

Field Engineering Library

# PERSONAL COMPUTER

POCKET SERVICE GUIDE  
Volume 1  
6<sup>th</sup> Edition

Code - 2718320W - 00

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The manufacturer reserves the right to carry out modifications to the product described in this documentation at any time and without notice.

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# PREFACE

This guide, easy and quick to consult, gives the field engineer all the essential information needed to work on mid- to top-range Olivetti Personal Computers at the customer's site.

## Summary

This guide is divided into two volumes each with a number of chapters giving information on the different Personal Computer models.

The last chapters of Volume II provide information concerning:

- The video, hard disk, interface and communication controllers which can be installed in the systems
- The Personal Computer configuration utilities
- The installable memory modules
- Traceability
- All the types of hard disks which can be installed.

## PART 1

**1<sup>st</sup> Edition:** August 1990

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## PART 2

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## M24 - M21 - M24 SP

### CHARACTERISTICS

1

Microprocessor	8086, 16 bit
Clock	8 MHz (M24, M21) 10 MHz (M24 SP)
RAM access time	150 ns (M24, M21) 120 ns (M24 SP)
Wait states	1 (M24, M21) 0 (M24 SP)
Maximum RAM capacity	640K bytes
ROM BIOS memory	-

### BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
System Board/CPU	BA106/121/135	414369 A	
System Board/CPU	BA139/170/171	414091 G	
System Board/CPU	BA196	411298 Z	640 KB in System Board
System Board/CPU	BA801	411031 G	M24 SP/640 KB
System Board/CPU	BA177	411187 A	M24 SP/640 KB
Bus Converter/Bus 2407	IF172/IF272/IF314	411038 P	M24/M24 SP
Bus Converter/Bus 2403	IF249	48741 P	M21 (3 Slot 8 Bits/16 Bits)
Video Adapter	GO317/GO318/GO380	411216 N	
Video Enhanced Adapter	GO329	48193 H	EGC 2413
Video Adapter	GO362	411053 N	M24 3270
1.2 MB MFD Adapter	GO703		M24 SP (Bit 56)
D.T.C./HDU Adapter	GO310/GO349	414194 C	
H.D.U. W.D. Adapter	GO391	411032 H	Bios 1.36
H.D.U. W.D. Adapter	GO425	411423 E	M24 SP (Bios 1.36 later)
CPU Alternate	GO330	48199 E	CPU Z8001/APB2481
Memory Expansion	ME048/M049	48613 C	
Memory Expansion	ME062		
Memory Expansion	ME056STL		Single In Line (CDM 5,4)
Power supply	LC07	411369 F	
Power supply	LA16	414093 A	
Power supply	LA16B	411052 M	
Micro Box Interface	IF362	411743 W	
Keyboard Adapter	MI293	491230 Z	Bios 1.43/MSDOS 3.20/3.27 Emulates 8741 Nivel CSNZ (1.1)



**PAL AND ROM BIOS LEVEL**

M24/M21							
FUNCTION	POS.	EVOLUTION					
ROM Bios	6 F	PFBFH	1.0H	1.10H	1.21H	1.36H	1.43H (PQBK)
	6 H	PBCFL	1.0L	1.10L	1.21L	1.36L	1.43L (PQBL)
Bus Adapter	8 H	PL48		PL51	PL52B		
Wait Logic	6 J	PL95	PBFD				PBFY
RAM Add.	2 P	PL49				PL90	
I/O Logic	6 E	PL51		PL74			
KBC uC 8741	10 U	CSNE/CSHX	CSNY/CSNZ				
KBC uC 8041				CS40			
Keyboard Firmware		PDBA/PDBB	PDBE (1.1)	PDBP (1.2)	PDBP (2.1)		

**NOTE:** (ANK 2463 = IBM Y ANK 2462 = OLIVETTI)

M24 SP			
FUNCTION	POS.	EVOLUTION	
ROM Bios	6 F	PBFW 1.36H	PQBK 1.43H
	6 H	PBFV 1.36L	PQBL 1.43L
Bus Arbiter	8 H	PL86	
Wait Logic	6 J	PBFX	PBFZ
RAM Add.	2 P	PL90	
I/O Logic	6 E	PL85	

**COMPATIBILITY**

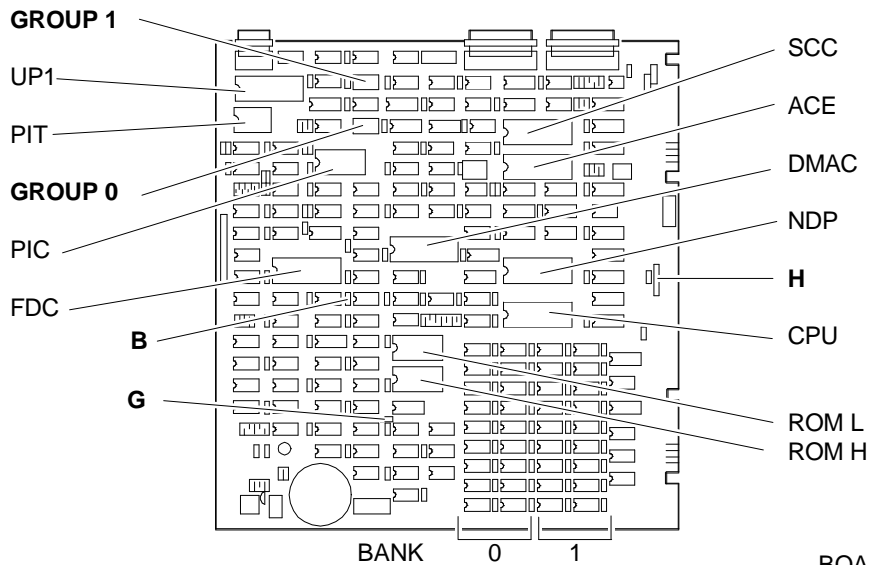
PBFY (M24) (CDM 1.60.60.1/525) PBFZ (M24 SP)	Solves timing problems of the 8250 serial interface controller and (bit 05) keyboard controller
PL52 (M24) (BIT 160.69.5/24)	To install APB card
PL74 (M24) (BIT 160.60.5/24)	Possibility of selecting between 8250 and 8530 by switch
PL90 (M24) * (BIT 160.60.5/48)	RAM Address improvement Born with 1.36 BIOS release
BIOS 1.10	Does not support MS-DOS REL. 3.20 REV. 327 "Frame Work" and "Symphony" compatibility
BIOS 1.36 (BIT 160.60.5/48)	Extends H.D. table in W.D. Adapter (GO391) COM2/EGC/COPROCESSOR right management
BIOS 1.43 * (CDM 160.60.1/529) (BIT 160.60.5/58)	Manages: MFDU 3.5" 720 KB Token Ring L.A.N. EGA Compatibility

(\*) ROM BIOS 1.43 + LP90 manage EGA emulation

**SYSTEM BOARD SETTINGS:**

**M24, M21:** BA106/BA121/BA135/BA139/BA170/BA171/BA196

**M24 SP:** BA801/BA177



**DIP-SWITCHES OF GROUP 0**

AREA	1	2	3	4	FUNCTION
RAM Capacity	OFF	ON	ON	ON	128 KB System Board
	ON	OFF	ON	ON	256 KB PB
	OFF	OFF	ON	ON	256 KB PB 128 KB PEXP
	ON	ON	OFF	ON	256 KB PB 256 KB PEXP
	OFF	ON	OFF	ON	256 KB PB 384 KB PEXP
	ON	ON	ON	OFF	512 KB Bank 0
	OFF	ON	ON	OFF	512 KB PB Bank 0 128 KB PB Bank 1
	OFF	ON	OFF	OFF	128 KB PB Bank 0 512 KB PB Bank 1

AREA	5	6	7	8	FUNCTION
Coprocessor	ON				Not installed
	OFF				Installed
Serial Interface		ON			8250 ACE Asynchronous
		OFF			8530 SCC Synchronous
System memory from BIOS REL. 1.36				ON	RAM Bank 0
				OFF	RAM Bank 0 and 1

**DIP-SWITCHES OF GROUP 1**

AREA	1	2	3	4	FUNCTION
Floppy Disk Unit	OFF				720 KB (3.5")
	ON				360 KB (5.25")
Speed		ON			Startup 800 ns
		OFF			Startup 250 ns
EPROM-BIOS			ON		ROM HDU System board
			OFF		ROM HDU External
Video				ON	Scroll CPU
				OFF	Slow scroll

AREA	5	6	7	8	FUNCTION
Monitor type	OFF	OFF			80 x 25 monochrome
	OFF	ON			40 x 25 colour
	ON	OFF			80 x 25 colour
	ON	ON			EGA (*)
MFDU			ON	ON	1 MFD unit
			OFF	ON	2 MFD units

(\*) BIOS 1.43 only

**JUMPERS (ONLY M24 SP BA801/BA177)**

JUMPERS	POS.	FUNCTION
B	B1 - B2	CLOCK 8 MHz FDC
	B2 - B3	CLOCK 4 MHz FDC
G	OUT	Floppy controller enable
	IN	Floppy controller disable

JUMPERS	POS.	FUNCTION
H	H-1	8087 8 MHz
	H-2	8087 10 MHz
C and E	OUT	Normal
	IN	Production test

**KEYBOARDS COMPATIBILITY**

TYPE	PROTOCOL	LAYOUT
ANK2462	Olivetti	Olivetti
ANK2463	Olivetti	IBM
ANK2502	Olivetti	M240 type
ANK2886	Olivetti	M28 type
ANK25-102	Standard AT	101/102 keys



# M240

## CHARACTERISTICS

Microprocessor	8086, 16 bit
Clock	10 MHz
RAM access time	120 ns
Wait states	0
Maximum RAM capacity	640 KB

2

## BOARDS

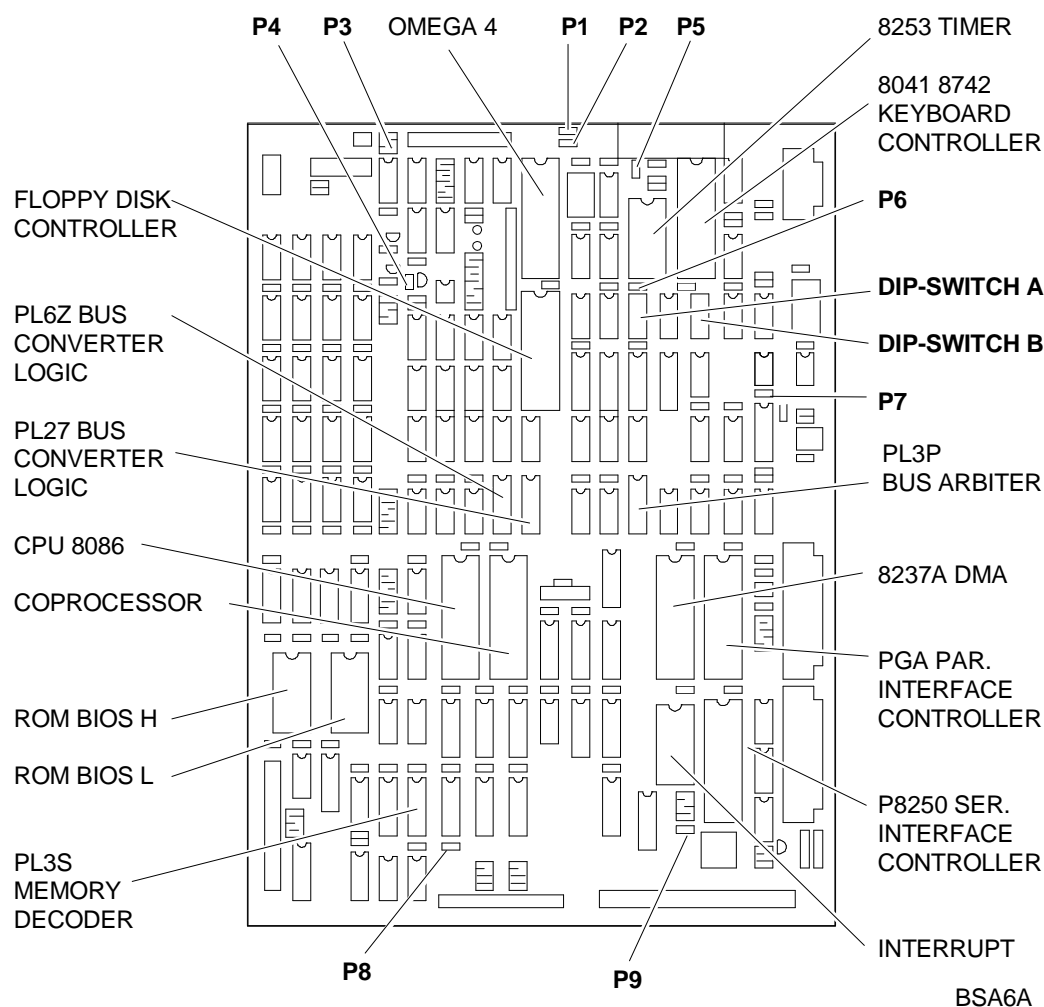
FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU System Board	BA200	411658 H	
CPU System Board	BA208	411730 V	
Console Controller	CO124	411659 A	
Bus Adapter 8-BIT	IN093	968651 Q	Managed by spares
Bus Adapter 16-BIT	IN094	968652 R	Managed by spares
Power supply 220 V	LA16B	411052 M	Not interchangeable with other 185 W
Power supply 220 V	LA16C	411711 N	
OGC Monitor adapter	GO708	411687 P	Olivetti
PGC Monitor adapter	GO423	411688 Y	Positive video
OEC Monitor adapter	GO451/GO467/GO491	411860 Y	EGA compatible
OVC Monitor adapter	GO729	412452 L	VGA compatible 8-BIT
Hard Disk WD Controller	GO425	411423 E	Managed by spares
Hard Disk NCL Controller	GO447	411660 F	
External uFD 720 KB interface	IF362	411743 W	
External uFD interface	IN101		An external unit

## ROM BIOS/PAL/EPROM LEVEL

FUNCTION	EVOLUTION				
	H	PCH5 2.04	PCHE 2.10	PCHK 2.11	PCHL 2.12
ROM BIOS	L	PCH6 2.04	PCHF 2.10	PCHJ 2.11	PCHM 2.12
RAM Decoder		PL3S			
Bus Converter logic		PL6Z			
Bus Converter logic		PL27			
Bus Arbiter		PL3P	PLYW/PLWW		
uP8742 Keyboard controller			CSQM 1.2	CSQR 1.5	
Character Generator ROM 259		PCFY 5.26	PDPL 5.28		
Keyboard firmware (ANK 25-102)		uPD8040 (CS35)		uPD8050: CSQH, CSP4	
Keyboard firmware (ANK 25-02)		PDB3 3.2	PDB5 3.5		

PAL PLYW (CDM 240.60.5/505A)	Solves "Parity Error" problems
PAL PLWW (BIT 240.60.5/07)	Solves compatibility with REDES ETHERLINK and 3 COM
BIOS 2.10 (BIT 240.60.5/8)	Solves: <ul style="list-style-type: none"> <li>- "Format Failure" message during hard disk formatting under MS DOS</li> <li>- WANGTEK 40 MB streaming tape unit management</li> <li>- I/O errors in floppy disk after an ON/OFF sequence</li> <li>- Clock problems after using "GOSLOW"</li> <li>- Possibility of testing system from a remote work station</li> <li>- Possibility of programming in RTCC</li> </ul>
BIOS 2.11 (BIT 240.60.5/10)	- Solves FUJITSU 8284 problem
BIOS 2.12 BIOS 2.14	- Manages 40 MB hard disk - Solves 3.5" JU253 floppy problem (BIT 11)
Keyboard firmware PDB5 3.5 (BIT 241.60.5/4)	Solves F9 decoding problems

**SYSTEM BOARD COMPONENTS AND SETTINGS: BA200/BA208**



**DIP-SWITCHES OF GROUP A**

AREA	1	2	3	4	5	FUNCTION
RAM capacity	ON	ON				RAM not enabled
	ON	OFF				256 KB
	OFF	ON				512 KB
	OFF	OFF				640 KB
EGC board			ON			Present
			OFF			Not present
No. MFD units				ON	ON	1 unit
				OFF	ON	2 units
				ON	OFF	3 units
				OFF	OFF	4 units

AREA	6	7	8	FUNCTION
Monitor type and screen form	ON	ON		EGA INS. or CRT not present
	OFF	ON		40 x 25 colour
	ON	OFF		80 x 25 colour
	OFF	OFF		80 x 25 monochromatic
Coprocessor 8087			ON	Not present
			OFF	Present

**DIP-SWITCHES OF GROUP B**

AREA	1	2	3	4	FUNCTION	
Microfloppy density	ON				720 KB/360	
	OFF				1.44 MB/1.2	
Unit A		ON			5.25"	
		OFF			3.5"	
Unit B			ON			5.25"
			OFF			3.5"
Floppy controller				ON	Enabled	
				OFF	Disabled	

AREA	5	6	7	8	FUNCTION	
ROM BIOS	ON				BIOS HD - system board	
	OFF				BIOS HD on controller	
Monitor controller		ON			OGC	
		OFF			Others	
Serial port			ON			Enabled
			OFF			Disabled
Parallel port				ON	Enabled	
				OFF	Disabled	

**JUMPERS**

NAME	FUNCTION	AREA	POSITION
P1 and P2	"Disk Change" signal enable P1 = Unit B P2 = Unit A	360 KB MFD unit	1-2
		720 KB, 1.2 MB, 1.44 MB uFD unit	2-3
P3	Production		Not present
P4	V.C.O. setting		Present
P5	Production		Not present
P6	Production		Not present
P7 and P9	Production		Present
P8	System ROM BIOS enable	Enabled	Not present
		Not enabled	Present

**I/O ADDRESS MAP**

ADDRESS	FUNCTION
000-01F	DMA controller
020-03F	Interrupt controller
040-05F	Timer
060-06F	Keyboard controller
070-07F	Date and time
080-09F	DMA register
0A0-0BF	NMI register
378-37F	Parallel controller
3F0-3F7	Floppy disk
3F8-3FF	Serial controller

**INTERRUPT LEVELS**

LEVEL	FUNCTION
IRQ0	Timer
IRQ1	Keyboard
IRQ2	Available
IRQ3	Available
IRQ4	Serial port
IRQ5	Available
IRQ6	Floppy disk
IRQ7	Parallel port

**DMA CHANNELS**

CHANNEL	FUNCTION
DMA0	RAM refresh
DMA1	Available
DMA2	Floppy disk
DMA3	Available





# M28

## CHARACTERISTICS

Microprocessor	80286
Clock	8 MHz (4 MHz BUS)
RAM access time	150 ns
Wait states	1
Minimum/maximum RAM capacity	512 KB/1 MB
ROM memory	32 KB

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## BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU System Board	BA802	411082 C	
CPU System Board	BA807	411082 V	ROM BIOS 2.07
CPU System Board	BA808/BA809		ROM BIOS 2.09
CPU System Board	BA815		ROM BIOS 2.12
CPU System Board	BA816	411949 V	ROM BIOS 2.12
Console Controller	CO113	964908 F	
Bus Adapter	IF606	411081 B	
Power supply	LA21	411077 N	W = 230
U-TURN board	IF608	-	
RAM expansion	ME903	411993 A	Maximum 2 MB
Monitor adapter	GO318	-	
Monitor adapter	GO380	411216 N	
Monitor adapter	GO709	411080 N	
Monitor adapter	GO413	411682 J	M283270
Monitor adapter	GO329	48193 H	E.G.C.
MDU adapter	GO705/GO711	411084 E	
HDU adapter	GO406	411083 D	
MFDU/HDU adapter	GO714	411638 V	BIOS 2.07 required

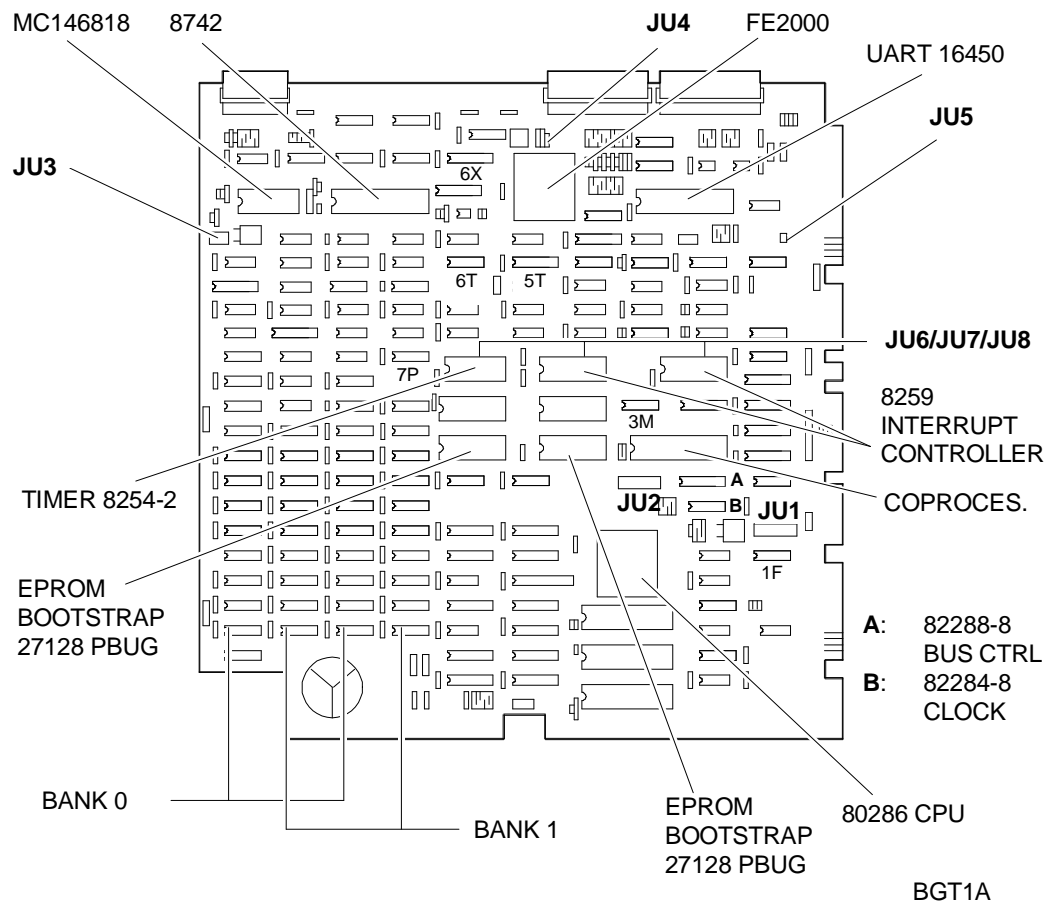
## ROM BIOS/PAL/EPROM LEVEL

FUNCTION		POS.	EVOLUTION							
ROM	H	6 K	PBUG/1.05	PBUL/1.08	1.10	PBUS/2.07	PBUY/2.09	PBU8/2.10	PBU6/2.12	
BIOS	L	4 K	PBUF/1.05	PBUM/1.08	1.10	PBUT/2.07	PBUX/2.09	PBU9/2.10	PBU7/2.12	
Wait logic		5 D	PL02							
Bus logic		6 T	PBUC							
RAM		7 P	PBUB							
select.										
BIO select.		3 M	PBUA							
I/O logic		1 F	PBUD							
RAM de-		5 T	PBUH							
code										
PIEGY		6 X	PL99							
BACK										
KBC		8 V	CSP9/2.01			CSL7/203				
uP8742										
Keyb. FW			CSPZ/1.0	CSSF/1.1						

