D I M E N S I O N 6 8 0 0 0

Z - 8 0 C O P R O C E S S O R

A N D

E M U L A T O R S

R E F E R E N C E M A N U A L

Micro Craft Corporation

6 8 0 - 0 0 0 4 - 1 0 0

V E R S I O N 0 . 0 0

N O T I C E

Micro Craft Corporation reserves the right to make improvements in the product described in this manual at any time and without notice.

DISCLAIMER OF ALL WARRANTIES AND LIABILITY

MICRO CRAFT CORPORATION MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS MANUAL OR WITH RESPECT TO THE PRODUCTS DESCRIBED IN THIS MANUAL, AS TO ITS QUALITY, PERFORMANCE, MERCHANTABILITY, OR FITNESS FOR ANY PARTICULAR PURPOSE. MICRO CRAFT CORPORATION SOFTWARE IS SOLD OR LICENSED "AS IS." THE ENTIRE RISK AS TO ITS QUALITY AND PERFORMANCE IS WITH THE BUYER. SHOULD THE PROGRAMS PROVE DEFECTIVE FOLLOWING THEIR PURCHASE, THE BUYER (AND NOT MICRO CRAFT CORPORATION, ITS DISTRIBUTOR, OR ITS RETAILER) ASSUMES THE ENTIRE COST OF ALL NECESSARY SERVICING, REPAIR, OR CORRECTION AND ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES. IN NO EVENT WILL MICRO CRAFT CORPORATION BE LIABLE FOR DIRECT, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY DEFECT IN THE PRODUCTS OR THE SOFTWARE, EVEN IF MICRO CRAFT CORPORATION HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF IMPLIED WARRANTIES OR LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

Micro Craft Corporation
4747 Irving Blvd.
Dallas, Texas 75247
(214) 630-2562

Additional copies of this manual

may be ordered from your DEALER

by using the MICRO CRAFT part number 680-0004-100

Ask your DEALER also for a

free brochure with a complete list of

Micro Craft manuals and products

MICRO CRAFT CORPORATION
Customer Support Department
4747 Irving Blvd.
Dallas, Texas 75247

TABLE OF CONTENTS

C H A P T E R 1

I N T R O D U C T I O N

THE DIMENSION COPROCESSOR CONCEPT

Application software is the most important component of any microcomputer system. Previously, the microcomputer's operating system and processor dictated the available choice of software for a given application. The Dimension Coprocessor System enables you to choose from a larger variety of programs and operating systems. By using coprocessors and a technique known as emulation, the DIMENSION 68000 can be made to run programs written for many machines.

The Dimension Z-80 Coprocessor enables a large library of programs and operating systems written for the KayPro II, for the Cromemco, for the Osborne I, and for a generic CP/M-80 machine to be run on the DIMENSION 68000 Computer. Emulation software and a dedicated Z-80 microprocessor (which is similar to the 8080) along with your DIMENSION 68000 computer system enables you to take advantage of the many quality programs written for CP/M-80 based machines in general.

USER SUPPLIED SOFTWARE, A PART OF THE COPROCESSOR SYSTEM

To utilize the Z-80 Coprocessor requires the purchasing of an operating system and/or purchasing (or writing) the programs necessary to perform the application that is desired. Operating systems such as CP/M-80 are available from many computer dealers, as well as many application programs that are specific to your needs. The Z-80 Coprocessor system, when combined with a powerful operating system and with the necessary application programs, becomes a valuable addition to the DIMENSION 68000 computer system.

Computer users, with large libraries of CP/M-80 (or equivalent) software, can move up to the power of the DIMENSION 68000 without losing their investment in software. Most custom programs that are written for the CP/M-80 operating system will run without change on the Z-80 Coprocessor with the appropriate Emulator.

MANUAL USAGE

The information contained in this manual documents the Z-8Ø Coprocessor and the procedures required for its use as an Emulator. In order to to fully apply the Coprocessor System, additional information may be required. In most cases, adequate documentation for the experienced user is included with the purchase of those programs. For the neophyte, however, the purchase of tutorial materials is strongly recommended.

The following symbols will be presented throughout this manual to aid understanding:

** Suggestions, reminders, and helpful hints will be noted by a ** symbol.

*** WARNING ***

indicates a possible source of danger to you, your equipment, or your software.

<CR> or (no <CR>) Indicates when the RETURN key should (or should not) be pressed.

(^) Indicates when a CONTROL character should be typed. "Ctrl" stands for CONTROL. As an example, (^C) is typed by holding the "Ctrl" key down, pressing the "C" key, releasing the "C" key, and finally releasing the "Ctrl" key.

Computer screen responses will look like this example:

```
Micro Craft Operating System - CP/M-68K copyright DIGITAL RESEARCH Inc. 1983
Bios version X.X Copyright Micro Craft Corp. 1983, 1984
```

In this manual, entries that are to be made, are shown in the context of the entire line as it is displayed on the screen. The part that you are to enter is shown in bold characters

BEFORE YOU BEGIN...

If you are unfamiliar with the DIMENSION 68ØØØ computer, you should refer to the "DIMENSION 68ØØØ System User's Guide" that is supplied with your unit. Installation and operation, of your computer system, is described in detail. You should be familiar with the machine before you attempt to install the Coprocessor hardware and software.

If you are new to the CP/M-68K operating system, the "CP/M-68K User's Guide" supplied with your DIMENSION 68000 explains the CP/M-68K operating system commands and syntax. References are made to certain CP/M 68K commands in order to install the Z-80 Coprocessor software.

C H A P T E R 2

I N S T A L L A T I O N

INSTALLATION OF YOUR Z-80 COPROCESSOR

If you are familiar with the DIMENSION 68000 and the basic commands of the CP/M-68K operating system, then you are ready to begin installation of your Z-80 Coprocessor circuit board. This chapter explains how to install your Dimension Z-80 Coprocessor circuit board into your DIMENSION 68000 computer system.

