M480-60

CHARACTERISTICS

Microprocessor	INTEL 486 DX
Clock	50 MHz
ArchItecture	MICROCHANNEL
Memory	From 8 to 64 MB on the motherboard. 8 sockets available for SIMM chips. The SIMM chips are to be installed in pairs and in the following order: 1st pair connectors A1 and A2 (mounted) 2nd pair connectors A2 and B2 3rd pair connectors A3 and B3 4th pair connectors A4 and B4 See the figure on page 32-8. The SIMM chips that can be installed are: **EXM 29-008** 8 MB: Two 4 MB 1 Mb x 40 **EXM 29-016** 16 MB: Two 8 MB 2 Mb x 40 These SIMM chips have the Error Code Correction (ECC) feature.
Secondary Level Cache	256 KB of secondary level cache memory in addition to CPU internal memory
Memory access	70 ns
Floppy Disk	5.25" 1.2 MB Panasonic JU 475-4/5 3.5" 1.44 MB Panasonic JU-257A - 103P/PJ 3.5" 1.44 MB Panasonic JU-257A - 104P 3.5" 1.44 MB Sony MP-F17 - 85 / MITSUMI D359T3 3.5" 1.44 MB Mitsubishi MF-355C-58ML 3.5" 1.44 MB Y-E Data YD-702B / 702 D 3.5" 2.88 MB Sony MB-F40W-17
Hard Disk	SCSI 210 MB CONNER CP30200 SCSI 340 MB SEAGATE ST1401N SCSI 340 MB CONNER CP3360 SCSI 525 MB SEAGATE ST1581N SCSI 525 MB CONNER CP3540 SCSI 525 MB CONNER CP30540 SCSI 1 GB DIGITAL DSP3105 May be single (HDS) or double (HDP Disk Pack)
Streaming Tape	80/120 MB IRWIN 287 with floppy interface SCSI 320/525 MB WANGTEK 5525 ES SCSI 150/250 MB WANGTEK 5150 ES 2.3 GB ExaB EXB-8200S Digital video tape
Slot	8 32-bit connectors, 6 available
Video controller	**XGA board GO2002** Installed in an MCA slot on the motheboard
FDU controller	Integrated on the motherboard.
SCSI HDU controller	SCSI controller GO610 in an MCA slot.
Mouse	AT- and PS/2-compatible
Keyboard	101/102-key ANK 26-101/N, ANK 26-102/N

MOTHERBOARD

BA307

CPU BOARD

UC 118 installed in a dedicated slot on the system board. It consists of a main board and piggy back.

BIOS

1st part of the EPROM code on the system board

2nd part of the code stored in the system's first HDU (IML)

POWER SUPPLY

400 W PS40

CONSOLE

Hardware module composed of 2 boards:
IF496
Interface circuits with the system board

IF497
Display for messages

NETWORK BOARDS

NCU 9164 GO528
Token Ring 4 Mbit/s
NCU 9174 GO553
Token Ring 4-16 Mbit/s
LCU 3474
WAN line controller
LCU 9216 GO516
Intelligent WAN line controller

FRONT BAYS FOR MAGNETIC AND OPTICAL PERIPHERALS

The mechanical structure of the M480-60 has 10 5.25" half-height bays. These bays are subject to the following limitations of use:

- Bay 10 (highest) is always used to accomodate a 3.5" floppy disk drive
- Bay 1 (lowest) is always used to accomodate the system's first hard disk drive
- Bays 9 to 5 can accomodate removabile peripherals. A maximum of 2 removable SCSI peripherals can be installed
- Bays 7 to 5 can also accomodate SCSI hard disk drives
- Bays 4 to 1 must only accomodate SCSI hard disk drives.

The peripherals with a floppy disk interface must be installed in the first three bays (10, 9 and 8).

All SCSI peripherals must be installed in the next bays starting from bay 7.

