



MICRO CRAFT CORPORATION

January 5, 1984

The Dimension 68000 User's Guide, (part number 680-0001-100) has been revised. Here are the new, revised pages that are to be placed into the manual.

The pages to be replaced are as follows:

<u>Page to be Replaced</u>	<u>New Page</u>
9,10	9,10
27,28	27,28
31,32	31,32
35,36	35,36

D I M E N S I O N   6 8 0 0 0  
S Y S T E M   U S E R ' S   G U I D E  
M i c r o   C r a f t   C o r p o r a t i o n

6 8 0 - 0 0 0 1 - 1 0 0 A

**PRELIMINARY**

0 1 / 0 5 / 8 4   R E V I S I O N

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 SOFTWARE DESCRIBED IN THIS MANUAL, 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 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.

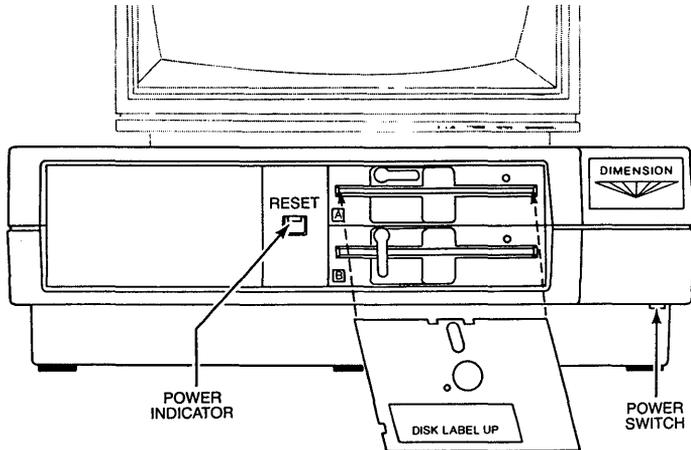
This manual is copyrighted. All rights are reserved. This document may not, in whole or in part, be copied, photocopied, translated, or reduced to any electronic medium or machine readable form without prior consent, in writing, from Micro Craft Corporation.

Copyright 1983 by Micro Craft Corporation

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

NOTE: The lever on the diskette drives can NOT be moved unless either a protector card or a diskette is inserted into the drive.

Forcing the lever will DAMAGE the drive!



**Inserting A Diskette Into The DIMENSION 68000**

- OPTIONALLY, if there is a printer, it should be connected to the connector on the rear of the System Unit that is labeled "PARALLEL CENTRONICS PRINTER".
- OPTIONALLY, if there is a modem, it should be connected to the connector on the rear of the System Unit that is labeled "RS232C". This connection may be used for any device that uses the EIA (Electronics Industry Association) RS-232C interface.

\*\*\* CAUTION \*\*\*

BE SURE THAT EACH CONNECTION HAS BEEN FIRMLY SEATED PRIOR TO "POWERING UP" THE SYSTEM.

To "POWER UP" the system, use the following steps:

- 1 - TURN ON the CRT. Allow time for the CRT to warm up.
- 2 - TURN ON the DIMENSION 68000. The power switch is under the right front edge of the System Unit. When the power is turned on, the LED in the RESET Switch will come ON. For the first few seconds, the computer will perform a self test routine. After the self test routine, the computer will display the message below, then the LED on Disk Drive A will light up. The lighting of the LED on Disk Drive A indicates that the system is ready for a "bootable" diskette to be inserted into the disk drive. The system should display, on the CRT, the following:

Welcome to the Realm  
of  
Dimension Computing  
by  
Micro Craft Corporation

There will be a character sized block, displayed in reversed video (light in color, instead of dark) displayed on the left side of the screen under the above message. This block is called the cursor. Since the display on the screen is white letters on a dark screen, the cursor will be a block of light.

- 3 - INSERT a "SYSTEM 1" diskette into Disk Drive A. The "SYSTEM 1" diskette that you use should be a COPY of the "SYSTEM 1" diskette that was shipped with the DIMENSION 68000 System, NOT THE ORIGINAL. If you have not made copies of the "SYSTEM" diskettes, STOP! You need to make copies NOW! The section on BACKING UP later in this chapter tells how to make copies of your "SYSTEM" diskettes. So does APPENDIX B which is titled "THE BACK UP PROCEDURE."