PACKAGE CONTENTS

Your Z-80 Coprocessor System contains the following:

1) A Z-80 Coprocessor Reference Manual
   Part number 680-0004-100
2) A Z-80 Coprocessor Circuit Board
   Part number 200-0008-001
3) A MASTER EMULATION diskette
   Part number 310-0004-100
4) A Product Registration/Warranty Card
   Part number 600-0014-103

If any of the above items are missing, contact your dealer for replacement.

SYSTEM REQUIREMENTS

In order to install your Z-80 Coprocessor System, the following equipment and materials will be required:

1) A DIMENSION 68000 with a minimum of 256K memory
2) A Dimension Z-80 Coprocessor circuit board
3) Two - 40 track, 5 1/4 inch, diskette drives
4) A video monitor
5) A Dimension "SYSTEM 1" or other CP/M-68K System Master diskette
6) A MASTER EMULATION diskette
7) Blank diskettes
8) A #2 (medium) Phillips head screwdriver

In addition to the above, an application program for the Z-80 Coprocessor/Emulator is required to use the unit, but is not necessary for installation or for initial checkout. Application programs may be purchased from your computer dealer.

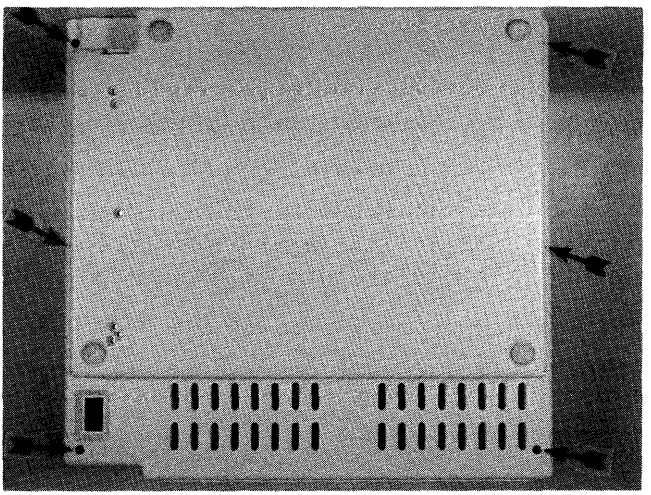
COPROCESSOR CIRCUIT BOARD INSTALLATION

In order to install the Z-80 Coprocessor circuit board in the DIMENSION 68000, the top cover, of the SYSTEM UNIT, will need to be removed. Then you must plug the Z-80 Coprocessor board into one of the expansion connectors. Finally the top cover is replaced.

Remove any diskettes from the disk drives and move other loose objects from around the machine. Disconnect the Video Monitor and monitor cable and set them aside. Disconnect the power cord from the DIMENSION 68000 back panel and unplug it from the wall. It is not necessary to disconnect the keyboard, but remove any cables or items which restrict the movement of the machine.

The top cover of the SYSTEM UNIT is attached, to the bottom cover, by 6 screws that are recessed into the bottom cover and that are fixed into the case to prevent the screws being lost. To remove the top cover, the following steps are recommended:

- TURN OFF the DIMENSION 68000 system.
- DISCONNECT the power cord from the Dimension SYSTEM UNIT.
- MOVE the unit to the edge of the table or desk so that it is sitting with one side (left or right) facing you.
- Use a #2 Phillips screwdriver (the shank of the screwdriver must be at least 3 1/2 inches long) to LOOSEN the screws. The screws will NOT fall out, but you will be able to tell, by the feel, when they are loose.
- When all 3 screws are loose, TURN THE UNIT so that you can reach the 3 screws on the other side and LOOSEN THEM. When all of the screws have been loosened, then the top cover of the housing can be lifted off to expose the inside of the DIMENSION 68000.
- REMOVE the top cover carefully and be sure to PLACE IT where it will not fall, get scratched, or be stepped on. (As a separate piece, the top cover is not nearly as rugged as the assembled unit.)



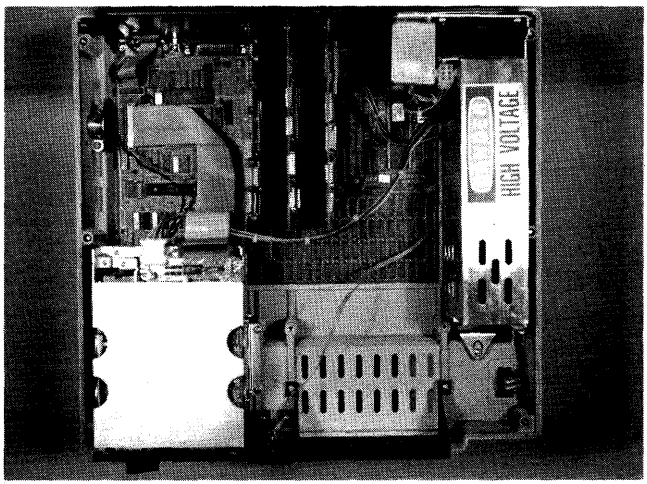
PLUGGUNG IN THE Z-8Ø COPROCESSOR CIRCUIT BOARD

*** WARNING ***

Static Electricity can damage sensitive computer components.

Before touching anything inside the case or the Z-8Ø circuit board, double check to make certain that the power cord is disconnected and the power switch is off. Touch the metal power supply case (located to the right of the unit) with both hands. This action will prevent static discharge and damage to the system components.

Installation of the Z-8Ø Coprocessor circuit board can now be performed. Find the expansion connectors on the DIMENSION 68ØØØ MAIN PC BOARD or motherboard. These connectors are located along the rear of the unit and are described in detail in the "DIMENSION 68ØØØ System Reference Manual". Your computer may already have some boards installed. We suggest you use the connector closest to the left, as shown in the illustration below, but you may choose any of the connectors. When you have decided, remove the metal or plastic locking tab behind that expansion connector being careful to note how it was installed.



Choose an expansion connector for the Z-8Ø board

*** WARNING ***

The Z-8Ø Coprocessor circuit board is shipped in an anti-static plastic envelope. Make certain that you discharge any static that may be stored in your body before removing the circuit board from the protective bag. Save this bag.

