-86 files and the CP/M 2.2 sysgened tracks.)

Run the Z80.CMD file.

That's it. Z80 can be run from any drive. Regardless of what drive it is run from, the computer will do a warm boot on Drive A. Be sure that Drive A has a bootable CP/M disk in it before running Z80.

C. Differences With the IBM-PC CP/M-86 Manual

With CP/M-86 you received an IBM-PC CP/M-86 manual. These are differences between the IBM manual and the CO-POWER system.

1. Ignore all references to the IBM function keys, IBM ROM, IBM I/O and IBM graphics.

2. Relating to low and high resolution, color and monochrome display, the Kaypro has the same abilities it has with CP/M. A light pen will not interface.

3. The following command files are not part of CO-POWER CP/M-86:

   CONFIG DSKMAINT FUNCTION ASSGN (use STAT for this)

4. Format disks under CP/M.

5. In DDT-86, there are no QI, QQ or SR commands.

6. Appendices F and H do not apply.

7. Boot CP/M-86 as per this document. As with CP/M-80, do a CTRL C when you change disks in any drive.

8. There is not a hardware supported message displayed on the screen during bootup as there is on an IBM.

9. The CP/M-86 control characters that work depend on your computer. CTRL C, CTRL P, and CTRL S work on all systems.

10. Backup disks with PIP.CMD or a CP/M-80 copy program.

11. Regarding physical devices: you do not have IBM hardware in your computer so you cannot use any extra devices that your CP/M system will not support.

PART 4. EXPANDING CO-POWER MEMORY

There are two models of CO-POWER, CO-POWER-88 and CO-POWER-Plus. Expanding each is described below.

CO-POWER-88: This CO-POWER has a maximum memory of 256k. Owners of the older 128k model can expand their board to 256k by purchasing an Add-On RAM card from SWP Sales. If you want to expand past 256k, call SWP Sales for details on the current trade-in policy to swap for a CO-POWER-Plus.

CO-POWER-Plus: This CO-POWER is expandable to 1024k of RAM! There are 32 sockets for RAM chips on this board. Each 8 256k RAM chips that are plugged in give the board 256k of memory. If your board is not populated to the 1024k level, you can purchase additional RAM sets from SWP Sales.

CO-POWER-Plus is expanded with 256k RAM chips that are 200 nanoseconds or faster. Our price as of April 1985 price is $80 per set of 8. To take a 256k board to 1024k, you would purchase 3 sets of chips at $80 each, or $240. (Prices may change without notice. Call SWP Sales for current prices.)

Unlike the IBM-PC which can only use 640k of RAM for the operating system, CO-POWER can use all but 64k of the 1024k available. The top 64k is reserved for SWP drivers. This means you can run IBM programs like LOTUS 1-2-3 and make bigger data files than the IBM can! With a 1024k CO-POWER, after MS-DOS and LOTUS are loaded, there is still over 860k left to construct your spreadsheet.

If you're interested in speed and big operating system memory, then read about the MS-DOS public domain ramdisk program available from SWP Sales. Details are in the MS-DOS section. Also, additional memory is terrific for the CP/M RAMDISK. A 1024k CO-POWER adds a lot of power to your computer.

(This page is intentionally left blank.)

$$\begin{array}{r} 1024 \\ \times\ 64 \\ \hline 960 \end{array}$$

PART 5. TROUBLE-SHOOTING: QUESTIONS AND ANSWERS

Q. How do I keep up-to-date on CO-POWER information?
A. Send SWP your registration card so your name will be added to our CO-POWER mailing list. You'll receive new information and the quarterly issues of CO-POWER NEWS.

Q. How do I obtain updates on software?
A. If a new version of our software is released, send your original SWP disks (both the MS-DOS and Load Files disks) to SWP with a check for $25. You'll receive new software and any new documentation. If your original disks have the Kaypro label instead of the SWP label, the update fee is $50. [Texas residents add Sales Tax]

Q. What is the maximum RAM capacity CO-POWER can have?
A. CO-POWER-88 has a maximum RAM of 256k. CO-POWER-Plus has a 1024k RAM maximum.