The removable peripherals (floppy disk, streaming tape, CD-ROM, DAT) must be installed in the high bays.
The fixed disk peripherals must be installed in the low bays.

CONSOLE	
BAY 10	3.5" 1.44 MB FDU or 3.5" 2.88 MB FDU
BAY 9	1.44 or 2.88 MB FDU or 1.2 MB FDU or 80/120 MB floppy STU
BAY 8	1.44, 2.88 or 1.2 MB FDU or 80/120 MB floppy STU or SCSI CD-ROM
BAY 7	SCSI STU or SCSI CD-ROM or DAT SCSI hard disk or hard disk pack
BAY 6	SCSI STU or SCSI CD-ROM or DAT or SCSI hard disk or hard disk pack
BAY 5	STU interfaccia SCSI o CD-ROM o DAT SCSI o Hard disk SCSI o hard disk pack
BAY 4	SCSI hard disk or hard disk pack
BAY 3	SCSI hard disk or hard disk pack
BAY 2	SCSI hard disk or hard disk pack
BAY 1	SCSI hard disk (system's first hard disk)

SCSI CHANNEL CONFIGURATION

The general rule for configuring the SCSI channel is that all the devices connected (up to 8, including the SCSI controller) have to have a different identifier (SCSI ID) and the BUS must be terminated at both ends only.

- The SCSI ID, in addition to assigning a different address to each peripheral, determines also the priority. SCSI ID 7 is the highest priority, SCSI ID 0 the lowest.
- The first hard disk installed on the M480-60 must have SCSI ID 6 and must be installed in bay 1. The SCSI controller has SCSI ID 7.
- The other SCSI peripherals must be given decreasing SCSI IDs as they are installed.
- The disk pack, consisting of 2 hard disks, must be given two SCSi IDs.
- The primary SCSI controller must be installed in MCA slot 1. If there are several SCSI controllers in the system, the first hard disk, which must contain part of the BIOS, must be connected with the SCSI controller installed in MCA slot 1and have a SCSI ID of 6.
- On each peripheral, the SCSI ID must be set through the jumpers on the peripheral itself. The SCSI ID of the SCSI controller is configured via software using the User Diskette or the Customer Test.

Termination rules

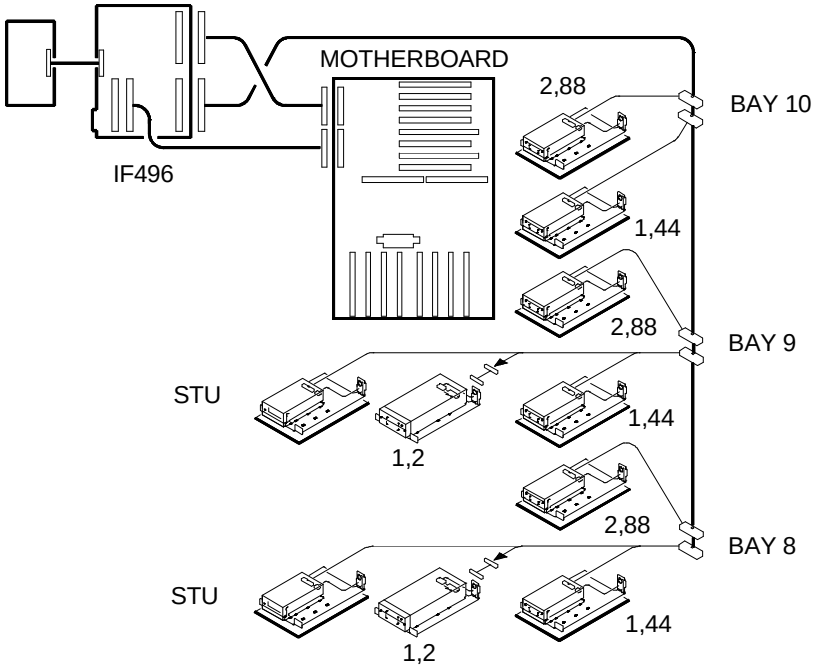
If there are no external SCSI peripherals, the hard disk or primary disk pack in bay 1 and the SCSI controller must always be terminated. If there are external SCSI peripherals connected to the basic module, the terminator must be removed from the SCSI controller and the last external peripheral connected to the system must be terminated.