*** ANOTHER WARNING ***

When handling the circuit board, be careful not to touch the gold connector at the edge of the board. Oil and moisture on from your fingers will contaminate the connector and create a poor electrical connection.

Remove the circuit board from its protective bag and note the serial number of the unit which is located on the circuit board along the metal locking tab.

** Record the serial number on both the warranty card and your records now, to prevent having to disassemble the machine later.

The Z-8Ø Coprocessor circuit board may be inserted into any available motherboard expansion connector. When inserting the metal locking tab into the rear panel, make certain that the lower tip is inserted into the cutout at the bottom of the rear panel. The upper portion of tab will then be able to slide into the panel.

The motherboard connector will offer some resistance to the seating of the circuit board. With firm but gentle pressure, press down on the circuit board until it is firmly seated in the motherboard expansion connector.

Inserting the Circuit Board and Attaching the Metal Tabs

PUTTING THE COVER BACK ON

Re-install the top cover of the Dimension 68000 by placing the top half of the case back onto the bottom half. The top cover fits smoothly over the disk drives in the front and around the back panel in the rear. Press the top half of the case until complete contact is made against the bottom half. Using the method described previously, re-install the cover screws being careful not to cross thread them. Tighten each screw until it is "finger tight." Do not overtighten.

Reconnect any cables that you removed earlier. In particular, be sure that the video monitor is connected. This process is explained in more detail in the "DIMENSION 68000 System User's Guide".

TURNING THE POWER ON TO TEST THE SYSTEM

In this step we will turn on the power and verify that the Z-80 Coprocessor Circuit Board is installed properly. Put a copy of the "SYSTEM 1" diskette into disk drive A:. Be sure that there is a write protect sticker over the write protect cutout on the right side of the "SYSTEM 1" diskette. Turn the lever on the front of disk drive A: clockwise until it points down. This closes the disk drive on to the diskette. DO NOT FORCE THE LEVER. If it will not turn easily, re-insert the diskette and try again.

** When this manual says, "insert the diskette..." or "put the diskette in ... ," it is assumed that you will turn the lever on the diskette drive to close it. Forgetting to do this will not harm your computer or the diskette but the computer will not be aware that the diskette is in place.

If you DO NOT have a BACKUP COPY of the "SYSTEM 1" diskette, refer to the "DIMENSION 68000 System User's Guide" - Appendix B and make one before proceeding.

The "SYSTEM 1" diskette is in drive A:. If there are any diskettes in diskette drive B: (or drive C:, or drive D:), then remove them at this time.

If the DIMENSION 68000 computer has never been turned ON, refer to the "DIMENSION 68000 System Reference Manual" for connection and for initial tests. If the system has been used prior to Coprocessor installation, then you may proceed with the instructions to reconnect the power cord and switch the unit on.

Turn on the video monitor and check both ends of the video cable.

The power switch should be off. Plug in the power cord. If the switch is ON you will see the red light on the reset button come on. Turn OFF the power switch immediately.

Allow enough time for the video monitor to warm up. Then turn the power switch on. First the red light on the reset button will come on. Then the following message will be displayed.

Welcome to the Realm
of
Dimension Computing
by
Micro Craft Corporation

At the same time the red light, on drive A:, will come on as drive A: begins spinning. Finally, the screen will clear and the following message and prompt will be displayed.

```
Micro Craft operating system- CP/M 68K Copyright DIGITAL RESEARCH Inc. 1983
Bios version 2.2 Copyright Micro Craft Corp. 1983
      last revised mm/dd/yy

A>
A>
```

If the first message does not appear, then check the following items.

Is the power cord connected at both ends?
Is the video monitor powered?
Is the video monitor connected to the DIMENSION 68000?
Is the brightness control on the video monitor turned up?

If the above items seem to check out, then turn the power off, remove the top cover and re-check the installation of the Z-80 Coprocessor circuit board. Make certain that the Coprocessor circuit board is seated firmly. If you still experience difficulty, remove the Z-80 Coprocessor circuit board, and consult your dealer.

If the second message does not appear, check the following items.

Is the lever on drive A: closed (down)?
Is the "SYSTEM 1" diskette in drive A:?
Is the diskette in drive A: a good copy?

Again, if these items seem to check out, then turn off the power, remove the top cover, and re-check the installation of the Dimension Z-80 Coprocessor circuit board. Make certain that the Z-80 Coprocessor circuit board is seated firmly. If you still experience difficulty, remove the Z-80 Coprocessor circuit board, and consult your dealer.

DISKETTE BACKUP, COPROCESSOR SYSTEM MASTER CREATION

The system software for your Z-80 Coprocessor system is supplied on an MASTER EMULATION diskette. To properly and efficiently utilize the Z-80 Coprocessor, requires the creation of a Coprocessor SYSTEM MASTER diskette from an MASTER EMULATION diskette.

The CP/M-68K operating system and other useful programs will be installed as you create your Coprocessor SYSTEM MASTER diskette. These programs will; simplify making additional WORK copies of your Coprocessor SYSTEM MASTER diskette, enable your backup work copies to be "booted", and ease installation of the Coprocessor software.

Your Coprocessor SYSTEM MASTER will be used later for the installation of the emulation software. The creation of a Coprocessor STSTEM MASTER diskette is essential before you proceed with system startup. DO NOT use ANY original or MASTER EMULATION diskette as a work copy. An error on your part or a malfunction in your DIMENSION 68000 Computer (no matter how rare either may occur) could damage the diskette you are using, even with the write protect sticker in place. To obtain a replacement from your dealer is expensive and much more inconvenient than the making of a copy from the "master" that you have stored in your desk.

** If you are not familiar with the CP/M-68K operating system you may wish to refer to the "DIMENSION 68000 System User's Guide" and the "CP/M-68K User's Guide" that is supplied with your DIMENSION 68000 before proceeding.

