M400-60

CHARACTERISTICS

Microprocessor	Intel 486DX2 with 32-bit addressing
Clock	50 MHz
Architecture	AT

Memory	From 4 MB to 52 MB
	- One bank of 4 MB soldered on system board (8 1M x 4 DRAM chips plus 4 1Mx1 parity DRAM chips)
	- Three banks, each of 4 sockets, in which the following SIMM modules can be installed:
	  - 1M x 9 **EXM 26-807** SIMM
	  - 4M x 9 **EXM 26-809** SIMM
	SIMM of different sizes can be installed in the three banks but not inside the same bank. banks can be left empty.

Memory access.	80 ns
Coprocessor	Integrated in i486DX2 processor
Floppy disk	1.2 MB Panasonic JU475-3-4-5 1.2 MB Toshiba ND08DE 1.44 MB Panasonic J-257 A / MITSUMI D359T3 1.44 MB Sony MP-F17 W - Mitsubishi MF355 1.44 MB YE DATA YD-702B / 702D 2.88 MB Sony MP-F40 W
Hard disk	85 MB CONNER CP30084 120 MB CONNER CP30126 120 MB QUANTUM ELS 127 AT 170 MB CONNER CP30174E 210 MB QUANTUM LPS 240 AT 210 MB CONNER CP30204 / CP30256 240 MB CONNER CP30254 340 MB CONNER CP3304 / CP3364 340 MB SEAGATE ST1401A 340 MB W.D. AC2340 510 MB CONNER CP3504 / CP3544 510 MB CONNER CP30544
Streaming tape	80/120 MB IRWIN 285 500 Mb/s 80/120 MB IRWIN 287 1 Mb/s 80/120 MB IRWIN 3125 1 Mb/s 150 MB WANGTEK SCSI 320 MB WANGTEK SCSI
Expansion slots	4 Present 4 Available **(IN 284 board)**
Video adapter	82C452A integrated on System Board
System board-integrated hard disk and floppy disk controller	FDU controller: Intel 82077AA-1 HDU controller: Logic gates and MSI Buffers implementing an IDE hard disk AT interface.
Cache controller	integrated in the CPU with 8 KB
Mouse	AT- and PS/2-compatible
Keyboard	101/102-key keyboard, compact ANK 27-101 ANK 27-102

SYSTEM BOARD

Printed Circuit
BA301:
System board BA334

BIOS

The BIOS ROM is a FLASH EPROM.
The BIOS code is supplied on diskettes and must be copied into Flash EPROM

Rel. 2.08

POWER SUPPLY

PS11/A - 220 V
PLESSEY

PS11/A - 115 V
PLESSEY

PS11/A - only 220 V
ASTEC

PS11/AR - 220 V
ASTEC

SCSI PERIPHERAL CONTROLLER

ASC - 1

GRAPHICS ACCELERATOR

ATI 8514 Ultra

SYSTEM BOARD

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
BA334	Lev. Nasc.	553076 T	Rev. 2.05	Board with 4 MB soldered.
	Lev. 01			Cuts, trimmings and replacement of PAL DPGSEL (GL9A) with PAL DPGSEL12 (GKCL) to solve the problem with the video controller during VIDEO RAM read operations. The ROM version of keyboard controller Rev. 10.01 is also introduced to cut costs.
	Lev. 02		Rev. 2.05	- Floppy disk controller INTEL component 82077-AA1 is replaced by the floppy disk controller INTEL component 82077SL-1. - Component 74F224 at location U37 is replaced by component 74F240 to solve the "snow effect" problem on high resolution monitors. This problem does not occur on the M400-60 since this system uses a graphics accelerator.
			Rev. 2.06	New BIOS. The characteristics of this BIOS and the problems it solves are explained further on in this chapter.
			Rev. 2.08	New BIOS.

