

M6-400 (PC GREEN)

CHARACTERISTICS

Processor	i486 SX
Clock	25 MHz
Coprocessor	25 MHz i487 SX i486 DX2 with a 50 MHz internal clock
Architecture	AT
Memory	From 4 MB to 36 MB on the motherboard. Bank 0: 4 MB soldered Bank 1: Socket capable of hosting one of these SIMMs: EXM 28-004 - 4 MB 1 1MB x 36 SIMM EXM 28-008 - 8 MB 1 2 MB x 36 SIMM EXM 28-016 - 16 MB 1 4 MB x 36 SIMM EXM 29-032 - 32 MB 1 8 MB x 36 SIMM
Memory access	70 ns
Video controller	Integrated CL-GD5428 Enhanced VGA
Video memory	512 KB + 512 KB of DRAM HM514260
Floppy Disk	1.2 MB 5.25" Panasonic JU475-3/4/5 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic JU 257 A 1.44 MB 3.5" Sony MP-F17 W 1.44 MB 3.5" Mitsubishi MF 355 1.44 MB 3.5" EPSON SMD 1040-418 1.44 MB 3.5" Y-E DATA YD-702B / 702D 1.44 MB 3.5" MITSUMI D359C / D359T3
Hard Disk	CONNER CP30174E / CFA170A 170 MB Quantum ELS 170 AT 170 MB W.D. AC1170 170 MB Quantum LPS170 AT (local BUS) 170 MB W.D. AC1220 210 MB CONNER CFS210A 210 MB CONNER CP3304 / CP3364 340 MB W.D.AC2340 340 MB CONNER CFA340A 340 MB CONNER CP30544 540 MB SEAGATE ST3655A 540 MB CONNER CFA540A (local BUS) 540 MB SEAGATE ST5660 (local BUS) 540 MB
Streaming Tape	Irwin 31250A 80/120 MB Floppy interface Wangtek 5159ES 150 MB SCSI interface Wangtek 5525ES - 5525ES-ACA 320 MB SCSI interface. Requires the ASC-2 board.
Slots	4 16-bit connectors on the expansion bus
HDU and FDU controllers	Integrated - Floppy disk controller: 87310 HDU interface - MSI buffer and logic ports
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 27-101/N, ANK 27-102/N

MOTHERBOARD

BA2073 - Derives from Base assembly BA2067

BA2087 - Derives from Base assembly BA2070

BIOS

Last level: Rev. 1.06

EXPANSION BUS

IN2016

POWER SUPPLY

PS11 R 220 V - 115 V
PS11 AR 220 V - 115 V

MOTHERBOARD

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS/NOTES
BA2073	Nasc Lev. 01	589583 J	Rel. 1.04 PD2H	<p>Derives from Base Assembly BA2067 from which also the other motherboards used on the M4-4x, M4-6x and PCS4xx personal computers derive from.</p> <p>Replaced resistors and capacitors to correct the following problems given by the video:</p> <ul style="list-style-type: none"> - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one). <p>Included at field level only.</p> <p>This board is no longer being manufactured and therefore is replaced by BA2078. It includes the same modifications made to the BA2078 even though they have effect at field level only.</p>

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS/NOTES
BA2087	Nasc		Rel. 1.04 PD2H	Derives from Base Assembly BA2070 from which also the other motherboards used on the M4-4x, M4-6x and PCS4xx personal computers derive from. Replaces motherboard BA2073.
	Lev. 01			Replaced resistors and capacitors to correct the following problems given by the video: <ul style="list-style-type: none"> - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 02		Rel. 1.04 PD2H	Cuts and wirings to correct WAN board (LPU) failures.
	Lev. 03		Rel. 1.06 PDK3	<ul style="list-style-type: none"> - New BIOS (see specific table) - New SL Enhanced 25 MHz i486SX CPU - Increase in CMOS VBATT margins during stand by. - Hard disk management in POWER MODE - Implementation of the code enabling this system to work in the OS/2 environment.
	Lev. 04		Rel. 1.06 PDK3	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 05		Rel. 1.06 PDK3	New printed circuit (level 02) that incorporates the wirings that corrected the problems that occurred when using WAN (LPU) boards - See level 02.
	Lev. 06		Rel. 1.06 PDK3	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 07		Rel. 1.06 PDK3	New printed circuit incorporating all previous modifications: <ul style="list-style-type: none"> WAN boards COGENT / WANG boards Increased VBATT value Intel SL Enhanced CPU operation