Creation of the Coprocessor System Master diskette is performed under the CP/M-68K operating system. Make certain that a copy of the "SYSTEM 1" diskette is in drive A:. Turn off the DIMENSION 68000 (if it is on). Wait 5 to 10 seconds and turn it back on. This will "boot" the system. "Booting" the system loads the CP/M 68K Operating System into the computer memory.

When CP/M-68K is initially loaded, the following information will be displayed:

```
icro Craft Operating System - CP/M-68K copyright DIGITAL RESEARCH Inc. 1983
ios version 2.2 Copyright Micro Craft Corp. 1983
      last revised MM/DD/YY

>
>
```

FORMATTING A DISKETTE

It is recommended that the System Master diskettes and the Turn-Key Emulation Master diskettes be formatted in the Micro Craft 40 Track Standard format. If you need instructions on formatting a diskette, there are detailed instructions in the "DIMENSION 68000 System User's Guide."

INSTALLATION OF CP/M 68K AND UTILITIES

Now you will need to create a "bootable" backup diskette from the formatted diskette that was created earlier. Leave the "SYSTEM 1" diskette in drive A: and the newly formatted (but really still blank) diskette in drive B:. Enter the following command to copy the contents of the "boot" track on the diskette in drive A: to the diskette in drive B:.

A>COPY BOOT A B [v]<CR>

** The [V] option [V]erifies the operation and should be included to make certain that the boot track was copied properly.

The system will respond:

Copy Ver 1.1

(^C to ABORT)
RETURN to copy BOOT from A to B

If the command was entered properly, press the "Retrn" key (<CR>) to continue. If it was not, type ^C (Ctrl and C) to return to CP/M-68K (with the A> prompt) and re-enter the COPY BOOT A B command.

When you press the "Retrn" key the system will respond:

***** Copying Tracks *****
0
Copy complete

The system will ask the following question.

Do you wish to repeat the copy?

To exit, enter the following response.

N <CR>

The system will return to CP/M 68K, showing the following prompt.

A>

The diskette in drive B: is now formatted and half-way "bootable." The next step is to install the CP/M-68K Operating System and the optional submit program. A submit program will be used in a later section to enable the system to automatically load the emulation programs.

To install the CP/M-68K operating system, enter the following command.

A>PIP B:=A:CPM.SYS[V]<CR>

** The [V] option [V]erifies the operation and should be included to make certain that the file was copied properly.

If the copy is successful, the system will return to CP/M-68K after 2Ø to 3Ø seconds and return the following prompt.

A>

If the prompt is not all that is printed at this point, an error message may indicate what the problem is. The "CP/M 68K Operating System User's Guide" explains more about the use of PIP and the possible error messages.

** If you experience difficulty, make certain that the PIP command was typed exactly as shown including all spaces.

To install the default (i.e. empty) submit program, enter the following command.

A>PIP B:=A:CPMCONF.SUB[v]<CR>

Again, the prompt should be returned.

A>

Before we begin the next step (creating a Coprocessor SYSTEM MASTER and the backup of the EMULATION MASTER distribution diskette), an additional file will need to be copied onto the newly created SYSTEM MASTER diskette in drive B:. This file, named PIP.68K, contains the program that will be used to copy the emulation programs. PIP has been used in the previous steps to copy the CP/M-68K operating system and Submit file from drive A: to drive B:. PIP can also be used to copy the file containing itself.

To copy PIP from drive A: to drive B:, enter the following command.

A>PIP B:=A:PIP.68K[V]<CR>

And CP/M 68K will again respond with the prompt.

A>

The "bootable" CP/M 68K system diskette (with PIP installed) that has just been created in drive B: is now ready for you to copy onto it the Z-8Ø Emulator software.

Log on to drive B:, by entering the command.

A>B:<CR>

The system will respond with the following prompt.

B>

Remove the "SYSTEM 1" diskette from drive A:. Insert the original EMULATOR MASTER distribution diskette into drive A:. Make sure that a write protect sticker is in place over the write protect cutout on the right side of this original EMULATOR MASTER distribution diskette.

To backup the EMULATOR MASTER diskette in drive A:, its contents are copied onto the new diskette that is in drive B:, by this command.

B>PIP B:=A:CPM8Ø.68K[ov]<CR>

Then this command is issued.

B>PIP B:=A:KAYPRO2.68K[ov]<CR>

And, then this command is issued.

B>PIP B:=A:CROMEM3.68K[ov]<CR>

Lastly, then this command is issued.

B>PIP B:=A:OSBORNE1.68K[ov]<CR>

Make certain that you include the [o] (letter O) option or your Emulation Coprocessor [O]bject files may not be copied correctly.

After each copy, the system will respond with:

B>

To verify that the preceding files have been copied and are contained on drive B:, enter the following command.

DIR B:<CR>

The system should display the following directory:

```
B:CPM      SYS : CPMCONF  SUB : PIP     68K : KAYPRO2   68K : CPM8Ø    68K
  CROMEM3  68K : OSBORNE1 68K
B>
```

Install a write protect sticker on the new Emulation System Master diskette to prevent accidental erasure. This diskette should be used for installation, copies, and all future system maintenence. The original Distribution Diskette should be stored in a safe place, away from your computer. It should only be used to restore your Emulation System Master if it is damaged or lost.

You should make several copies of the new Coprocessor SYSTEM MASTER diskette at this time. Save the first Coprocessor SYSTEM MASTER away with the original MASTER EMULATION diskette. Now you will not need to repeat the whole installation process in case your work copy is ruined in some way.

** Children, animals, magnets, and most electric appliances are natural enemies of the information on your diskettes. Keep them away from your master diskettes.

** Appendix B of the "DIMENSION 68000 System User's Guide" describes how to make backup copies of diskettes.

At this point your Coprocessor SYSTEM MASTER diskette is ready to be used in the further installation process that is outlined in later sections.

CREATING A TURN-KEY EMULATION DISKETTE

If you wish to dedicate your DIMENSION 68000 and Z-80 Coprocessor System as an Emulator you will want to create a TURN-KEY EMULATOR DISKETTE from a copy of your Coprocessor SYSTEM MASTER.