WIRING OF PERIPHERALS

The following figures show the wiring of the peripherals with floppy interface and those with SCSI interface.

Wiring of peripheral with floppy disk interface

In order to manage the different interface signals between the floppy disks, the floppy disk cable has two connectors for each of the peripherals that can be installed. The bottom connector of each pair of must be used when installing 1.44 MB, 1.2 MB or streaming tape drives. The upper connector must be used when installing a 2.88 MB floppy disk drive.

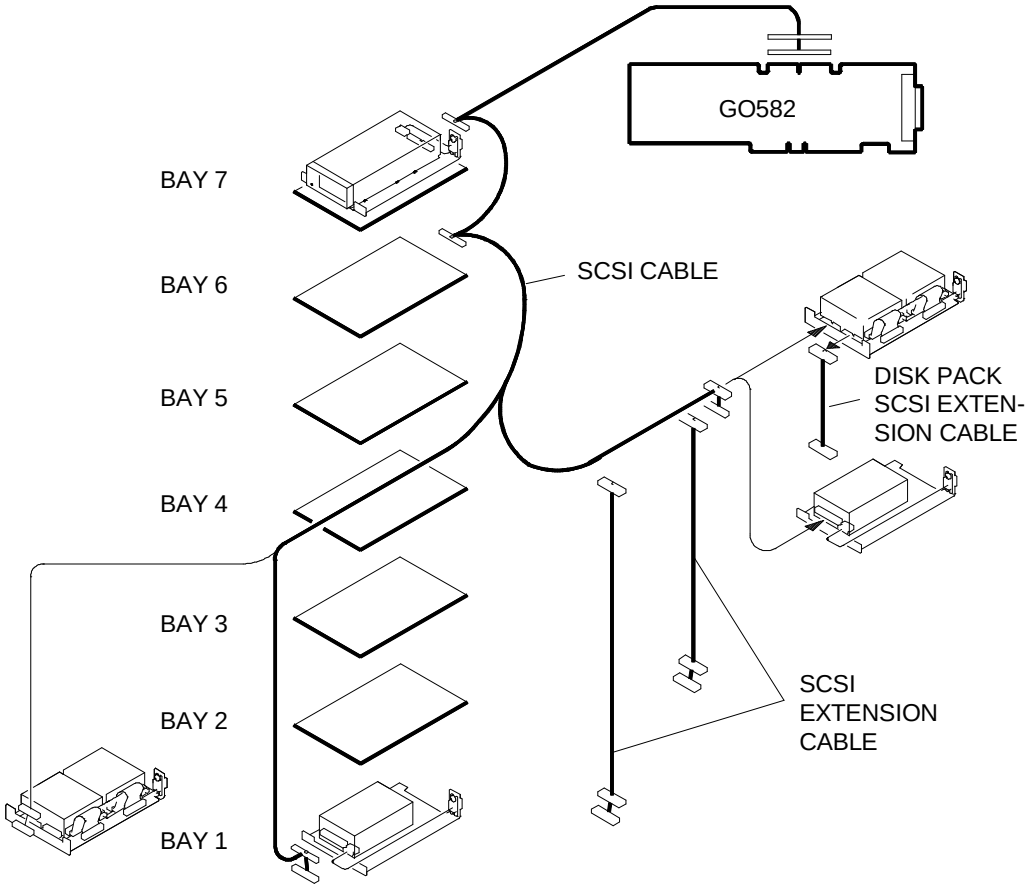


Wiring of peripherals with SCSI interface

The SCSI cable is a straight cable connecting at one end to the SCSI hard disk controller and with three connectors at the other end connecting to the peripherals. The last connector must be connected to the system's first hard disk, while the other two must be connected to removable SCSI peripherals.