MOTHERBOARD INTEGRATED CONTROLLERS

MOTHERBOARD	INTEGRATED CONTROLLERS
T.1.5 (BA2067) BA2073	<p>CPU: i486SX @ 25 MHz (soldered QFP) Pentium OverDrive Ready Socket Allows the installation of the Pentium-based P24T processor</p> <p>ET6000 This component includes the following functions:</p> <ul style="list-style-type: none"> - Reset signal generation and system synchronization - System and CPU bus control - Control of operations and arbitration between Device Masters, DMA and memory refresh - Control port B registers and NMI logic - Port 92 logic control - Memory control - Control of memory concurrent refresh in addition to normal PC refresh - BIOS shadowing control - Control of the interface between the three system buses: <ul style="list-style-type: none"> - CPU local data bus (16-bit) - Memory local data bus (32-bit) - I/O peripherals data bus (16-bit) - Parity checking - Math coprocessor interface - Clock generation <p>BIOS EPROM 83C206Q 27c010-120, 128 Kb x 8, installed in a socket System peripheral controller. This component includes the following functions:</p> <ul style="list-style-type: none"> - CMOS RAM - 114 Bytes of non-volatile RAM powered by a lithium battery to maintain the data even when the system is powered off - Real Time Clock system date and time - DMA control - Interrupt control <p>PC87310 Super I/O. This controller includes the following functions:</p> <ul style="list-style-type: none"> - Floppy disk control - Interface for two serial ports - Interface for a parallel port - Interface for intelligent hard disks <p>8042 Keyboard and mouse controller ICD2023 Programmable system clock generator</p> <ul style="list-style-type: none"> - Timer - Interface for the local address bus <p>CL-GD5428 Enhanced VGA video controller</p>
T.1.5 (BA2070) BA2087	Replaces BA2073.

BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
Motherboard	T.1.5 (2067)	589583 J	Base Assembly for BA2073
Motherboard	T.1.5 (2070)		Base Assembly for BA2087
PS11 A power supply	220 V		
PS11 A power supply	115 V		
PS11 AR power supply	220 V	588062 Z	
PS11 AR power supply	115 V	589579 D	
Bus adapter board	IN2016	588304 H	For 305 BOX case systems

USER PROGRAM

This program is stored in the System Regions of the hard disk drives.

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LEVEL	NOTES
Lev. 1.02	This version introduces the Power Management Utilities. These utilities allow to define how long the hard disks and monitor must remain powered on during the time the system is not being used.
Lev. 1.04	This version includes the following corrective updates: <ul style="list-style-type: none">- The Power Management Utility has been modified- The video configuration utility has been modified to include the new monitors- The Setup utility has been modified to allow multi-sector read/write operations on the hard disk- The security utilities and firmware revision have been modified- New messages have been added- The keyboard test has been modified- The floppy disk test has been modified- The video test has been modified Requires BIOS LEVEL 1.06.