** A turn-key system using a submit file is recommended for "emulation only" diskettes to prevent the operator from being required to enter or learn CP/M 68K commands.

This section explains how to create a submit file to tell CP/M 68K that you want to perform Emulation when your DIMENSION 68000 is first turned on. This makes the diskette with the submit file and the Emulator programs a TURN-KEY EMULATOR diskette.

A "turn-key" system has the advantage of requiring a minimum of operator intervention at the CP/M 68K command level. Users who are not familiar with the DIMENSION 68000 or the CP/M 68K operating system do not have to learn the necessary commands to start Emulation.

A "turn-key" system allows you to begin emulation immediately upon turning on the power switch of your DIMENSION 68000. The term "turn-key" is used because some, older, computers used a locking "key" to turn the power on. A "turn-key" system would begin running immediately upon "turning the key" on. Your Dimension 68000 has a simple ON-OFF switch for that purpose, but the term "turn-key" is still with us.

When the submit file in the following example is installed, all that is required to begin emulation is that the operator take out the diskettes that are in the drives and insert the diskettes that have the CP/M 2.2 format, when the Emulator Welcome Menu indicates that it is time to do so.

There is a file, named CPMCONF.SUB, that is on the Coprocessor SYSTEM MASTER, on the copies of the Coprocessor SYSTEM MASTER, on the "SYSTEM 1" diskette, and on the copies of the "SYSTEM 1" diskette. When the power is turned on, or a disk is "booted", the CP/M 68K operating system is loaded. The first action of CP/M 68K (upon being loaded) is to examine the submit file, named CPMCONF.SUB, to see what further action should be taken.

The CPMCONF.SUB file on your Coprocessor SYSTEM MASTER diskette and the copies made from it does not contain any instructions. When CP/M 68K is loaded, control is passed immediately back to the operating system by the submit file and the A> prompt is returned.

The CPMCONF.SUB submit file on your work diskettes may be modified to "type" commands for you and to load the Z-80 Emulation program for you.

** If you have any questions regarding the use of submit files or have a diskette which has already been modified, refer to the "CP/M 68K User's Guide" supplied with your DIMENSION 68000.

To enter commands into the CPMCONF.SUB file, the ED text (ED)itor utility on your CP/M 68K System Master diskette will be used.

** Documentation of ED, the text editor utility, is contained in your "CP/M 68K User's Guide".

The Coprocessor SYSTEM MASTER work diskettes, that you have created, are the diskettes that you should use to install the submit file.

- PUT the diskette, on which you wish to install the submit file, into drive B:.
- REMOVE the write protect sticker from this diskette temporarily.
- PUT a "SYSTEM 1" diskette copy, that contains the file ED.68K, into drive A:.
- LOG ON to drive A:, if necessary, by entering the following command.

B>A:<CR>

The system will then display the prompt:

A>

** If you make a typing mistake, while in ED, you may press the Back-Space key to delete the last character.

To load the ED program and to edit the CPMCONF.SUB file on the Coprocessor SYSTEM MASTER in drive B:, enter the following command.

A>ED B:CPMCONF.SUB<CR>

ED will display it's normal prompt character, which is a colon.

:*

To Append to the existing CPMCONF.SUB file and to Insert the new commands, enter the following commands.

```
:*500A<CR>
:*I<CR>      (Note: you should not type spaces before the <CR>)
```

ED will return:

```
1:
```

Type the filename of the emulation program followed by any options that you wish to use. For the Z-80 Emulator, you should enter one of the following commands.

```
CPM80.68K<CR>

KAYPRO2.68K<CR>

CROMEM3.68K<CR>

OSBORNE1.68K<CR>
```

The ED program will respond with the following prompt.

```
2:
```

To end the entering information using the ED program, enter the following command.

```
2:^Z(No <CR>)    (CONTROL Z, NO RETURN)
```

The ED program will return the following prompt.

```
:*
```

To exit the ED program, enter the following command.

```
:*E<CR>
```

The ED program will then save the modified submit file onto the diskette in drive B:.

** The name of the original, empty, submit file will be changed to CPMCONF.BAK.

The CP/M system will then display the following prompt.

```
A>
```

The previous operations are summarized below:

```
A> ED B:CPMCONF.SUB<CR>          edit CPMCONF.SUB file on drive B:
   :* 500A<CR>                   append existing submit file
   :* I<CR>                      insert new information
  1:  CPM80.68K<CR>              filename of desired emulation program
  2:  <^Z><CR>                   <^Z> CONTROL-Z to finish
   :* E<CR>                      Exit ED

A>
```

The modified submit file on drive B:, may now be used to load the IBM PC Emulation program, when you turn on the power, with the "Turn-Key" Emulator diskette in drive A:.

Put the write protect sticker back on the "Turn-Key" diskette in drive B:.

Submit files have many other powerful applications. To learn more about submit files, refer to the "CP/M 68K User's Guide".

** CP/M 68K submit files cannot be used or have control after the emulation mode is entered.

C H A P T E R 3

U S I N G T H E E M U L A T O R S

USING THE Z-8Ø COPROCESSOR AS AN EMULATOR

To use the Z-8Ø Coprocessor as a CP/M 2.2 System, that will emulate a KayPro II, a Cromemco, an Osborne I, or a generic CP/M 2.2 system requires either a Coprocessor SYSTEM MASTER diskette or a Turn-Key Emulator diskette. Chapter 2 describes how to create either type of diskette. Either type of diskette will require that the Z-8Ø Coprocessor Software must be installed.

If you do not have a Coprocessor SYSTEM MASTER diskette or a Turn-Key Emulator diskette, then you need to make one at this time. DO NOT use the original EMULATION MASTER distribution diskette. Information on making copies of the EMULATION MASTER diskette and on creating a Turn-Key diskette is contained in the previous chapter.