To add a hard disk, proceed as follows:

1. Insert the hard disk in the bay immediately above the one already occupied.
2. Disconnect the connector attached to the hard disk already installed and attach it to the hard disk being added.
3. Between the hard disk being added and the one already installed, connect the extension cable provided in the installation kit of the hard disk option being added.



APG7A

MOTHERBOARD

	LEVEL	D.R.S. CODE	NOTES
BA307	Nasc.		System board integrating: - CPU board connector - MCA expansion connector - SIMM chip sockets - CMOS RAM and Real Time Clock - Mouse and keyboard interface - Floppy disk interface - Serial interface - Parallel interface

CPU BOARD

	LEVEL	D.R.S. CODE	BIOS	NOTES
UC118	Nasc.		The EPROMs on the CPU board contain only the first part of the BIOS code. The remaining part of the code is on the system's first HDU.	System CPU board integrating: - i486 DX processor - 128 KB BIOS ROM - Memory Controller - DMA controller

XGA VIDEO CONTROLLER

	LEVEL	D.R.S. CODE	BIOS	NOTES
GO589	Nasc. Lev. 01	553037 L		IBM XGA video controller Solves timing problems within the first MB of video RAM.
GO2002	Nasc.			IBM XGA video controller replacing the previous version which is no longer being manufactured

SCSI HARD DISK CONTROLLER

BOARD	D.R.S. CODE	LEVEL	DESCRIPTION
GO610	-	Nasc.	Replaces GO582. The differences between the two boards are: - The termination resistances are incorporated on board GO610 so this board does not need an external terminator on the cable as board GO582. - Different printed circuit board - New BIOS

DISK PACK IF 487 BOARD

BOARD	D.R.S.CODE	LEVEL	DESCRIPTION
IF 487	932911 H	Nasc	

CONSOLE

	LEVEL	D.R.S. CODE	NOTES
IF496	Nasc.		This board integrates the circuits for interface with the system board, the power supply and the floppy disk interface adapter circuit.
IF497	Nasc.		This board integrates the display and console LEDs.

POWER SUPPLY DISTRIBUTION BOARD

	LEVEL	D.R.S. CODE	NOTES
IF495/R	Nasc.		Replaces board IF484/R so as to recover the cuts and wirings on the printed circuit board.

USER DISKETTE

LEVEL	COMPATIBILITY
Rev. 1.20	

SYSTEM TEST

LEVEL	COMPATIBILITY

POWER SUPPLY

POWER SUPPLY	LEVEL	DESCRIPTION
PS40A 220 V PS40A 110 V	Lev. Nasc.	Power supply with a power output of 400 W.
Magnetek	Liv. 01	New printed circuit to recover the wirings.

NOTES ON COMPATIBILITY

BOARD OR HW/SW DEVICE	DESCRIPTION
XGA-2 board GO2002	The latest User Disk version must be used with this board.