SYSTEM TEST

LEVEL	NOTES
Lev. 1.02	This version introduces the Power Management Utilities. These utilities allow to define how long the hard disks and monitor must remain powered on during the time the system is not being used.
Lev. 1.03	
Lev. 1.05	This version includes the following corrective updates: <ul style="list-style-type: none">- The Power Management Utility has been modified- The video configuration utility has been modified to include the new monitors- The Setup utility has been modified to allow multi-sector read/write operations on the hard disk- The security utilities and firmware revision have been modified- New messages have been added- The keyboard test has been modified- The floppy disk test has been modified- The video test has been modified Requires BIOS LEVEL 1.06.
Lev. 1.06	This version includes the following corrective updates: <ul style="list-style-type: none">- The memory test has been modified- Floppy disk tests have been added. Requires BIOS LEVEL 1.06.

SYSTEM REGION SETUP

LEVEL	NOTES
Lev. 1.02	Allows user disk Lev. 1.01 to be automatically installed on the hard disk.
Lev. 1.04	Allows user disk Lev. 1.04 to be automatically installed on the hard disk. Requires BIOS 1.06

POWER SUPPLY

POWER SUPPLY	LEVEL	DESCRIPTION
PS11 A - 220 V PS11 A - 115 V PS11 AR - 220 V PS11 AR - 115 V		

BUS EXPANSION BOARD

NAME	LEVEL	DESCRIPTION
IN2016	Nasc.	Bus expansion board for the Personal Computer models using the 305 BOX case.

SOFTWARE DRIVER

DRIVER	NOTES
EVD Rel. 1.06	<ul style="list-style-type: none">- Corrects the problem with the 1024x768, 256 col. 60/72 Hz which only operated in 16 colors under Windows NT.- Incorrect CLOCK accessory management; problems in displaying the fonts selected within CLOCK.- The DOS window (ALT-ENTER) contains contaminated lines.- The keyboard codepage 437 generates some incorrect character codes.
EVD Rel. 1.07	<ul style="list-style-type: none">- Updates the Windows 3.1 video drivers which are based on the Cirrus component version 1.43.- Solves the CTRL ALT DEL problem in Windows 3.1- Updates the documentation.

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BIOS

LEVEL	NOTES
Rev. 1.04	
Rev. 1.05 Was never manufactured	<p>This release corrects the following problems:</p> <ul style="list-style-type: none"> - In the Windows environment, the HDU was never set into the Stand-by mode during the power saving phase. - In the Windows environment, the colors were never restored when powering the monitor back on after a power saving phase. - The Conner CP 3044 HDU would occasionally power itself on during the power saving phase without program intervention. - When exiting the power saving phase in a LAN environment the picture on the screen would be frequently incorrect or the monitor would not power on. - Pressing ALT-TAB during a DOS session made it impossible to return to the Program Manager, and the DOS screen became unreadable. - It was impossible to disable the AMP through the Windows Control Panel utility. - The Interface Connect 16-Bit Protected Mode was not supported. - IBM OS/2 V.2.01 did not recognize the system's APM (Advanced Power Management) feature. - If Quantum ELS-127AT hard disk operations were interrupted by the Stand-by phase, upon resuming operation the hard disk would experience random errors. Messages such as "Error reading drive C:" or "Error in EXE file" were often displayed when hard disk operations resumed and the system had to be powered off. - Problems with the DOS INTERLINK driver. The system would switch to Stand-by during copy operations from another PC through the parallel port, but was unable to automatically resume the hard disk since access to the drive on the other system would generate the "Drive not ready" error. - Random characters would be displayed after a first monitor scroll in the 132 column video mode. <p>SUMMARY OF UNCORRECTED PROBLEMS</p> <ul style="list-style-type: none"> - Powering the monitor back on again on an MSDOS box seems to be slower. - When re-enabling the Windows Power feature, the system will not activate its APM feature (monitor). It is therefore necessary to exit Program Manager and launch Windows again. - If pressing a mouse button is the last operation performed before system power off, it is no longer possible to reactivate the monitor by pressing a mouse button. - If the last key pressed before Stand-by is used to resume operations, the system will not come on. This key needs to be pressed several times. - The monitor never switches to Stand-by when the DOS INTERSVR program is run. - The HDUs are always switched to Stand-by even if POWER SAVE is not installed (or if it is installed, but disabled). - Some video tests have negative outcomes. <p>Even if approved, this release never went into production. It has, however, been replaced by release 1.06 which includes some of the modifications made to 1.05.</p>