**COMPATIBILITY NOTES**

ROM BIOS 1.05	- Solves lock problems when hard disk is formatting defective tracks
ROM BIOS 1.08	- System distinguishes between 360 KB and 1.2 MB FDs
ROM BIOS 2.07 (BIT 168.605/05)	- 102-key keyboard management (ANK 2502) - 720 KB micro floppy disk management - "COMBO" HD/MFD controller board GO714 management - "NOVEL" LAN management
ROM BIOS 209 (CD 168.601/518)	- Solves Random lock problems when working with Starlan with IRQ=2 - Eliminates interrupt 13 routine locks in the Step Motor phase
ROM BIOS 2.10	- Solves losses of set-up problems
ROM BIOS 2.12 (CDM 168.60.1/525)	- 1.44 MB micro floppy disk management - OEC/PGC video controller management

**SYSTEM BOARD COMPONENTS AND SETTINGS:  
BA802 / BA807 / BA808 / BA815 / BA816**



**JUMPERS**

JU4 and JU5			
AREA	4	5	FUNCTION
Production	IN*	IN*	Test both OUT

<b>JU1</b> 1..... 8 16..... 9						
<b>AREA</b>	<b>1-16</b>	<b>2-15</b>	<b>3-14</b>	<b>FUNCTION</b>		
Parity check	IN			512 KB on system board		
	OUT*			1 MB on system board		
User Eprom		IN *	OUT*	2764/27128		
		OUT	IN	27256		
<b>AREA</b>	<b>4-13</b>	<b>5-12</b>	<b>6-11</b>	<b>7-10</b>	<b>8-9</b>	<b>FUNCTION</b>
BIOS Eprom	IN*	OUT*				27128
	OUT	IN				27256
Parallel port			IN*			Enabled
			OUT			Not enabled
Serial port				IN*		Not enabled
				OUT		Enabled

<b>JU2</b> 1..... 8 16..... 9					
<b>AREA</b>	<b>1-16</b>	<b>2-15</b>	<b>3-14</b>	<b>4-13</b>	<b>FUNCTION</b>
Coprocesor clock	IN	OUT	OUT	IN	5.33 MHz
	OUT	IN	IN	OUT	8 MHz *
<b>AREA</b>	<b>5-12</b>	<b>6-11</b>	<b>7-10</b>	<b>8-9</b>	<b>FUNCTION</b>
Video adapter	IN*	OUT*			Video adapter only
	OUT	IN			Video adapter + EGC
	IN	IN			External video adapter enable
	OUT	OUT			

<b>JU3</b> 1..... 4 8..... 5					
<b>AREA</b>	<b>1-8</b>	<b>2-7</b>	<b>3-6</b>	<b>4-5</b>	<b>FUNCTION</b>
Production	IN*				Test
Video type		IN*			Colour
		OUT			Monochromatic
Production			IN*		-

<b>JU6-JU7-JU8</b>				
<b>AREA</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>FUNCTION</b>
CPU Wait states	IN	OUT	OUT	4 Wait states
	OUT	IN	OUT	5 Wait states
	OUT	OUT	IN	6 Wait states

(\*) Default position

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller 1	2F8-2FF	Serial port 2
020-03F	Interrupt controller 1	300-31F	Reserved
040-05F	Timer	360-36F	Reserved
060-06F	Keyboard controller	378-37F	Parallel port 1
070-07F	RTC, CMOS, NMI mask	380-38F	COM2 SDLC
080-09F	DMA page register	3A0-3AF	SDLC 1
0A0-0BF	Interrupt controller 2	3B0-3BF	Reserved
0F0-0FF	80287	3C0-3CF	Reserved
1F0-1F8	Hard disk controller	3D0-3DF	Video controller
200-207	Reserved	3F0-3F7	Floppy disk controller
278-27F	Parallel port 2	3F8-3FF	Available

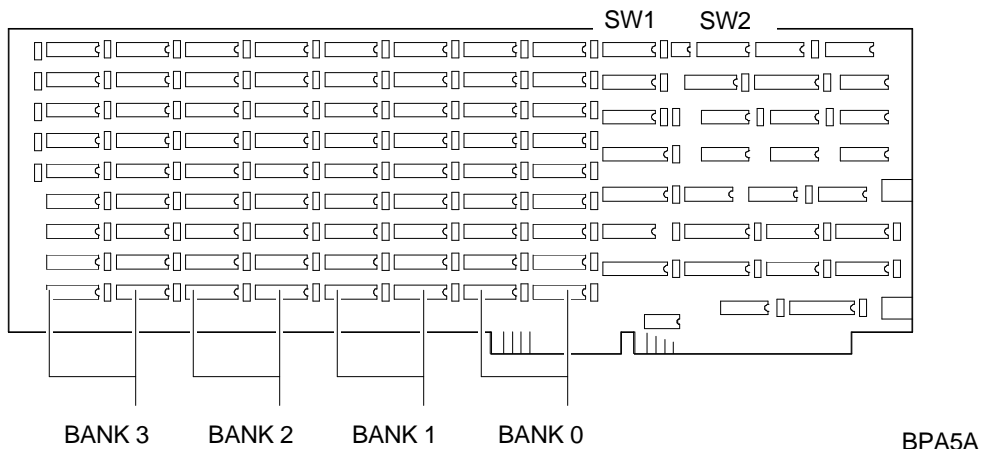
**INTERRUPT LEVELS**

LEVEL	FUNCTION
IRQ0	Channel 0 timer
IRQ1	Keyboard controller
IRQ2	Interrupt from interrupt controller 2
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Parallel port 2
IRQ6	Floppy disk controller
IRQ7	Parallel port 1
IRQ8	Date and Time
IRQ9	Redirected to IRQ 2
IRQ10	Available
IRQ11	Available
IRQ12	Available
IRQ13	80287
IRQ14	Hard disk controller
IRQ15	Available

**DMA CHANNELS**

CHANNEL	FUNCTION
DMA0	8 BIT
DMA1	8 BIT
DMA2	8 BIT
DMA3	8 BIT
DMA4	16 BIT
DMA5	16 BIT
DMA6	16 BIT
DMA7	16 BIT

**SETTINGS FOR MEMORY EXPANSION BOARD ME903 (MEM2852)**



**3**

**FOR M28**

SW1 GROUP					
AREA	1	2	3	4	FUNCTION
Parity check		ON			YES
		OFF			NO
RAM Capacity on-board ME-903			OFF	OFF	512 KB
			ON	OFF	1 MB
			OFF	ON	1.5 MB
			ON	ON	2 MB

SW2 GROUP									
AREA	1	2	3	4	5	6	7	8	FUNCTION
System board 512 K	ON	ON	ON	OFF	ON	ON	ON	OFF	1st board on bus
	ON	ON	ON	OFF	OFF	ON	ON	OFF	2nd board on bus
	ON	ON	ON	OFF	ON	OFF	ON	OFF	3rd board on bus
System board 1 MB	OFF	OFF	ON	OFF	ON	ON	ON	OFF	1st board on bus
	OFF	OFF	ON	OFF	OFF	ON	ON	OFF	2nd board on bus
	OFF	OFF	ON	OFF	ON	OFF	ON	OFF	3rd board on bus

**FOR M250**

**SW1 GROUP:** Configures expansion board capacity, set it as M28.

**SW2 GROUP:**

FOR M250 WITH 1 MB ON SYSTEM BOARD

SW2 GROUP								
No. MEM 2852	1	2	3	4	5	6	7	8
1	ON	ON	ON	OFF	ON	ON	ON	OFF
2	ON	ON	ON	OFF	OFF	ON	ON	OFF
3	ON	ON	ON	OFF	ON	OFF	ON	OFF

FOR M250 WITH 2 MB ON SYSTEM BOARD

SW2 GROUP								
No. MEM 2852	1	2	3	4	5	6	7	8
1	ON	OFF	ON	ON	OFF	ON	ON	OFF
2	ON	OFF	ON	ON	ON	OFF	ON	OFF
3	ON	OFF	ON	ON	OFF	OFF	ON	OFF

**NOTE:** If the MEM 2852 board is installed in a system with 1 MB on the system board, 256 KB are lost from total system memory.



# M280

## CHARACTERISTICS

Microprocessor	80286
Clock	12 MHz (8 MHz BUS)
RAM access time	100 ns
Wait states	1
ROM memory	32 KB
Minimum/maximum RAM capacity	1 MB

4

## BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU System board	BA817	411994 B	W = 230  Maximum 2 MB EGA compatible Monitor, positive ST506/MFM ST506/RLL
CPU System board	BA824		
Console controller	CO113	964908 F	
Bus Adapter	IF622	497680 T	
Power supply	LA21	411077 N	
U-TURN board	IF623	497682 R	
RAM expansion	ME903	411993 A	
OEC monitor adapter	GO451/GO467	411860 Y	
PGC monitor adapter	GO423	411688 Y	
HD/FD controller	GO714	411638 V	
HD/FD controller	GO723	412141 L	

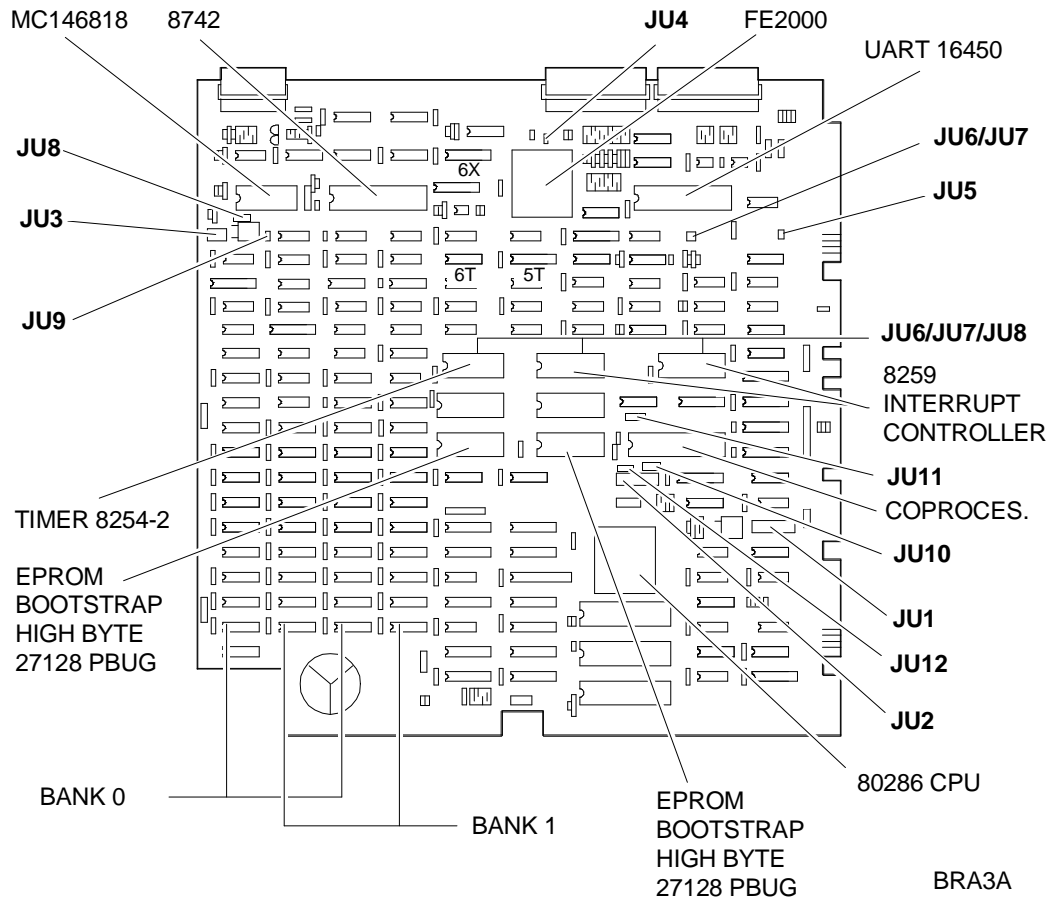
## ROM BIOS/PAL/EPROM LEVEL

FUNCTION		POS.	EVOLUTION		
ROM	H	6 K	PBVW 2.14	PBVS 2.16	Rev. 2.16.1
Bios	L	4 K	PBVV 2.14	PBVT 2.16	
Wait logic		5 D	PLY4		
Bus logic		6 T	PBVU		
		1 A	PLY5		
BIO select.		3 M	PBUA		
I/O logic		1 F	PBUD		
RAM decode		5 T	PBUC		
PIGGY BACK		6 X	PL99		
KBC uP8742		8 V	CSP9		
Keyboard FW		-			

## COMPATIBILITY NOTES

ROM BIOS 2.16: (CD 255.60.1/502)	<ul style="list-style-type: none"> <li>- Enlarges the HDU table and adds a 62 MB RLL hard disk</li> <li>- Solves problems with 1.44 MB uFD</li> <li>- Supports OEC 2 board in CGA mode</li> <li>- Solves format B problem: (CDM 501 M280)</li> <li>- Manages correctly hard disk even if it is not formatted with the system BIOS level</li> </ul>
ROM BIOS 2.16.1	Solves problems of operation with Windows/S and with the PG 208M2 printer.

**SYSTEM BOARD COMPONENTS AND SETTINGS**



JU1 1.....8 16.....9						
AREA	1-16	2-15	3-14	FUNCTION		
RAM	ON			512 KB		
	OFF*			1 MB		
Customer Eprom		ON	OFF	27128		
		OFF*	ON*	27256		
AREA	4-13	5-12	6-11	7-10	8-9	FUNCTION
BIOS Eprom	ON	OFF				27128
	OFF*	ON*				27256
Parallel Port			ON*			Enabled
			OFF			Not Enabled
Serial Port				ON		Not Enabled
				OFF*		Enabled
-	-				OFF*	Not used



**JU2**

AREA	1	2	3	4	FUNCTION
Clock of 80287 coprocessor See: JU10/JU11 and JU12	OFF*	OFF*	OFF*	OFF*	8 MHz
	ON	ON	ON	ON	12 MHz *
AREA	5	6	7	8	FUNCTION
Video	OFF*	OFF*			"Dual Port" PGC or OEC
	ON	ON			"Flicker" matrox
System clock			OFF*		24 MHz
			ON		External
80287 Wait states				OFF	10
				ON*	3

**JU3**

AREA	1	2	3	4	FUNCTION
Burn-in	OFF				Disabled
	ON				Enabled
Monitor type		OFF			Monochromatic
		ON*			Colour / Monochromatic
32 MHz clock			OFF		Disconnected
			ON*		Connected
			OFF *		Reserved

**JU4**

AREA	1	FUNCTION
14 MHz clock	OFF	Disconnected
	ON*	Connected

**JU6**

AREA	1	FUNCTION
System clock	OFF	8 MHz
	ON*	12 MHz

**JU5**

AREA	1	FUNCTION
1.8 MHz clock	OFF	Disconnected
	ON*	Connected

**JU8**

AREA	1	FUNCTION
MC146818 and non-volatile RAM clock	OFF	-
	ON*	MC146818 and RAM

(\*) Default position

**JU7**

AREA	1	FUNCTION
System clock	OFF*	12 MHz
	ON	8 MHz

**JU10 JU11 JU12**

AREA	1	FUNCTION
80287 coprocessor clock (See: JU2)	OFF*	8 MHz
	ON	12 MHz

**JU9**

AREA	1	FUNCTION
MC146818 clock	OFF	
Non-volatile RAM	ON*	MC146818 and RAM

(\*) Default position

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller 1	2F8-2FF	Serial port 2
020-03F	Interrupt controller 1	300-31F	Reserved
040-05F	Timer	360-36F	Reserved
060-06F	Keyboard controller	378-37F	Parallel port 1
070-07F	RTC, CMOS, NMI mask	380-38F	Comm. SDLC 2
080-09F	DMA page register	3A0-3AF	SDLC 1
0A0-0BF	Interrupt controller 2	3B0-3BF	Reserved
0F0-0FF	80287	3C0-3CF	Reserved
1F0-1F8	Hard disk controller	3D0-3DF	Video controller
200-207	Reserved	3F0-3F7	Floppy disk controller
278-27F	Parallel port 2	3F8-3FF	Available

**INTERRUPT LEVELS**

LEVEL	FUNCTION
IRQ0	Channel 0 timer
IRQ1	Keyboard controller
IRQ2	Interrupt from interrupt controller 2
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Parallel port 2
IRQ6	Floppy disk controller
IRQ7	Parallel port 1
IRQ8	Date and Time
IRQ9	Redirected to IRQ 2
IRQ10	Available
IRQ11	Available
IRQ12	Available
IRQ13	80287
IRQ14	Hard disk controller
IRQ15	Available

**DMA CHANNELS**

CHANNEL	FUNCTION
DMA0	8 BIT
DMA1	8 BIT
DMA2	8 BIT
DMA3	8 BIT
DMA4	16 BIT
DMA5	16 BIT
DMA6	16 BIT
DMA7	16 BIT



# M290

## CHARACTERISTICS

Microprocessor	80286
Clock	12 MHz
RAM access time	100 ns
Wait states	1
Minimum/maximum capacity	512 KB - 2 SIMM 256 KB modules 1 MB - 2 SIMM 512 KB modules 2 MB - 2 SIMM 1 MB modules
ROM memory	64 KB (1 CHIP 27512)

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## BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU System board	UC081	412061 P	W = 150 MEM 25-292 Positive monitor VGA compatible 16-bit EGA compatible ST506/MFM 1:1 ST506/MFM 1:1 Floppy-int. HD controller
CPU System board	UC090	412495 G	
Console controller	GE012		
Bus Adapter	IN108	412062 Q	
Power supply 220V	ESAN/HANTAREX	412065 K	
RAM expansion	RA081/A		
PGC monitor adapter	GO423	411688 Y	
OVC monitor adapter	GO481	412444 L	
OEC monitor adapter	GO491	411860 Y	
HD/FD adapter	GO727	412063 R	
HD/MFD adapter	GO731	412508 V	
Multifunction board	GO477	412543 P	
Serial Interface controller	IF613	411714 R	

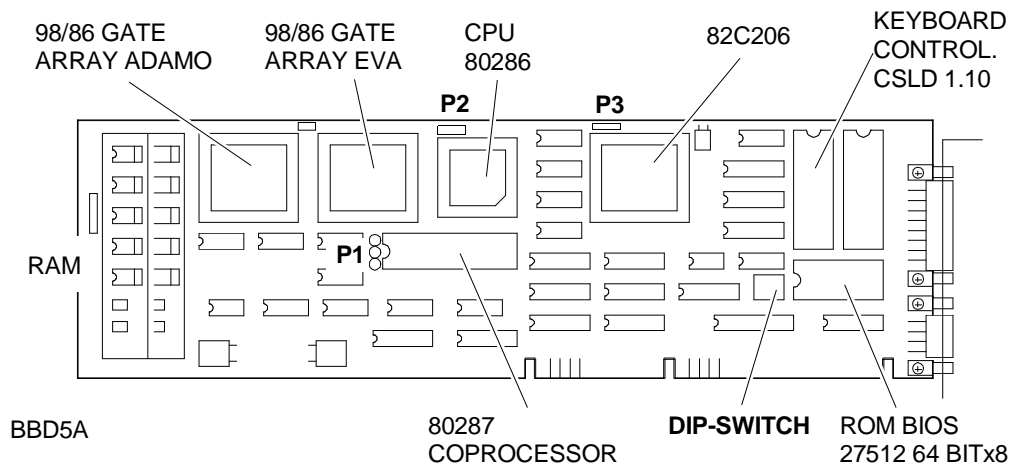
## ROM BIOS/PAL/EPROM LEVEL

FUNCTION	EVOLUTION									
BIOS ROM (2/512)	1.08	1.10	1.11	1.12	1.17	1.24	1.25	1.28	1.29	1.34
Keyboard controller	1.10							PEP4	PEP5	field only

## COMPATIBILITY NOTES

PAL PLVW	- Solves incompatibility problems with PGC monitor adapter (positive video) in M290
ROM BIOS 1.12	- Solves RAM acknowledge problems, after pressing the reset button
ROM BIOS 1.17	- SHADOW RAM management
ROM BIOS 1.24	- 100 MB hard disk management
GA86 and GA87	- 128 KB SHADOW RAM management
ROM BIOS 1.25 PEP3/BIT 11	- Correct management of memory expansion board - Solves problems of "NOVELL"/"A" "@" - Solves parity error
ROM BIOS 1.26	- Solves problems of CONNER hard disk and 33 clock
New ADAMO 2 gate (FC0511)	- New "ADAMO" Gate Array GA099B-V2

### SYSTEM BOARD COMPONENTS AND SETTINGS



#### DIP-SWITCHES

AREA	1	2	3	4	FUNCTION
RAM memory capacity	ON	ON			512 KB
	ON	OFF			1 MB
	OFF	ON			2 MB
	OFF	OFF			2 MB + 256 KB
Monitor adapter type			ON		OEC/OVC adapter
			OFF		PGC/other adapter
Production control			ON		BURN-IN
			OFF		Normal

#### JUMPER P1

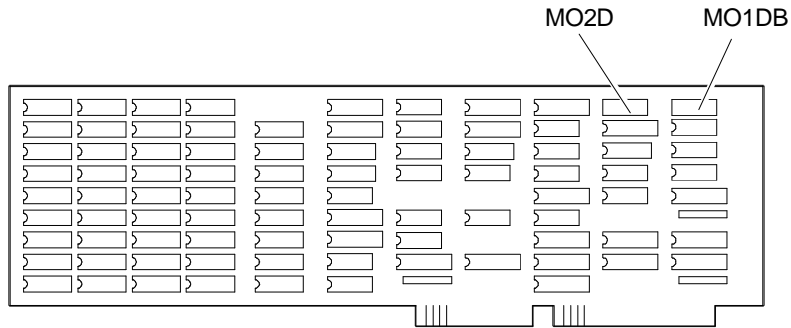
POSITION	FUNCTION
1-2	256-512 KB RAM Module
2-3	1 MB RAM Module

#### JUMPERS P2 and P3

ON OF NORMAL OPERATION

COMPONENT	FUNCTIONS
GATE ARRAY 98/86 EVA	<ul style="list-style-type: none"> <li>- Memory and I/O select logic control</li> <li>- System configuration register</li> <li>- Memory refresh and interrupt logic</li> <li>- Memory paging logic and DMA operations</li> </ul>
GATE ARRAY 99/87 ADAMO	<ul style="list-style-type: none"> <li>- BUS control and memory timing</li> <li>- Clock generator</li> <li>- BUS arbiter logic</li> <li>- Parity check management</li> <li>- Shut-down logic and reset generation</li> <li>- Coprocessor management logic</li> </ul>
IPC 82C206	<ul style="list-style-type: none"> <li>- 7-channel DMA controller</li> <li>- 13-channel interrupt controller</li> <li>- 3-channel timer management</li> </ul>

**MEM 25-292 MEMORY BOARD SETTINGS**



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BBD6A

**MO2D DIP-SWITCH BLOCK FOR RAM ADDRESS SELECTION**

		1st BOARD	2nd BOARD	3rd BOARD
M290 with 1 MB	1 BOARD	MEM 2/4 MB		
	2 BOARDS	MEM 4 MB	MEM 2/4 MB 4-8 OFF	
	3 BOARDS	MEM 4 MB	MEM 4 MB 4-8 OFF	MEM 2/4 MB 5 OFF
M290 with 2 MB	1 BOARD	MEM 2/4 MB 2-3 OFF		
	2 BOARDS	MEM 4 MB 2-3 OFF	MEM 2/4 MB 2-3-4-8 OFF,	
	3 BOARDS	MEM 4 MB 2-3 OFF	MEM 4 MB 2-3-4-8 OFF	MEM 2/4 MB 2-3-5 OFF

**NOTE:** The previous table shows only the DIP-Switches that should be set to **OFF**. The rest should be set to **ON**. (See the following table).