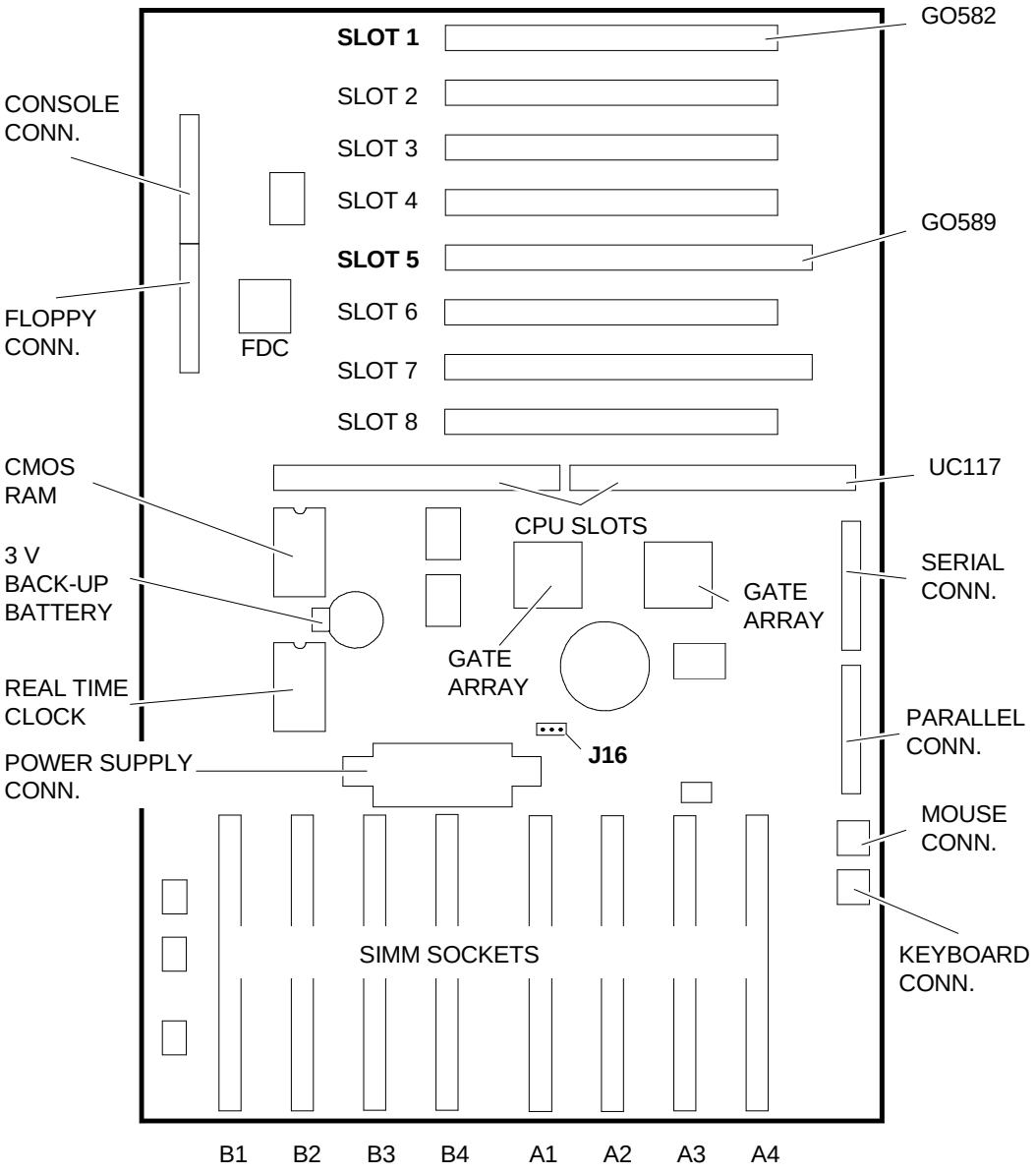
SOFTWARE COMPATIBILITY

OPERATING SYSTEM	NOTES
IBM DISK Operating System, DOS 3.3X, 4.XX, 5.XX and later releases. Olivetti OS/2, from Version 1.3 upd 2, 20.0 IBM Operating System/2 standard edition, Ver. 1.1, 1.2, 1.3 and later releases. IBM Operating System/2 Extended Edition, Ver. 1.1, 1.3 and later versions. OS/2 Presentation Manager Standard and extended editions SCO OSF/Motif presentation manager IBM AIX 1.1 SCO UNIX System V/386 3.2 Ver. 2 for MCA IBM OS/2 LAN Server and Requestor Olinet LAN Manager 1.1, 2.0 Novell Netware 386, Novell advanced netware Windows 3.0 and later releases. IBM PC LAN Program	Only from release 5.XX is it possible to manage up to 7 SCSI HDUs.