LEVEL	NOTES
Rev. 1.06	<p>Replaces Rev. 1.05, in which a failure in the management of the multiblock read/write set option for hard disk accesses was detected.</p> <p>Listed below are the modifications included with Rev. 1.06:</p> <ul style="list-style-type: none"> - The new CPUs supplied by Intel have a different identifier than the one known to date. The CPU recognition procedure was rewritten to correct this problem. - A video BIOS failure is corrected: in the 132x43 video mode the font was displayed incorrectly, leaving a line of undriven pixels between one row and the next. - The Personal Computer no longer crashes at the end of the Solitaire game provided with Windows 3.1. - Oversampling in the 72 Hz 640x480 video mode is corrected. This problem came about during video diagnostics, when the lower side of the frame was not displayed on the screen. - Correction of the video controller's fifo code programming values in the different video modes for video refresh function. - This BIOS version now optionally handles the multisector RD/WR function during hard disk accesses (user-selectable through the Setup Utility included in the hard disk's system regions). <p>Listed below are the modifications made to the APM BIOS code with respect to the APM BIOS version being currently produced (APM BIOS Rev. 1.04):</p> <ul style="list-style-type: none"> - Hard disk power off management in AUTO-POWER DOWN MODE. - Management of two separate time outs for powering off the monitor and hard disks. - New APM functions so that the PC Green mode is also supported in the OS/2 Rev. 2.X environment.