BOARD	DIP-SWITCH								SYSTEM BOARD RAM
	1	2	3	4	5	6	7	8	
1	ON	ON	ON	ON	ON	ON	ON	ON	1 MB
	ON	OFF	OFF	ON	ON	ON	ON	ON	2 MB
2	ON	ON	ON	OFF	ON	ON	ON	OFF	1 MB
	ON	OFF	OFF	OFF	ON	ON	ON	OFF	2 MB
3	ON	ON	ON	ON	OFF	ON	ON	ON	1 MB
	ON	OFF	OFF	ON	OFF	ON	ON	ON	2 MB

**MO1DB DIP-SWITCH BLOCK FOR I/O ADDRESS SELECTION**

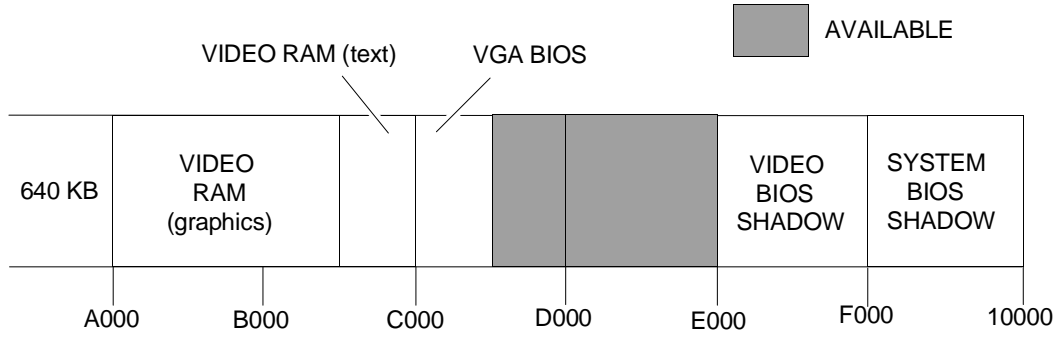
DIGIT No.	SWITCH No.				VALUE
3	6		7		
	ON		ON		000H
	OFF		ON		100H
	ON		OFF		200H
	OFF		OFF		300H
2	2	3	4	5	
	ON	ON	ON	ON	000H
	OFF	ON	ON	ON	010H
	ON	OFF	ON	ON	020H
	OFF	OFF	ON	ON	030H
	ON	ON	OFF	ON	040H
	OFF	ON	OFF	ON	050H
	ON	OFF	OFF	ON	060H
	OFF	OFF	OFF	ON	070H
	ON	ON	ON	OFF	080H
	OFF	ON	ON	OFF	090H
	ON	OFF	ON	OFF	0A0H
	OFF	OFF	ON	OFF	0B0H
	ON	ON	OFF	OFF	0C0H
	OFF	ON	OFF	OFF	0D0H
	ON	OFF	OFF	OFF	0E0H
OFF	OFF	OFF	OFF	0F0H	
1	1				
	ON				000H
	OFF				008H

**Example:** In order to select address I/O 3C8H, MO1DB DIP-Switch should be set as follows:

DIGIT	VALUE	SWITCH							
		1	2	3	4	5	6	7	8
3	300H						OFF	OFF	X
2	0C0H		ON	ON	OFF	OFF			X
1	008H	OFF							X
TOTAL	3C8H	OFF	ON	ON	OFF	OFF	OFF	OFF	X

X = NOT SIGNIFICANT

**SYSTEM MEMORY MAP**



Addresses C800 to DFFF are available if shadow memory is active.  
 If shadow memory of both video BIOS and system BIOS is disabled, segment E000 is available.  
 If only shadow memory of video BIOS is disabled memory segments are not available because system can not reallocate less than 128 KB.

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller 1	0C0-0DF	DMA controller 2
020-03F	Interrupt controller 1	0C0-0FF	80287
040-05F	Timer	278-27F	Parallel port 2
060-064	Keyboard controller	378-37F	Parallel port 1
061-065	GA98 registers	1F0-1F8	Hard disk controller
067	RAM page registers	2F8-2FF	Serial interface
069	RAM enable registers	380-3AF	Reserved
070-07F	RTC and NMI registers	3D0-3DF	OEC or PGC board
080-09F	DMA page register	3F0-3F7	Floppy disk controller
0A0-ABF	Interrupt controller 2	3F8-3FF	Serial interface

**INTERRUPT LEVELS**

LEVEL	FUNCTION
IRQ0	Timer
IRQ1	Keyboard controller
IRQ2	Interrupt from interrupt controller 2
IRQ3	Available
IRQ4	Serial port 1
IRQ5	Available
IRQ6	Floppy disk controller
IRQ7	Parallel port 1
IRQ8	RTC
IRQ9	Available
IRQ10	Available
IRQ11	Available
IRQ12	Available
IRQ13	80287
IRQ14	Hard disk controller
IRQ15	Available

**DMA CHANNELS**

CHANNEL	FUNCTION
DMA0	8-BIT
DMA1	8-BIT
DMA2	8-BIT
DMA3	8-BIT
DMA4	16-BIT
DMA5	16-BIT
DMA6	16-BIT
DMA7	16-BIT

**HARDWARE COMPATIBILITY**

<p><b>MODEM</b></p> <p>HAYES SMARTMODEM (1200B)          QUADRAM QUADMODEM II (QM2024)          TELENETICS EXPRESSDATA 24i (24i-12i)          VEN-TEL PC MODEM HALF-CARD (PCM XT)          AT&amp;T 2200 SERIES MODEM (2224-CD0)          HAYES SMARTMODEM 1200</p>	<p><b>MEMORY EXPANSIONS</b></p> <p>AST RAMPAGE/286 (RAMP286)          BOCARAM/AT          IBM 128 KB/512 KB EXPANSION MEMORY OPTION (6450338)          IBM 512 KB/2 MB EXPANSION MEMORY OPTION (6450343)          IBM ENHANCED MEMORY EXPANSION ADAPTER (74X8635)          INTEL ABOVEBOARD/286 (PCMB4020)</p>
<p><b>DISPLAY UNITS</b></p> <p>IBM COLOR GRAPHICS DISPLAY (5153)          IBM ENHANCED GRAPHICS MONITOR (5154)          IBM MONOCHROME MONITOR (5151)          IBM PS/2 COLOR DISPLAY (8512)          NEC MULTISYNC MONITOR (APC-H431)          PRINCETON RGB DISPLAY (HX-12)          ZENITH RGB/COMPOSITE DISPLAY (ZVM-135)</p>	<p><b>MOUSE</b></p> <p>AT&amp;T BUS MOUSE (459420)          LOGITECH BUS MOUSE (P7-3F)          MICROSOFT BUS MOUSE, REV. C          MICROSOFT SERIAL MOUSE          MOUSE SYSTEMS PC MOUSE (M1)</p>
<p><b>NETWORKS &amp; LAN PRODUCTS</b></p> <p>AT&amp;T STARLAN NETWORK          IBM PC NETWORK          IBM TOKEN RING NETWORK          NOVELL NETWORK          3COM NETWORK</p>	<p><b>I/O INTERFACE PRODUCTS</b></p> <p>APPARAT PARALLEL/SERIAL CARD (7950), REV. 1          IBM ASYNCHRONOUS COMMUNICATIONS CARD (1502074)          IBM MONO DISPLAY/PRINTER ADAPTER (1504900)          IBM PRINTER ADAPTER (1505200)          IBM SERIAL/PARALLEL CARD (6450215)</p>
<p><b>GRAPHICS PRODUCTS</b></p>	
<p>AST RESEARCH AST-3G PLUS          ATI EGA WONDER          GENOA SUPER EGA HIRES          HERCULES COLOR CARD (GB200)          HERCULES GRAPHICS CARD (GB102)          IBM ENHANCED GRAPHICS ADAPTER (5154001)          IBM VGA ADAPTER          PARADISE EGA 480</p>	<p>PARADISE MODULAR GRAPHICS CARD (06-1, Revision 02)          PARADISE MULTI-DISPLAY CARD (05-1)          QUADRAM QUAD EGA PLUS          TECMAR GRAPHICS MASTER BOARD (20037, REV. C)          VIDEO-7 VEGA DELUXE          325 INC. ADVANTAGE GRAPHICS INTERFACE (325 SHADOW)</p>



**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ
1	Standard 85 ms	10 MB	306	4	128	305
2	OPE XM5221 half size	21 MB	615	4	256	700
2	Seagate ST225	21 MB	615	4	256	700
2	NEC D3126	21 MB	615	4	256	700
3	WREN 2 full size	40 MB	925	5	128	924
4	CDC WREN 1	30 MB	697	5	128	696
5	ST4096	80 MB	1024	9	NO	1023
6	OPE XM5340	42 MB	820	6	256	819
7	NEC D5146H	42 MB	615	8	128	614
8	TM755 slim size	42 MB	981	5	NO	980
9	CDC WREN II slim size	42 MB	981	5	128	980
10	Micropolis 1324 full size	53 MB	1024	6	NO	1023
10	RODIME RO413 full size	53 MB	1024	6	NO	1023
11	CDC WREN II full size	55 MB	925	7	128	924
12	Micropolis 1325 full size	71 MB	1024	8	NO	1023
12	RODIME RO414 full size	71 MB	1024	8	NO	1023
13	CDC WREN II full size	71 MB	925	9	128	924
14	Micropolis 1323-A full size	44 MB	1024	5	NO	1023
15	RESERVED					
16	OPE XM5220 85 ms	20 MB	612	4	128	656
16	NEC D5126	20 MB	612	4	128	656
16	OPE XM3220	20 MB	612	4	128	656
16	Miniscribe M3425	20 MB	612	4	128	656
16	NEC D5126H	20 MB	612	4	128	656
17	TANDON TM 362 85 ms	20 MB	612	4	NO	663
18	Seagate ST251 40 ms	40 MB	820	6	NO	880
19	Rodime RO3055 40 ms	40 MB	872	6	0	871
20	Miniscribe M8425 68 ms	20 MB	612	4	0	663
21	Seagate ST277TR	62 MB	820	6	-1	819
22	OPE XM5340/60	62 MB	820	6	123	819
23	NEC D5147H	62 MB	615	8	384	664
24	NEC D5652	136 MB	820	10	-1	822
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023
27	NEC D5452	62 MB	823	10	512	824

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**Where:** CYL: No. of disk cylinders  
T: No. of disk heads  
WPC: Precompensation cylinder number  
LZ: Head parking cylinder number

## M250 - M250 E

### CHARACTERISTICS

Microprocessor	80286 16-BIT
Clock	8 MHz/12 MHz (M250 E)
RAM access time	120 ns/80 ns (M250 E)
Wait states	0
Maximum/minimum RAM capacity	M250 -1 MB / 2 MB on system board M250 E 1, 2 or 4 MB on system board
Memory expansion KIT for M250 E	<b>EXM 25-531</b> - 2 SIMM 512 KB 80 ns (1 MB to 2 MB memory expansion on system board) <b>EXM 25-332</b> - 2 SIMM 1 MB 80 ns (2 MB to 4 MB memory expansion on system board)
BIOS RAM	64 KB
Bus	AT339 compatible
Monitor	VGA compatible
Magnetic units	2 3.5" uFD/1 HD/1 STC
SHADOW memory	SI-128 KB (E0000-FFFF)
Hard disk adapter	AT/RLL on system board
BUS ADAPTER board	Three 8-/16-Bit connectors <b>IN 113</b> for the M250 <b>IN 118</b> for the M250 E
Monitor adapter	PVGA1 on system board
Memory expansion board	For M250 ME 903  For M250 E AMB 2678 Expandable to 4 MB by means of <b>EXM 25-852</b> memory kit 18 chips 120 ns
External floppy disk controller board	IF374
External floppy disk power supply	PSU
Coprocessor for M250 E	Intel 80287-2

<b>SYSTEM BOARD</b>	
M250	BA227 BA233 BA239 BA240
M250 E	BA241
<b>POWER SUPPLY</b>	
PS07/B 220 V D.R.S. code 412442 J PS07/B 110 V D.R.S. code 412441 R	
<b>BIOS</b>	
M250: Lev. 1.06 M250 E: Lev. 1.09	
<b>MEMORY EXPANSIONS</b>	
M250 - ME903 M250 E - AMB 2678	

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**SYSTEM BOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>BIOS ROM</b>	<b>NOTES</b>
<b>BA227</b>	Nasc.	412436 M	See following table	M250 system board. Multilayer & SMD Problems with 16-bit boards, and with 3 COM Token Link Plus, Novell NP 600, Olicom, Madge Token Ring boards. Impossible to utilize 512 KB SIMM
	Lev. 01		Lev. 1.03	
	Lev. 02		Lev. 1.03	Solves the parity error, CMOS and timer problems.
<b>BA233</b>	Nasc		See following table	M250 motherboard. Multilayer & SMD
	Lev. 01		Lev. 1.03 Lev. 1.03	
	Lev. 02		Lev. 1.04	New BIOS
	Lev. 03		Lev. 1.06	Replaces BIOS 1.04 with 1.06. Corrects serial port problems.
<b>BA239</b>	Nasc.		See following table	M250 system board.
	Lev. 01		Lev. 1.04	SETUP loss problem solved
	Lev. 02		Lev. 1.04	Coprocessor problems solved
	Lev. 02/A		Lev. 1.04	Coprocessor and timer problems solved
	Lev. 04		Lev. 1.06	BIOS 1.04 replaced by 1.06
	Lev. 05		Lev. 1.06	Floppy disk controller W.D. 37C65C ver. C can be used in place of the W.D. 37C65B ver. B floppy disk controller.
<b>BA240</b>	Nasc.	412577 R	See following table	M250 system board. Impossible to read 360 MB floppy disk with 1.2 MB drive
	Lev. 01		Lev. 1.04	Piggy-Back board RA 085 (VIDEO DRAM) soldered directly on-board
	Lev. 02		Lev. 1.04	SETUP loss problem solved
	Lev. 03		Lev. 1.04	Coprocessor problems solved
	Lev. 03/A		Lev. 1.04	Coprocessor and timer problems solved
	Lev. 05		Lev. 1.06	BIOS 1.04 replaced by 1.06
	Lev. 06		Lev. 1.06	Floppy disk controller W.D. 37C65C ver. C can be used in place of the W.D. 37C65B ver. B floppy disk controller.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
<b>BA241</b>	Nasc.	412758 E	See following table	M250 E system board. Impossible to read 360 MB floppy disks with 1.2 MB drive
	Lev. 01		Lev. 1.06	Solves: SETUP loss problems Timing compatibility Keyboard defects Chip select output glitches Parallel port malfunctions
	Lev. 02		Lev. 1.06	Cutting and trimming recovery
	Lev. 03		Lev. 1.07	BIOS Rev. 1.06 replaced by 1.07
	Lev. 04		Lev. 1.08	BIOS Rev. 1.07 replaced by 1.08
	Lev. 05		Lev. 1.09	BIOS Rev. 1.08 replaced by 1.09
	Lev. 06		Lev. 1.09	Floppy disk controller W.D. 37C65C ver. C can be used in place of the W.D. 37C65B ver. B floppy disk controller.

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**ROM BIOS/PAL/EPROM LEVEL**

FUNCTION	POS.	EVOLUTION FOR M250				
ROM Bios	U12	1.01	1.02	1.03 PERB	1.04 PERD	1.06
Keyboard controller	U10	7.01	1.06 PERC			
ROM OVC (PVGA1A)	U13	1.04 PERA	PLRT (BA233)			
Video circuit	U14	PLQ4				
Video circuit	U15	PLQB				
Video circuit	U16	PLQC				
Hard disk circuit	U17	PLQD	PLRU (BA233)			
Keyboard/sound circuit	U88	PLQE				

FUNCTION	POS.	EVOLUTION FOR M250 E			
ROM BIOS	U12	1.06	1.07	1.08	1.09
Keyboard controller	U10	7.01			
ROM OVC (PVGA1A)	U13	1.06 PERC			
Video circuit	U14	PLQ4			
Video circuit	U15	PLQB			
Video circuit	U16	PLQC			
Hard disk circuit	U17	PLQD			
Keyboard/sound circuit	U88	PLQE			

**COMPATIBILITY**

BIOS 1.03	Solves SETUP problems on diskless M250 (BI/01)
BIOS 1.04 (BIT 03)	Positive video management Hard Disk Update table
BIOS 1.06 PERC	M250 as Personal Banking option and for M250 E Serial port problems solved
BIOS 1.07 PDSG	M250 E only - Eliminates generation of spurious characters during Power On Added hard disk type 7 for CONNER CP3044
BIOS 1.08	M250 E only - Solves keyboards installation problems
BIOS 1.09	M250 E only

**HARD DISK UNIT TYPE SELECTION --> SETUP**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	CONNER CP346	40 MB	805	4	-1	804	26
2	CONNER CP3106	100 MB	766	8	-1	775	33
3	CONNER CP3142	40 MB	635	4	-1	639	33
4	CONNER CP3022	20 MB	615	4	-1	614	17
7	CONNER CP3044	40 MB	635	4	-1	639	33

**Where:** CYL: No. of disk cylinders  
 T: No. of disk heads  
 WPC: Precompensation cylinder number  
 LZ: Head parking area cylinder number  
 SET: No. of disk sectors

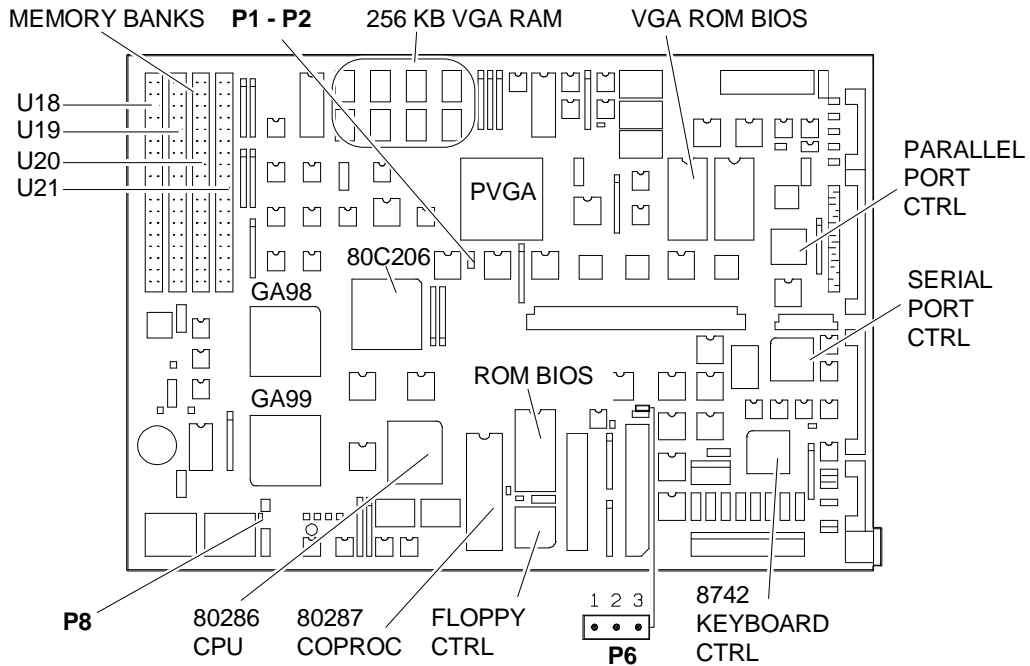
**SETUP OPERATIONS**

1	Date
2	Time
3	Base Memory Size
4	Extended Memory Size
5	Shadow Memory
6	Floppy Drive 1
7	Floppy Drive 2
8	Hard Disk 1
9	Mathematic Coprocessor
10	Primary CRT Adapter Type
11	Additional Setup

**POWER SUPPLY**

MODEL	LEVEL	D.R.S. CODE	ROM BIOS
PS07/B 220 V	Lev. 03	412442J	Power Good board replaced.
	Lev. 04		Retrofit made to solve certain operating malfunctions
PS07/B 110V	Lev. 03	412441R	Same modifications made to the 220 V version.
	Lev. 04		
	Lev. 05		Corrects the problems given by EMI noise.