HARDWARE COMPATIBILITY

MODEMS	I/O INTERFACE PRODUCTS
Hayes Smartmodem 1200P Hayes Smartmodem 2400P IBM PS/2 300/1200 Internal Modem/A (6450349)	FUTURE DOMAIN HOST ADAPTER (MCS-350) IBM PS/2 Dual Async Adapter/A (6450347)
EXPANSION MEMORIES	**MOUSE**
IBM PS/2 80386 2-6 MB Exp. Memory Option IBM PS/2 80386 2-8 MB Exp. Memory Option Olivetti Memory Expansion board MEM 26-503 Profit System Elite 16/2	IBM PS/2 Mouse (6450350) Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti New Advanced Mouse (GRD 25-025)
MONITORS	**NETWORKING AND LAN PRODUCTS**
IBM PS/2 Monochrome Display 8503 IBM PS/2 Color Display 8512 IBM PS/2 Color Display 8513 IBM PS/2 Color Display 8514	IBM PC Network IBM PC Network (Baseband Adapter) IBM Token Ring Network Novell Advanced netware Ver. 2.12 3COM Network (Ethernet) 10NET Network
GRAPHICS PRODUCTS	**OTHER PRODUCTS**
IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller	SOFTWARE SECURITY Parallel Port Block

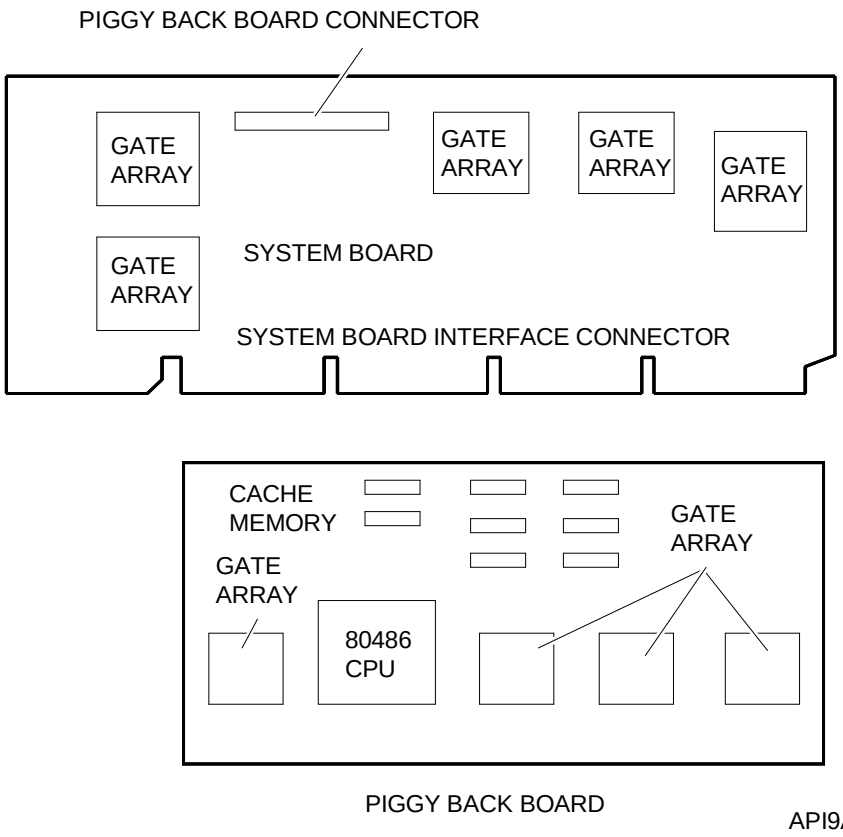
MOTHERBOARD COMPONENTS AND JUMPERS



JUMPER J16 Password erase

To erase the password, change the position of jumper J16. When the pasword has been erased there is no need to put the jumper back to its original position.