SOFTWARE COMPATIBILITY

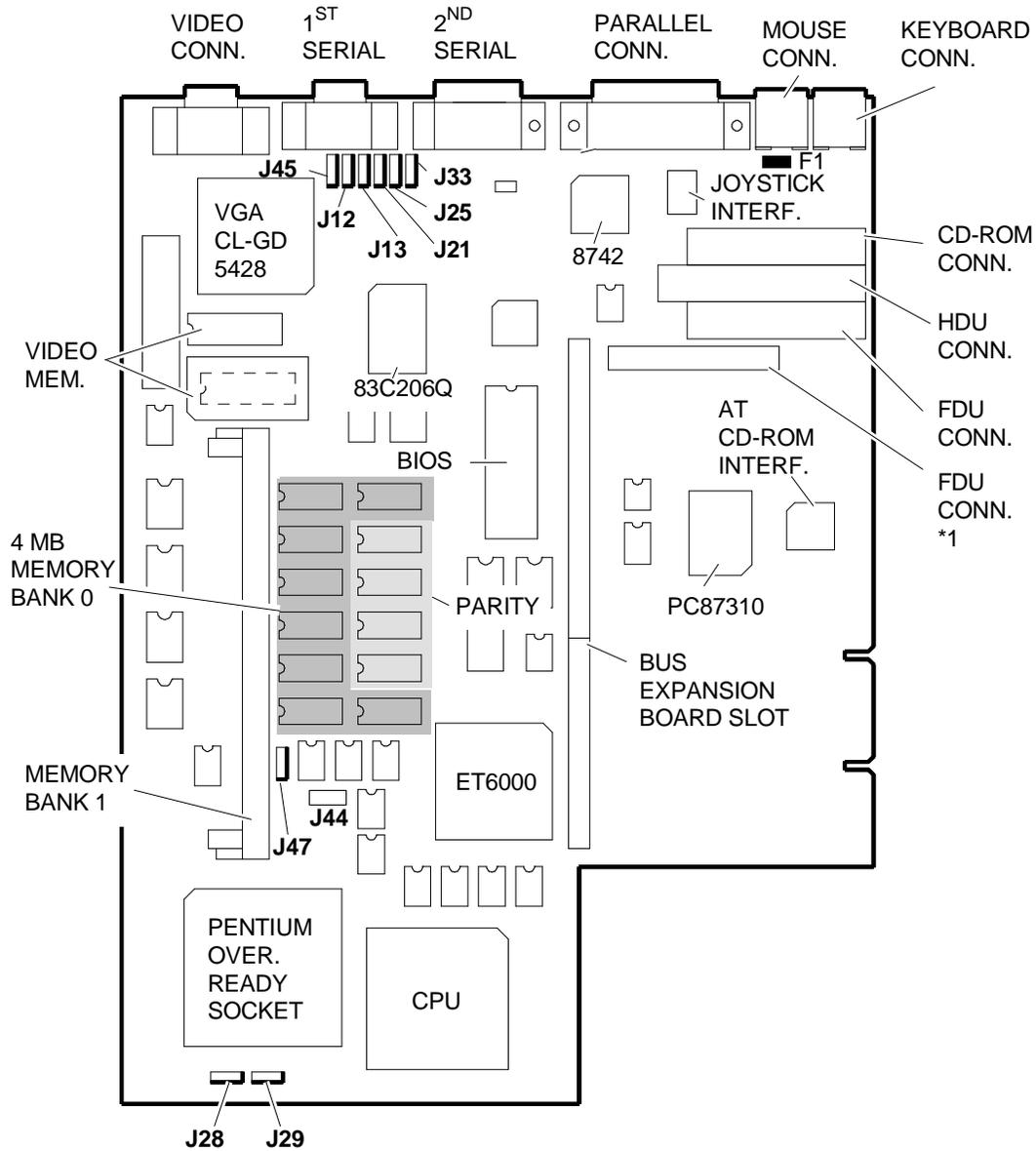
OPERATING SYSTEMS	NOTES
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01 MS-DOS Release 6.0 OS/2 Release 2.0 OS/2 Release 1.3 SE	Requires a formatted DSDD diskette during installation on hard disk.
IBM Operating System/2, Ver. 1.10 and 1.20	The PS/2 mouse is not recognized.
IBM Operating System/2 Extended Edition, Ver. 1.10 and 1.20	The PS/2 mouse is not recognized.
INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2.4 SCO XENIX 386, Rev. 2.3	
WINDOWS	
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
MULTIMEDIA SOFTWARE PRODUCTS	
MS-WINDOWS Ver. 3.0 + MULTIMEDIA Ver. 1.0 MS-WINDOWS Ver. 3.1 MULTIMEDIA Appl. tested) MS-MDK Multimedia Development kit AUTHOWARE STAR Ver. 1.0A	IM-AGE Ver. 2.0 IM-AGE Ver. 3.0 TOOLBOOK Ver. 1.5 MS-MPC SAMPLER

HARDWARE COMPATIBILITY

MODEM	I/O INTERFACE PRODUCTS
Hayes Smart modem 2400B Intel Safisfaxction board DIGICOM MODEM FAX Mod. SNM28SR AT&T 2224 CEO MODEM Worlport 1200 modem	ADAPTEC 1540C SCSI HOST ADAPTER SCANMAN plus
MULTIPOINT	MOUSE
CHASE AT 16+ CHASE AT 8+ COMPUTONE 8 MULTIPOINT COMPUTONE 16 MULTIPOINT DIGIBOARD MULTIPOINT SPECIALIX SI / 8	IBM PS/2 Mouse Logitech Bus Mouse Logitech cordless Radio Mouse MS-BUS mouse IBM PS/2 Mouse Serial MS BALL POINTER MOUSE
MULTIMEDIA	NETWORKING AND LAN PRODUCTS
PRO AUDIO SPECTRUM PLUS CARD SUPER VIDEO WINDOWS FAST SCREEN MACHINE Videologic CVA 4000/ISA SOUND PLASTER PRO SRS 170 Active Speaker System SONY SRS 77G Active Speaker System SONY CD-ROM DRIVER CDU 541 INTELLITOUCH PC-BUS 4025	3COM Etherlink 16 adapter 3C507 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink III adapter 3C509 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C603 DECNET ETHER WORKS LC DEC ETHERWORKS TURBO ADAPTER DEC ETHERWORKS TURBO TP ADAPTER IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter
DISPLAYS	GRAPHICS PRODUCTS
NEC MULTISYNC 4 FG NEC MULTISYNC 5 FG	INFOTRONIC XGC NUMBER NINE GXi Graphicx Coprocessor SPEA Graphiti HiLite