**MOTHERBOARD COMPONENTS AND SETTINGS: BA227/BA233/BA239/BA240**



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BSA7A

**JUMPERS**

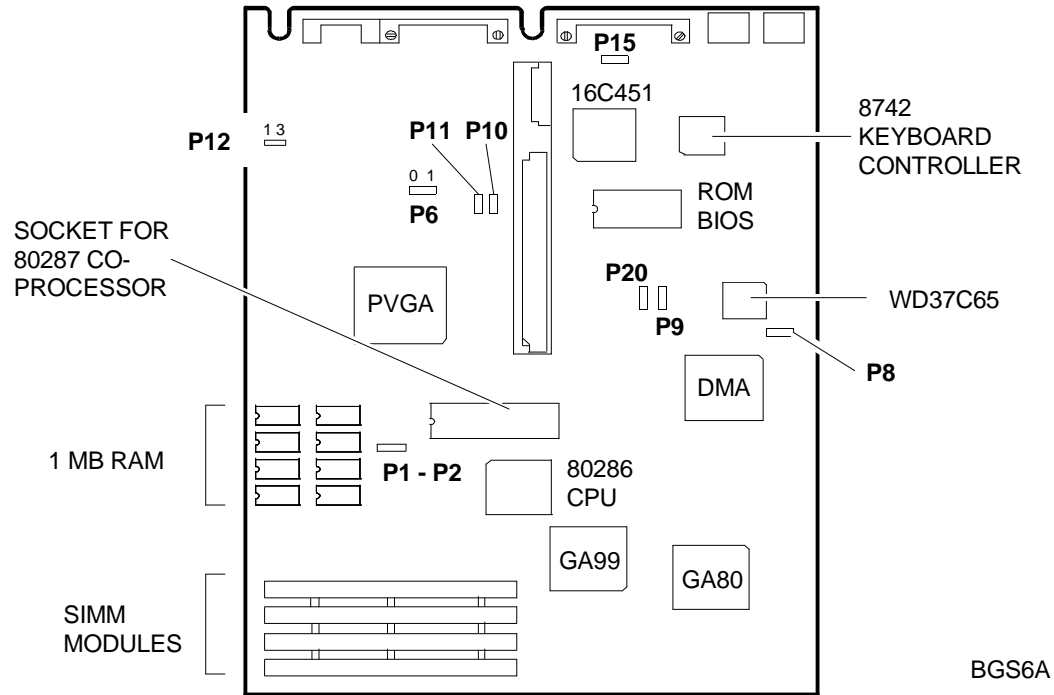
P1	P2	BANK 0	BANK 1	No. SIMM	SIMM TYPE
IN	OUT	ACTIVE	NOT ACTIVE	2	256 x 9 512 x 9
OUT	OUT	ACTIVE	ACTIVE	4	256 x 9 512 x 9
IN	IN	ACTIVE	NOT ACTIVE	2	1 M x 9
OUT	IN	CONFIGURATION NOT USED			

**NOTE:** - BANK 0 (SLOTS U18 and U19)  
- BANK 1 (SLOTS U20 and U21)

<b>P6</b>	1-2	40 MB Hard disk (CP3142 interl. 1:1/RLL)/CP346 or CP3024 (1:1)
	2-3	20 MB Hard disk (CP3022 interl. 3:1/RLL or SIN HDU)
<b>P8</b>	IN *	Battery connected
	OUT	Battery not connected

(\*) Default setting

**BA241 SYSTEM BOARD COMPONENTS AND SETTINGS FOR M250 E**



**JUMPERS**

NAME	POSITION	FUNCTION
P6	3 - 2	HDU interleave 1:1
	2 - 1	HDU interleave 1:3
P8	IN	Battery connected
	OUT	Battery not connected
P9	IN	16 MHz floppy disk
	OUT	1.2 MB floppy disk
P10	IN	Hard disk not present
	OUT	Hard disk present
P11	IN	Serial port disabled
	OUT	Serial port enabled
P12	1 - 2	VGA enabled
	2 - 3	VGA disabled
P15	IN	Selectable hysteresis
	OUT	Normal hysteresis
P20	IN	187 ns precompensation
	OUT	125 ns precompensation

**JUMPERS P1 - P2**



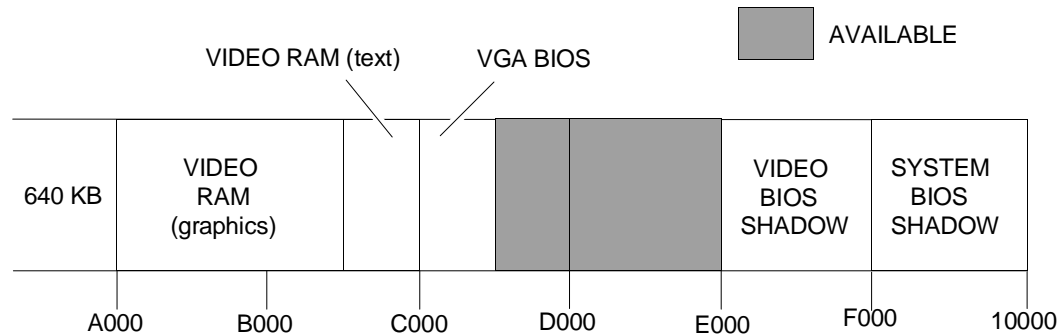
**MEM 2852 (ME903) MEMORY EXPANSION BOARD SETTINGS FOR M250**

(See M28 page 3-5).

**AMB 2678 MEMORY EXPANSION BOARD SETTINGS FOR M250 E**

(See M300 page 10-7).

**M250 MEMORY MAP**



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**M250 I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller 1	0A0-0BF	Interrupt controller 2
020-021	Interrupt controller 1	0C0-0DF	DMA controller 2
022-023	82C206	0F0-0FF	80287
040-05F	Timer	1F0-1F7	Hard disk adapter
060-064	Keyboard controller	278-27F	Parallel port 2
61	General control register	378-37F	Parallel port 1
65	Configuration register	3B0-3DF	VGA controller
67	Memory page register	3F0-3F1	Hard disk controller
69	Memory map register	3F2-3F6	Floppy disk registers
070-07F	RTC and NMI controller	3F7	Exchange registers between hard disk and floppy disk
080-09F	DMA page register	3F8-3FF	Serial interface

**M250 E INTERRUPT LEVELS**

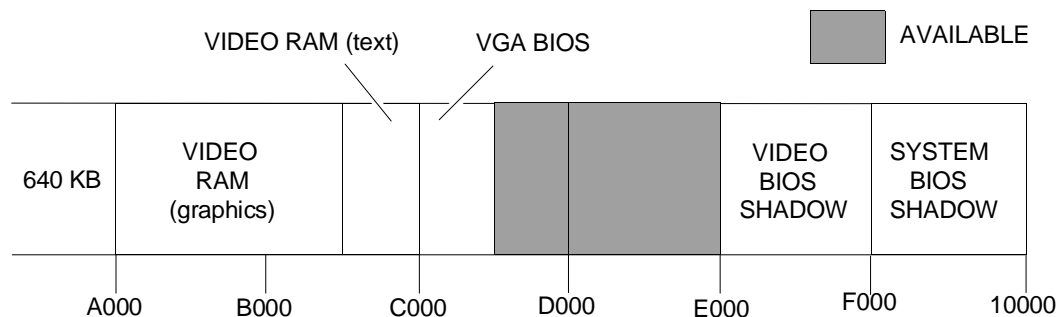
LEVEL	FUNCTION	LEVEL	FUNCTION
IRQ0	Channel 0 timer	IRQ8	RTC
IRQ1	Keyboard	IRQ9	Available
IRQ2	Interrupt from interrupt controller 2	IRQ10	Available
IRQ3	Serial port 2	IRQ11	Available
IRQ4	Serial port 1	IRQ12	Available
IRQ5	Parallel port 2	IRQ13	80287
IRQ6	Floppy disk	IRQ14	Hard disk
IRQ7	Parallel port 1	IRQ15	Available

**M250 DMA CHANNELS**

CHANNEL	FUNCTION	CHANNEL	FUNCTION
DMA0	8-BIT available	DMA4	16-BIT cascade DMA controller 2
DMA1	8-BIT CD-ROM	DMA5	16-BIT available
DMA2	8-BIT floppy	DMA6	16-BIT available
DMA3	8-BIT video	DMA7	16-BIT available



### M250 E MEMORY MAP



### M250 E I/O ADDRESS MAP

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller 1	080-09F	DMA page register
020-021	Interrupt controller 1	0A0-0BF	Interrupt controller 2
022-023	82C206	0C0-0DF	DMA controller 2
040-05F	Timer	0F0-0FF	80287
060-064	Keyboard controller	1F0-1F7	Hard disk adapter
61	General control register	278-27F	Parallel port 2
65	Configuration register	378-37F	Parallel port 1
67	Memory page register	3B0-3DF	VGA controller
69	Memory map register	3F0-3F1	Hard disk controller
06B	Memory banks starting address register	3F2-3F6	Floppy disk registers
		3F7	Exchange registers between hard disk and floppy disk
070-07F	RTC and NMI controller	3F8-3FF	Serial interface

### M250 E INTERRUPT LEVELS

LEVEL	FUNCTION	LEVEL	FUNCTION
IRQ0	Channel 0 timer	IRQ8	RTC
IRQ1	Keyboard	IRQ9	Available
IRQ2	Interrupt from interrupt controller 2	IRQ10	Available
IRQ3	Serial port 2	IRQ11	Available
IRQ4	Serial port 1	IRQ12	Available
IRQ5	Parallel port 2	IRQ13	80287
IRQ6	Floppy disk	IRQ14	Hard disk
IRQ7	Parallel port 1	IRQ15	Available

### M250 E DMA CHANNELS

CHANNEL	FUNCTION	CHANNEL	FUNCTION
DMA0	8-BIT available	DMA4	16-BIT cascade DMA controller 2
DMA1	8-BIT CD-ROM	DMA5	16-BIT available
DMA2	8-BIT floppy	DMA6	16-BIT available
DMA3	8-BIT video	DMA7	16-BIT available

**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK OPERATING SYSTEM, Version 3.30 IBM DISK OPERATING SYSTEM, Version 4.01  IBM OPERATING SYSTEM/2, Version 1.10 IBM OPERATING SYSTEM/2, EXTENDED EDITION, Version 1.10 OLIVETTI'S MICROSOFT DISK OPERATING SYSTEM, Version 3.30 OLIVETTI'S MICROSOFT DISK OPERATING SYSTEM, Version 4.01 OLIVETTI MICROSOFT OS/2, Version 1.10	During installation on hard disk, a formatted DSDD disk is required. PS/2 mouse not acknowledged PS/2 mouse not acknowledged

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**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
HAYES SMARTMODEM (1200B) HAYES SMARTMODEM (2400B) QUADRAM QUADMODEM II (QM2024) TELENETICS EXPRESSDATA 24i (24i-12i) VEN-TEL PC MODEM HALF-CARD (PCM XT) HAYES SMARTMODEM 1200	AT&T STARLAN NETWORK IBM PC NETWORK IBM TOKEN RING NETWORK MADGE AT RING NODE TOKEN-RING 3COM NETWORK (ETHERNET) 10NET NETWORK
<b>MOUSE</b>	<b>MEMORY EXPANSION PRODUCTS</b>
IBM PS/2 MOUSE (6450350) LOGITECH BUS MOUSE (P7-3F) MICROSOFT BUS MOUSE, REV. C MICROSOFT SERIAL MOUSE MSC PC MOUSE PS/2 OLIVETTI NEW ADVANCED MOUSE (GRD 25-025)	AST RAMPAGE/AT (RAMPAT-2000) AST RAMPAGE/286 (RAMP286) BOCA RESEARCH BOCARAM/AT INTEL ABOVEBOARD PLUS 8 (PCMB4525)
<b>INTERFACE &amp; I/O PORT PRODUCTS</b>	<b>DISPLAY UNITS</b>
FUTURE DOMAIN HOST ADAPTER (TMC-830) IBM ASYNCHRONOUS COMMUNICATIONS CARD (1502074) IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL CARD (6450215) NATIONAL IEEE-488 CARD (GPIB-PC, Rev. A)	IBM MONOCHROME MONITOR (5151) IBM ENHANCED GRAPHICS MONITOR (5154) IBM PS/2 MONOCHROME DISPLAY (8503) IBM PS/2 COLOR DISPLAY (8512) IBM PS/2 COLOR DISPLAY (8513) IBM PS/2 COLOR DISPLAY (8514) NEC MULTISYNC MONITOR (APC-H431)
<b>GRAPHICS PRODUCTS</b>	
AST RESEARCH AST-3G PLUS ATI EGA WONDER GENOA SUPER EGA HIRES HERCULES GRAPHICS CARD (GB102) IBM ENHANCED GRAPHICS ADAPTER (5154001)	IBM VGA ADAPTER MATROX PG-1280A ORCHID PRODESIGNER VGA PLUS PARADISE EGA 480 QUADRAM QUAD EGA PLUS (QC8601) TECMAR VGA AD VIDEO-7 VEGA DELUXE

## M380 - M380 C - M380 C NEW

### CHARACTERISTICS

Microprocessor	80386
Clock	16 MHz
RAM access time	120 ns
Wait states	1
ROM memory	128 KB
Expansion slots	Two 8 bits, two 16 bits, three 32 bits
Coprocessor	Intel 80387
Memory	1 MB to 48 MB No memory on system board. All memory resides in expansion boards to be installed on BUS
Hard disk and floppy disk controllers	<p style="text-align: center;"><b>M380, M380 C</b></p> <p><b>GO717</b> (WD1003-WAH) - ST506-MFM 3:1 (Hard disk controller)</p> <p><b>GO720</b> (WD1005-WAH) - ESDI 3:1 (Hard disk controller)</p> <p style="text-align: center;"><b>M380 C NEW</b></p> <p><b>GO723</b> (WD1003 RA-2) - ST506-RLL 2:1 (HDU and FDU controller)</p>

#### SYSTEM BOARD

BA806  
BA818

#### ROM BIOS

Rev. 1.14

#### POWER SUPPLY

M380 C      LA16/C  
M380 C N    LA16/C

M380        LA21/C

#### MEMORY BOARDS

**ME908** 1 MB  
4 SIMM 256 Kb x 9

**ME912** 4 MB  
16 SIMM 256 Kb x 9

**ME916** 1 MB  
4 SIMM 256 Kb x 9

**ME919** 1 MB  
4 SIMM 256 Kb x 9

**ME923** 16 MB  
16 SIMM 1 Mb x 9

**ME927** 4 MB  
16 SIMM 256 Kb x 9

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### BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU system board	BA806		
CPU system board	BA818	411766 V	ROM BIOS 1.14
Bus Adapter	IF615	411868 U	7 SLOT
Bus Adapter	IF624	412318 V	
Power supply 220 V	LA16/C	411711 N	M380 C/M380 C N 185 W
Power supply 110 V	LA16/C	411710 Z	
Power supply 220 V	LA21/C	411771 S	M380 230 W
Power supply 110 V	LA21/C	411770 D	
U-TURN board	IF614	497576 N	
RAM expansion	ME908	411767 W	1 MB
RAM expansion	ME912	-	4 MB
RAM expansion	ME916	-	1 MB
RAM expansion	ME919	-	1 MB
RAM expansion	ME923	411895 G	16 MB
RAM expansion	ME927	-	4 MB
OEC monitor adapter	GO451/GO467/GO491	411860 Y	EGA compatible
PGC monitor adapter	GO423	411688 Y	Positive
OVC monitor adapter	GO470/GO481	412444 L	M380 C NEW (VGA)
Hard Disk controller	GO717/WD1003 WAH	411709 D	ST506-MFM 3:1
Hard Disk controller	GO723/WD 1003 RA-2	412141 L	ST506-RLL 2:1 (COMBO)
Hard Disk controller	GO720/WD 1005 WAH	411869 V	for M380 C NEW ESDI 3:1

**ROM BIOS/PAL/EPROM LEVEL ON SYSTEM BOARD**

		<b>POS.</b>	<b>EVOLUTION</b>			
ROM BIOS	H L	N07B1 SO751	PBUK 1.05 PBUJ 1.05	PBUZ 1.09 PBUQ 1.09	PBVQ 1.13 PBVR 1.13	PBVN 1.14 PBVP 1.14
Buffer control	PBUFCONT	B06B	PLYH			PLYH
Clock generator	CLOCKGEN	C06B	PLYJ			PLXL
Cycles generator	CYCLEGEN	D06B	PLYS	PLYZ	PLX7	PLXD/ PLX8
Bus initialization	BUSINIT	E06B	PLYU			PLYL
EPROM control	SBUFCONT	F06B	PLY			PLYG
Orders generator	GSIGGEN	G06B	PLYE	PLY	PLXX	PLXX
Refresh control	RFSHCONT	C05BN	PLYN	PLY3	PLX2	PLX2
Bus master	BMASCONT	D05BN	PLYK			PLXM
Wait states	DELASCNT	E05BN	PLYM	PLY1		PLY1
Coprocessor control	COPRCONT	F04B	PLYU			PLYU
Bus cycle initialization	ALTINIT	G05BN	PLYT			PLYT
BAJAS direction	LOWADOR	M07B7	PLYV			PLYV
Floppy control	FLOPCONT	N09B	PLYQ			PLYQ
I/O decoder	IODEC	R0837	PLYR			PLYR
I/O port control	SPPCONT	V0731	PLYP			PLYP
Keyboard ctrl uP8742	AHP	X09DB	CSP6	CSL5/4.04	CSLS/4.05	CSL2
Floppy controller R6765P		W113G	CSFA		CSFE	

**COMPATIBILITY**

ROM BIOS 1.09 (CD 250.60.1/505)	- More accurate error signalling in auto-test - RAM capacity display above 32 MB - WEITEK coprocessor management routines implemented
ROM BIOS 1.13 (CDM 250.60.1/506)	- 80 and 300 MB ESDI HDU management
ROM BIOS 1.14 COM509	- OS/2 Compatibility
ROM BIOS 2.0 COM511	- CP3106 Hard disk (100 MB) field only

**SYSTEM BOARD COMPONENTS AND JUMPERS**

(See chapter M380 T, M380/XP1, M380/XP3, M380/XP5, page 8-3).

**MEMORY BOARD TABLE**

MEMORY BOARD	CAPACITY	SIMM	SIMM TYPE
ME908 ME912 ME919	1 MB 4 MB 1 MB	4, 256 Kb x 9 16, 256 Kb x 9 4, 256 Kb x 9	TI TM4256GU9-10L TI TM4256U9-12L NEC MC41256A9B-12 SAM KMM59256-12 MIC MT9259-10
ME912 ME919	4 MB 1 MB	16, 256 Kb x 9 4, 256 Kb x 9	NMB MM2801J9S-8 HIT HB561003B-12
ME916 ME927	1 MB 4 MB	4, 256 Kb x 9 16, 256 Kb x 9	NMB MM2801J9S-8 TI TM4256GU9-12L TI TM4256U9-12L NEC MC41256A9B-12 SAM KMM59256-12 MIC MT9259-10 MIC MT9259-12 HIT HB561003B-12
ME923	16 MB	16 DA 1 Mb x 9	TOS THM91000S-10 TOS THM91000S-12 TI TM024EAD9-12L

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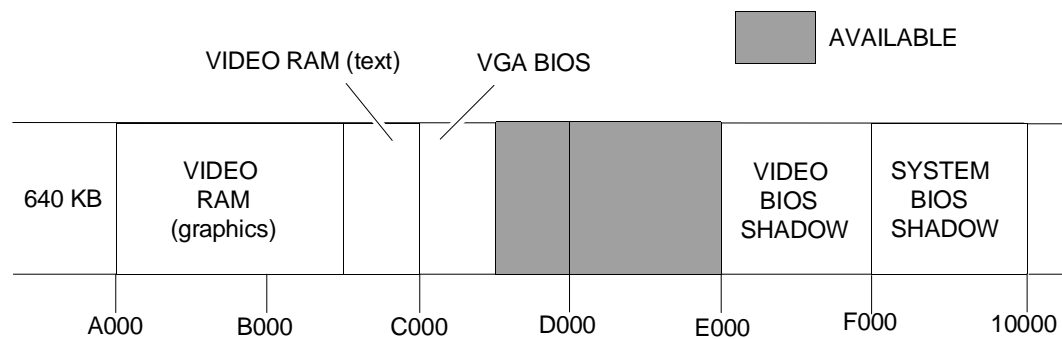
**PAL LEVEL ON MEMORY EXPANSION BOARDS**

FUNCTION	POSITION	EVOLUTION		
PARGEN	E07	PLYA	PLY7	
INTLCONT	C07	PLYD	PLY6	
CASCONT	D08	PLYC		
RASCONT	D07	PLYB		PLX4

**MEMORY BOARD INSTALLATION**

(See chapter M380 T, M380/XP1, M380/XP3, M380/XP5, page 8-6).