MAIN COMPONENTS OF SYSTEM BOARD

SYSTEM BOARD	PRINTED CIRCUIT	MAIN COMPONENTS
BA334	BA301	- 50 MHz Intel **486DX2** processor - Numeric coprocesssor integrated in the i486DX2 - Performance upgrade processor socket - **82C206:** Real time clock 128 Byte Non-Volatile RAM Timer DMA controller Interrupt controller - Keyboard and mouse controller **8742** OPT PLCC - Video controller **82C452A** - **WD16C551-D**: 16C550-compatible serial port AT/PS2-compatible parallel port - Floppy disk controller **82077 AA-1** - Buffer for intelligent hard disks - BIOS Flash EPROM (1 Mbit) - Chip set consisting of 4 gate arrays: - BCUE BUS controller - MCUE Memory controller - DPU Data flow controller - IOU Input/Output controller - System memory (from 4 to 52 MB) - EYE component **GA4Q** - 50 MHz oscillator

USER DISKETTE / SYSTEM TEST / DRIVERS

LEVEL	COMPATIBILITY / NOTES
USER DISKETTE Rev. 2.02	Alignment with BIOS 2.05.
USER DISKETTE Rev. 2.03	Keyboard, mouse and high resolution monitor problems are solved.
Enhanced video drivers Rev. 5.00	
Enhanced video drivers Ver. 7.1 Rev. 2.0	Update of the previous version.
Streaming Tape USER DISKETTE Rev. 1.02 provided in the STU 26-082/A kit	This release allows a streaming tape drive to be installed when a 2.88 MB floppy disk drive is already present.
Streaming Tape USER DISKETTE Rev. 1.03 Ver. 1 provided in the STU 26-082/A kit	User Diskette version 1.02 was entering into conflict with the second floppy drive. This problem is solved with version 1.03.
SYSTEM TEST Rev. 2.03	This release supports tests on the i486DX2 CPU and works properly only with BIOS Rel. 2.05. Also solved are the problems concerning the monitor with the 72 Hz vertical refresh rate.
EOD USER DISKETTE Rel. 1.03	Release 1.03 is replaced by 1.05 which implements the ASPI4DOS.SYS driver that supports multitasking Windows 3.xx V86 and the ASPIDISK.SYS driver that supports the DOS 3.31 extended partition.

COMPATIBILITY

BOARD / DEVICE	COMPATIBILITY
Component EYE1	Component EYE2 is introduced as the alternative to EYE1. The level of the boards does not change.
INTEL component PDL 85C220-7	The AMD component PALCE 16V8-7 (GKCT) is introduced as the alternative to the INTEL component PDL 85C220-7 (GLZX). The level of the boards does not change.

POWER SUPPLY UNIT

POWER SUPPLY	LEVEL	DESCRIPTION
PS11/A ASTEC 220 V	Lev. 02	This power supply has already been used on other Personal Computers (see earlier chapters). The level shown is that used on this system.
	Lev. 03	Change to solve problem of failure of system to come on when connected to a device (parallel printer or drive installed on the BUS) that is already on.
	Lev. 04	Inductor L5 has been added and modifications have been made to the circuitry to solve the problems regarding EMI radio interference and random voltage drops.
	Lev. 05	New inductor and printed circuit. **NOTE:** Given the new printed circuit, the power supplies of previous levels cannot be updated to this present level.
PS11/A Plessey 220 V	Lev. 03	This power supply has already been used on other Personal Computers (see earlier chapters). The level shown is that used on this system.
PS11/A Plessey 110 V	Lev. 03	
PS11/AR ASTEC 220 V	Lev. Nasc.	New alternative power supply to cut costs.

BIOS EVOLUTION

LEVEL	EVOLUTION
Rev. 2.05	This BIOS revision has been extended to all the systems of the M400-10, M400-40 and M400-60 family.
Rev. 2.06	This BIOS version solves the following: - Delayed bootstrapping with CP3304 HDUs or other Master HDUs - Spurious characters when entering a password on slow keyboards - Cache for compatibility with COMPUITONE AT 8/16 boards - Eliminates the message on hidden partitions that is displayed after the POD
Rev. 2.08	This release corrects IBM OS/2 ver. 2.0 faults in DOS windows.

