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**PRELIMINARY**

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**WARNING:** This equipment has been certified to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals certified to comply with the Class A or B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and television reception.

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## **1.0 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 8086 Coprocessor enables a large library of programs and operating systems written for the IBM-PC to be run on the Dimension 68000 Computer. Emulation software and a dedicated 8086 microprocessor in conjunction with your Dimension 68000 enable you to take advantage of the many quality programs written for PC-DOS and CP/M-86 based machines.

### **1.1 USER SUPPLIED SOFTWARE, A PART OF THE COPROCESSOR SYSTEM**

Application of the 8086 Coprocessor requires the purchase of an operating system and application programs. Operating systems such as PC-DOS or CP/M-86 are available from your computer dealer, as well as application programs specific to your needs. Combined with a powerful operating system and application programs, your 8086 Coprocessor becomes a valuable addition to your Dimension 68000 computer.

### **1.2 MANUAL USAGE**

The information contained within this manual documents the 8086 Coprocessor and procedures required for its use as an IBM-PC Emulator.

In order to fully apply the Coprocessor System, additional information may be required.

The operating system and programs used with the 8086 Coprocessor will require documentation. 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 are strongly recommended.



## 1.2 MANUAL USAGE continued

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 a RETURN key should be entered.

(^ ) Indicates when a CONTROL character should be typed. As an example, (^C) is typed by holding the control key down while typing the letter C.

Computer screen responses will look like this example:

```
Micro Craft Operating System - CP/M-68K copyright DIGITAL RESEARCH Inc. 1983
Bios version 2.2 Copyright Micro Craft Corp. 1983
```

## 1.3 BEFORE YOU BEGIN...

If you are unfamiliar with the Dimension 68000 computer, you should refer to the "System Reference Manual" 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 8086 Coprocessor software.

\*\* If you are familiar with the Dimension 68000 and the basic commands of the CP/M-68K operating system, you should proceed to Section 2 where Installation of the Coprocessor Circuit Card will be covered.

\*\* If your Coprocessor System is already installed and you have a Coprocessor System Master Diskette then you may proceed to Section 3, which covers System Startup.





## 2.0 INSTALLATION OF YOUR 8086 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 8086 Coprocessor circuit board.

\*\* If your 8086 Coprocessor circuit board is already installed and you have created a Coprocessor System Master diskette, then you may proceed to Section 3.

## 2.1 PACKAGE CONTENTS

Your 8086 Coprocessor System contains the following:

- 1) An 8086 Coprocessor Reference Manual #680-0003-100
- 2) An 8086 Coprocessor Circuit Board #200-0007-001
- 3) An 8086 Coprocessor Distribution diskette #310-0004-100
- 4) A Product Registration/Warranty Card #600-0014-103

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

## 2.2 SYSTEM REQUIREMENTS

In order to install your 8086 Coprocessor System, the following equipment and materials will be required:

- 1) A Dimension 68000 with a minimum of 256K memory
- 2) A Dimension 8086 Coprocessor circuit board
- 3) Two disk drives
- 4) A video monitor
- 5) A CP/M-68K System Master diskette
- 6) An 8086 Coprocessor Distribution diskette
- 7) Blank diskettes
- 8) A medium #2 Phillips head screwdriver

In addition to the above, an operating system and application program for the 8086 Coprocessor is required to apply the unit, but is not necessary for installation or initial checkout. Operating systems such as PC-DOS or CP/M-86 and application programs may be purchased from your computer dealer.



### 2.3 COPROCESSOR CIRCUIT BOARD INSTALLATION

In order to install the 8086 Coprocessor circuit board in the Dimension 68000, the top cover will need to be removed.

Remove any diskettes from the disk drives and move other loose objects about the machine. Disconnect the power cord. It is not necessary to disconnect the keyboard, but remove any cable or item which restricts movement of the machine.

**\*\*\* WARNING \*\*\***

Make certain that the power cord is disconnected before removing the cover.

The top half of the case is fastened to the bottom by six recessed screws. These screws are located, three to a side, down the left and right of the bottom case half. To remove the screws make certain everything is clear and slide the machine to a position where the left side is hanging over the edge of a desk or other work surface by about 2 inches. Insert a #2 Phillips head screwdriver into the recessed holes and unscrew the three fasteners until they turn freely. Do not attempt to extract the screws as they are captive and may not be removed. Rotate the unit to where the right side is hanging over the desk edge and remove those screws. Remove the top half of the case from the machine by carefully lifting it straight up.

**\*\*\* WARNING \*\*\***

Before touching anything inside the case or the 8086 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.