**MEMORY MAP**



**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller 1	0C0-0DF	DMA controller 2
020-02F	Interrupt controller 1	0E0-0FF	Coprocessor
040-05F	Timer	278-27F	Parallel port 2
060-06F EVEN	Keyboard controller 8742	2F8-2FF	Serial port 2
060-06F ODD	Port B status check	378-37F	Parallel port 1
070-07F EVEN	NMI	3F0-3F7	Floppy controller
070-07F ODD	RTC	3F8-3FF	Serial port 1
080-09F	DMA page register	400-FFFF	
0A0-0BF	Interrupt controller 2	2BG+F8-2GB+FF	80387

**INTERRUPT LEVELS**

LEVEL	FUNCTION	LEVEL	FUNCTION
IRQ0	Timer	IRQ8	RTC
IRQ1	Keyboard	IRQ9	Redirected to IRQ2 via software
IRQ2	Interrupt from interrupt controller 2	IRQ10	Available
IRQ3	Serial port 2	IRQ11	Available
IRQ4	Serial port 1	IRQ12	Available
IRQ5	Parallel port 2	IRQ13	80387
IRQ6	Floppy disk	IRQ14	Hard disk
IRQ7	Parallel port 1	IRQ15	Available

**DMA CHANNELS**

CHANNEL	FUNCTION	CHANNEL	FUNCTION
DRQ0	8-BIT memory refresh	DRQ4	Reserved
DRQ1	8-BIT reserved	DRQ5	16-BIT available
DRQ2	8-BIT floppy disk	DRQ6	16-BIT available
DRQ3	8-BIT reserved	DRQ7	16-BIT available

**COMPATIBLE HARD DISKS**

TYPE	MANUFACTURER	CAPACITY	CYL	T	WPC	LZ
1	Standard 85 ms	10 MB	306	4	128	305
2	OPE XM5221 half size	21 MB	615	4	256	700
2	Seagate ST225	21 MB	615	4	256	700
2	NEC D3126	21 MB	615	4	256	700
3	WREN 2 full size	40 MB	925	5	128	924
4	CDC WREN 1	30 MB	697	5	128	696
5	ST4096	80 MB	1024	9	NO	1023
6	OPE XM5340	42 MB	820	6	256	819
7	NEC D5146H	42 MB	615	8	128	614
8	TM755 slim size	42 MB	981	5	NO	980
9	CDC WREN II slim size	42 MB	981	5	128	980
10	Micropolis 1324 full size	53 MB	1024	6	NO	1023
10	RODIME RO413 full size	53 MB	1024	6	NO	1023
11	CDC WREN II full size	55 MB	925	7	128	924
12	Micropolis 1325 full size	71 MB	1024	8	NO	1023
12	RODIME RO414 full size	71 MB	1024	8	NO	1023
13	CDC WREN II full size	71 MB	925	9	128	924
14	Micropolis 1323-A full size	44 MB	1024	5	NO	1023
15	RESERVED					
16	OPE XM5220 85 ms	20 MB	612	4	128	656
16	NEC D5126	20 MB	612	4	128	656
16	OPE XM3220	20 MB	612	4	128	656
16	Miniscribe M3425	20 MB	612	4	128	656
16	NEC D5126H	20 MB	612	4	128	656
17	TANDON TM 362 85 ms	20 MB	612	4	NO	663
18	Seagate ST251 40 ms	40 MB	820	6	NO	880
19	Rodime RO3055 40 ms	40 MB	872	6	0	871
20	Miniscribe M8425 68 ms	20 MB	612	4	0	663
21	Seagate ST277TR	62 MB	820	6	-1	819
22	OPE XM5340/60	62 MB	820	6	123	819
23	NEC D5147H	62 MB	615	8	384	664
24	NEC D5652	136 MB	820	10	-1	822
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023
27	NEC D5452	62 MB	823	10	512	824

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**Where:** CYL: No. of disk cylinders  
T: No. of disk heads  
WPC:Precompensation cylinder number  
LZ: Head parking cylinder number

## M380 T - M380/XP1 - M380/XP3 - M380/XP5

### CHARACTERISTICS

Microprocessor	80386
Clock	20 MHz
RAM access time	100 ns/80 ns
Wait states	1
ROM memory	128 KB
Coprocessor	80387 Weitek WTL 1167
Memory	XP1-XP3 1 MB/48 MB XP5-M380T 1 MB/64 MB No memory on system board. All memory resides on expansion boards to be installed on BUS
Floppy disk controller	On system board
Hard disk controller	<b>M380 T</b> <b>GO728</b> (WD1007A) or <b>GO565</b> (WD1009-SE2) ESDI 1:1 <b>GO723</b> (WD1003-RA2) ST506-RLL 2:1 (Hard disk/floppy disk controller) <b>GO720</b> (WD1005 WAH) ESDI 3:1 <b>M380/XP1</b> <b>GO728</b> (WD1007A) or <b>GO565</b> (WD1009-SE2) ESDI 1:1 <b>M380/XP3</b> <b>GO728</b> (WD1007A) or <b>GO565</b> (WD1009-SE2) ESDI 1:1 <b>M380/XP5</b> <b>GO728</b> (WD1007A) or <b>GO565</b> (WD1009-SE2) ESDI 1:1
Controller and console board	M380 T and M380/XP5 only IF621 Console controller MI514 Console board
U-TURN board	M380 T IF618 M380/XP5 IF618 M380/XP1 IF614 M380/XP3 IF614
BUS Adapter board	M380 T IF617 M380/XP5 IF617 M380/XP1 IF615/IF624 M380/XP3 IF615/IF624
Expansion slots	M380 T 10 slots M380/XP5 10 slots M380/XP1 7 slots M380/XP3 7 slots

<b>SYSTEM BOARD</b> BA814
<b>ROM BIOS</b> 2.0
<b>POWER SUPPLY</b> M380/XP1 LA16/C M380/XP3 LA21/C M380 T PS30A M380/XP5
<b>MEMORY BOARDS</b> <b>ME905</b> 4 MB 16 SIMM 256 Kb x 9 <b>ME915</b> 2 MB 8 SIMM 256 Kb x 9 <b>ME917</b> 1 MB 4 SIMM 256 Kb x 9 <b>ME924</b> 16 MB 16 SIMM 1 Mb x 9 <b>ME925</b> 4 MB 4 SIMM 1 Mb x 9 <b>ME926</b> 4 MB 16 SIMM 256 Kb x 9 <b>ME928</b> 1 MB 4 SIMM 256 Kb x 9 <b>ME929</b> 2 MB 8 SIMM 256 Kb x 9 <b>ME067</b> 2 MB Field only 8 SIMM 256 Kb x 9



**BOARDS**

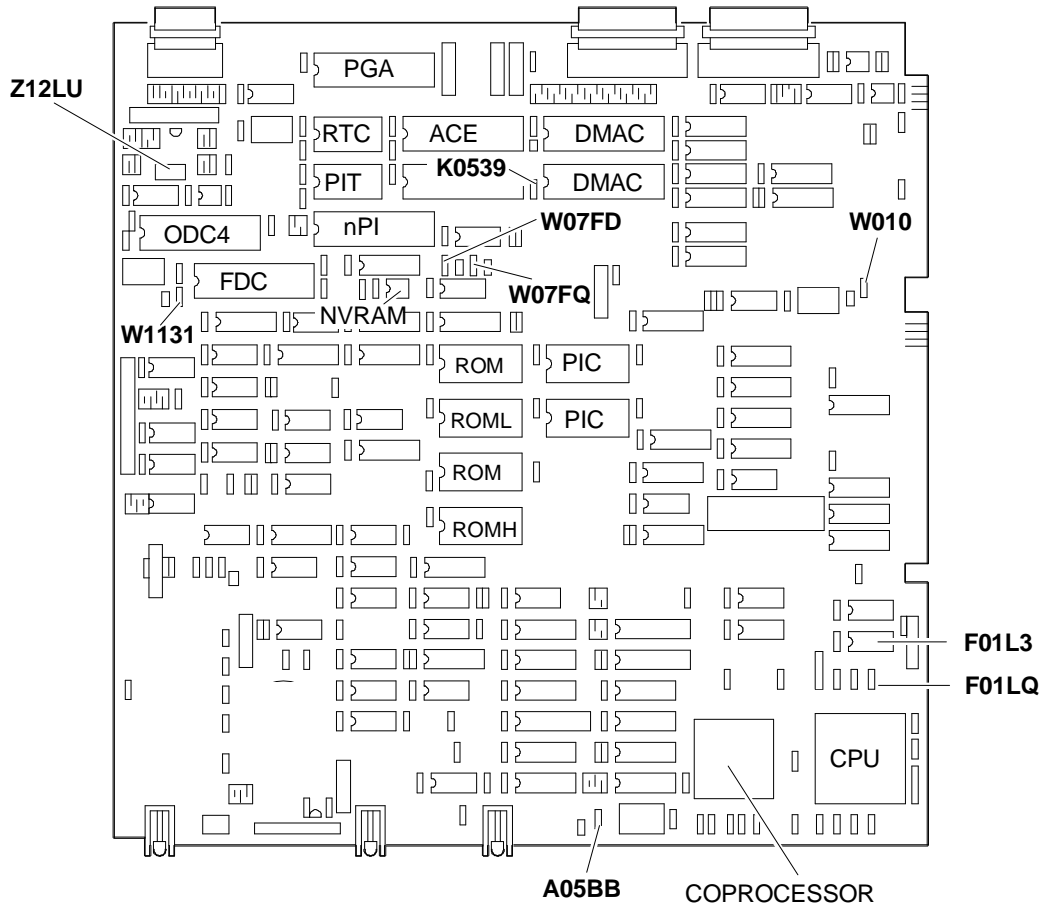
FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU system board	BA814	412142 M	M380T /XP1 /XP3 /XP5
Bus Adapter	IF624	412318 V	M380 /XP1/XP3 (7 slots)
Bus Adapter	IF615	411868 U	M380 /XP1/XP3 (7 slots)
Bus Adapter	IF617	412143 N	M380T /XP5 (10 slots)
Power supply 220 V	PS30A	412165 L	M380T /XP5-340W
Power supply 110 V		412164 K	"
Power supply 220 V	LA16C	411711 N	M380/XP1-185W
Power supply 110 V		4117110 Z	"
Power supply 220 V	LA21C	411771 S	M380/XP3-230W
Power supply 110 V		411770 D	"
U-TURN board	IF614	497576 N	M380 XP1/XP3
U-TURN board	IF618	447622 L	M380T /XP5
RAM expansion	ME905	412145 Q	4 MB M380T /XP5
RAM expansion	ME915	412208 G	2 MB M380/XP1/XP3
RAM expansion	ME917	412207 K	1 MB T/XP5/XP1/XP3
RAM expansion	ME924	412146 R	16MB T/XP5/XP1/XP3
RAM expansion	ME925	412352 X	4 MB M380/XP1/XP3
RAM expansion	ME067	-	2 MB /XP1 /XP3 field only
OEC video adapter	GO451/GO467/GO491	411860 Y	M380T (EGA-compatible)
PGC video adapter	GO423	411688 Y	M380T /XP1 /XP3 /XP5 (positive monitor)
OVC video adapter	GO470/GO481	412444 L	M380 /XP1 /XP3 /XP5 (VGA-compatible)
Hard Disk controller	GO720 (WD1005 WAH)	411869 V	M380T
Hard Disk controller	GO728 (WD1007 WAH)	412212 K	M380T /XP1 /XP3 /XP5
Hard Disk controller	GO723 (WD1003-RA2)	412141 L	M380T
Console controller	IF621	412144 P	M380T /XP5
Console board	MI514	412147 J	M380T /XP5

**ROM BIOS/PAL/EPROM LEVEL ON SYSTEM BOARD**

FUNCTION		POS.	EVOLUTION			
<b>ROM BIOS</b>	H	N07B1	PBUZ 1.09	PBVQ 1.13	PBVN 1.14	PBZ6 2.0
	L	SO751	PBUQ 1.09	PBVR 1.13	PBVP 1.14	PBZ7 2.0
Buffer control	PBUFCONT	B06B	PLY			
Clock generator	CLOCKGEN	C06B	PLY0	PLX6	PLXN	
Cycles generator	CYCLEGEN	D06B	PLYZ	PLY7		
Bus initialization	BUSINIT	E06B				
EPROM control	SBUFCONT	F06B				
Orders generator	GSIGGEN	G06B	PLYE	PLXX		
Control refresh	RFSHCONT	C05BN	PLX2			
Master bus	BMASCONT	D05BN	PLYK	PLXJ	PLXK	PLBS
Wait states	DELASCNT	E05BN	PLY2	PLXH		
Coprocessor control	COPRCONT	F04B	PLYU			
Bus cycles initialization	ALTINIT	G05BN	PLYT			
BAJAS direction	LOWADR	M07B7	PLYV			
Floppy control	FLOPCONT	N09B	PLYQ			
I/O decoder	IODEC	R0837	PLYR			
I/O port control	SPPCONT	V0731	PLYP			
MP keyboard controller	8742 AHP	X09DB	CSL5/4.04	CSL5/4.04	CSLS/4.05	
Floppy controller	R6765P	W113G	CSFA	CSFE		

**NOTE:** ROM BIOS evolution (Ver. M380 - M380 C).

**SYSTEM BOARD COMPONENTS AND SETTINGS: A806/BA818/BA814**



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BTA1A

AREA	POSITION	FUNCTION
W010 A05BB W1131 K05339	IN * IN * IN * IN *	14 MHz clock 32 MHz clock 24 MHz clock 1.8 MHz clock
W07FD	IN OUT *	Test BURN-IN mode Normal
W07FQ	IN OUT *	PGC or OEC video controller VGA and other video controllers
F01LQ	IN OUT *	80387 coprocessor uses an external oscillator which must be installed on system board F01L3 80387 coprocessor uses system oscillator
Z12LU	1-2 IN / 3-4 OUT * 5-6 IN / 7-8 OUT * 9-10 OUT *	Floppy disk - setting for standard operations

**NOTE 1:** (\*) Default setting.

**NOTE 2:** Information valid for all Personal Computer models.

**COMPONENTS**

<b>NAME (on page 9-3)</b>	<b>FUNCTION</b>	
CPU	80386	CPU
NPX	80387	Coprocessor
ROM	User ROM	
ROMH / ROML	BIOS ROM	
PIC	8259A (2)	Interrupt controller
NVRAM	NMC9306	Non-volatile RAM
FDC	PD765	Floppy disk controller
ODC4	OMEGA4	Floppy disk controller
nPI	8742	Keyboard controller
PIT	8245	Timer
RTC	MC146818A	Real time clock
ACE	NS16450A	Serial port controller
DMAC	8237A (2)	RAM access controller
PGA	PGA	Parallel port controller

**SETUP OPERATIONS**

<b>PAGE 1: C-MOS RAM</b>	<b>PAGE 2: RAM NVRAM</b>
Date	Serial Port
Time	Parallel port
System board memory size	Basic memory
Extended memory	Memory test
Floppy A	Scroll type
Floppy B	I/O delay time
Hard disk C	Delay time on memory
Hard disk D	Monitor adapter
Math Coprocessor 80387	Monitor type
CRT adapter type	

**COMPATIBLE HARD DISKS**

TYPE	MANUFACTURER	CAPACITY	CYL	T	WPC	LZ
1	Standard 85 ms	10 MB	306	4	128	305
2	OPE XM5221 half size	21 MB	615	4	256	700
2	Seagate ST225	21 MB	615	4	256	700
2	NEC D3126	21 MB	615	4	256	700
3	WREN 2 full size	40 MB	925	5	128	924
4	CDC WREN 1	30 MB	697	5	128	696
5	ST4096	80 MB	1024	9	NO	1023
6	OPE XM5340	42 MB	820	6	256	819
7	NEC D5146H	42 MB	615	8	128	614
8	TM755 slim size	42 MB	981	5	NO	980
9	CDC WREN II slim size	42 MB	981	5	128	980
10	Micropolis 1324 full size	53 MB	1024	6	NO	1023
10	RODIME RO413 full size	53 MB	1024	6	NO	1023
11	CDC WREN II full size	55 MB	925	7	128	924
12	Micropolis 1325 full size	71 MB	1024	8	NO	1023
12	RODIME RO414 full size	71 MB	1024	8	NO	1023
13	CDC WREN II full size	71 MB	925	9	128	924
14	Micropolis 1323-A full size	44 MB	1024	5	NO	1023
15	RESERVED					
16	OPE XM5220 85 ms	20 MB	612	4	128	656
16	NEC D5126	20 MB	612	4	128	656
16	OPE XM3220	20 MB	612	4	128	656
16	Miniscribe M3425	20 MB	612	4	128	656
16	NEC D5126H	20 MB	612	4	128	656
17	TANDON TM 362 85 ms	20 MB	612	4	NO	663
18	Seagate ST251 40 ms	40 MB	820	6	NO	880
19	Rodime RO3055 40 ms	40 MB	872	6	0	871
20	Miniscribe M8425 68 ms	20 MB	612	4	0	663
21	Seagate ST277TR	62 MB	820	6	-1	819
22	OPE XM5340/60	62 MB	820	6	123	819
23	NEC D5147H	62 MB	615	8	384	664
24	NEC D5652	136 MB	820	10	-1	822
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023
27	NEC D5452	62 MB	823	10	512	824

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**Where:** CYL: No. of disk cylinders  
T: No. of disk heads  
WPC:Precompensation cylinder number  
LZ: Head parking cylinder number

**ME9xx RAM MEMORY BOARD**

**COMPATIBILITY NOTES**

BOARD	NOTES
Board ME925 4 MB	On this board 80 ns 1 Mb x 9 SIMM modules have been introduced; they replace 100 ns 1 Mb x 9 SIMM modules. To expand this board use the expansion KIT related to the type of SIMMs already on board. Possible kits are: - EXM 25-885 (100 ns SIMM modules) - EXM 26-805 (80 ns SIMM modules)
Board ME913 16 MB	On this board 80 ns 1 Mb x 9 SIMM modules have been introduced; they replace 100 ns 1 Mb x 9 SIMM modules. To replace SIMM modules, check which type of SIMMs are already on the board. 80 ns SIMM suppliers are: NEC - SAMSUNG
Board ME067	This board is used only by the field to solve problems with the LAN board NPU9144. It replaces the 2MB ME915 board. The difference between the two boards is as follows: the M915 board has PAL PLY9 in position C07 while on the ME067 board PAL PLY9 has been replaced by PAL PLZ9.

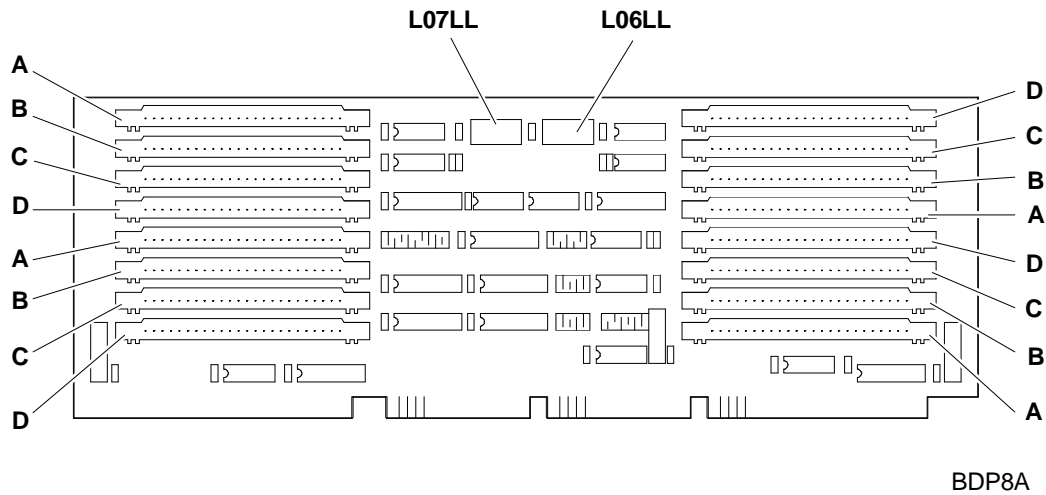
**PAL LEVEL ON MEMORY EXPANSION BOARD**

FUNCTION	POSITION	EVOLUTION		
PARGEN	E07	PLY7	PLY7	PLZ9
INTLCONT	C07	PLY9	PLY9	
CASCONT	D08	PLXA	PLXA	
RASCONT	D07	PLXB	PLX3	

**MEMORY BOARD TABLE**

MEMORY BOARD	CAPACITY	SIMM	SIMM TYPE
ME905	4 MB	16, 256 Kb x 9	TI TM4256GU9-10L
ME915	2 MB	8, 256 Kb x 9	NMB MM2801J9S-8
ME917	1 MB	4, 256 Kb x 9	HIT HB561409B-10
ME926	4 MB	16, 256 Kb x 9	NMB MM2801J9S-8
ME928	1 MB	4, 256 Kb x 9	HIT HB561409B-10
ME929	2 MB	8, 256 Kb x 9	
ME924	16 MB	16, 1 Mb x 9	TOS THM91000S-10
ME925	4 MB	4, 1 Mb x 9	NEC SAMSUNG

**RAM BOARD SETTINGS**



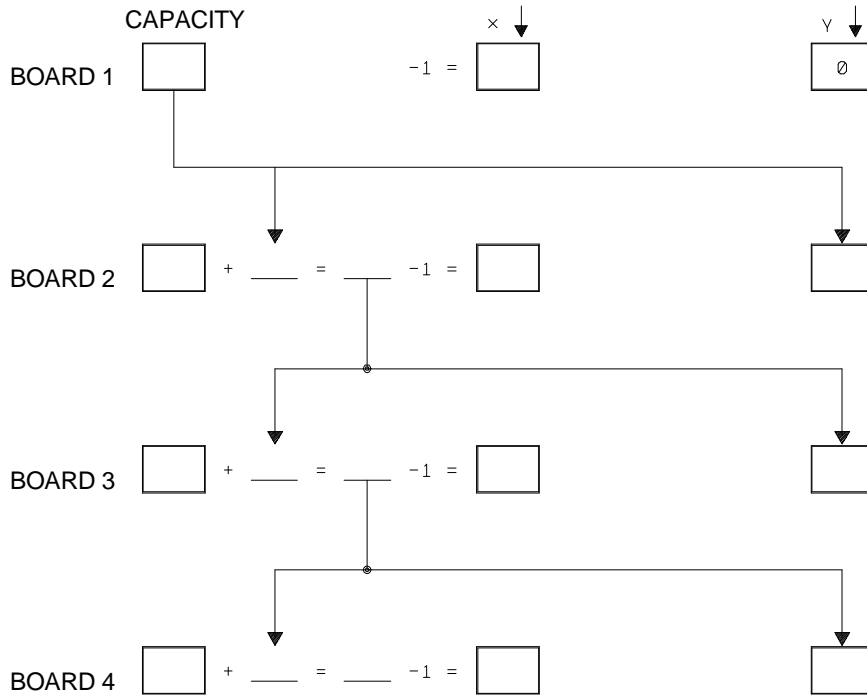
BDP8A

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**CAPACITY**

No. SIMM MODULES MEMORY EXPANSION BOARD	SOCKETS WITH SIMM MODULES	CAPACITY	
		256K bit SIMM	1M bit SIMM
4	A	1 MB	4 MB
8	AB	2 MB	8 MB
16	ABCD	4 MB	16 MB

**X, Y CALCULATION SYSTEM**



BPA1A

**L07LL DIP-SWITCH (SWITCHES 1-6)**

CAPACITY		DIP-SWITCH POSITION					
256 K KIT	1 MB KIT	1	2	3	4	5	6
1	4	ON	OFF	OFF	ON	ON	ON
2	8	ON	OFF	ON	ON	ON	ON
4	16	ON	ON	ON	ON	ON	ON

**L07LL DIP-SWITCH (SWITCHES 7-8)**

VALUE OF Y	DIP-SWITCH POSITION	
	7	8
	ON	ON
	ON	OFF
	OFF	ON
	OFF	OFF

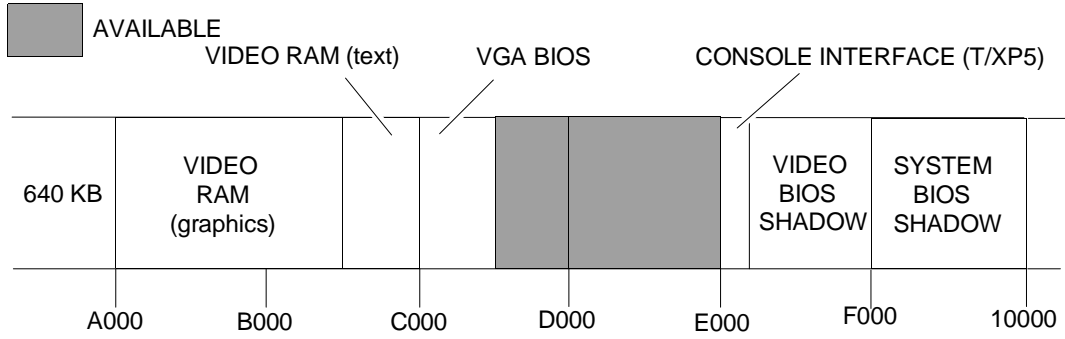
**L06LL DIP-SWITCH (SWITCHES 1-4)**

VALUE OF X				DIP-SWITCH POSITION				VALUE OF X				DIP-SWITCH POSITION			
				1	2	3	4					1	2	3	4
0	16	32	48	ON	ON	ON	ON	8	24	40	56	OFF	ON	ON	ON
1	17	33	49	ON	ON	ON	OFF	9	25	41	57	OFF	ON	ON	OFF
2	18	34	50	ON	ON	OFF	ON	10	26	42	58	OFF	ON	OFF	ON
3	19	35	51	ON	ON	OFF	OFF	11	27	43	59	OFF	ON	OFF	OFF
4	20	36	52	ON	OFF	ON	ON	12	28	44	60	OFF	OFF	ON	ON
5	21	37	53	ON	OFF	ON	OFF	13	29	45	61	OFF	OFF	ON	OFF
6	22	38	54	ON	OFF	OFF	ON	14	30	46	62	OFF	OFF	OFF	ON
7	23	39	55	ON	OFF	OFF	OFF	15	31	47	63	OFF	OFF	OFF	OFF