Q. What power does CO-POWER take?
A. Less than 750 milliamps of +5 volts.

Q. After running RAMDISK if I reset the computer and rerun RAMDISK without erasing the directory, why do I sometimes get incomplete files or other problems?
A. Such problems can happen but it is not the RAMDISK program at fault. The ability to load ramdisk without erasing the file directory is mainly an emergency measure and should be used as such. If the reset pulse is extremely long it can cause the 8088 to drop bits in memory.

Q. Under CP/M I run a key reassign program. When I use RAMDISK it does not work. What can be done?
A. In some cases, both the key reassign program and RAMDISK use the same area of memory. You can try relocating either program. In the case of Smartkey, they have a solution.

Q. Can I obtain source code for CO-POWER programs?
A. No. This is not currently released and because of various contracts SWP is involved with it is not scheduled to be released.

Q. Can I obtain CO-POWER schematics?
A. Yes. First you must sign a non-disclosure agreement. The agreement and schematics are available from SWP Sales. As of May 1985, CO-POWER-88 schematics are available for $25 and CO-POWER-Plus schematics have not been completed.

Q. If I think my CO-POWER board has a bad memory chip, what do I do?
A. First run the MEMTEST program and see if it turns up any bad chips. Directions are in this document. You may be able to locate and replace the bad chip yourself.

Q. Where do I go for help if I don't understand something in the CO-POWER system?
A. If you purchased CO-POWER from a dealer, contact them for support. If you bought CO-POWER directly from SWP, contact SWP Technical Support. Tech Support hours are Monday thru Thursday, 9 a.m. to 4 p.m.

Q. If I have a problem with the CO-POWER hardware can I just ship it back to you for repair?

A. No! First call and get an RMA#, then ship the unit back. If the CO-POWER is under warranty (90 days) we'll repair it and return it to you at no charge. If the unit is out of warranty, there is a minimum repair charge of $35. Actual cost depends on problem diagnosed.

License

All SWP programs are licensed on an "AS IS" basis without warranty.

SWP shall have no liability or responsibility to customer or to any other person or entity with respect to liability, loss or damage caused or alleged to be caused directly or indirectly by SWP computer programs or equipment, including but not limited to any interruption of service, loss of business or anticipatory profits or consequential damages resulting from the use or operation of such computer programs or equipment. By purchasing an SWP product, user agrees to these conditions.

Software License

1). SWP grants to customer a nonexclusive, paid-up license to use on customer's SWP computer the SWP computer software received. Title to media on which the software is recorded (disk) or stored (ROM) is transferred to the customer but not title to the software.

2). In consideration for this license, customer shall not reproduce copies of SWP's software except to reproduce the number of copies to use on the customer's computer (if the software allows a backup copy to be made), and shall include SWP's copyright notice on all copies of software reproduced in whole or in part.

3). Customer may resell SWP's software (modified or not, in whole or in part), provided customer has purchased one copy of the software for each one resold.

4). None of the software included with the SWP computer is in the public domain (unless so indicated) and may not be distributed by customer to other parties unless customer has purchased and is reselling the SWP computer with its original SWP software package.

The provisions of this Software License (paragraphs 1,2,3, and 4) shall also be applicable to third parties purchasing such software from customer.

SWP, 1000 W. Fuller, Ft. Worth, TX 76115-3301 USA. 817-924-7759

PART 6. REGISTRATION AND WARRANTY

CO-POWER Warranty

CO-POWER is under warranty for 90 days from the original end user's date of purchase. To be valid the enclosed registration form must be thoroughly completed and returned to SWP Microcomputer Products within 10 days from the date of purchase. (A purchase receipt may be required at the sole discretion of SWP.) The serial number of the CO-POWER must be entered on the registration card. (This number is written on the circuit board.) Under no circumstances will any warranty be honored after 6 months past the last date of a production run or board change.

SWP is not responsible for any changes the user makes to the CO-POWER circuit board, including the improper configuring or connecting of any peripherals. Detailed information on such procedures are in this manual.

SWP is responsible for replacing or repairing malfunctioning components on an under-warranty CO-POWER. The responsibility is void if the user has damaged the board or caused the malfunction or if CO-POWER is resold.