### 2.3 COPROCESSOR CIRCUIT BOARD INSTALLATION continued

Installation of the 8086 Coprocessor circuit board can now be performed. Find the expansion connectors on the Dimension 68000 motherboard. These connectors are located along the rear of the unit and are described in detail in the "System Reference Manual". The 8086 Coprocessor circuit board may be installed in any available connector; your unit may already have some boards installed. When you have determined the expansion connector you wish to install the Coprocessor circuit board in, remove the metal or plastic locking tab behind the expansion connector being careful to note how it was installed.

#### \*\*\* WARNING \*\*\*

The 8086 Coprocessor circuit board is shipped in an antistatic plastic envelope. Make certain that you are discharged before removing the circuit board from the protective bag. Save this bag.

When handling the circuit board, be careful not to touch the gold connectors at the edge of the board; oil and moisture on your fingers will contaminate the connectors which might create a bad 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 8086 Coprocessor circuit board may be inserted into any available motherboard expansion connector. Refer to figure 1 for assistance with insertion of the circuit board and metal locking tab. 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.



### 2.3 COPROCESSOR CIRCUIT BOARD INSTALLATION continued

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.

Re-install the top cover of the Dimension 68000 by placing the top half of the case back onto the bottom half. 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.

This completes installation of the 8086 Coprocessor circuit board.

### FIGURE 1 - DETAIL OF CIRCUIT BOARD INSTALLATION





## 2.4 POWERING THE SYSTEM

In this step we will apply power to the system to verify proper installation of the 8086 Coprocessor circuit board.

Remove any diskettes from the disk drives.

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

Upon powering the unit the prompt:

```
      Welcome to the Realm
      of
      Dimension Computing
      by
      Micro Craft Corporation
```

should appear.

**If the prompt does not appear, turn off the unit immediately.**

Recheck the following:

- 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 OK, then remove the top cover and recheck the installation sequence of section 2.3. Make certain that the coprocessor circuit board is seated firmly. If you still experience difficulty, remove the board and consult your dealer.

If all proceeds as it should, install a BACKUP MASTER copy (did you make a copy?) of your CP/M-68K System diskette into drive A, and load the operating system.

IF YOU DO NOT HAVE A BACKUP MASTER copy of your CP/M-68K system diskette, refer to the "System Reference Manual" and make one before proceeding.



## 2.5 DISKETTE BACKUP, 8086 COPROCESSOR SYSTEM MASTER CREATION

Your Coprocessor system software is supplied on a DISTRIBUTION MASTER diskette. This section explains how to create a Coprocessor SYSTEM MASTER diskette from a DISTRIBUTION MASTER.

The CP/M-68K operating system and other useful programs will be installed as you create your 8086 Coprocessor System Master diskette. These programs simplify making additional WORK copies of your 8086 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 in Section 3 for installation of the emulation software. Creation of an 8086 Coprocessor System Master diskette is essential before you proceed with system startup. DO NOT use ANY original or Distribution Master diskette as a work copy.

\*\* If you are not familiar with the CP/M-68K operating system refer to the "CP/M-68K User's Guide" supplied with your Dimension 68000 before proceeding.

Creation of the Coprocessor System Master diskette is performed under CP/M-68K. Make certain that a copy of the CP/M-68K system diskette is mounted in drive A.

Press the RESET pushbutton to load CP/M-68K if it is not already loaded.

To load CP/M-68K if RESET is pushed,

Type: bt (no <CR> needed)

to boot the system.

When CP/M-68K is initially loaded, the following information 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>
```



## 2.51 FORMATTING A DISKETTE

Mount a new, unformatted, diskette into drive B.

### \*\*\* WARNING \*\*\*

Make certain that the diskette is blank and that you enter the correct drives.

To FORMAT the blank diskette in drive B,

Type: FORMAT <CR>

The system will respond:

```

Micro Craft DIMENSION 68000 Disk Formatting Program
***** 5 1/4 Inch Drives *****
A = Micro Craft Standard 40 Track
B = Micro Craft Standard 80 Track
C = IBM-PC Single and Double Sided
D = TRS-80 Model III
E = KayPro
F = Cromenco Single Density
G = Osborne Single Density
H = 8 Inch 3740 Format
***** 8 Inch Drives *****
I = 8 Inch 3740 Format, Single Density, Single Sided
J = 8 Inch TRS-16, Double Density, Double Sided
***** Winchester Drives *****
M = 10 Megabyte
N = 20 Megabyte
O = 50 Megabyte