HARD DISK SELF-ACKNOWLEGE FEATURE

This system has the hard disk slef-acknowledge feature.
Using the SETUP utility of the System Test or Customer Test, it is possible to define the type of hard disk installed in the system. After the SETUP utility has been selected, select option hard disk #1 and #2. The following values can be defined in this field:

Not Present: Where no hard disk is installed.

Standard In this case, the system automatically acknowledges type and capacity of the hard disk installed. This option can be used for hard disks with the self-acknowledge feature and with a capacity of less than 528 MB.

High Capacity In this case, the system automatically acknowledges type and capacity of the hard disk installed. This option must be used for hard disks with a capacity of more than 528 MB with the self-acknowledge feature and which have to be used with the Olivetti OS/2, IBM OS/2 and MS-DOS operating systems.

Compatible This option must be used for hard disks that are compatible with the system but which do not have the self-acknowledge feature, or hard disks that do have the feature but which have been used before hand on systems other than this one. When this option is selected, a list is displayed of the hard disks with preset parameters. Check that the parameters defined match those of the hard disk being installed. The different types are illustrated in the table below:

TYPE	CAPACITY	CYLINDERS	HEADS	SECTORS PER TRACK	WPC	LZ	MODEL
01	10 MB	306	4	17	128	305	STANDARD 10 MB, 8.5 ms
02	40 MB	925	5	17	128	924	WREN II, Full, 35 ms
03	30 MB	697	5	17	128	696	WREN, Full, 35 ms
04	42 MB	981	5	17	-1	980	WREN II Slim
05	53 MB	1024	6	17	-1	1023	Micropolis 1324, Full
06	56 MB	925	7	17	128	924	CDC WREN II, Full
07	71 MB	1024	8	17	-1	1023	Micropolis 1325, Full
08	72 MB	925	9	17	128	924	CDC WREN II, Full
09	44 MB	1024	5	17	-1	1023	Micropolis 1323-A
10	42 MB	820	6	17	-1	819	Seagate ST251, Half
11	45 MB	872	6	17	-1	871	RODIME RO3055
12	21 MB	612	4	17	128	663	MINISCRIBE M8425
13	65 MB	820	6	26	-1	819	SEAGATE ST277R
14	65 MB	820	6	26	128	819	OPE XM5340/60

Not Standard This option allows the service engineer to personally define the parameters of a hard disk without the self-acknowledge feature and which are not in the list of compatible hard disks. The table listing the parameters of the hard disks that are supported by the system BIOS is the same as that of the M400-40 personal computer (see page 28-8).