EMULATION HARDWARE INTERFACE CONFIGURATION

The Z-8Ø Coprocessor Emulation software supports the following interface "adapters" and peripherals:

64K bytes of Memory
(2) 4Ø Track, 5 1/4 inch, Dual sided, Diskette Drives
(1) Parallel Printer Interface
(1) ADM-3 monochrome video display

** Only the "CPM8Ø" emulator will support disk drives C:, D:, E:, F:, G:, H:, and K:. (Drive K: is the RAMDISK.) The "KAYPRO", "CROMEMCO", and "OSBORNE" emulators will ONLY support disk drives A: and B:.

** All of the Z-8Ø Emulator programs require that drives A: and B: both be 4Ø Track diskette drives.

INSTALLATION OF EMULATION PROGRAMS

The procedure, for installation of the emulation software, is determined by the intended application of the DIMENSION 68ØØØ and the Z-8Ø CP/M Coprocessor System.

If it is desired to use the DIMENSION 68ØØØ exclusively as a Z-8Ø CP/M Emulator, then it will be preferable to use a Turn-key Emulator diskette, as previously described. If it is desired to use the DIMENSION 68ØØØ to emulate a Z-8Ø CP/M system on an occasional basis only, then it will be preferable to use a Coprocessor SYSTEM MASTER diskette, as previously described.

If it is desired to use the DIMENSION 68ØØØ to emulate a Z-8Ø CP/M system and also operate under CP/M 68K, then it will be preferable to move a copy of the emulation software to a work copy of the "SYSTEM 1" diskette, as described below.

MOVING EMULATION PROGRAMS ONTO A DIMENSION "SYSTEM 1" DISKETTE

Make certain that it is a WORK COPY of the "SYSTEM 1" diskette that is being used, and that it is in drive A:. (The procedure for copying the "SYSTEM 1" diskette is in the APPENDIX titled BACKING UP in the "DIMENSION 68000 System User's Guide".) Also, make sure that a copy of the Emulation Master diskette is in drive B:. And, make sure that CP/M 68K is loaded. The system will be displaying the following prompt:

A>

Use the PIP program to copy the Emulation software from drive B: to the CP/M 68K System Disk in drive A:, by entering the following command.

A>PIP A:=B:CPM80.68K[ov]<CR>

Then enter the following command.

A>PIP A:=B:KAYPRO2.68K[ov]<CR>

And, then enter the following command.

A>PIP A:=B:OSBORNE1.68K[ov]<CR>

Lastly, then enter the following command.

A>PIP A:CROMEM3.68k[ov]<CR>

** Be sure to include all spaces as well as the [ov] options. The letter O option copies [O]bject files to insure that all of the emulation program file is copied correctly.

The system should return this prompt at the end of each copy operation is finished.

A>

If the A> prompt is not all that is returned, read the error message and check the typing of the command line. If that fails, "re-boot" and try again.

** It is possible that some files may have to be removed from the "SYSTEM 1" diskette before there will be room for one or more of the Emulation programs. Use the CP/M 68K command ERA to remove files.

The Z-80 Coprocessor Emulation programs are now on the "SYSTEM 1" diskette. To check the diskette directory, enter the following command.

A>DIR A:<CR>

Other programs, originally on the diskette, will also be shown in the directory. If any of the files CPM80.68K, OSBORNE1.68K, KAYPRO2.68K, or CROMEM3.68K is present, then the "SYSTEM 1" diskette is ready to be used for emulation.

USING YOUR EMULATOR

The Dimension Z-80 Coprocessor System, when used as a Z-80 CP/M system Emulator, includes the CP/M-80 operating system (the CP/M that is for the Z-80 processor). You will only need the necessary application software before the Z-80 Coprocessor can be used. Your dealer can provide assistance with selecting the best software for your application.

BEFORE YOU BEGIN...

During emulation, the DIMENSION 68000 assumes the personality of the selected Z-80 CP/M system. System operation, in the emulation mode, is determined by the application program and by the CP/M 2.2 operating system. It will be necessary to refer to the information provided with the programs for documentation on the operation of those programs.

When in the emulation mode, the system will expect a disk in the format that corresponds to the emulator that was selected. The formats are listed below. It will be necessary, to start out the selected emulator, with a "bootable" diskette for the emulator selected. Only the "CPM80" emulator, will read Dimension Standard, 40 Track, CP/M-68K, diskettes. The other emulators will not read Dimension Standard, 40 Track, CP/M 68K, diskettes.

Emulator	Disk Format
CPM80	Dimension Standard 40 Track
KAYPRO	KayPro II
CROMEMCO	Cromemco
OSBORNE	Osborne I

LOADING EMULATION PROGRAMS

All of the emulator programs are loaded by CP/M 68K. When CP/M 68K finishes loading the program, the system is converted to the emulation mode. If the emulator loaded is NOT the "CPM80" emulator program, the format for diskette drives A: and B: will be changed to the format that matches the emulator.

There are two ways to begin Z-80 CP/M Emulation. These two ways are the same from the point of view of the computer, but you may find one of them to be preferable. The first way is to use a "bootable" CP/M 68K systems diskette, with the selected Z-80 CP/M Emulator installed as a Turn-Key program.

The second way is to begin the desired Z-8Ø CP/M Emulator directly from the keyboard while in CP/M 68K. A copy of the Coprocessor SYSTEM MASTER diskette is used to begin the desired Z-8Ø CP/M Emulation in this way. If a Turn-Key system is being used, put the Emulator Turn-Key diskette into drive A: and "boot." (Either turn on the power switch on the DIMENSION 68ØØØ, or if the power is already on, press the RESET button on the DIMENSION 68ØØØ front panel, and then enter: bt(no <CR>)). Just ignore the things that flash across the screen.

If a Turn-key Emulator diskette is NOT being used, or if it is NOT desirable to "re-boot" the system, make certain that CP/M 68K is loaded. Disable the Spooler and Ramdisk if they are enabled. Only the "CPM8Ø" emulator can use the Ramdisk. (Use the commands: RAMDISK Ø and SPOOL Ø to disable them.) Log on to the drive that contains the Z-8Ø Coprocessor emulation software. If it is installed on a "SYSTEM 1" diskette, then it should be in drive A:. If an Emulator diskette is specified, then it may be in any available drive as long as the drive is specified.