COMPONENTS AND JUMPERS ON MOTHERBOARD T.1.5 (BA2067) (BA2070)

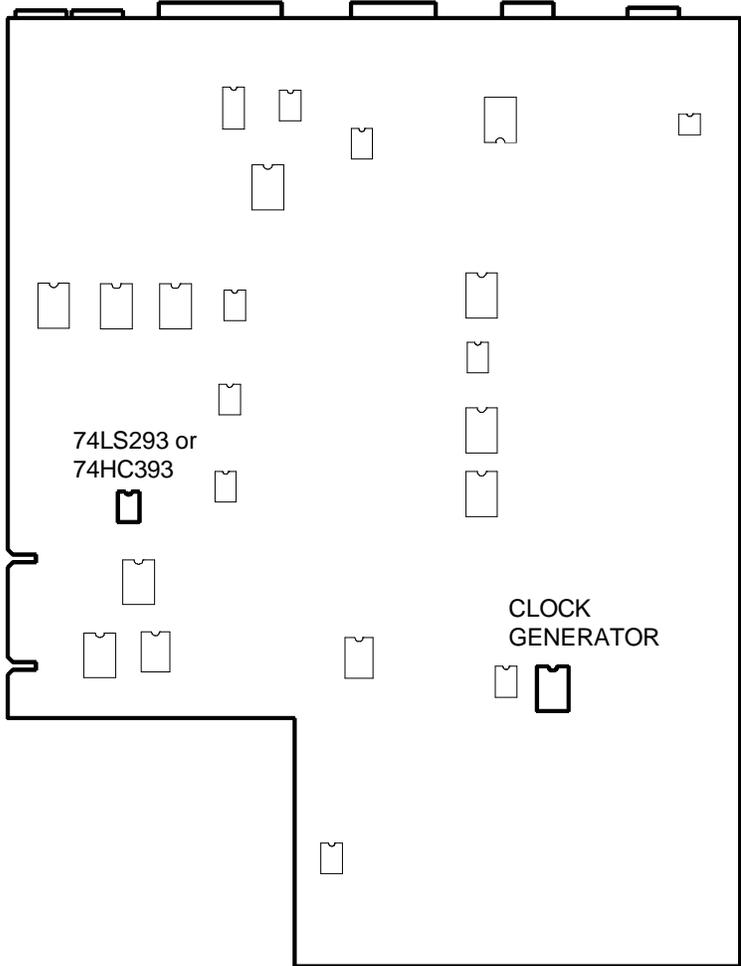
COMPONENTS ON SIDE A



EXM9A

*1 FOR PERSONAL COMPUTERS WITH MICROTOWER CASE ONLY

COMPONENTS ON SIDE B



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EXN3A

JUMPERS ON MOTHERBOARD T.1.5 (BA2067) (BA2070)

Jumper J21 (Serial Port 1) and J25 (Serial Port2) - Serial port control.

Position 2-3 The system can be bootstrapped from the serial ports. *
Position 1-2 The system cannot be bootstrapped from the serial ports.

Jumper J33 - Floppy disk write protect

Position 1-2 Disables floppy disk drive write protection.
Position 2-3 Enables floppy disk drive write protect. *
This feature is also valid for the streaming tape drives with floppy disk interface.