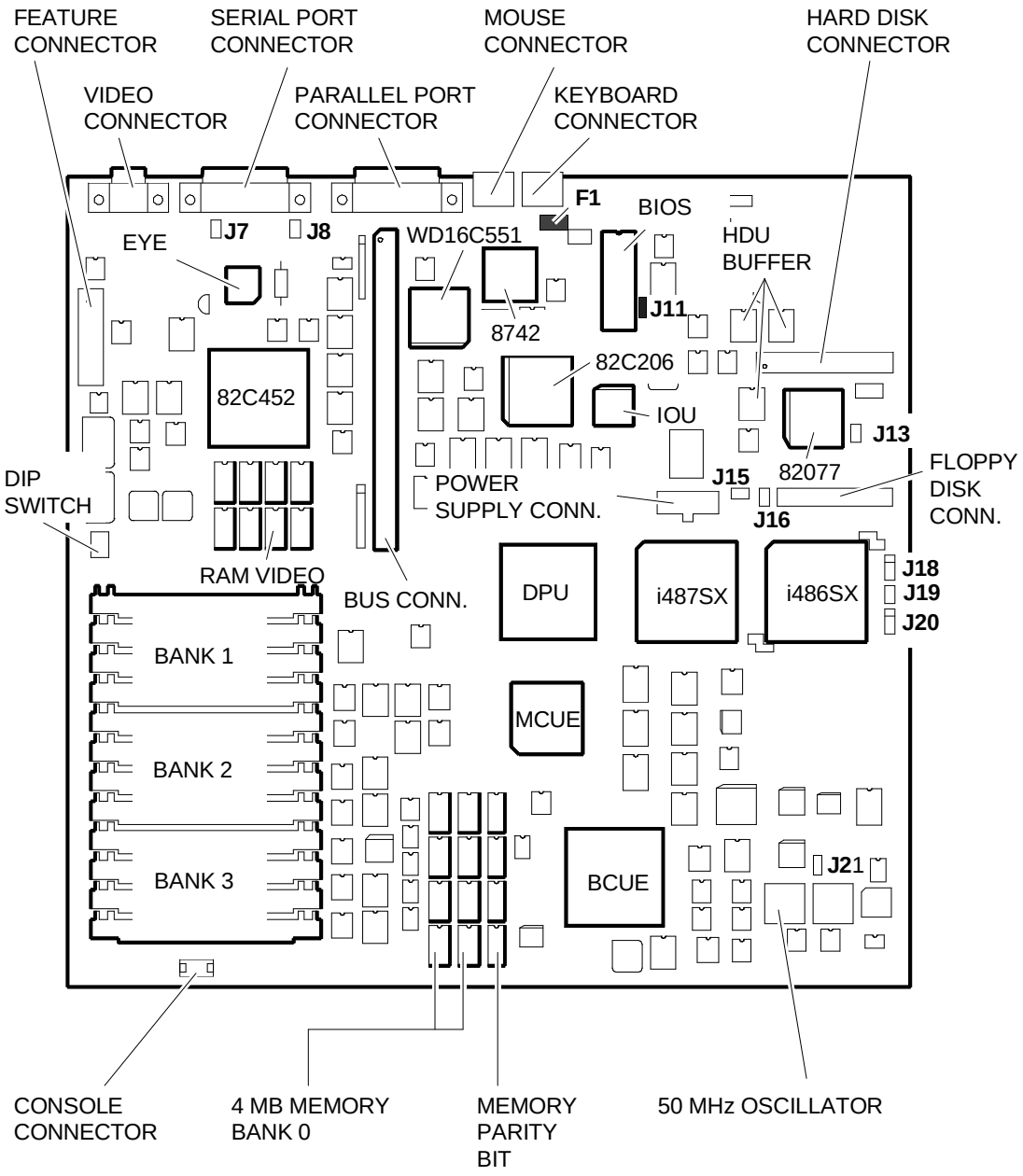
SOFTWARE COMPATIBILITY

OPERATING SYSTEMS	**NOTES**
IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.01 Olivetti's Microsoft Disk Operating System. 3.30a Olivetti's Microsoft Disk Operating System, Ver. 4.01 Olivetti's Microsoft Disk Operating System, Ver. 5.00 Olivetti's Microsoft OS/2, Ver. 1.10 and 1.20 IBM OS/2 version 2.0 IBM OS/2 extended edition Version 1.10, 1.20, 1.30 IBM OS/2 standard edition Version 1.10, 1.20, 1.30 SCO UNIX System V Rev. 4.0, Rev. 2.1 SCO XENIX Rev. 3.2	A formatted DSDD diskette is required during the installation on hard disk.
WINDOWS	
DESQ-VIEW 386 Ver. 2.31 GEM/3 Desktop, IBM-PC Ver. 3.13 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