As an example, if the system is logged on to drive A: and the software is on drive B:, the system will display the following prompt.

A>

To log on to drive B:, enter the following command.

A>B:<CR>

The system will then display the prompt:

B>

To load a Z-8Ø CP/M Emulator program and begin emulation, after logging on to the drive with the Emulator software, enter one of the following commands.

For the generic Z-8Ø CP/M 2.2 emulator, enter the following command.

B>CPM8Ø<CR>

For the KayPro II emulator, enter the following command.

B>KAYPRO2<CR>

For the Cromemco emulator, enter the following command.

B>CROMEM3<CR>

For the Osborne I emulator, enter the following command.

B>OSBORNE1<CR>

** The drive, on which the software is located, may also be specified and the Emulator program may be started without changing the default drive by entering, for example: B:CPM80<CR>

RUNNING THE EMULATOR

When the Z-80 CP/M Emulator "CPM80" is started, then the system will return this message on the 80x24 screen display:

```
        The Micro Craft DIMENSION 68000
            Z-80 Emulation, Ver. 1.2
    Copyright 1983 by Micro Craft Corporation

        Your Z80 configuration is;
        64K bytes of Memory
        (2) 40 track floppy disk drives
        (1) Parallel Centronics Style Printer
        (1) Console, ADM-3 terminal with Auto line feed "OFF"

        Place Boot Disk into Drive A:
              and press any key
```

When the Z-80 Emulator "KAYPRO2" is started, then the system will return this message on the 80x24 screen display:

```
        The Micro Craft DIMENSION 68000
       KayPro II(TM) Emulation, Ver. 1.2
    Copyright 1983 by Micro Craft Corporation

        Your configuration is;
        64K bytes of Memory
        (2) 40 track floppy disk drives
        (1) Parallel Centronics Style Printer

        Place Boot Disk into Drive A:
              and press any key
```

When the Z-80 Emulator "CROMEM3" is started, then the system will return this message on the 80x24 screen display:

```
        The Micro Craft DIMENSION 68000
          Crommemco Emulation, Ver. 1.2
    Copyright 1983 by Micro Craft Corporation

        Your Z80 configuration is;
        64K bytes of Memory
        (2) 40 track floppy disk drives
        (1) Parallel Centronics Style Printer
        (1) Console, ADM-3 terminal with Auto line feed "OFF"

        Place Boot Disk into Drive A:
              and press any key
```

When the Z-80 Emulator "OSBORNE1" is started, then the system will return this message on the 80x24 screen display:

```
        The Micro Craft DIMENSION 68000
           Osborne Emulation, Ver. 1.2
    Copyright 1983 by Micro Craft Corporation

        Your Z80 configuration is;
        64K bytes of Memory
        (2) 40 track floppy disk drives
        (1) Parallel Centronics Style Printer
        (1) Console, ADM-3 terminal with Auto line feed "OFF"

        Place Boot Disk into Drive A:
              and press any key
```

The system is now in the emulation mode. At this point, to begin using the DIMENSION 68000 and the Z-80 Coprocessor as the Z-80 CP/M system selected, insert a diskette that is formatted, for the system specified, in drive A:.

If instead of getting the above message, the following message is received.

No Z-80 Coprocessor Board Found

The Z-80 Coprocessor circuit board is either not installed properly or it is not functioning. If it is certain that installation is correct, then contact your dealer for assistance.

If instead of getting the "not-installed" message, that is shown above, the following message is received.

sector id addrs mark not found
Do You Want To Retry (RETRN) or Abort (ESC) ?

Then the Z-80 CP/M Emulator software cannot read the Z-80 format diskette. A defective diskette is the most likely cause.

Make sure that the following items are observed:

- The DIMENSION 68000 must have 256K memory at the minimum.
- The "SYSTEM 1" diskette or other boot diskette must be configured for 256K Bytes of memory at the minimum. Use either the "SYS256" program, the "SYS384" program, or the "SYS512" program to change the memory configuration.
- Unless the emulator is "CPM80", the RAMDISK and/or SPOOL should be disabled and removed from memory. They should be disabled by using the following commands.

RAMDISK 0<CR> and SPOOL 0<CR>

If there is a problem, check that these items are correct and then try starting the Z-80 Emulator again.

Normally, the disk drive will be making sounds and eventually the welcome message from the operating system (or the application program) will manifest itself on the screen. The screen is now that of the Z-80 system that you selected. The 25th line will display one of the following messages.

KayPro II Emulation of CP/M 2.2 Ver 1.2

Z80 Emulation of CP/M 2.2 Ver 1.2

CP/M Emulator Vsn x.xx

This indicates the type of computer that the DIMENSION 68000 is currently acting like. (When a computer will emulate the Apple][Plus, the IBM PC, the Kaypro II, and other computers, as well as having its own CP/M 68K, it is necessary to have a message telling what kind of emulation is being performed.) The 25th line does not interfere with the normal display that is on the screen.

Use the DIMENSION 68000 in the selected Z-80 CP/M Emulation mode exactly as if it were the system, and not an emulation.

LEAVING THE EMULATION MODE

This section explains how to reset, exit, and restart emulation.

*** WARNING ***

> NEVER exit emulation or press RESET without first saving any files or data being worked on. If emulation is exited or if the system is RESET without saving the data, the data will be lost.

The DIMENSION 68000 may be reset from the front panel pushbutton, which is refered to as the reset-button. The reset-button will work in all situations. However, the reset-button is designed for EMERGENCY situations in which no other method of restoring order to the program will work.

The Z-80 Emulator may also be reset by pressing the Ctrl, Alt, and Del keys all at the same time. This is only available when the Z-80 Emulator is trying to read a key from the keyboard. It is designed to be used in situations that are less drastic than the reset-button.