**L06LL DIP-SWITCH (SWITCHES 5-8)**

VALUE OF Y				DIP-SWITCH POSITION				VALUE OF Y				DIP-SWITCH POSITION			
				5	6	7	8					5	6	7	8
0	16	32	48	ON	ON	ON	ON	8	24	40	56	OFF	ON	ON	ON
1	17	33	49	ON	ON	ON	OFF	9	25	41	57	OFF	ON	ON	OFF
2	18	34	50	ON	ON	OFF	ON	10	26	42	58	OFF	ON	OFF	ON
3	19	35	51	ON	ON	OFF	OFF	11	27	43	59	OFF	ON	OFF	OFF
4	20	36	52	ON	OFF	ON	ON	12	28	44	60	OFF	OFF	ON	ON
5	21	37	53	ON	OFF	ON	OFF	13	29	45	61	OFF	OFF	ON	OFF
6	22	38	54	ON	OFF	OFF	ON	14	30	46	62	OFF	OFF	OFF	ON
7	23	39	55	ON	OFF	OFF	OFF	15	31	47	63	OFF	OFF	OFF	OFF

**MEMORY MAP**



**I/O ADDRESS MAP**

**8**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller 1	2F8-2FF	Serial port 2
020-03F	Interrupt controller 1	300-31F	External boards
040-05F	Timer	360-36F	Reserved
060-06F	Keyboard controller 8742	378-37F	Parallel port 1
070-07F	RTC	380-38F	SDLC 2
080-09F	DMA page register	3A0-3AF	SDLC 1
0A0-0BF	Interrupt controller 2	3B0-3BF	Black and white monitor
0C0-0DF	DMA controller 2	3C0-3CF	Reserved
0F0	Processor	3D0-3DF	Colour monitor
0F8-0FF	Coprocessor	3F0-3FF	Floppy controller
278-27F	Parallel port 2	3F8-3FF	Serial port 1

**INTERRUPT LEVELS**

LEVEL	FUNCTION	LEVEL	FUNCTION
IRQ0	Timer	IRQ8	RTC
IRQ1	Keyboard	IRQ9	Redirected to IRQ2 via software
IRQ2	Interrupt from interrupt controller 2	IRQ10	Available
IRQ3	Serial port 2	IRQ11	Available
IRQ4	Serial port 1	IRQ12	Available
IRQ5	Parallel port 2	IRQ13	80387
IRQ6	Floppy disk	IRQ14	Hard disk
IRQ7	Parallel port 1	IRQ15	Available

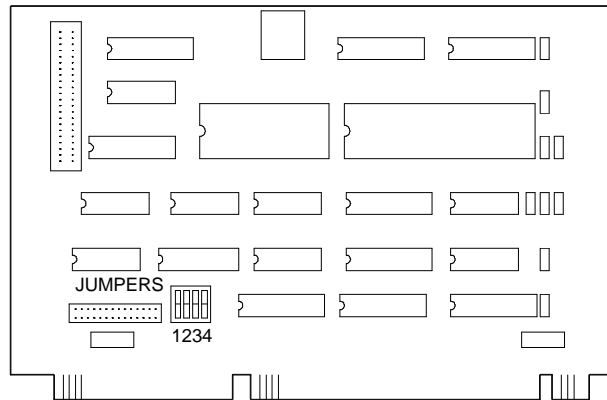
**DMA CHANNELS**

CHANNEL	FUNCTION	CHANNEL	FUNCTION
DRQ0	8-BIT memory refresh	DRQ4	Reserved
DRQ1	8-BIT reserved	DRQ5	16-BIT available
DRQ2	8-BIT floppy disk	DRQ6	16-BIT available
DRQ3	8-BIT reserved	DRQ7	16-BIT available



### IF621 CONSOLE INTERFACE BOARD

This board is installed on M380/T - M380/XP5 - M380/XP7 - M380/XP9 Personal Computers.



BBD9A

### DIP-SWITCH SETTINGS

DIP-SWITCH				ROM ADDRESS
1	2	3	4	
ON	ON	OFF	ON	C8000-C9FFF
OFF	ON	OFF	ON	CA000-CBFFF
ON	OFF	OFF	ON	CC000-CDFFF
OFF	OFF	OFF	ON	CE000-CFFFF
ON	ON	ON	OFF	D0000-C1FFF
OFF	ON	ON	OFF	C2000-D3FFF
ON	OFF	ON	OFF	D4000-D5FFF
OFF	OFF	ON	OFF	D6000-D7FFF
ON	ON	OFF	OFF	D8000-D9FFF
OFF	ON	OFF	OFF	DA000-DBFFF
ON	OFF	OFF	OFF	DC000-DDFFF
OFF	OFF	OFF	OFF	DE000-DFFFF

### JUMPER SETTINGS

JUMPER NO.	FUNCTION
1-2	IRQ14
3-4	IRQ13
5-6	IRQ12
7-8	IRQ11
9-10	IRQ10
11-12	IRQ3
13-14	IRQ4
15-16	IRQ5
17-18	IRQ6
19-20	IRQ7

**NOTE:** By default, the system does not use interrupts (all jumpers set to OFF).

EVOLUTION			
D03	PLX5	PLXP	
D05	PBVZ	PBU3	

**HARDWARE COMPATIBILITY**

<b>GRAPHICS PRODUCTS</b>	<b>EXPANSION MEMORIES</b>
AST RESEARCH AST-3G PLUS ATI EGA WONDER GENOA SUPER EGA HIRES HERCULES COLOR CARD (GB200) HERCULES GRAPHICS CARD (GB102) IBM COLOR/GRAPHICS ADAPTER (5153001) IBM ENHANCED GRAPHICS ADAPTER (5154001) IBM VGA ADAPTER PARADISE EGA 480 PARADISE MODULAR GRAPHICS CARD (06-1, Revision 02) PARADISE MULTI-DISPLAY CARD (05-1) QUADRAM QUAD EGA PLUS TECMAR GRAPHICS MASTER BOARD (20037, REV. C) VIDEO-7 VEGA DELUXE 325 INC. ADVANTAGE GRAPHICS INTERFACE (325 SHADOW)	AST ADVANTAGE (ADV-128S) AST RAMPAGE/AT (RAMPAT-2000) AST RAMPAGE/286 (RAMP286) BOCARAM/AT EVEREX RAM-2000 (EV-171) IBM 512 KB EXPANSION MEMORY OPTION (6450203) IBM 512 KB/2 MB EXPANSION MEMORY OPTION (6450343) IBM ENHANCED MEMORY EXPANSION ADAPTER (74X8635) INTEL ABOVEBOARD/AT (PCMB2010) INTEL ABOVEBOARD/286 (PCMB4020) QUADRAM LIBERTY/AT
<b>MODEM</b>	<b>MOUSE</b>
HAYES SMARTMODEM (1200B) QUADRAM QUADMODEM II (QM2024) TELENETICS EXPRESSDATA 24i (24i-12i) VEN-TEL PC MODEM HALF-CARD (PCM XT) HAYES SMARTMODEM 1200	LOGITECH BUS MOUSE (P7-3F) MICROSOFT BUS MOUSE, REV. C MICROSOFT SERIAL MOUSE MOUSE SYSTEMS PC MOUSE (M1)
<b>I/O INTERFACE PRODUCTS</b>	<b>NETWORKS &amp; LAN PRODUCTS</b>
APPARAT PARALLEL/SERIAL CARD (7950), REV. 1 IBM ASYNCHRONOUS COMMUNICATIONS CARD (1502074) IBM MONO DISPLAY/PRINTER ADAPTER (1504900) IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL CARD (6450215)	AT&T STARLAN NETWORK IBM PC NETWORK IBM TOKEN RING NETWORK NOVELL NETWORK 3COM NETWORK

## M380/XP4 - M380/XP7 - M380/XP9

### CHARACTERISTICS

Microprocessor	80386
Clock	M380/XP4            25 MHz M380/XP7            25 MHz M380/XP9            33 MHz
Architecture	AT/XT
Memory	These three systems have 4 MB on system board which can be expanded to 8 MB via: <b>EXM 25-885</b> - 4 SIMM 1 Mb x 9 100 ns Memory can be furtherly expanded via memory board <b>MEM 25-886</b> - 4 MB SIMM 1 Mb x 9
Memory access	100 ns
Cache memory	32 KB
Cache controller	82385
Coprocessor	Intel 80387 / Weitek 3167
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	NEC D5655 135 MM ESDI Micropolis 1654-7 136 M ESDI Micropolis 1355 135 MM ESDI Micropolis 1558 300 MB ESDI MAXTOR 8760 600 MB ESDI SEAGATE WREN V 304 MB ESDI SEAGATE ST2182E 136 MB ESDI SEAGATE ST2383 320 MB ESDI
Streaming Tape	40 MB IRWIN 245 - only XP4 80 MB IRWIN 285 150 MB WANGTEK with controller
AT Expansion slots	XP4            7 Present    5 Available XP7/XP9 10 Present    7 Available
Video Adapter	<b>GO470</b> VGA compatible <b>GO481</b> VGA compatible <b>HGC 1281</b> MATROX installation kit
Hard Disk Floppy Disk Controller	<b>GO733</b> (WD1007A-WA2) ESDI 1:1 <b>GO535</b> (WD1007V-SE2) ESDI 1:1 <b>GO565</b> (only for XP9)
CMOS RAM	64 Byte
ROM BIOS	128 KB
Mouse	PS/2 and AT Compatible GRD 25-025
Keyboard	101/102-key ANK26-101 ANK26-102 <b>NOTE:</b> An ANK 25-102 keyboard with adapter cable may be used.

#### SYSTEM BOARD

XP4: BA842  
BA829  
XP7: BA842  
BA829  
BA825  
XP9: BA832  
BA833  
BA839

#### BUS ADAPTER BOARD

XP4: IF624 ( 7 slots)  
XP7: IF617 (10 slots)

#### U-TURN BOARD

XP4: IF614  
XP7: IF618  
XP9: IF618

#### POWER SUPPLY

XP4: LA21C  
XP7: PS30 A or PS30/B1  
XP9: PS30 A  
PS30 B or PS30/B1

#### CONSOLE CONTROLLER

XP7 IF621    Lev.03  
XP9 IF621    Lev.03

#### CONSOLE

XP7 MI514  
XP9 MI514

#### MEMORY EXPANSION

ME-931 **MEM 25-886**  
from 4 to 16 MB with  
SIMM modules of  
(1 MB x 9)

#### STREAMING TAPE CONTROLLER

GO725

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**SYSTEM BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
<b>BA829</b>	Nasc.	412589 N	<b>ROM H:</b> PBU5 Rev. 1.05 <b>ROM L:</b> PBU4 Rev. 1.05	System board <b>M380/XP4</b> and <b>M380/XP7</b> Supports from 4 MB to 8 MB and 32 KB of SRAM memory
	Lev. 01		Rev. 1.05	Corrects the problem with random resets occurring when a streaming tape drive is installed.
	Lev. 02		Rev. 1.05	Retrofitting kit to fix problems of incompatibility with intelligent multiport boards. After modification, boards pass to level: NA/A, 01/A, 03/A.
	Lev. 03		<b>ROM H:</b> PBZ1 Rev. 1.07 <b>ROM L:</b> PBZ0 Rev. 1.07	Permits use of multiport boards: <ul style="list-style-type: none"> <li>- Mapped between 512 and 640 KB</li> <li>- Liable to problems from IOCHRDY signal</li> <li>- Using interrupt 12</li> <li>- Using memory between 12 and 16 MB</li> <li>- Requiring CMOS input on BIRQ signals for interrupt handling</li> </ul>
	Lev. 04		Rev. 1.07	Cuts and wirings performed at the Subsidiary to correct: <ul style="list-style-type: none"> <li>- Real time clock problems on startup circuit</li> <li>- Timing problems during DMA cycles</li> </ul>
	Lev. 05		Rev. 1.07	Solved Panic Error problem in UNIX enviroment. Replaced component 74F373 with 2 74AS373
	Lev. 06		Rev. 1.07	Replacement of microprocessor I80386 step D0 with microprocessor I80386 step D1
	Lev. 07		Rev. 1.07	Components replaced to correct the problems given by the multiport board.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA825	Nasc.	412565 M	<b>ROM H:</b> PBU5 Rev. 1.05 <b>ROM L:</b> PBU4 Rev. 1.05	System board <b>M380/XP7</b> Supports from 4 MB to 8 MB and 32 KB of SRAM
	Lev. 01		Rev. 1.05	Component 82835/25/B replaced by component 82835/25/C
	Lev. 02		Rev. 1.05	Corrects the problem of random resets occurring when a streaming tape drive is installed in the system.
	Lev. 03		<b>ROM H:</b> PBZ1 Rev. 1.07 <b>ROM L:</b> PBZ0 Rev. 1.07	PAL in position U116 replaced
	Lev. 04		Rev. 1.07	Made changes not implemented by factory. See CDM code 3877537 M 504
	Lev. 05		Rev. 1.07	Corrects the problems with the refresh.
	Lev. 06		Rev. 1.07	Cutting and trimming done by Subsidiary laboratories to eliminate: - Real time clock problems on startup circuit - Timing problems during DMA cycles
	Lev. 07		Rev. 1.07	Level existing for field only, not implemented by factory. Replacement of component 74F373 with 2 74AS373
	Lev. 08		Rev. 1.07	Replacement of microprocessor I80386 step D0 with microprocessor I80386 step D1
	Lev. 09		Rev. 1.07	Components replaced to correct the problems given by the multiport board.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA832	Nasc.	412816S	<b>ROM H:</b> PBZ1 <b>ROM L:</b> PBZ0 Rev. 1.07	<b>M380/XP9</b> motherboard
	Lev. 01			Code added for H template of 82C206 component
	Lev. 02			Cutting and trimming to eliminate: <ul style="list-style-type: none"> <li>- Real time clock problems on startup circuit</li> <li>- Timing problems during DMA cycles</li> </ul>
	Lev. 03		<b>From this level on, changes are no longer implemented by factory but are run by field engineers.</b> Solved Panic Error problem in UNIX environment. Replaced component 74F373 with 2 74AS373	
	Lev. 04		<b>ROM H:</b> PBZP <b>ROM L:</b> PBZQ Rev. 2.02	Replacement of BIOS and components to solve "Panic Error" problem in UNIX environment
	Lev. 05		Replacement of a GAL code 497585 G with code 978257 P (GLZ6)	
	Lev. 06		Solves the problem of system random locks when running 16-bit BUS cycles.	
	Lev. 07		Replacement of component PLS168-33 code 497051 K in U90 with PLAZ (ULC 24-PLS168) code 4897070 D gate array that has larger margins during setup time.	
	Lev. 08		Replacement of keyboard controller 8.00 with version 8.01 for problems with software packages such as Lotus, OS/2 in network server mode.	
	Lev. 08		The 33 MHz "step E" CPU 80386DX is introduced as an alternative to the 33 MHz "step 1" CPU 80386DX. Board level does not change.	

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
<b>BA833</b>	Nasc.	412665 Z	<b>ROM H:</b> PBZ1 <b>ROM L:</b> PBZ0 Rev. 1.07	<b>M380/XP9</b> motherboard
	Lev. 01		Rev. 1.07	Solves the random reset problem when a streaming tape is installed.
	Lev. 01.1			
	Lev. 02		Rev. 1.07	Solves the benchmark problems
	Lev. 03		Rev. 1.07	Solves the serial port problems
	Lev. 04		Rev. 1.07	Solves the memory refresh problems
	Lev. 05		Rev. 1.07	<b>From this level on, changes are no longer implemented by factory but are run by field engineers.</b> Cutting and trimming to eliminate: - Real time clock problems on start up circuit - Timing problems during DMA cycles
	Lev. 06		Rev. 1.07	Replacement of component 74F373 with 2 74AS373
	Lev. 07		<b>ROM H:</b> PBZP <b>ROM L:</b> PBZQ Rev. 2.02	Replacement of the BIOS
	Lev. 08		Rev. 2.02	Replacement of a GAL code 497585 G with code 978257 P (GLZ6)
	Lev. 09		Rev. 2.02	Solves the problem of system random locks when running 16-bit BUS cycles.
	Lev. 10		Rev. 2.02	Replacement of component PLS168-33 code 497051 K in U90 with PLAZ (ULC 24-PLS168) code 4897070 D gate array which has larger margins during setup time.
Lev. 11		Rev. 2.02	- Replacement of keyboard controller 8.00 with version 8.01 for problems with software packages such as Lotus, OS/2 in network server mode.  - The 33 MHz "step E" CPU 80386DX is introduced as an alternative to the 33 MHz "step 1" CPU 80386DX. Board level does not change.	

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
<b>BA839</b>	Nasc.		<b>ROM H:</b> PBZH1 <b>ROM L:</b> PBZ0 Rev. 1.07	<b>M380/XP9</b> motherboard
	Lev. 01		<b>ROM H:</b> PBZP <b>ROM L:</b> PBZQ Rev. 2.02	New BIOS for 600 MB hard disk management. Use user diskette 2.01 upd 2 Use hard disk controller GO535 Two BUILT in SETUP hard disks can be preset. Solves the "lock" message problem of console key.
	Lev. 02		Rev. 2.02	Replacement of a GAL code 497585 G with code 978257 P (GLZ6)
	Lev. 03		Rev. 2.02	Solves the problem of system random locks when running 16-bit BUS cycles.
	Lev. 04		Rev. 2.02	Replacement of component PLS168-33 code 497051 K in U90 with PLAZ (ULC 24-PLS168) code 4897070 D gate array that has larger margins during setup time.
	Lev. 05		Rev. 2.02	<ul style="list-style-type: none"> <li>- Replacement of keyboard controller 8.00 with version 8.01 for problems with software packages such as Lotus, OS/2 in network server mode.</li> <li>- The 33 MHz "step E" CPU 80386DX is introduced as an alternative to the 33 MHz "step 1" CPU 80386DX. Board level does not change.</li> </ul>

**HARD DISK AND FLOPPY DISK CONTROLLERS**

CONTROLLER	CHARACTERISTICS	LEV.	NOTES
<b>GO733</b> (M380/XP4) (M380/XP7)	WD1007A-WA2) ESDI 1:1 Supports a 20 ms transfer rate	Nasc Lev. 01 Lev. 02 Lev. 03 Lev. 04	Oscillator replaced Printed circuit modified Nuovo step del component New step for component 50C12A New step for component WD3675
<b>GO535</b> (M380/XP9)	WD1007V-SE2 ESDI 1:1 Supports transfer rates of lower than 20 ms and is used to control the 600 MB hard disk on XP9 and SEAGATE hard disks with transfer rates of less than 20 ms	Nasc Lev. 01 Lev. 02	New step for component WD3765 Enhanced board quality
<b>GO565</b> (M380/XP9)	Replaces the GO535 controller		



INTEGRATED CONTROLLERS	INTEGRATED CONTROLLERS
<b>80386</b> CPU <b>80387</b> Coprocessor <b>Weitek WLT 3126</b> Coprocessor <b>82385</b> Cache controller	<b>82C206</b> Peripherals controller <b>8742</b> Keyboard and mouse controller <b>UART 16550</b> Serial port

**ROM BIOS AND PAL EVOLUTION**

FUNCTION		POS.	EVOLUTION OF M380/XP4 - XP7 BA829 BOARD			
ROM BIOS	H / L	U127 U126	REV. 1.05	REV. 1.07	REV. 2.02 **	
DRAM DECOD	MEM DEC	U123	PLFP/PLHF	PLEK/PLJ4		
I/O DECOD	LIO DEC	U94	PLCK/PLGC			
ALT I/O DECOD	ALT DEC	U145	PLFR/PLHK			
TIMER	TIMCLK	U143	PLFD/PLGF	PLJO/PLHY		
ARBITER	ARBCTL	U30	PLGG	PLJ3		
REFRESH	REFCTL	U21	PLFE/PLHD	PLET/PLJZ		
STROBE	LIOSTB	U18	PLCP/PLGJ			
BUFFERS BUS	BUFCNV	U87	PLFC/PLHC			
LATCHES BUS	LADCNV	U75	PLXS/PLGL			
DRAM	MEMSEL	U131	PLCW/PLGM			
DRAM	DBUFEN	U130	PLXU/PLGN			
DRAM	PCHKEN	U150	PLFU/PLHM			
NMI INT	RDYNMI	U105	PLCY/PLGQ			
RAM-CAS	CASCTL	U129	PLFS/PLHJ			
DRAM-RAS	RASCTL	U148	PLCX/PLGS			
BUS	CMDCNT	U59	PLCC/PLGT			
PARALLEL	SPPCNT	U71	PLCD/PLGU	PLDP/PLHX		
PERIPHERAL	DPGSEL	U41	PLCV/PLXV			
COPROC.	NPXCTL2	U92	PLCT			
PASSWORD	PWPRO	U104	PLHH	PLHU		
BUS	BUSCTL16	U40	PBVE			
BUS	BUSCTL25	U90	PLBH			
PROCESSOR	NCACTL	U116	PLFT/PLHL	PLBL/PLHT	PLJW/PLJY	
COPROC.	NPXCTL1	U19	PLFH		**	
KBC 8742		U27	CSLB			
CTRL RAM		U99	CS2V(C)			
CACHE 82385						

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\*\* Only for field level.

FUNCTION		POS.	EVOLUTION OF M380/ XP7 BA825 BOARD		
ROM BIOS	H / L	U127 U126	REV. 1.05	REV. 1.07	
DRAM DECOD	MEM DEC	U123	PLFP/PLHF		
I/O DECOD	LIO DEC	U94	PLCK/PLGC		
ALT I/O DECOD	ALT DEC	U145	PLFR/PLHK		
TIMER	TIMCLK	U143	PLFD/PLGF		
ARBITER	ARBCTL	U30	PLGG	PLJ3 **	
REFRESH	REFCTL	U21	PLFE/PLHD	PLET/PLJZ	
STROBE	LIOSTB	U18	PLCP/PLGJ		
BUFFERS BUS	BUFCNV	U87	PLFC/PLHC		
LATCHES BUS	LADCNV	U75	PLXS/PLGL		
DRAM	MEMSEL	U131	PLCW/PLGM		
DRAM	DBUFEN	U130	PLXU/PLGN		
DRAM	PCHKEN	U150	PLFU/PLHM		
NMI INT	RDYNMI	U105	PLCY/PLGQ		
RAM-CAS	CASCTL	U129	PLFS/PLHJ		
DRAM-RAS	RASCTL	U148	PLCX/PLGS		
BUS	CMDCNT	U59	PLCC/PLGT		
PARALLEL	SPPCNT	U71	PLCD/PLGU	PLDP/PLHX **	
PERIPHERAL	DPGSEL	U41	PLCV/PLXV		
COPROC.	NPXCTL2	U92	PLCT		
PASSWORD	PWPRO	U104	PLHH	PLHU	
BUS	BUSCTL16	U40	PBVE		
BUS	BUSCTL25	U90	PLCS	PLCZ	PLBH
PROCESSOR	NCACTL	U116	PLFT/PLHL	PLBL/PLHT	PLJW/PLJY **
COPROC.	NPXCTL1	U19	PLFH		
KBC 8742		U27	CSLB		
CTRL RAM		U99	CS2V(B)	CS2V(B)	
CACHE 82385					

\*\* Only for field level.