HARDWARE COMPATIBILITY

MODEMS	**I/O INTERFACE PRODUCTS**
Hayes Smartmodem 2400B / 1200 B DR: NEUHAUS FAXY PC MASTER FERRARI Fax Card Fury 2400 PC modem / Fury 2400 master AT&T 2224 CEO modem	IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL
MULTIPORT	**MOUSE**
Anvil Stallion Intelligent 16 Port Controller Chase AT16 / Chase AT8 Computone System Intelliport 16 Port AT16 Computone System Intelliport 8 Port AT8 Corollary 8 x 4 MUX Digiboard Digichannel COM/xi Intelligent 8 Port Specialix Si Intelligent I/O Controller Intel-Bell ACE 8 / Intel (Bell) ICC.6 Wyse WY-995	IBM PS/2 Mouse (6450350) Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-Mouse serial Olivetti Bus Mouse (GRD 25-019) Olivetti New Advanced Mouse (GRD 25-025)
GRAPHIC PRODUCTS	**NETWORK & LAN PRODUCTS**
AST RESEARCH AST - VGA PLUS FASTWRITE 1024I FASTWRITE VGA HERCULES GRAPHICS CARD IBM EGA ADAPTER IBM VGA ADAPTER HERCULES GRAPHICS STATION CARD Olivetti AGC Olivett HGC Olivetti XGC ORCHID PRODESIGNER VGA PLUS PARADISE VGA PRO CARD	IBM PC Network ADAPTER II IBM Token Ring PC ADAPTER IBM Token Ring 16/4 ADAPTER MADGE Token-Ring Network 10 NET INTERFACE BOARD (200 SERIES) 3COM ETHERLINK 16 ADAPTER 3COM ETHERLINK ADAPTER (3C501 - 3C503) 3COM ETHERLINK PLUS (3C505 - 3C605) DEPCA DE100 - DEPCA DE200 - DEPCA MICOM NP600A NOVELL NE1000 NOVELL NE2000
DISPLAY UNITS	**OTHER PRODUCTS**
IBM 8514 IBM COLOR GRAPHIC MONITOR 5153 IBM ENHANCED GRAPHIC MONITOR 5151 IBM ENHANCED GRAPHIC MONITOR 5154 IBM PS/2 COLOR DISPLAY 8512 IBM PS/2 COLOR DISPLAY 8513 IBM PS/2 MONOCHROME DISPLAY 8503 NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D NEC MULTISYNC II PHILIPS 7BM749 PHILIPS 9CM82	ADAPTEC 1542A SCSI HOST ADAPTER ADAPTEC 1542B SCSI HOST ADAPTER ADAPTEC 2322B-10 ESDI ADAPTER IRWIN STREAMER MODEL 285 IRWIN STREAMER MODEL 287 JETSCRIPT QMS POSCRIPT CONTROLLER OMTI 8627 ESDI ADAPTER OMTI 8627 RLL ADAPTER SCANMAN PLUS WD1007A ADAPTER WD1007V ADAPTER WD1007V-SE2 ADAPTER

COMPONENTS AND JUMPERS ON SYSTEM BOARD BA334 (PCB BA301)



AJA2A

FUSE FI
2 A 5 V keyboard and mouse fuse.

JUMPERS AND FUSE ON SYSTEM BOARD BA334 (PCB BA301)

JUMPERS J18, J19 and J20 FOR PROCESSOR SELECTION

JUMPER	POSITION	FUNCTION
J18 3-way jumper	1-2 * 2-3 OUT	Processor i486DX2 installed in the system Processor i487SX (floating point) installed in system Processor i486SX installed in system
J19	IN * OUT	Processor i486DX2 or i487SX installed in the system Processor i486SX installed in the system
J20 3-way jumper	1-2 * 2-3	Processor i486DX2 or i487SX installed in the system Processor i486SX installed in the system
J21 3-way jumper	1-2 2-3 *	33 MHz processor clock 25 MHz processor clock

Jumpers J7, J8, J11, J13, J15, J16

JUMPER	POSITION	FUNCTION
J 7	OUT * IN	RING Indicator signal (RS232 threshold voltage) FAIL-SAFE disabled RING Indicator signal (RS232 threshold voltage) FAIL-SAFE enabled
J 8	OUT * IN	Input signals (RS232 threshold voltage) FAIL-SAFE disabled Input signals (RS232 threshold voltage) FAIL-SAFE enabled
J11	OUT IN *	ROM BIOS disabled ROM BIOS enabled
J 13	IN * OUT	Floppy disk oscillator enabled Floppy disk oscillator disabled
J15	OUT * IN	Normal operation Erases the CMOS RAM
J16	IN * OUT	One hard disk only installed Two hard disks installed
F1	Keyboard protection fuse	

DIP-SWITCHES

SWITCH	POSITION	FUNCTION
1	ON * OFF	Serial port enabled Serial port disabled
2	ON * OFF	NOT USED
3	ON * OFF	Normal operation Disables floppy disk write operations
4	ON OFF	NOT USED

IN: Jumper installed
OUT: Jumper not installed
The asterisk indicates the default setting.