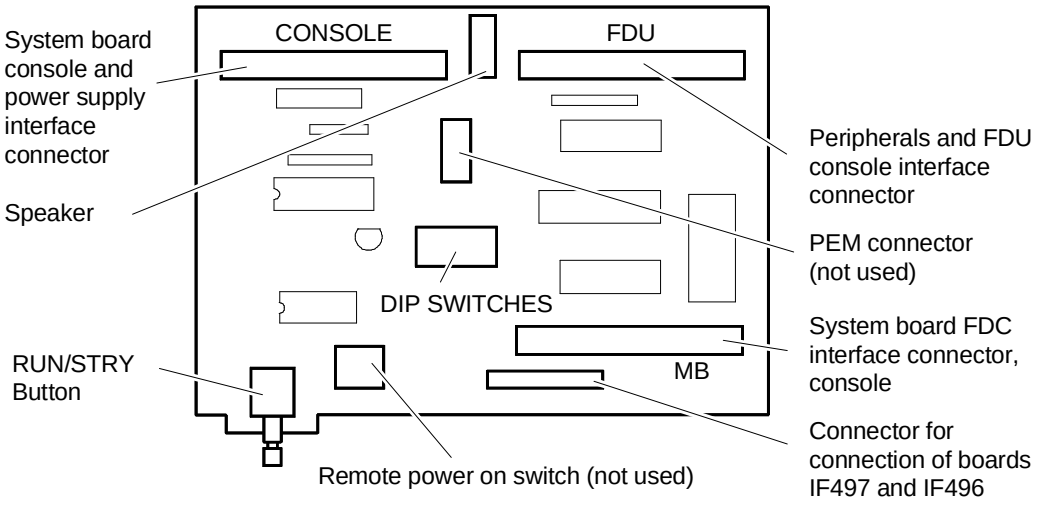
CPU BOARD COMPONENTS



API9A

There are no jumpers on this board.

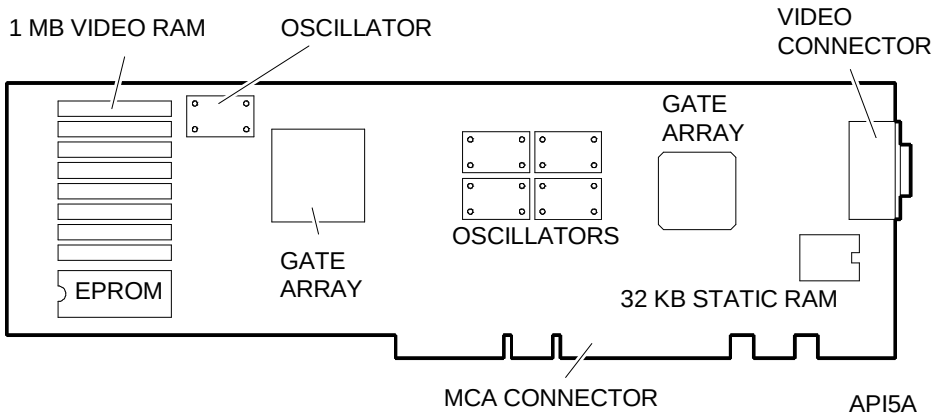
CONSOLE BOARD IF496 COMPONENTS AND JUMPERS



DIP-SWITCHES for the configuration of peripherals with floppy disk interface

BAY	**FDU/STU**	**CONNEC-TOR**	**DIP-SWITCHES**						
			1	3	4	5	6	7	8
FIRST PERIPHERAL WITH FLOPPY DISK INTERFACE (ALWAYS PRESENT)									
10	1.44 MB FDU 2.88 MB FDU	Lower Upper	**ON** **OFF**	OFF OFF	OFF OFF	OFF OFF	OFF OFF	OFF OFF	OFF OFF
SECOND PERIPHERAL WITH FLOPPY DISK INTERFACE									
9	1.44 MB FDU 2.88 MB FDU 1.2 MB FDU (with cable) 80/120 MB STU	Lower Upper Lower Lower	# # # #	**ON** **OFF** **ON** **OFF**	**ON** **ON** **OFF** **OFF**	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF	OFF OFF OFF OFF
THIRD PERIPHERAL WITH FLOPPY DISK INTERFACE									
8	1.44 MB FDU 2.88 MB FDU 1.2 MB FDU (with cable) 80/120 MB STU	Lower Upper Lower Lower	# # # #	# # # #	# # # #	**ON** **OFF** **ON** **OFF**	**ON** **ON** **OFF** **OFF**	OFF OFF OFF OFF	OFF OFF OFF OFF