FUNCTION		POS.	EVOLUTION OF M380/ XP9 BA832 BOARD		
ROM BIOS	H / L	U127 U126	REV. 1.07	REV. 2.02 **	
DRAM DECOD	MEM DEC	U123	PLFP/PLHF	PLEK/PLJ4	
I/O DECOD	LIO DEC	U94	PLCK/PLGC		
ALT I/O DECOD	ALT DEC	U145	PLFR/PLHK		
TIMER	TIMCLK	U143	PLJO/PLHY		
ARBITER	ARBCTL	U30	PLJ3		
REFRESH	REFCTL	U21	PLFE/PLHD	PLET/PLJZ	
STROBE	LIOSTB	U18	PLCP/PLGJ		
BUFFERS BUS	BUFCNV	U87	PLFC/PLHC		
LATCHES BUS	LADCNV	U75	PLXS/PLGL		
DRAM	MEMSEL	U131	PLCW/PLGM		
DRAM	DBUFEN	U130	PLXU/PLGN		
DRAM	PCHKEN	U150	PLFU/PLHM		
NMI INT	RDYNMI	U105	PLCY/PLGQ		
RAM-CAS	CASCTL	U129	PLFS/PLHJ		
DRAM-RAS	RASCTL	U148	PLCX/PLGS		
BUS	CMDCNT	U59	PLCC/PLGT		
PARALLEL	SPPCNT	U71	PLDP/PLHX		
PERIPHERAL	DPGSEL	U41	PLCV/PLXV		
COPROC.	NPXCTL2	U92	PLBN		
PASSWORD	PWPRO	U104	PLHH	GLZ6 **	
BUS	BUSCTL16	U40	PBVE		
BUS	BUSCTL33	U90	PLBK	PLAZ **	
PROCESSOR	NCACTL	U116	PLJ1/PLJ2		
COPROC.	NPXCTL1	U19	PLBM		
KBC 8742		U27	CSLB		
CTRL RAM		U99	CS2V(C)		
CACHE 82385					

\*\* Only for field level.

FUNCTION		POS.	EVOLUTION OF M380/ XP9 BA833 BOARD		
ROM BIOS	H / L	U127 U126	REV. 1.07	REV. 2.02 **	
DRAM DECOD	MEM DEC	U123	PLFP/PLHF		
I/O DECOD	LIO DEC	U94	PLCK/PLGC		
ALT I/O DECOD	ALT DEC	U145	PLFR/PLHK		
TIMER	TIMCLK	U143	PLJO/PLHY		
ARBITER	ARBCTL	U30	PLGG	PLJ3	
REFRESH	REFCTL	U21	PLFE/PLHD	PLET/PLJZ	
STROBE	LIOSTB	U18	PLCP/PLGJ		
BUFFERS BUS	BUFCNV	U87	PLFC/PLHC		
LATCHES BUS	LADCNV	U75	PLXS/PLGL		
DRAM	MEMSEL	U131	PLCW/PLGM		
DRAM	DBUFEN	U130	PLXU/PLGN		
DRAM	PCHKEN	U150	PLFU/PLHM		
NMI INT	RDYNMI	U105	PLCY/PLGQ		
RAM-CAS	CASCTL	U129	PLFS/PLHJ		
DRAM-RAS	RASCTL	U148	PLCX/PLGS		
BUS	CMDCNT	U59	PLCC/PLGT		
PARALLEL	SPPCNT	U71	PLCD/PLGU	PLDP/PLHX	
PERIPHERAL	DPGSEL	U41	PLCV/PLXV		
COPROC.	NPXCTL2	U92	PLBN		
PASSWORD	PWPRO	U104	PLHU	PLHH	GLZ6 **
BUS	BUSCTL16	U40	PBVE		
BUS	BUSCTL33	U90	PLBQ	PLBK	PLAZ **
PROCESSOR	NCACTL	U116	PLBJ	PLBP	PLJW/PLJY **
COPROC.	NPXCTL1	U19	PLBM		
KBC 8742		U27	CSLB		
CTRL RAM		U99	CS2V(B)	CS2V(C)	
CACHE 82385					

\*\* Only for field level.

FUNCTION		POS.	EVOLUTION OF M380/ XP9 BA839 BOARD		
ROM BIOS	H / L	U127 U126	REV. 1.07	REV. 2.02	
DRAM DECOD	MEM DEC	U123	PLEK/PLJ4		
I/O DECOD	LIO DEC	U94	PLCK/PLGC		
ALT I/O DECOD	ALT DEC	U145	PLFR/PLHK		
TIMER	TIMCLK	U143	PLEN/PLJ7		
ARBITER	ARBCTL	U30	PLJ3		
REFRESH	REFCTL	U21	PLET/PLJZ		
STROBE	LIOSTB	U18	PLCP/PLGJ		
BUFFERS BUS	BUFCNV	U87	PLFC/PLHC		
LATCHES BUS	LADCNV	U75	PLXS/PLGL		
DRAM	MEMSEL	U131	PLCW/PLGM		
DRAM	DBUFEN	U130	PLXU/PLGN		
DRAM	PCHKEN	U150	PLFU/PLHM		
NMI INT	RDYNMI	U105	PLCY/PLGQ		
RAM-CAS	CASCTL	U129	PLFS/PLHJ		
DRAM-RAS	RASCTL	U148	PLCX/PLGS		
BUS	CMDCNT	U59	PLCC/PLGT		
PARALLEL	SPPCNT	U71	PLDP/PLHX		
PERIPHERAL	DPGSEL	U41	PLCV/PLXV		
COPROC.	NPXCTL2	U92	PLBN		
PASSWORD	PWPRO	U104	PLHH	GLZ6	
BUS	BUSCTL16	U40	PBVE		
BUS	BUSCTL33	U90	PLBK	PLAZ	
PROCESSOR	NCACTL	U116	PLJ2/PLJ1		
COPROC.	NPXCTL1	U19	PLBM		
KBC 8742		U27	CSLB		
CTRL RAM		U99	CS2V(B)		
CACHE 82385					

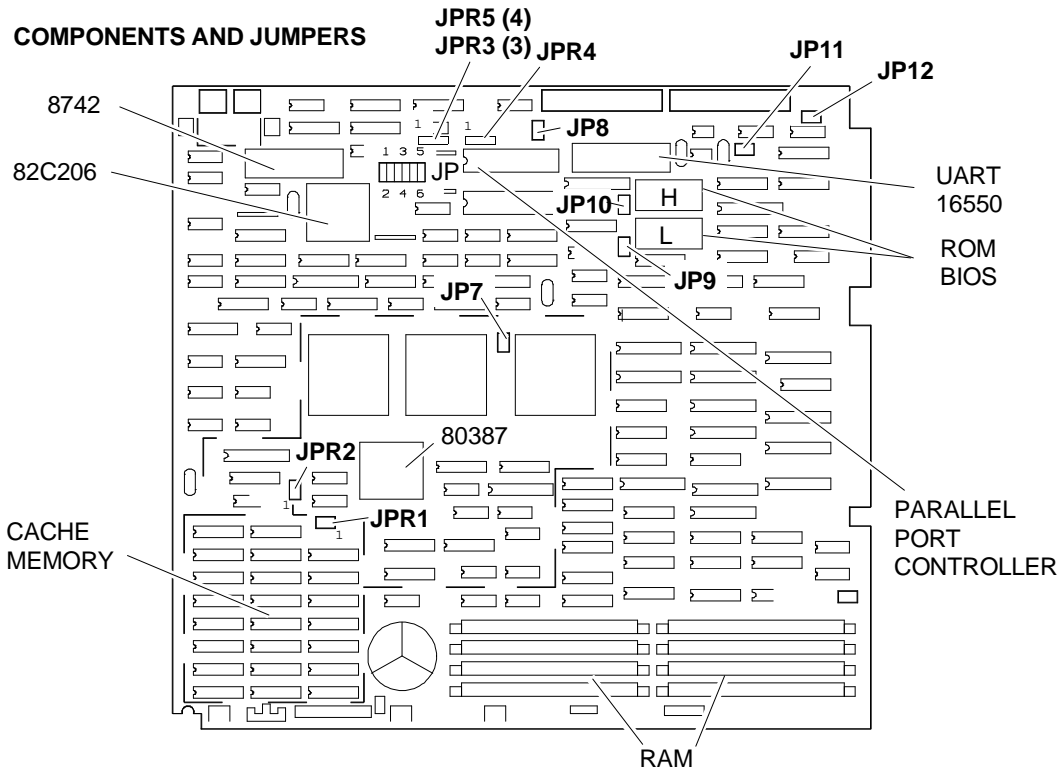
**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU motherboard	BA839		M380/XP9 33 MHz
CPU motherboard	BA832	412816 S	M380/XP9 33 MHz
CPU motherboard	BA829	412589 N	M380/XP4/XP7 25 MHz
CPU motherboard	BA825	412565 M	M380/XP7 25 MHz
CPU motherboard	BA833	412665 Z	M380/XP9 33 MHz
Adapter BUS board	IF615	411868 U	M380/XP4
	IF624	412534 E	M380/XP4
Adapter BUS board	IF617	412143 N	M380/XP7/XP9
U-TURN board	IF614	497576 N	M380/XP4
U-TURN board	IF618	497622 L	M380/XP7/XP9
220 V power supply	LA21/C	411771 S	M380/XP4
110 V power supply	LA21/C	411770 D	M380/XP4
220 V power supply	PS30A-PS30B	412165 L	M380/XP7/XP9
110 V power supply	PS30A-PS30B	412164 K	M380/XP7/XP9
Hard disk controller	GO733	412566 N	M380/XP4/XP7
Hard disk controller	GO535		M380/XP9
Hard disk controller	GO565		M380/XP9
Video controller	GO481	412444 L	Analog video controller
Memory expansion board	ME931		M380/XP4/XP7
Console interface board	IF621		M380/XP7/XP9
Console	MI525		M380/XP7/XP9

**COMPATIBILITY NOTES**

BOARD OR HW/SW DEVICE	DESCRIPTION	SYSTEM BOARD
DEME (position U162)	Solves: - Parity error problems - Replaces delay line 4	BA825
PLHT/BL (position U116)	Solves: - Flight simulator incompatibility	BA825-29
PLHU (position U104) PLBH (position U90)	Solves: - Wangtek streaming tape unit problems	BA825-29
PLBP (position U116) PLHH (position U104)	Improves system timing and benchmarks	BA829-25
PLBK (position U90)	Solves: - Wangtek streaming tape unit problems	BA833-39 BA832
PLHX/PLDP (position U71)	Solves: - System board serial port management problems	BA833-39 BA832
PLJ3 (position U30)	Solves: - Management Enlargement BUS errors	BA829-25 BA832-33 BA829
PLJZ/PLET (position U121)	Solves system blocks with the Banyan Multiport ICA Operating System	BA839-33 BA832-25 BA829
PLJ4 (position U123)	Solves system blocks when using 512 - 640 KB memory paging	BA829-32 BA839

BOARD OR HW/SW DEVICE	DESCRIPTION	MOTHER-BOARD
PLJY (position U116) PLJ4 (position U123) PLHY (position U143)	Solves: <ul style="list-style-type: none"> <li>- RAM management problems of CACHE in the presence of a Multiport board</li> <li>- Memory problems when using 512 - 640 KB paging</li> <li>- Interrupt 12 management</li> </ul>	BA839-25 BA833-32 BA829
Power supply PS30/B1	Power supply unit used to conform with Northern Countries safety rules (see CP486, P800)	
Hard disk and floppy disk controller board	Replaced component, for factory change, but same performance	
Hard disk controller board	M380/XP9 no longer uses hard disk controller board GO733 which is replaced by GO535 for each configuration	
Peripherals controller C&T 82C206	In alternative to this C&T, TEXAS 82C206 component can be used	BA839-25 BA833-32
Hard disk SEAGATE ST2182E 136 SEAGATE ST2383E 320	These hard disks work with controller WD1007 SE2 (GO535) only. Therefore, upgrading KIT is still produced for the old NEC and MICROPOLIS hard disks. They operate with both <b>GO535</b> and <b>GO733</b> controllers	
BIOS 2.01	This BIOS is only distributed by OLISERVICE and has never been discontinued	
Power supply LA21/C	Inductor I129 has been replaced to solve component overheating problems. Field change only	
Hard disk controller GO535	Modifications made to the printed circuit board in order to improve the quality of the board. The level of this board changes to 02. The original and level 01 GO535 boards cannot be updated to level 02. To low level format the NEC D5655 hard disk when the GO535 level 02 board is installed, LLF release 2.06 is needed. The LLF program on the System Test diskette does not ensure correct hard disk formatting	
Hard disk controller	The GO535 is replaced by GO565	



JPR1		JPR2		82385 CLOCK
1 - 2	2 - 3	1 - 2	2 - 3	
ON	OFF	OFF	ON	25 MHz
OFF	ON	ON	OFF	33 MHz

JP <sub>6</sub>	COPROCESSOR CLOCK
ON	External clock
OFF	System clock (normal)

JP <sub>5</sub>	SYSTEM BOARD RAM ENABLE
ON	Enabled (normal)
OFF	Not enabled

JP <sub>7</sub>	80386 OPERATING MODE
ON	Pipeline
OFF	Non-Pipeline (normal)

JP <sub>11</sub>	JP <sub>12</sub>	RS232 COMPAT.
OFF	OFF	COMPAQ (normal)
ON	ON	IBM

JP <sub>9</sub>	JP <sub>10</sub>	EPROM CAPACITY
ON	OFF	256 KB (normal)
OFF	ON	512 KB

JP <sub>8</sub>	SERIAL PORT CLOCK
ON	System clock (normal)
OFF	External clock

JP <sub>1</sub>	JP <sub>2</sub>	FUNCTION
ON	ON	16 or 20 MHz (not used)
OFF	ON	25 MHz (not used)
ON	OFF	33 MHz
OFF	OFF	40 MHz (not used)

JP <sub>3</sub>	JP <sub>4</sub>	SYSTEM BOARD MEMORY		
		Bank	SIMM type	Size
ON	ON	0	1 MB x 9	4 MB(1)
OFF	ON	0 and 1	1 MB x 9	8 MB
ON	OFF	0	4 MB x 9	16 MB
OFF	OFF	0 and 1	4 MB x 9	32 MB

JPR4		RAM from 12 MB to 16 MB
1 - 2	2 - 3	
OFF	ON	Enabled as a cache (1)
ON	OFF	Managed by I/O controller
OFF	OFF	Disabled

JPR3/JPR5		IRQ 12 MOUSE
1 - 2	2 - 3	
OFF	ON	Enabled for the mouse (1)
ON	OFF	I/O Disabled / Enabled
OFF	OFF	Mouse must not be connected

- (1) Default setting
- (2) Not present on BA839
- (3) Present on BA832 and BA839 only
- (4) Present on BA829 only



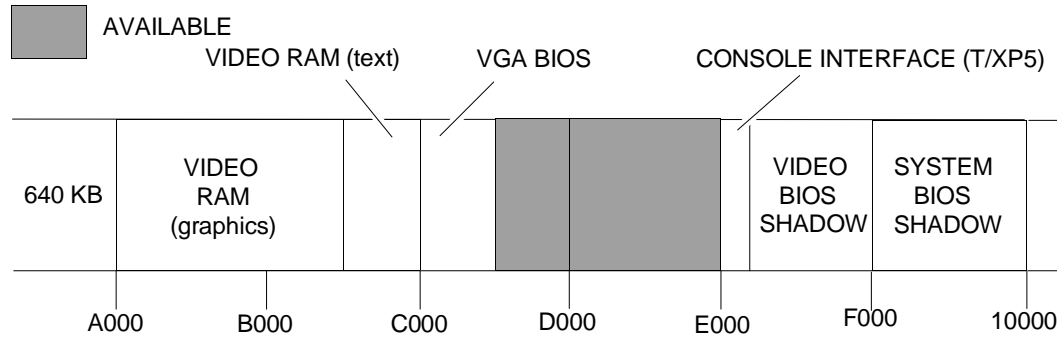
**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.00	Requires formatted DSDD diskette during installation on hard disk PS/2 type mouse not recognised
IBM Operating System/2, Ver. 1.10	
IBM Operating System/2 Extended Edition, Ver. 1.10	PS/2 type mouse not recognised
AT&T UNIX System V/386 Version 3.2 Rev.2.0 SCO XENIX 386, Rev. 2.3.1	

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smartmodem 1200B Hayes Smartmodem 2400B Quadram Quadmodem II QM2024 Telenetics Expressdata 24i 24i - 12i VEN-TEI PC modem Half Card PCM-XT Hayes Smartmodem 1200	IBM Async. communication card 1502074 IBM mono display / printer adapter 1504900 IBM printer adapter1505200 IBM Serial / Parallel card 6450215 National IEEE-488 card GPIB-PC. Rev.A
<b>MEMORY EXPANSIONS</b>	<b>MOUSE</b>
AST Rampage 286 RAMP286 AST Rampage/AT RAMPAT 2000 AST ADVANTAGE ! ADV 128S BOCARAM / AT EVEREX RAM 2000 EV 171 IBM 512KB EXP. MEMORY OPT. 6450203 IBM 512KB/2MB EXP. MEMORY OPT. 6450343 IBM Enhanced Memory Exp. Adap. 74X8635 INTEL Aboveboard / AT PCMB2010 INTEL Aboveboard / 286 PCMB4020	IBM PS/2 Mouse (6450350) Logitech BUS mouse P7-3F Microsoft BUS Mouse rev.C Microsoft Serial Mouse MSC PC Mouse PS/2 Mouse Systems PC mouse M1
<b>DISPLAY UNITS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
IBM color graphics monitor 5153 IBM enhanced color graphics monitor 5154 IBM monochrome monitor 5151 IBM PS/2 Color Display 8512 IBM PS/2 Color Display 8514 JVC Quad-sync color monitor GD-H6116VFW NEC multisync monitor APC-H431 Princeton RGB monitor HX-12	AT&T Starlan Network IBM PC Network IBM Token Ring Network Madge AT Ring node Token ring Madge PC Ring node Token ring Novell Advanced netware ver. 2.12 3COM Network (Ethernet) 10NET Network
<b>GRAPHICS PRODUCTS</b>	
AST research AST-3G plus ATI EGA WONDER Genoa Super EGA Hires Hercules color card GB200 Hercules graphics card GB102 IBM Color graphics adapter 5153001	IBM Enhanced graphics adapter 5154001 IBM VGA adapter Paradise EGA 480 Quadram quad EGA Plus QC8601 Video-7 VEGA deluxe

**SYSTEM MEMORY MAP**



ADDRESS	BITS	TYPE	FUNCTION
FFFFFFFF - FFFE0000	16	NCA	128 KB system ROM
FFFE0000 - E0000000	16	NCA	Reserved
E0000000 - D0000000	32	NCA	Reserved
D0000000 - C0000000	32	NCA	Weitek Coprocessor
C0000000 - A0000000	32	CA	Reserved
A0000000 - 80000000	34	CA	Image system RAM
80000000 - 20000000	32	CA	Reserved
20000000 - 01000000	32	CA	System RAM
01000000 - 00100000	32/16	CA/NCA	System RAM
00100000 - 000E0000	32/16	CA/NCA	SHADOW RAM
000E0000 - 000C0000	16	NCA	I/O Expansion ROM
000C0000 - 000A0000	16	NCA	Video RAM
000A0000 - 00080000	32/16	CA/NCA	I/O Expansion RAM
00080000 - 00000000	32/16	CA/NCA	System RAM

**DMA CHANNELS**

CHANNEL	FUNCTION
DRQ 0	Reserved
DRQ 1	Reserved
DRQ 2	Floppy disk
DRQ 3	Reserved
DRQ 4	Reserved
DRQ 5	EXP. SLOT
DRQ 6	EXP. SLOT
DRQ 7	EXP. SLOT

**INTERRUPT LEVELS**

LEV.	FUNCTION	LEV.	FUNCTION
RQ0	Timer channel 0	RQ8	Real Time Clock
IRQ1	Keyboard interface	IRQ9*	Reserved
IRQ2	Interrupt from PIC2	IRQ10	Available
IRQ3	Serial port 2	IRQ11	Available
IRQ4	Serial port 1	IRQ12	Mouse
IRQ5	Parallel port 2	IRQ13	Coprocessor
IRQ6	Floppy disk controller	IRQ14	Hard disk CTRL
IRQ7	Parallel port 1	IRQ15	Available

\* Redirected via software to IRQ2

**I/O ADDRESS MAP**

ADDRESS	FUNCTION (INTERNAL)	ADDRESS	FUNCTION (EXTERNAL)
F8-FF	Coprocessor	3F0-3FF	Floppy disk
F0	Clear processor	3D0-3DF	Graphic color video
C0-DF	DMA 2	3C0-3CF	Reserved
A0-BF	Interrupt controller 2	3B0-3BF	B/W display
80-9F	DMA registers	3A0-3AF	SDLC 1
70-7F	Real Time Clock	380-38F	SDLC 2
60-6F	Keyboard controller	378-37F	Parallel port 1
40-5F	Timer	360-36F	Reserved
20-3F	Interrupt controller 1	300-31F	External boards
0-1F	DMA 1	2F8-2FF	Serial port 2
3F8-3FF	Serial port 1	278-27F	Parallel port 2

**SETUP**

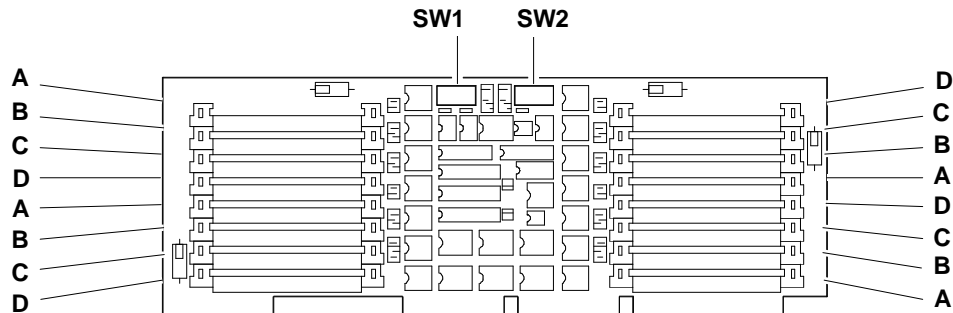
PAGE 1		PAGE 2	
1 Date	7 Hard disk C	1 System board serial port	5 Scrolling type
2 Time	8 Hard disk D	2 System board parallel port	6 I/O delay
3 Base memory size	9 80387 coprocessor	3 Base memory	7 Memory delay
4 Extended memory size	10 Primary CRT adapter type	4 Power On memory test	8 Video controller
5 Floppy A	11 Additional setup		9 Primary monitor type
6 Floppy B			10 Additional setup