SWP will NOT accept any returned merchandise, FOR ANY REASON, that has not been issued an RMA number by SWP Technical Support. The RMA # must be clearly marked on the outside of the shipping carton.

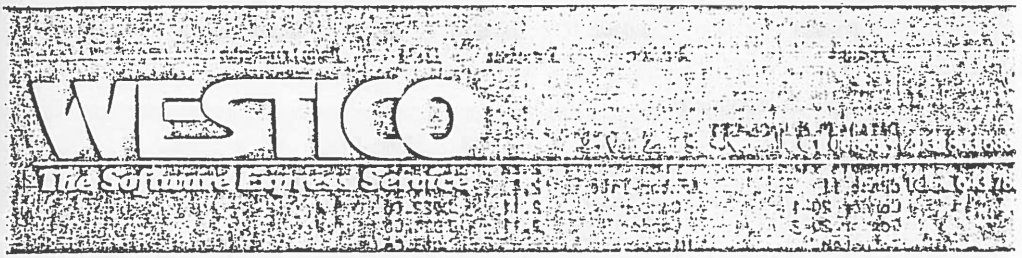
The user is responsible for shipping charges to SWP for any warranty work. SWP will pay return shipping via ground service within the continental United States.

Repairs on SWP Components Not Under Warranty

Once the warranty has expired, or if the warranty has been voided, SWP will repair malfunctioning CO-POWERs and other SWP products for repair charges (minimum is $35). These charges will include both the cost of materials used and labor.

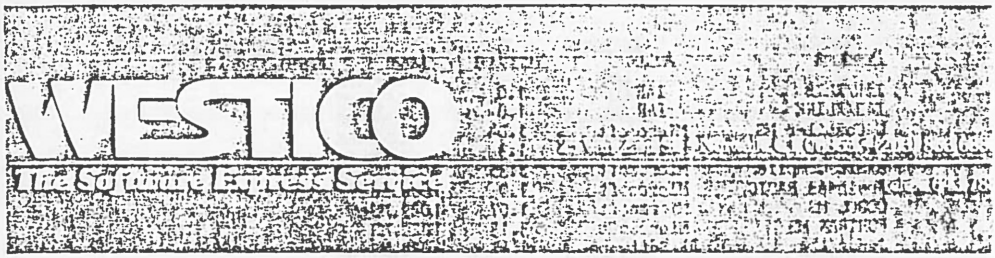
The user will be charged for all time spent analyzing and repairing the unit. Any pertinent information sent in writing by the user describing the malfunction will decrease the analysis time, and lower the repair charges.

The customer is responsible for all shipping charges to and from SWP. Repairs must be paid in full before return shipping. SWP accepts checks and credit cards. No CODs.



CP/M-86 Software available for KayPro with Co-Power-88

Product	Author	Version	Code	Requirements
ACCOUNTING				
Income A/P	MC	2.4B	A034.C6	* D,I
Income A/R	MC	2.5C	A023.C6	* D,I
Income G/L	MC	2.1B	A010.C6	* D,I
Income Order Entry	MC	1.1B	A015.C6	* D,I+A032.C6
Income Purchasing	MC	1.1B	A013.C6	* D,I+A032.C6
Income Inv. Control	MC	3.2B	A032.C6	* D,I
Income Job Cost/WIP	MC	1.1A	A014.C6	* D,I+A032.C6
Inmass Bill of Material	MC	3.2C	A012.C6	* D,I+A032.C6
Inmass Materials	MC	1.0B	A016.C6	* D,I+A032.C6
Fixed Asset Acctng.	Origin	3.96	A068.C6	* I
BUSINESS MANAGEMENT				
Billkeeper	Micro Craft	1.2F	B009.C6	* J
Verdict	Micro Craft	3.2F	B006.C6	* J
Audit	Micro Craft	1.3	B015.C6	* +B006 or B009
G/L For Professional	Micro Craft	2.0	B011.C6	* J
Pas-3 Medical	AI	2.1	B001.C6	* I
Pas-3 Dental	AI	1.75	B002.C6	* I
BidSheet	Comp For Constr	2.1	B008.C6	* I
Market Pro	AIM		B004.C6	
Pro-Man	American Software		B046.C6	*
LANGUAGE PROCESSORS				
Janus/ADA	RR Software	1.47	L044.I6	
CBASIC 86	DRI	1.4	L001.C6	
CB-86 Compiler	DRI	2.0	L039.I6	
CIS COBOL	DRI	4.5	L009.C6	
Level II COBOL	DRI	2.1	L010.C6	
Pascal/MT+86	DRI	3.2	L005.I6	
PL/I-86	DRI	1.0	L002.I6	
C86	Comp Innovations	1.32D	L047.C6	
M2CBASIC 86	Buzzwords	1.3	L004.C6	*