Select Type

CP/M 68K Disks Are !A:=A!B:=A!C:=B!D:=B!E:=I!F:=I!G:=I!H:=I!usr=219K

```

\*\* Your default Disk Configuration may be different if it has been previously changed.

In order to make the disk readable by the CP/M-68K operating system and Dimension computer, select type A for the 40 track standard.

Type: A (no <CR>)

The system will respond with:

Which drive to use? (a-h)

Type: B (no <CR>)



## 2.51 FORMATTING A DISKETTE continued

The system will respond:

Do you wish to (F)ormat, (T)est, (D)ump or (P)rint

To FORMAT, Type: F (no <CR>)

The system will respond:

FORMAT will destroy disk data - ARE YOU SURE (Y)

Enter Y to continue.

The system will respond:

Starting Format  
Starting Test  
Another function (y) or return to cpm (n)

\*\* Formatting a disk takes a couple of minutes so take a break and relax while the Dimension 68000 does the work.

To exit type: N (no <CR>)

The system will return to CP/M-68K and respond:

A)





## 2.52 INSTALLATION OF CP/M-68K AND UTILITIES

To create a bootable backup diskette from a formatted diskette,

Type: COPY BOOT <CR>

The system will respond:

Copy Ver 1.1

Enter SOURCE drive:

Type: A <CR>

Enter DESTINATION drive:

Type B: <CR>

The system will respond:

(^C to ABORT)

Return to copy BOOT from A to B

If the commands are entered properly type return to begin. If they are not, type CONTROL C (^C) to return to CP/M-68K and re-enter the COPY BOOT command.

When you enter Return the system will respond:

\*\*\* Copying Tracks \*\*\*

0

Copy complete

Do you wish to repeat the copy?

To exit type: N <CR>

The diskette in drive B is now formatted and bootable. The next step is to install the CP/M-68K Operating System and Submit program. Submit programs will be used in section 3 to enable the system to automatically load the emulation programs.

To install the CP/M-68K operating system,

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

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



**2.52 INSTALLATION OF CP/M-68K AND UTILITIES** continued

If the copy is successful, the system will return to CP/M-68K and return the prompt;

A>

If the prompt is not returned, check the error message to see what happened.

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

A SUBMIT program will be used later to automatically start emulation.

To install the Submit program,

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

The A> prompt should be returned.

Before you begin backup, an additional file will need to be copied onto your newly created system disk in drive B. This file, named PIP, 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 itself.

To copy PIP from drive A to drive B,

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

The system disk you have just created in drive B will now be used to store a backup of your 8086 Coprocessor/IBM Emulator software.



### 2.53 BACKING UP YOUR COPROCESSOR DISTRIBUTION MASTER DISKETTE

Once you have created a CP/M-68K system disk and installed PIP, you may proceed to copy your 8086 Coprocessor/IBM Emulator software.

Log on to drive B,

Type: B: <CR>

The system will respond with the cursor:

B>

Mount the original 8086 Coprocessor/Emulator Distribution Master Diskette in drive A.

To backup the Distribution Diskette in drive A and copy the contents onto drive B,

Type: PIP B:=A:\*. \*[QV] <CR>

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

The system will respond with:

```
Copying-
IBM.68K
IBMGRF40.68K
IBMMONO.68K
```

To verify that the preceding files have been copied and are contained on drive B,

Type: DIR B: <CR>

The system should display the following directory:

```
CPM      SYS
CPMCONF  SUB
PIP      68K
IBMGRF40 68K
IBM      68K
IBMMONO  68K
```



### **2.53 BACKING UP YOUR COPROCESSOR DISTRIBUTION MASTER DISKETTE** continued

Install a write protect tab on the copy of the Coprocessor System Master diskette to prevent accidental erasure. This disk should be used for installation, copies, and all future system maintenance. The original Distribution Diskette should be archived in a location entirely different from your computer and should only be used to restore your System Master if it is damaged or lost.

At this point your 8086 Coprocessor System Master diskette is ready to be used in the installation process outlined in section 3.





### 3.0 USING YOUR 8086 COPROCESSOR AS AN IBM-PC EMULATOR

This section will describe how to install the 8086 Coprocessor Software and apply it for use as an IBM-PC Emulator operating under PC-DOS or CP/M-86.

If you have a Coprocessor System Master diskette (which was created in section 2.5) then you are ready to begin.

If you do not have a Coprocessor System Master diskette, read section 2.5 and make one. DO NOT use your original Distribution Master diskette.

The Dimension 8086 Coprocessor software may emulate an IBM-PC equipped with either a Monochrome Text display or Color Graphics adapter. To survey your display options, read section 3.1.

When you have evaluated your emulation options, the desired software is installed in section 3.2. There are two installation choices depending upon the intended use of the system. The 8086 Coprocessor system may be used at the completion of section 3.2.

When you have installed your software Section 3.3 explains how to reset, exit, and restart emulation.

If a turn-key system is desired to emulate an IBM-PC without operator intervention, then section 3.4 should be read. This section explains how to create a submit file to tell CP/M-68K that you want to perform IBM-PC emulation when power is applied.

\*\* Creation of a turn-key system is helpful for persons who are familiar with the IBM-PC but are not yet acquainted with the Dimension 68000 or the CP/M-68K operating system.

Section 3.5 explains how to change the default emulation configuration modes.



### 3.1 YOUR EMULATION OPTIONS

The software contained on your Coprocessor System Master diskette enables your 8086 Coprocessor to emulate multiple configurations of the IBM-PC. This section describes the various graphics and text options available to you.

External peripheral interface to the Dimension 68000 during IBM-PC emulation is also described.

#### 3.1.1 EMULATION VIDEO DISPLAY MODES

The Dimension 8086 Coprocessor software emulates the three IBM-PC video display configurations:

- 80 x 25 Display with the color/graphics adapter
- 40 x 25 Display with the color/graphics adapter
- 80 x 25 Display with the monochrome adapter

Separate emulation programs contained on your 8086 Coprocessor System Master diskette set the initial video configuration. When your application software is loaded, the video display may be reset to another configuration. The three programs are named:

IBM.68K	80 x 25 Graphics
IBMGRF40.68K	40 x 25 Graphics
IBMMONO.68K	Monochrome Text

The program(s) you require will be installed on your Emulation Work copy in section 3.2.

Your application software will ultimately determine which video display mode is required. In many cases, the display configuration will be modified by your software for you. If you are not sure which video mode is required by your software, consult the manual supplied with that software or your dealer.

If you are not certain what software you will be using or desire the flexibility of being able to emulate multiple configurations, it is recommended that you install all three programs on your Emulation Work copy. Installation of the emulation software is covered in section 3.2.

\*\* If you experience difficulty with certain programs, Section 3.5 explains how to change the emulation video attributes for each display mode.



### 3.1.1 EMULATION VIDEO DISPLAY MODES continued

\*\* Color generation in the Dimension 68000 and many microcomputers use a technique known as aliased color to generate a composite video output. This technique has some inherent quality limitations, and as such, displays in color are not supported. If you require color capability, contact your dealer or Micro Craft for availability of the RGB color display adapter.

### 3.1.2 EMULATION INTERFACE CONFIGURATION

Your 8086 Coprocessor Emulation software supports the following IBM-PC interface configuration:

- (2) Double Sided Disk Drives
- (1) Parallel Printer Interface
- (1) Asynchronous Serial Interface

\*\* If your Dimension 68000 system contains more than two disk drives, only the A and B drives will be used during emulation.



### 3.2 INSTALLATION OF EMULATION PROGRAMS

The intended application of your Dimension 68000 and the 8086 Coprocessor System will determine the procedure for installation of your emulation software.

If you desire to use the Dimension 68000 exclusively as an IBM-PC emulator you will want to copy the Coprocessor System Master diskette and use the backup as an EMULATOR WORK diskette. Refer to section 3.2.1 to create a work diskette for dedicated applications.

If you want to take full advantage of the Dimension 68000's ability to emulate the IBM-PC and also operate under CP/M-68K, then you will want to install the emulation software on your CP/M-68K System Backup diskette. Refer to section 3.2.2 for this procedure.

#### 3.2.1 CREATING AN EMULATOR WORK DISKETTE FOR DEDICATED APPLICATIONS

A dedicated 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 perform IBM-PC emulation.

If you wish to dedicate your Dimension 68000 and 8086 Coprocessor System as an IBM-PC emulator you may copy your 8086 Coprocessor System Master to create an Emulator work diskette.

\*\* A turn-key system using a submit file is recommended for 'emulation only' diskettes to prevent the operator from having to enter CP/M-68K commands. Section 3.4 illustrates the use of a submit file to reduce operator intervention.





**3.2.1 CREATING AN EMULATOR WORK DISKETTE** continued

To create an Emulator Work diskette make certain that the CP/M-68K System Backup diskette is mounted in drive A and the CP/M-68K operating system is loaded. If you are currently logged on to drive A you will see the prompt:

A)

Mount a FORMATTED diskette in drive B.

\*\* If you do not have a formatted diskette, refer to section 2.5 for formatting procedures.

To copy the 8086 Coprocessor System Master diskette,

Type: COPY ALL A B [V] <CR>

CP/M-68K will load the COPY utility program and return the following prompt:

Copy Ver 1.1

(^C to ABORT)

Return to copy ALL from A to B

BEFORE pressing the RETURN key mount the 8086 Coprocessor System Master diskette in drive A.

**\*\*\* WARNING \*\*\***

Make certain that drive A is the source drive to copy ALL from A to B, or the contents of the A drive (your master diskette) could be erased. Did you install a write protect tab on your Coprocessor System Master diskette? If you haven't, do it now to protect your software.

If the commands are entered correctly press the RETURN key to begin the copy process. If the command is in error, enter a CONTROL-C (^C) and retype the COPY ALL command sequence.



**3.2.1 CREATING AN EMULATOR WORK DISKETTE** continued

When RETURN is entered, the system will display the following prompt:

```
### Copying Tracks ###
  0
  1
  .
  .
  .
 39
Copy Complete
Do you wish to repeat the copy?
```

\*\* The copy process takes several minutes so take a break and relax while the Dimension 68000 copies the disk.

To exit type: N <CR>

To check the contents of the disk you have just copied,

Type: DIR B: <CR>

The disk should contain all three emulation program files.

The copy you have just made of your 8086 Coprocessor System Master diskette may be used as an Emulation Work copy. Install a write protect tab on this diskette.

Section 3.3 describes how to enter, exit, and restart emulation. Proceed to section 3.3 and familiarize yourself with the IBM-PC emulator. When you are comfortable with the emulator, you may want to create a turn-key system. If you do, read section 3.4.



### 3.2.2 INSTALLATION OF THE EMULATION PROGRAMS ONTO A CP/M-68K SYSTEM DISKETTE

Make certain that you are using a WORK COPY of your CP/M-68K System Master diskette.

\*\* To review the procedure for copying a CP/M-68K System diskette, refer to the "CP/M-68K User's Guide".

\*\* If your Dimension 68000 is being used for purposes other than IBM-PC emulation, it is wise to install the IBM-PC programs on a separate WORK COPY, rather than the BACKUP MASTER, of your CP/M-68K System diskette. This is particularly important if you create a turn-key system where transfer of control to the 8086 Coprocessor is automatic.

To install the 8086 Coprocessor Emulation software on your CP/M-68K System Work Disk, make certain that it is mounted in drive A and that CP/M-68K is loaded. If you are currently logged on to drive A you will see the prompt:

A>

Mount your 8086 Coprocessor System Master Diskette in drive B.

We will now use PIP to move the Emulation software from drive B to the CP/M-68K System Work Disk in drive A.

\*\* It is recommended that you move all three emulation programs. If you do not want a certain program installed you may omit copying that program, but you will not have it on your CP/M-68K System Work Disk if you should need it later.

To copy the IBMMONO emulation program file from drive B to drive A,

```
Type: PIP A:=B:IBMMONO.68K[QV] <CR>
```

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

The system should return the A> prompt when the copy operation is finished. If the A> prompt is not returned, read the error message and check entry of the command line.



### 3.2.2 INSTALLATION ONTO A CP/M-68K SYSTEM DISK continued

To copy the remaining program files,

Type:

```
PIP A:=B:IBMGRF40.68K[IOV]
```

And when CP/M-68K returns the A> prompt,

Type:

```
PIP A:=B:IBM.68K[IOV]
```

Your 8086 Coprocessor Emulation programs are now installed onto your CP/M-68K System Work Diskette.

Type: DIR A:

Check the disk directory to make certain the files you have just installed are present.

Your CP/M-68K System Work Diskette is now ready to be used for emulation.

Section 3.3 describes how to enter, exit, and restart emulation. Proceed to section 3.3 and familiarize yourself with the IBM-PC emulator. When you are comfortable with the emulator you may want to create a turn-key system. If you do, read section 3.4.





### 3.3 USING YOUR EMULATOR

This section explains how to begin using your 8086 Coprocessor system as an IBM-PC emulator.

Application of the Dimension Coprocessor System as an IBM-PC emulator requires an IBM compatible operating system such as PC-DOS or CP/M-86. If you do not have an operating system and application software you will need them before you can use the 8086 Coprocessor. Your dealer can provide assistance with selecting the best software for your application.

If you are already or have previously been an IBM-PC owner, then you will most likely have an operating system and application programs.

#### 3.3.1 BEFORE YOU BEGIN EMULATION...

During emulation, the personality of your Dimension 68000 assumes that of an IBM-PC. System operation in the emulation mode is determined by your application program and operating system. For documentaion of those programs you will need to refer to the information provided with them.

When in the emulation mode, the system will expect an IBM-PC compatible disk format containing either a PC-DOS or CP/M-86 operating system.

CP/M-68K disks will not be read.

#### 3.3.2 LOADING EMULATION PROGRAMS

If your emulation software is installed on a work copy you are ready to begin.

The IBM-PC emulator program files are loaded from CP/M-68K. When CP/M-68K finishes loading the program, the system is transferred to the emulation mode.

The following example illustrates loading the IBM program file to emulate an IBM-PC equipped with an 80 x 25 graphics display.

If you want to emulate a different display configuration, then you may substitute the IBM filename with IBMMONO or IBMGRF40.



### 3.3.2 LOADING EMULATION PROGRAMS continued

Make certain that CP/M-68K is loaded. Log on to the drive that contains your 8086 Coprocessor emulation software. If you have installed it on your CP/M-68K System Work Master, then it should be mounted in drive A. If you are using a dedicated Emulator Work copy, then it may be mounted in any available drive as long as it is specified.

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

A>

To log on to drive B,

Type: B: <CR>

The system will then display the prompt:

B>

To load the IBM emulator program and begin emulation,

Type: IBM <CR>

\*\* You may also specify the drive on which your software is located without changing the default drive by typing B:IBM.

The system will return the prompt:

```
Welcome to the Micro-Craft DIMENSION 68000
8086 Coprocessor System
IBM-PC (tm) Emulation Version #.##
Copyright 1983 Micro Craft Corporation
```

Your configuration is:

```
###K R/W Memory
80 x 25 Graphics Display Adapter
2 Double Sided Diskette Drives
1 Parallel Printer Interface
1 Serial Interface
```

Please mount a bootable IBM diskette in drive A  
and press any key

You are now in the emulation mode.



### 3.3.2 LOADING EMULATION PROGRAMS continued

To begin using your Dimension 68000 and the 8086 Coprocessor system, insert an IBM format disk in drive A.

If you receive the prompt,

```
No 8086 Coprocessor Board Found
```

The 8086 Coprocessor circuit board is either not installed properly or is not functioning. If you are certain that installation is correct, contact your dealer for assistance.

If the Emulator software cannot read the IBM format disk, the message

```
Error while loading bootstrap
```

will appear. If this is the case, you most likely have a defective diskette.

The above example illustrates the use of the file IBM to load the 80 x 25 graphics video display mode. Your application program may require a different display mode than the example illustrated. Load the application programs you will be using and determine the video modes that will be required.

If you need assistance your dealer may be able to specify the required display modes for a given program. If you experience difficulty, refer to section 3.5 and review the emulation configuration options before contacting your dealer.



### 3.3.3 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 you are working on. If you exit emulation or RESET the system without saving your data, it will be lost.

The 8086 Coprocessor and IBM-PC emulator may be reset in two ways:

(1) The IBM-PC emulator may be reset from the keyboard without leaving the emulation mode. This is referred to as EMULATOR reset.

(2) The Dimension 68000 may be reset from the front panel pushbutton. This is referred to as SYSTEM reset.

EMULATOR RESET does not exit emulation and is equivalent to an IBM-PC reset when the keyboard command sequence CONTROL ALTERNATE DELETE is detected. All three keys must be depressed simultaneously for emulator reset to occur. The system response to this action is determined by your operating system and application software. Consult the documentation supplied with your software to determine the response to CONTROL ALTERNATE DELETE.

SYSTEM RESET allows you to exit emulation. All data and programs are lost after SYSTEM RESET. When you want to exit or quit emulation, press the RESET pushbutton on the Dimension 68000 front panel. The system will respond:

Reset-- Press <Retrn> to restart emulation, <Break> to restart CP/M-68K.

If you wish to remain in the emulation mode enter a RETURN <CR>.

If you want to return to CP/M-68K press the BREAK key.

\*\* When Emulation is exited, make certain you re-install a CP/M-68K format disk.

\*\* If you want to change any of the emulation modes, you must exit emulation and specify the desired mode from CP/M-68K. For more information on the emulation configuration modes refer to section 3.5.





### 3.4 CREATING A TURN-KEY SYSTEM TO BEGIN EMULATION ON APPLICATION OF POWER

A "turn-key" system reduces the operator intervention required to load and execute emulation programs. When the submit file in the following example is installed, all that is required to begin emulation is that the operator change diskettes to an IBM-PC format.

If you wish to use a submit file to begin emulation, you must know which emulation configuration is needed for your application software. If you are not certain which emulation configuration you need, refer to section 3.3.2 and determine your requirements.

The 8086 Coprocessor System Master, its' copies, and the CP/M-68K System Master disk contain a program named CPMCONF.SUB. When power is applied and a disk containing the CP/M-68K operating system is loaded, the CPMCONF.SUB submit file is examined to see what action should be taken.

The CPMCONF.SUB file installed on your 8086 Coprocessor System Master disk and the copies made from it do not contain any instructions. When CP/M-68K is loaded, control is passed to the operating system by the submit file and the A> prompt is returned.

The submit file on your work diskettes may be modified to "type" commands for you. This section will explain how to embed commands in the CPMCONF.SUB submit file to load an IBM-PC emulation program.

\*\* If you have any questions regarding the use of submit files or have a disk 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 (E)ditor 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 work diskettes created in section 3.2.1 or 3.2.2 should be used to install the submit file. Mount the diskette you wish to have the submit file installed on in drive B. REMOVE the write protect tab from this diskette temporarily.

A CP/M-68K System Master diskette containing the file ED should be mounted in drive A.



### 3.4 CREATING A TURN-KEY SYSTEM continued

Log on to drive A. The system should display the A> prompt.

The following example illustrates the use of ED to install a submit file containing the emulation program file IBM. If you wish to emulate a different configuration, you may substitute the IBM filename with the one you desire.

\*\* If you make a typing mistake while in ED, you may enter CONTROL-H (^H) to delete the last character.

To load ED and edit the CPMCONF.SUB file located on drive B, type:

```
ED B:CPMCONF.SUB <CR>
```

ED will display its' prompt which is a :.

To Append the existing CPMCONF.SUB file and Insert the new commands, type:

```
#A <CR>
I <CR>
```

ED will return:

```
1:
```

Type the filename of the emulation program you desire to have submitted:

```
IBM <CR>
```

ED will respond:

```
2:
```

To tell ED that you are through giving it commands, type:

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

ED will return the : prompt.



### 3.4 CREATING A TURN-KEY SYSTEM continued

To exit ED, type:

E <CR>

ED will then save the modified submit file to the diskette in drive B.

\*\* Your original submit file will be saved as CPMCONF.BAK.

The system will then return the A> prompt. The previous operations are summarized below:

```
A) ED B:CPMCONF.SUB <CR> edit CPMCONF.SUB file on drive B and output the modified file to drive B
   : #A <CR> append existing submit file
   : #I <CR> insert new information
   1: IBM <CR> filename of desired emulation program
   2: -> <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 emulation program on power-up. If you wish to use a different emulation program, you may substitute the IBM filename with the one you desire.

Re-install the write protect tab on the disk mounted in drive B.

To test the newly modified submit file, move the disk in drive B to drive A. The Dimension 68000 will always expect the "boot" disk to be located in drive A. Power down the Dimension 68000. Re-apply power. After loading is completed, the following prompt should be displayed:

```
Welcome to the Micro-Craft DIMENSION 68000
8086 Coprocessor System
IBM-PC (tm) Emulation Version #.##
Copyright 1983 Micro Craft Corporation
```

Your configuration is:

```
###K R/W Memory
80 x 25 Graphics Display Adapter
2 Double Sided Disk Drives
1 Parallel Printer Interface
1 Serial Interface
```

Please mount a bootable IBM diskette in drive A  
and press any key



### 3.4 CREATING A TURN-KEY SYSTEM continued

The preceding example illustrates the simplicity provided by submit files when loading programs. 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.

\*\* If the operating system used during emulation permits, you may use submit files under that system after the emulation mode is entered.





### 3.5 MODIFYING THE EMULATION CONFIGURATION

This section explains what to do if you experience difficulty emulating the IBM-PC with certain application programs.

The emulator software supplied to you allows the 8086 Coprocessor System to emulate the most common IBM-PC configurations. If your application program uses a non-standard configuration, the emulator software may be modified. The following modifications are described in this section:

- Video Display Attributes - Intensity On/Off
- Memory Size
- System Components

Section 3.1 details the three video display modes available to you. If you are certain that you have selected the proper display mode but the display does not appear as it should, you may need to change the VIDEO ATTRIBUTES for that particular display mode.

The MEMORY SIZE of your system is determined by the amount of memory installed in your Dimension 68000. If you wish to reduce the MEMORY SIZE you may do so.

The default SYSTEM COMPONENTS are determined by the Dimension 68000. If you wish to add or delete SYSTEM COMPONENTS you may specify the configuration you desire.

\*\* MEMORY SIZE and the configuration of SYSTEM COMPONENTS are included to assist the programmer and should not require modification.

The desired Emulation Configuration is specified when emulation programs are loaded from CP/M-68K. If you do not wish to change the emulation configuration, the default will be loaded for you. If you wish to change the configuration, examples are given for each mode.



### 3.5.1 VIDEO ATTRIBUTE SELECTION

If your application software requires the use of the IBM-PC intensity video attribute, you will want to turn the INTENSITY mode ON. Intensified characters will appear in inverse on the Dimension 68000 screen.

\*\* If intensified characters are required by your software and the intensity mode is not set, some characters may not appear on the screen.

The intensity mode may be required in any of the three available display configurations. The following example illustrates setting INTENSITY ON for the 80 x 25 Color Graphics Video Display mode.

When you are ready to load emulation you should follow the steps outlined in section 3.3. Instead of just typing the filename of the program, type:

```
Filename INTENSITY <CR>
```

The intensity mode will then be set. If you wish to embed this command in a submit file the procedure outlined in section 3.4 should be followed.

As an example, type:

```
IBMMQNO INTENSITY
```

If you want to turn the intensity mode off, you must reload the IBMMQNO emulation program.

### 3.5.2 MEMORY SIZE

Memory size is included to assist the programmer. To specify a different memory size type:

FILENAME MEM=###, where FILENAME is the emulation configuration and ### is a decimal value less than the default memory size.



### 3.5.3 SYSTEM COMPONENTS

Modification of the default system components under emulation is included to assist the programmer and should not be modified by the end-user.