After pressing the reset-button or Ctrl-Alt-Del the Z-80 Emulator allows you to choose one of two options. These can be seen in the prompt given on the screen after pressing the reset-button on the front panel of the DIMENSION 68000:

```
      RESET has been pressed
Press Break key to return to CP/M68K
or Retrn key to return to EMULATION
```

To remain in the emulation mode press the RETURN key.

When return is pressed after any reset, the Z-8Ø Emulator will act like the Z-8Ø CP/M system selected after the Ctrl-Alt-Del keys have been pressed. The Z-8Ø Emulator is reset. Some programs effectively ignore this. Some programs go to a special state allowing only the saving of the data and an exit. Some programs will lose any data, but the program is intact. And some programs (eg. many copy protected games) will attempt to "re-boot" the program, thus losing both the program and the data. Consult the documentation for the programs being used to know exactly what the results will be.

To return to CP/M 68K press the BREAK key.

Pressing the Break key, after any reset, will end the Z-8Ø CP/M Emulator. The system will go back to CP/M 68K. Make certain that the diskettes formatted for the Z-8Ø CP/M system are removed and CP/M 68K format diskettes are inserted.

** When Emulation is exited, make certain that a CP/M 68K format diskette is re-installed.

** Of course, the most obvious way to exit Emulation is to turn off the power to your DIMENSION 68ØØØ. This is like turning off the power switch on the Z-8Ø system selected.

Emulator Name	Diskette Format	Supports Ramdisk	Supports Async.	Supports Drives
CPM8Ø	4Ø Trk Std	YES	NO	A,B,C,D,E,F,G,H
OSBORNE1	Osborne I	NO	NO	A,B
KAYPRO2	KayPro II	NO	NO	A,B
CROMEM3	Cromemco	NO	NO	A,B

C H A P T E R 4

C U S T O M E R S U P P O R T

CUSTOMER SUPPORT

The Micro Craft Corporation and its dealers are committed to providing you with the highest quality products and services. Micro Craft appreciates your input. If you have suggestions or comments you would like to make, Micro Craft welcomes them and appreciates your interest.

IF YOU EXPERIENCE DIFFICULTY

If you experience diffilculty, in the installation or operation of your Coprocessor System, your dealer and Micro Craft Corporation are available for assistance. There are a number of checks you may make yourself in order to assist your dealer or Micro Craft in solving your problem.

DIMENSION 68000 MALFUNCTIONS AFTER COPROCESSOR INSTALLATION

If you suspect your DIMENSION 68000 System is malfunctioning after installation of the Z-80 Coprocessor Circuit Board, remove the board from the system and check operation.

- If your DIMENSION 68000 functions properly, then the problem is most likely with your Coprocessor. If your Coprocessor does not function properly, but your DIMENSION 68000 does, then return the Coprocessor circuit board to your dealer (or Micro Craft).

- If your DIMENSION 68000 still does not function properly with the Coprocessor removed, then there is a problem in the DIMENSION 68000 System itself. If the symptoms, of the problem, are the not same as the symptoms when the Coprocessor circuit board was installed, then note the changes, in the symptoms, so as to help in diagnosing the problem. If your DIMENSION 68000 does not work, return both it and your Z-80 Coprocessor to your dealer.

COPROCESSOR MALFUNCTION

If your DIMENSION 68000 functions normally, but you suspect that your Coprocessor Board may be malfunctioning, there are several tests that you may perform yourself in order to aide in the determination of the problem. Record your observations in order to assist your dealer, and Micro Craft, in solving the problem.

- Does the problem consistently occur with only one software package, or with just a few programs? If the problem occurs with only one program, or with just a few programs, then the problem is most likely an incompatability between the emulation software and your program, or programs. Your dealer may be able to provide assistance in reconfiguring the system to work with your program.

- Do the errors or problems always occur at the same point in the program?

- Do the errors, in the program, occur in a random fashion?

- Does the problem occur when the system has been used for an extended length of time?

- Does the problem only occur with a specific copy of your program or a specific copy of the emulation software? If this is the case, you most likely have a defective diskette.

If you have access to another DIMENSION 68000 system, try to reproduce the problem on that system. If the problem is unique to your system, the problem could be with your hardware.

If you are unable to solve the problem yourself contact your dealer. In many cases, problems may be traced to defective diskettes or an improperly configured system. Your observations will greatly assist your dealer (and Micro Craft) in solving the problem.

IF YOU NEED REPAIR OR ASSISTANCE...

Your authorized Micro Craft dealer is the most expedient means of obtaining repair or assistance with your Z-80 Coprocessor board, your DIMENSION 68000 system, or your application software. When contacting your dealer, please make certain that you fully describe the problem. If the problem only occurs under certain circumstances, then make certain that your dealer (or Micro Craft) is told the conditions which created the problem. If you fail to do this, the problem may be overlooked and the system returned to you as it was.

Warranty service may require proof of purchase. Save all the receipts in order to verify the purchase date. In addition, your receipts document ownership of your system for insurance purposes.

If you are unable to contact your dealer or have moved since purchasing your DIMENSION 68000, contact the Micro Craft Customer Relations department for specific instructions. Micro Craft will direct you to the dealer or service center closest to you.

If it is impractical for you to return the product to a dealer, Micro Craft will issue a Return Materials Authorization so that you may ship the unit directly to the factory. Do not return any product to Micro Craft without a return authorization and description of the problem.

Save ALL packing material. If you do not have the original shipping container, Micro Craft will provide (for a nominal charge) a shipping container for the DIMENSION 68000 system unit. When returning the system, make certain that you insure the unit for full replacement cost. Micro Craft is not responsible for damage or loss which occurs to the unit in transit. For additional information on returning equipment for repair, consult the Micro Craft Customer Relations department.

IF YOU NEED ADDITIONAL INFORMATION OR HAVE SUGGESTIONS...

If you have suggestions for improvement or have questions about this documentation or any Micro Craft product we would like to hear from you.

You may contact us at:

Micro Craft Corporation
Customer Relations Department
4747 Irving Blvd., Suite 241
Dallas, Texas 75247