Jumper J12 - Setup control.

Position 1-2 The User Program resident in the System Region of the hard disk drive and which allows the system to be configured, is not executed. If the configuration of the system has changed, the only way to reconfigure the system is by launching the System Test program.
If this security feature is enabled, the following message is displayed at the end of the Power On Diagnostics: *POD Warning*.
Position 2 - 3 If the configuration of the system has changed, the POD will automatically access the User Program which allows the system to be reconfigured. *

Jumper J13 - Mouse interrupt

Position 1 - 2 Disables mouse interrupt 12.
Position 2 - 3 Enables mouse interrupt 12. *

Jumper J44 - CPU clock selection

Jumper IN 25 MHz
Jumper OUT 33 MHz

Jumper J47 - AT bus status selection

Position 1 - 2 Synchronous
Position 2 - 3 Asynchronous *

Jumper J45 - VGA video controller setting

Position 1 - 2 Disables the on-board VGA video controller
Position 2 - 3 Enables the on-board VGA video controller. *

Jumpers J29 - J28 - Type of processor installed

TYPE OF PROCESSOR INSTALLED IN THE SYSTEM	J29	J28
80486 SX QFP	On 1 e 2	On 1 e 2
80486 SX PGA	On 2 e 3	On 1 e 2
80486 DX PGA	On 1 e 2	On 2 e 3
80486 SX QFP + 80487 SX PGA Coprocessor	On 1 e 2	On 1 e 2
80486 SX QFP + 80486 DX2 PGA OverDrive	On 1 e 2	On 1 e 2
80486 SX QFP + P24T PGA	On 1 e 2	On 1 e 2
80487 SX PGA	On 1 e 2	On 1 e 2
80486 DX2 PGA OverDrive	On 1 e 2	On 2 e 3
P24T PGA	On 1 e 2	On 2 e 3

* Default setting

INTERRUPT LEVELS

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

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* The priority level depends on the interrupt selected. For example, if interrupt IRQ11 is selected the priority level is 6, or if interrupt IRQ15 is selected the priority level is 10.

DMA CHANNELS

CHANNEL	NUMBER OF BITS	FUNCTION
0	8	Reserved
1	8	Free
2	8	Floppy disk transfers
3	8	Video
4	16	Used for the cascade connection of DMA 1
5	16	Free
6	16	Free
7	16	Free

I/O ADDRESS MAP

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller 1, 8237A-5	300-31F h	Reserved
020-03F h	Interrupt controller 1, 8259A	360-36F h	Reserved
040-05F h	Timer, 8254	378-37F h	Parallel port 1 (LPT1)
060-06F h	8742 keyboard controller - data	380-38F h	Reserved for SDLC communications, Bisync 2
61 h	System Control Port B	3A0-3AF h	Reserved for bisync 1
64 h	8742 keyboard controller - commands	3B0-3BF h	Reserved
070-07F h	Real time clock, NMI Mask, CMOS RAM (write registers)	3C0-3CF h	Reserved
080-09F h	DMA page registers	3D0-3DF h	Video controller
0A0-0BF h	Interrupt controller 2, 8259	3E8-3EF h	Serial port 3 (COM3)
0F0 h	Clear NPX (80487) busy	3F0-3F7 h	Floppy disk controller
0F1 h	Reset NPX, 80487	3F8-3FF h	Serial port (COM1)
0F8-0FF	80487 math coprocessor	533 h	Audio subsystem mute control (in alternative to 607 h)
1F0-1F8 h	Hard disk drive controller	534-537 h	Audio subsystem (in alternative to 608-60B h)
200-207 h	Reserved	607 h	Audio subsystem mute control (in alternative to 533 h)
278-27F h	Parallel port 2 (LPT 2)	608-60B h	Audio subsystem (in alternative to 534-537 h)
2F8-2FF h	Serial port 2 (COM2)		

SYSTEM MEMORY MAP