The system components are specified as a hex value which corresponds to the equipment flag word established by dipswitch settings within the IBM-PC. For additional information on the value of the equipment flag word required for a certain configuration, refer to the "IBM-PC Reference Manual" page A67.

The general format for changing the default system components is:

FILENAME CONFIG=\$\$\$\$, where FILENAME is the emulation configuration and \$\$\$ is a hexadecimal value corresponding to the equipment flag word.

\*\* Illegal values of the equipment flag word are not checked for validity.

### 3.5.4 MULTIPLE CONFIGURATION OPTIONS

If multiple options are required, they may be specified in any order separated by spaces. The following example illustrates the command structure.

```
IBM INTENSITY MEM=128
```

The above command sets the intensity video attribute on and establishes a 128K memory size.









## **4.0 CUSTOMER SUPPORT**

Micro Craft Corporation and its dealers are committed to providing you with the highest quality of product and services for your computing needs.

If you experience difficulty or have questions regarding operation of your 8086 Coprocessor System, please read section 4.1.

Section 4.2 explains what to do if you need repair.

Warranty information is explained section 4.3.

Micro Craft appreciates your input. If you have suggestions or comments you would like to make, section 4.4 lists contacts that are available to you.

### **4.1 IF YOU EXPERIENCE DIFFICULTY**

If you experience difficulty 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. The following sections outline some problems you may encounter and what you can do.

#### **4.1.1 DIMENSION 68000 MALFUNCTIONS AFTER COPROCESSOR INSTALLATION**

If you suspect your Dimension 68000 System is malfunctioning after installation of the 8086 Coprocessor Circuit Board, remove the board from the system and check operation. If your Dimension 68000 functions properly, the problem is most likely with your Coprocessor.

If your Dimension 68000 still does not function properly with the Coprocessor removed, there is a problem in the System itself. Are the symptoms of the problem the same as when the Coprocessor circuit board was installed? Make a note of any changes in symptoms for when you talk to your dealer.

If your Coprocessor Board does not function properly but your Dimension 68000 does, return the Coprocessor circuit board to your dealer.

If your Dimension 68000 does not work, return both it and your 8086 Coprocessor to your dealer.



#### 4.1.2 COPROCESSOR MALFUNCTION

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

Does the problem occur with only one software package, or does it consistently occur with several programs? If the problem occurs with only one program, the problem is most likely an incompatibility between the emulation software and your program. Your dealer may be able to provide assistance to configure the system to work with your program.

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

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 emulation software? If this is the case, you most likely have a defective diskette.

If you have access to another Dimension system, try producing 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.

#### 4.2 IF YOU NEED REPAIR OR ASSISTANCE...

Your authorized Micro Craft dealer is the most expedient means of obtaining repair or assistance with your Dimension 68000, 8086 Coprocessor, or application software. When contacting your dealer, make certain you define the problem. If the problem only occurs under certain circumstances, make certain that they are told the conditions which create the problem. If you fail to do this, the problem may be overlooked and the system returned to you as it was.



**4.2 IF YOU NEED REPAIR OR ASSISTANCE continued**

Warranty service may require proof of purchase. Save all 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 relocated, 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, refer to the warranty in section 4.3.



#### 4.3 LIMITED WARRANTY

Micro Craft Corporation (Micro Craft) warrants this product against defects in material and workmanship for a period of ONE YEAR from the date of original retail purchase. This warranty applies only to products manufactured by or for Micro Craft, which can be identified by the "Micro Craft" trademark, trade name or logo affixed to them (Micro Craft Product). Micro Craft does not otherwise warrant any products not manufactured by Micro Craft.

For Micro Craft products other than software, Micro Craft will repair (or at its option replace) this Micro Craft Product during the warranty period at no charge to you, provided it is returned to an authorized Micro Craft Service Center, freight prepaid within the country of original retail purchase.

For Micro Craft software accompanying a Micro Craft Product (1) Micro Craft will replace media at no charge if you discover physical defects in it and return it during the warranty period, and (2) Micro Craft will update or replace media for software developed by Micro Craft at no charge to you if Micro Craft releases a corrective update to such system software during the warranty period. This specifically does not include any software provided by Micro Craft but developed by any third party.

In order to obtain warranty service return the Micro Craft product to an authorized Micro Craft Service Center in the country of original retail purchase transportation charges prepaid. (You can obtain the name and address of an authorized Micro Craft Service Center from your local authorized Micro Craft Dealer or from Micro Craft). Attach to the Micro Craft Product your name, address, telephone number, a description of the problem, and a bill of sale bearing the appropriate Micro Craft serial numbers as proof of date of original retail purchase.

This warranty does not apply if the Micro Craft product has been damaged by accident, abuse, misuse or misapplication, has been modified without written permission of Micro Craft, or if any Micro Craft serial number has been removed or defaced.

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#### **4.4 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