I/O ADDRESS MAP

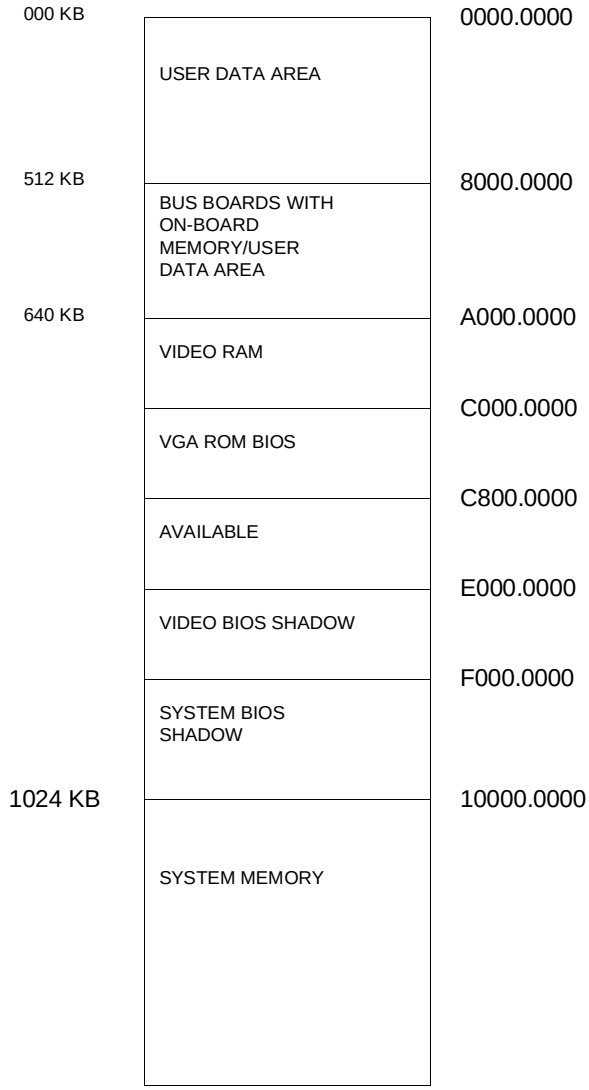
ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller (all channels)	2F8-2FF h	Serial port COM2 (alternate)
020-021F h	Interrupt controller 1	378-37B h	Parallel port 1
040-043 h	Timer	3B4-3B5 h	Video adapter
60 h	Keyboard data controller	3BA h	Video adapter
61 h	System Control Port B	3C0-3CF h	Video adapter
64 h	Keyboard commands controller	3D4-3D5 h	Video adapter
70-71 h	Real time clock, NMI Mask, CMOS RAM	3DA h	Video adapter
081-08F h	DMA page registers	3F0-3F7 h	Floppy disk controller
0A0-0A1 h	Interrupt controller 2	3F8-3FF h	Serial port COM1
0C0-0DF h	DMA channels 4-7	46E8 h	VGA control registers
1F0-1F8 h	Hard disk drive	8000F0-8000FF	Coprocessor
278-27B h	Parallel port 2 (alternate)		

INTERRUPT LEVELS

LEVEL	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 - 10	IRQ2	1	Interrupt to Controller1 from Controller 2
3	IRQ8	2	Real time clock
4	IRQ9	2	Available
5	IRQ10	2	Available
6	IRQ11	2	Available
7	IRQ12	2	Available
8	IRQ13	2	Coprocessor
9	IRQ14	2	Hard Disk controller
10	IRQ15	2	Available
11	IRQ3	1	Serial port 2
12	IRQ4	1	Serial port 1
13	IRQ5	1	Parallel port 2
14	IRQ6	1	Floppy Disk controller
15	IRQ7	1	Parallel port 1

SYSTEM MEMORY MAP

The system memory map will vary according to the configurations that the system will be given through the User Diskette or System Test. Consequently an example of configuration of the first MegaByte of memory only is given below.



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