## KEYBOARD

The keyboard for the DIMENSION 68000 is a microprocessor controlled, 30 character per second (300 BPS), ASCII coded, TTL output level device. The keyboard has 10 function keys and a combination numeric pad/cursor control pad .

## CRT INTERFACE

The CRT interface is an EIA RS-170 compatible interface. The voltage output is adjusted to be 1 volt pk-pk nominal. The interface supplies composite sync. The interface can supply either an interlace or a non-interlace output signal. The DIMENSION 68000 sets the mode to interlace or to non-interlace as follows:

## NON-INTERLACE

-----  
 20x20 TEXT  
 40x24 TEXT  
 80x24 TEXT  
 50x25 TEXT  
 LO-RES and MEDIUM RES GRAPHICS

## INTERLACE

-----  
 80x50 TEXT  
 100x50 TEXT  
 HI-RES GRAPHICS

Interlace mode has two times the resolution as non-interlace mode. This is because interlace mode has 525 horizontal lines on the screen, while non-interlace mode has 262 1/2 horizontal lines.

## REAL TIME CLOCK

There is an internal, interrupt driven, Real-Time Clock and event timer that has programmable interval rates between 10 microseconds and 250 milliseconds.

## PROCESSOR

The microprocessor used in the DIMENSION 68000 is an 8 MHz 68000 type microprocessor. The 68000 microprocessor has 16 bit wide external data paths. The internal architecture of the 68000 microprocessor is 32 bits wide. The 68000 has the following registers:

- 8 DATA REGISTERS that are 32 BITS wide
- 7 ADDRESS REGISTERS that are 32 BITS wide
- 2 STACK POINTER REGISTERS that are 32 BITS wide
  - 1 for the USER
  - 1 for the SUPERVISOR
- 1 PROGRAM COUNTER REGISTER that is 32 BITS wide
- 1 STATUS REGISTER that is 16 BITS wide

Because of the internal architecture, the 68000 is properly described as a 32 bit micro-processor.

Some of the features of the 68000 microprocessor are:

- 5 DATA TYPES
  - Bit
  - BCD Digits (4 bits)
  - Bytes (8 bits)
  - Words (16 bits)
  - Long Words (32 bits)
- 16M byte direct addressing range
- 14 addressing modes on 61 basic instructions for over 1000 total instruction types

#### DISK DRIVES

The standard disk drives used for diskettes in the DIMENSION 68000 system are half height, 5 1/4 inch, double sided, double density, half stepable, 40 track units. They are capable of storing up to 400K bytes. Optionally, the DIMENSION 68000 system can be supplied with the following types of drives:

- 80 track, 817K byte, 5 1/4 inch diskette drives
- 8 inch diskette drives
- 3 1/2 inch diskette drives
- 3 1/4 inch diskette drives
- Winchester-type Hard disk drives

Space is provided on the rear panel of the system unit for a 34 pin connector and for a 50 pin connector. These connectors can be used for connections to any externally mounted disk drives.

Micro Craft Corporation manufactures a disk drive expansion unit that can contain two 8 inch diskette drives, or a mix of 3 1/2 inch diskette drives, 3 1/4 inch diskette drives, and 8 inch diskette drives. These diskette drives are packaged in an expansion chassis. The expansion chassis also includes a power supply to supply the necessary voltages and currents to operate the drives.

## EXPANSION SLOTS

The six expansion slots in the DIMENSION 68000 system may be used for additional memory, co-processors, additional input or output (I/O) ports, etc. as desired by the user. A description of the pinouts used by the expansion slots is available in the DIMENSION 68000 System Reference Manual.

## ADDITIONAL MEMORY

The DIMENSION 68000 can support up to 16M bytes of memory. If the user desires to expand the RAM on the DIMENSION beyond 512K bytes, the additional memory may be added by installing cards that contain the extra memory.

## CO-PROCESSORS

The DIMENSION 68000 can support other microprocessors co-resident with the 68000 type processor that resides in the system. The DIMENSION, by using co-processors, can emulate other personal computers. By using the 6512 processor as a co-processor, the DIMENSION is able to emulate the APPLE II. By using an 8086 processor, the DIMENSION is able to emulate the IBM-PC and the IBM-PC look-alikes. And, by using a Z-80, the DIMENSION can emulate most of the CP/M-80 machines and the TRS-80 units.