MS DOS Software available for KayPro with Co-Power-88

Product	Author	Version	Code	Requirements
ACCOUNTING				
Income A/P	MC	2.4B	A034.PC	* D,I
Income A/R	MC	2.5C	A023.PC	* D,I
Income G/L	MC	2.1B	A010.PC	* D,I
Income Order Entry	MC	1.1B	A015.PC	* D,I+A032.PC
Income Purchasing	MC	1.1B	A013.PC	* D,I+A032.PC
Income Inv. Control	MC	3.2B	A032.PC	* D,I
Income Job Cost/WIP	MC	1.1A	A014.PC	* D,I+A032.PC
Inmass Bill of Material	MC	3.2C	A012.PC	* D,I+A032.PC
Inmass Materials	MC	1.0B	A016.PC	* D,I+A032.PC
TOTAL A/P	TCS	2.36	A027.MS	* I
TOTAL A/R	TCS	2.36	A026.MS	* I
TOTAL A/R(rev.3)	TCS	3.36	A071.MS	* I+A073.MS
TOTAL G/L	TCS	2.36	A025.MS	* I
TOTAL Inventory	TCS	2.36	A029.MS	* I
TOTAL Inv.(rev.3)	TCS	3.36	A073.MS	* I
TOTAL Materials	TCS	3.36	A053.MS	* I+A073orA071.MS
TOTAL Payroll	TCS	2.36	A028.MS	* I
TOTAL Sales	TCS	3.36	A057.MS	* I+A073orA071.MS
Simple	TCS	2.36	A031.MS	I
Q/Label	TCS	2.36	A055.MS	I
Total Utilities	TCS	3.36	A058.MS	I
Client Ledger System	TCS	3.36	A030.MS	* I
Fixed Asset Acctng.	Origin	3.94	A068.MS	* I
BUSINESS MANAGEMENT				
Billkeeper	Micro Craft	1.2F	B009.PC	* J
Verdict	Micro Craft	3.2F	B006.PC	* J
Audit	Micro Craft	1.3	B015.PC	* +B006 or B009
G/L For Professional	Micro Craft	2.0	B011.PC	* J
Pas-3 Medical	AI	2.1	B001.PC	* I
Pas-3 Dental	AI	1.75	B002.PC	* I
BidSheet	Comp For Constr	2.1	B008.MS	* I
Market Pro	AIM		B004.MS	
LANGUAGE PROCESSORS				
BASIC MS	Microsoft	5.28	L006.MS	
IAR/6502	IAR	1.0	L045.MS	
IAR/8085	IAR	1.0	L015.MS	
IAR/6809	IAR	1.0	L014.MS	
IAR/8086	IAR	1.0	L046.MS	
IAR/AT7000	IAR	1.0	L042.MS	
IAR/A1802	IAR	1.0	L013.MS	
IAR/A6801	IAR	1.0	L025.MS	
IAR/A6805	IAR	1.0	L027.MS	
IAR/A68K	IAR	1.0	L033.MS	
IAR/A804X	IAR	1.0	L012.MS	
IAR/A8501	IAR	1.0	L011.MS	
IAR/AZ80	IAR	1.0	L026.MS	
IAR/AT99	IAR	1.0	L043.MS	
IAR/AZ8	IAR	1.0	L036.MS	
IAR/XLINK + 3	IAR	1.0	L037.MS	
IAR/XLINK + 5	IAR	1.0	L038.MS	