DIP-Switch 2 is not used. # = same as the settings for the drives already installed.



XGA VIDEO CONTROLLER COMPONENTS

This board does not have any jumpers.

INTERRUPT LEVELS

LEVEL	NAME	CONTROLLER	FUNCTION
	NMI	1	Channel control
1	IRQ0	1	Timer
2	IRQ1	1	Keyboard
3	IRQ2	1	Interrupt to controller 1 from controller 2
4	IRQ8	2	Real time clock
5	IRQ9	2	Redirected to IRQ2
6	IRQ10	2	Available
7	IRQ11	2	Available
8	IRQ12	2	Mouse
9	IRQ13	2	Coprocessor
10	IRQ14	2	Hard disk controller
11	IRQ15	2	Available
12	IRQ3	1	Serial port 2
13	IRQ4	1	Serial port 1
14	IRQ5	1	Available
15	IRQ6	1	Floppy disk controller
16	IRQ7	1	Parallel port

I/O ADDRESS MAP

ADDRESS	FUNCTION	ADDRESS	FUNCTION
0020, 0021h	Interrupt controller (master)	03F0-03F7	Floppy disk controller
0040, 0042 0044, 0047	Timer	03F8-03FF	Serial port 1
0060	Keyboard data controller	1278-127D	Parallel port 1 (DMA mode)
0061	System Control Port B	1378-137D	Parallel port 4
0064	Keyboard commands controller	3220-3227	Serial port 3
0070, 0071	Real time clock, NMI Mask, CMOS RAM	3228-322F	Serial port 4
0091	Card Selected feedback register	4220-4227	Serial port 5
0092	System Control Port A	4338-422F	Serial port 6
0094	System Board Enable / Setup	5220-5227	Serial port 7
0096	Adapter enable register / Setup	5228-522F	Serial port 8
00A0-00A1	Interrupt controller (slave)	83F8-83FF	Serial port 1 (DMA mode)
0100-0107	POS registers	82F8-82FF	Serial port 2 (DMA mode)
0108-010F	Console	B220-B22F	Serial port 3 (DMA mode)
0278-027D	Parallel port 3	C220-C227	Serial port 4 (DMA mode)
02F8-02FF	Serial port 2	C228-C22F	Serial port 5 (DMA mode)
0378-037D	Parallel port 2	C220-C22F	Serial port 6 (DMA mode)
03BC-03BF	Parallel port 1	D220-D227	Serial port 7 (DMA mode)
		D228-D22F	Serial port 7 (DMA mode)

SYSTEM MEMORY MAP

ADDRESS	SIZE	FUNCTION
00000000 - 0007FFFF	512 KB	System DRAM
00080000 - 0009FFFF	128 KB	I/O RAM
000A0000 - 000BFFFF	128 KB	Video controller RAM
000C0000 - 000DFFFF	128 KB	I/O ROM
000E0000 - 000FFFFF	128 KB	BIOS
00100000 - 007FFFFF		System RAM
00800000 - 00FFFFFF		System RAM
01000000 - BFFFFFFF		System RAM
C0000000 - C1FFFFFF		Coprocessor
C2000000 - DFFFFFFF		System RAM
E0000000 - FFFDFFFF		System RAM
FFFE0000 - FFFFFFFF	128 KB	System BIOS ROM

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