Micro Craft can provide the user with an APPLE II emulator card, an IBM emulator card, and a Z-80 emulator card. The emulator cards from Micro Craft do not have to be plugged into any particular slot. They are slot independent.

## HARD DISK

The DIMENSION 68000 Winchester-type hard disk controller will plug into any expansion slot. It is a ST506 type interface capable of handling 2 Winchester-type disks with a total of 300M bytes of storage.

## PROTOTYPING KIT

Micro Craft Corporation has a prototyping kit which contains a prototyping board and all of the necessary documentation for anyone to be able to build a card that will properly plug in to and properly operate in the expansion slots of the DIMENSION 68000 system.



## ARCHITECTURE

The DIMENSION 68000 is designed to have the hardware functions that are inside the system to be software configurable. This is accomplished by means of software controlled hardware latches that are placed between the system bus and the various device controllers. The system bus carries the address signals, the data signals, and the control signals for the whole DIMENSION 68000 system. The device controllers handle the following devices for the system:

- memory
- video display
- speaker
- disk drives
- keyboard
- RS-232 interface
- parallel interface
- game controller interface
- real time clock

## MEMORY USAGE

The organization of the DIMENSION 68000 memory is detailed in the DIMENSION 68000 SYSTEM REFERENCE MANUAL. The overall memory usage is as follows:

ADDRESSES	USAGE
000000 - 0000FF	INTERRUPT VECTORS
000100 - 0001FF	SYSTEM RAM AREA
000200 - 0011FF	VIDEO SCREEN TEXT AREA
001200 - 0012FF	SYSTEM FUNCTIONS
001300 - FFFFFFFF	CP/M TRANSIENT AREA (Depending on Memory Size)
010000 - 01FFFF	CO-PROCESSOR AREA DURING EMULATION (MIN.)
020000 - 07FFFF	CO-PROCESSOR EXPANSION AREA
080000 - FFFFFFFF	RAM EXPANSION AREA
FF0000 - FF1FFF	ROMBIOS
FF2000 - FF7FFF	RESERVED GRAPHICS RAM
FF8000 - FFFFFFFF	PERIPHERAL CONTROL AREA

The DIMENSION 68000 has 8K of Read Only Memory (ROM) which is located in memory between FF0000 and FF1FFF. This ROM is known as the ROMBIOS. ROMBIOS stands for Read Only Memory Built-in Input / Output System. The overall ROMBIOS usage is as a group of 68000 machine language routines that handle the I/O requirements of the DIMENSION 68000.

## I/O

The I/O requirements of the DIMENSION 68000 are handled by the machine language routines in the ROMBIOS. The ROMBIOS functions are used to handle the following I/O device requirements:

- the CRT Controller
- the Keyboard
- the Disk Drives
- the RS-232 Interface
- the Parallel Printer Interface
- the Real Time Clock

A detailed description of the ROMBIOS functions is contained in the DIMENSION 68000 SYSTEM REFERENCE MANUAL.

## The DIMENSION 68000

The DIMENSION 68000 system is designed to allow software configuration of the hardware controllers that are connected to the system bus. This feature and the memory utilization design lend themselves to the easy implementation of co-processor emulation of other microprocessor systems. Even the memory controllers are software configurable.

## CO-PROCESSORS

The DIMENSION 68000 system was designed to allow co-processor emulation of other microprocessor systems. The Micro Craft Corporation can supply for the DIMENSION 68000 system, as options, three co-processor boards. These co-processor boards plug into the expansion slots on the main board inside the DIMENSION 68000 system unit. The co-processor boards do not have to be plugged into any particular expansion slot. They are slot independent. The three co-processor boards are the 6512 board, the 8086 board, and the Z-80 board. The system can have one board, two boards, or all three boards installed at the same time. However, only one co-processor can be in operation at a time.

## 6512

The Micro Craft 6512 co-processor board is supplied with the necessary software to allow the DIMENSION 68000 to be able to emulate the Apple II (TM), the APPLE II+ (TM), and the Apple IIe (TM) personal computers.