**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
01	Standard 85 ms	10 MB	306	4	128	305	17
02	Seagate ST 225 half size	20 MB	615	4	256	700	17
03	WREN II full size	38 MB	925	5	128	924	17
04	CDC WREN 1 35ms full size	28 MB	697	5	128	696	17
05	ST4096	76 MB	1024	9	-1	1023	17
06	OPE XM5340	40 MB	820	6	256	819	17
07	NEC D5146H	40 MB	615	8	128	664	17
08	TM S1 im	40 MB	981	5	-1	980	-
09	CDC WREN II slim size	40 MB	981	5	128	980	17
10	Micropolis 1324 full size	51 MB	1024	6	-1	1023	17
11	CDC WREN II full size	53 MB	925	7	128	924	17
12	Micropolis 1325 full size	68 MB	1024	8	-1	1023	17
13	CDC WREN II full size	69 MB	925	9	128	924	17
14	Micropolis 1323 A full size	42 MB	1024	5	-1	1023	17
15	RESERVED						
16	Miniscribe 85 ms 3,5"	20 MB	612	4	128	656	17
17	Tandom TM362 85 ms 3,5"	20 MB	612	4	-1	663	17
18	Seagate ST251 40 ms half size	40 MB	820	6	-1	819	17
19	Rodime RO3055 40 ms 3,5"	43 MB	872	6	0	871	17
20	Miniscribe M8425 3,5"	20 MB	612	4	128	663	17
21	Seagate ST277R	62 MB	820	6	-1	819	26
22	OPE XM5340/60	62 MB	820	6	128	819	26
23	NEC D5147H	62 MB	615	8	384	664	26
24	Fujitsu M2246 ESDI	136 MB	820	10	-1	822	34
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023	34
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023	34
27	NEC D5452	68 MB	823	10	512	822	17
28	FUJITSU M2227D	40 MB	615	8	512	614	17
29	FUJITSU M2227D RLL	60 MB	512	8	512	614	26
30	CDC 94205-77	62 MB	981	5	-1	980	26
31		304 MB	814	15	-1	51	51
32		81 MB	977	5	-1	1	34
33		136 MB	820	10	-1	1	34
34	CDC 94196-766	600 MB	1623	15	-1	1	-
35	CONNER CP3142	40 MB	635	4	-1	639	33
36	CONNER CP346	40 MB	805	4	-1	804	26
37	CONNER CP3106	100 MB	776	8	-1	775	33

**Where:** CYL: No. of disk cylinders  
T: No. of disk heads  
WPC: Precompensation cylinder number  
LZ: Head parking cylinder number  
SET: No. of disk sectors

**MR 931 MEMORY EXPANSION BOARD**

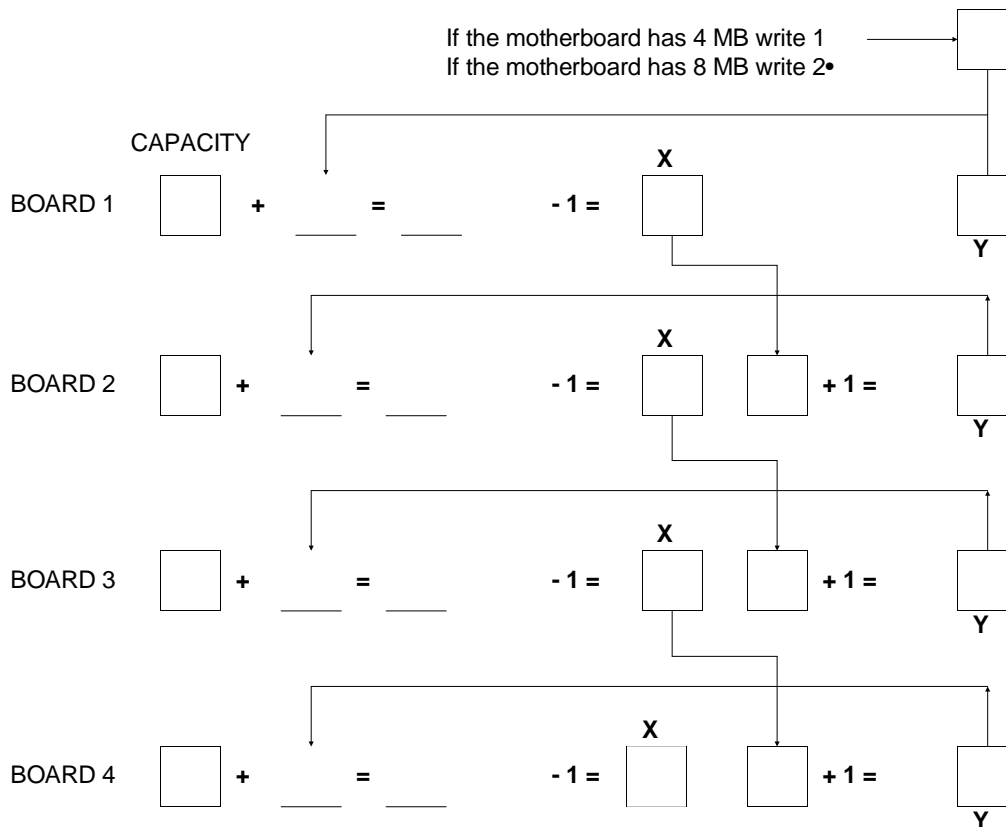


**CONFIGURATION OF BOARD DIP-SWITCHES**

NUMBER OF SIMMs INSTALLED	CONNECTORS WITH SIMMs INSTALLED	BOARD CAPACITY
4	A	4 MB
8	AB	8 MB
12	ABC	12 MB
16	ABCD	16 MB

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**X AND Y CALCULATION SYSTEM**



**DIP-SWITCH SW1 SWITCHES 1 to 4**

Values that can be assumed by X	SW1 Switches 1 - 4				Values that can be assumed by X	SW1 Switches 1 - 4			
	1	2	3	4		1	2	3	4
1	ON	ON	ON	ON	9	OFF	ON	ON	OFF
2	OFF	ON	ON	ON	10	ON	OFF	ON	OFF
3	ON	OFF	ON	ON	11	OFF	OFF	ON	OFF
4	OFF	OFF	ON	ON	12	ON	ON	OFF	OFF
5	ON	ON	OFF	ON	13	OFF	ON	OFF	OFF
6	OFF	ON	OFF	ON	14	ON	OFF	OFF	OFF
7	ON	OFF	OFF	ON	15	OFF	OFF	OFF	OFF
8	OFF	OFF	OFF	ON					
8	ON	ON	ON	OFF					

**DIP-SWITCH SW1 SWITCHES 5 to 8**

Values that can be assumed by Y	SW1 Switches 5 - 8				Values that can be assumed by Y	SW1 Switches 5 - 8			
	1	2	3	4		1	2	3	4
1	ON	ON	ON	ON	9	OFF	ON	ON	OFF
2	OFF	ON	ON	ON	10	ON	OFF	ON	OFF
3	ON	OFF	ON	ON	11	OFF	OFF	ON	OFF
4	OFF	OFF	ON	ON	12	ON	ON	OFF	OFF
5	ON	ON	OFF	ON	13	OFF	ON	OFF	OFF
6	OFF	ON	OFF	ON	14	ON	OFF	OFF	OFF
7	ON	OFF	OFF	ON	15	OFF	OFF	OFF	OFF
8	OFF	OFF	OFF	ON					
8	ON	ON	ON	OFF					

**DIP-SWITCH SW2 SWITCHES 1 to 8**

All switches to be set to ON.



# M300

## CHARACTERISTICS

Microprocessor	I386SX on motherboard to be inserted in BUS Slot 3
Clock	16 MHz
Architecture	AT/XT
Memory	System supports 12 MB: - 2 banks on motherboard in which to install: <b>SIMM of 286 Kb</b> - 4 SIMM = 1 MB of memory <b>SIMM of 1M x 9</b> - 2 SIMM = 2 MB of memory - 4 SIMM = 4 MB of memory - From 2 to 4 MB on memory expansion board <b>AMB 2678</b> - motherboard memory can be expanded using the expansion kit <b>EXM 26-502</b> (2 1Mx9 SIMMs) - The memory board can be expanded using the expansion kit <b>EXM 25-852</b> (18 chips)
Memory access	100 ns
Coprocessor	i80387 SX
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	20 MB CONNER CP3024 20 MB NEC D3126 40 MB CONNER CP346 40 MB CONNER CP3044/3046 40 MB NEC D4146 100 MB CONNER CP3106 100 MB CONNER CP30104/106 100 MB QUANTUM LPS 105 AT
Streaming Tape	40 MB IRWIN 245 - 80 MB IRWIN 285
AT Expansion slots	8 Present - 5 Available
Video adapter	GO481 VGA compatible board set in slot 6 of the Expansion BUS
Hard Disk Interface Floppy Disk controller Serial port	GO477 Multi-function board set in slot 8 of the Expansion BUS
BIOS ROM	64 KB (27C512)
Mouse	PS/2 and AT compatible GRD 25-025
Keyboard	101/102-key ANK 26-101 ANK 26-102

<b>MOTHERBOARD</b> 1) UC.097/093 2) UC.112/113
<b>BIOS</b> Latest level: Rev. 1.10 For the different versions see table: <b>Compatibility Notes</b>
<b>POWER SUPPLY</b> Hantarex 3613 B
<b>VIDEO ADAPTER</b> GO481
<b>MULTI-FUNCTION BOARD</b> GO477 Lev. 02 MI
<b>EXPANSION BUS BOARD</b> IN 108 8 slots: 5 AT and 3 XT

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**MOTHERBOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>NOTES</b>
<b>UC.097/09</b>	Lev. 02	412614 N	Lev. 1.02	Malfunction revealed by the XENIX application rel. 2.3.
	Lev. 03		PEPD Lev.1.04	Solution: Replaced PAL 20R4 with a PALGL50
	Lev. 04		PEPD Lev.1.04	Solves the problem with the board at lev. 02
	Lev. 05		PEPD Lev.1.04	Problems: - No cold start - Malfunctions with the Olicom Token Ring board Solutions: - Replace PAL PLDR or PLD1 with PLD6 Pos. U41 With these modifications board level changes to 03/A, 04/A, 05/A
	Lev. 06		PEPE Lev. 1.06	Solves: - Conflict problems with second parallel port - Too short Conner HDU status signal at ready
	Lev. 07		PEPE Lev. 1.06	Trimming and substitutions of 2.7 V diode at position DZ2 with 2.4 V SMD diode at position DZ1
	Lev. 08		PEPF Lev. 1.07	Solves: - Optional ROM managment problems - Addition of keyboard fuse UC test The +12 V on the UC has been removed by trimming
	Lev. 09		PEPH Lev. 1.08	Solves keyboard LED control problems during POD. Introduction of PLD5 PAL instead of PLD2 PAL at position U41 to solve problem with Olicom Token Ring board. PLD5 PAL can be used on all system boards starting with level 06.
	Lev. 10			Replaced component 82335 with 82335SX



	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
UC.112/113	Lev. Nasc.		ROM BIOS 1.07	Replace the UC097 and UC093 boards Implements correct interrupt management for the JEPSCRIPT board that is not handled on the previous boards
	Lev. 01		ROM BIOS 1.09	Also introduced for UC097 and UC093 boards to solve date and time loss.
	Lev. 02		ROM BIOS 1.10	Solves the loss of the 1st character after CTRL+ALT+DEL when Shadow Memory is disabled
	Lev. 03		ROM BIOS 1.10	Replaced component 82335 with 82335SX

INTEGRATED CONTROLLERS		INTEGRATED CONTROLLERS	
<b>i386SX</b> CPU		<b>82335</b>	- Address map and decoder - DRAM controller - Parity check - Synchronisms - Reset circuit
<b>80387SX</b> Coprocessor		<b>82231</b>	- Timer 8254 - DMA 8237 (2) - 74LS612 Memory Mappers (2) - RAM logic refresh - DMA arbiter
<b>82230</b>	- Clock generator 8284 - Coprocessor interface - Interrupt controller 8259 (2) - R.T.C. 6818 and CMOS RAM - BUS controller 82288 - Logic control of the data and address BUS		
<b>PAL</b>	See the System Board table		
<b>PGA</b>	Parallel port controller		

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**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU motherboard	UC93	412614 N	1 MB on board RAM
BUS Adapter board	IN108	412062 Q	8 slot, 5 16-bit and 3 8-bit
Memory board	AMB 2678 (RA081)	412542 N	Memory 2 MB
Speaker board	GE012	359899 P	
Power supply 220 V	HANTAREX	412065 K	
Power supply 110 V	HANTAREX	412064 J	
Hard disk controller	GO477	412543 P	Multi-function board
Video adapter	GO481	412444 L	Analog video adapter

### MEMORY MANAGEMENT OEMM386

OEMM386 controls system extended and expanded memory. OEMM386 can not be simultaneously used with other programs that handle system extended and expanded memory, such as: WINDOWS386, DESQview Novell, etc.

OEMM386 is to be configured by adding in CONFIG.SYS file its configuration parameters.

Two configuration modes for OEMM386 are illustrated below.

In CONFIG.SYS insert a string as follows:

DEVICE = drv:\path\OEMM386.SYS NOXRAM

In this case: 64 K is used as extended memory (for OEMM386), the remaining system memory is expanded memory.

DEVICE = drv:\path\OEMM386.SYS NOXRAM EMS = 0

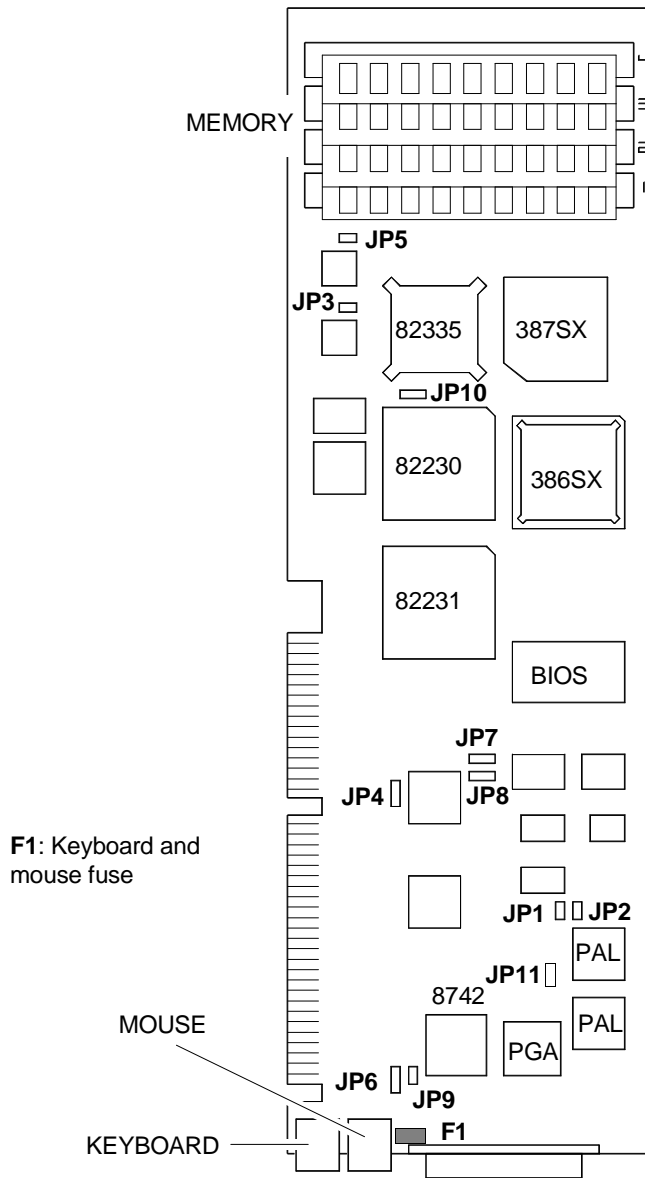
In this case: All system memory is extended memory.

OEMM386 VERSION	COMPATIBILITY
Ver. 4.02	Can not be used for the M300
Ver. 4.06	Can give problems. (See OEMM386.DOC)
Ver. 4.08	For installation, see OEMM386.DOC

### COMPATIBILITY NOTES

COMPONENT	NOTES
Intel 82355 on: UC093 UC097 UC112 UC113	Intel no longer supplies 82355 component, therefore 82355SX component is to be used. Parity is no longer handled with the introduction of this component. Component 82355SX can be used on UC093 and 097 from level 03 on, and on UC112 and 113 from original level onwards. To use the new component, make some trimming and replace a PAL. See FCO 3877542 R 509.
Multifunction board GO477	Floppy disk controller W.D. 37C65C ver. C can be used in place of the floppy disk controller W.D. 37C65C ver. B. The board level does not change

**MOTHERBOARD COMPONENTS AND JUMPERS**



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F1: Keyboard and mouse fuse

JP11	FUNCTION
IN	Enable IRQ12 from intelligent mouse circuit
OUT	Disable IRQ12 from mouse

JP1	JP2	FUNCTION
OUT	OUT	100 ns Fast Page mode 4 DRAM pages active
OUT	IN	100 ns Fast Page mode 1 DRAM page active
IN	OUT	100 ns DRAM
IN	IN	120 ns DRAM

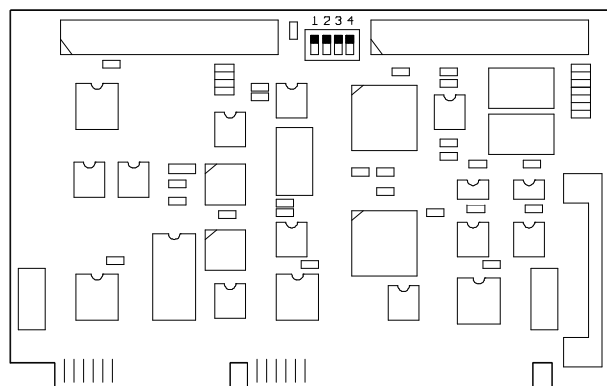
JP3 - JP5	FUNCTION
IN	Always (normal)
OUT	Factory used only

JP9	FUNCTION
IN	Video adapters - on-board BIOS (normal)
OUT	Video adapters - no BIOS on board

JP6	FUNCTION
1 - 2	To activate signal A20GATE through keyboard ctrl (normal)
2 - 3	To activate signal A20GATE in fast mode

JP4-7-8-10	FUNCTION
1 - 2	For component 82335 B
2 - 3	For component 82335 A

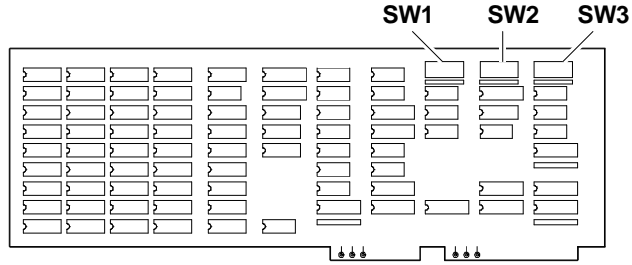
### MULTI-FUNCTION BOARD GO477



SWITCH	POSITION	FUNCTION
1	ON OFF	Disables the board Floppy Disk Controller Enables the board Floppy Disk Controller (normal)
2	ON OFF	Disables the system hard disk Enables the system hard disk (normal)
3	ON OFF	Disables the serial port Enables the serial port (normal)
4	ON OFF	Serial port address COM2 Serial port address COM1 (normal)

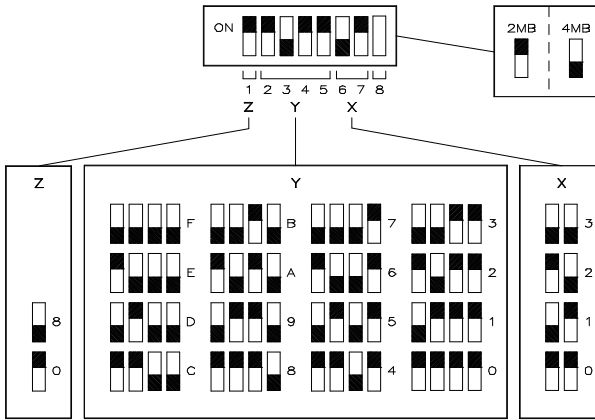
**NOTE:** The serial port must be disabled in presence of a multiport board configured for MS-DOS operations.

**AMB 2678 MEMORY BOARD**



**SW1**

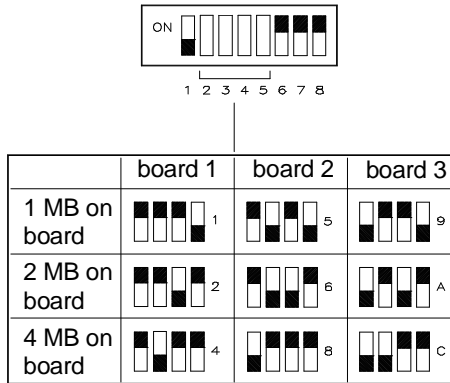
XYZ: Selection of memory I/O addresses  
 Normal address 120  
 X = 1  
 Y = 2  
 Z = 0



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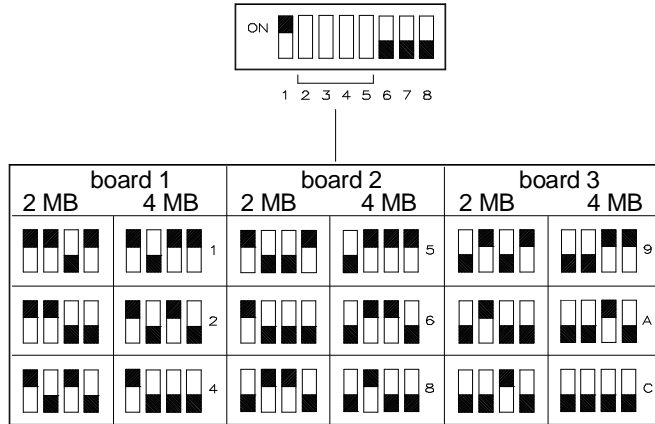
**SW2**

Start address of each board. Depends on the memory size installed on the system board.  
**NOTE:** If installing a second or third board, boards already installed must have a capacity of 4 MB



**SW3**

Boards' end address. Depends on capacity of memory installed on board.



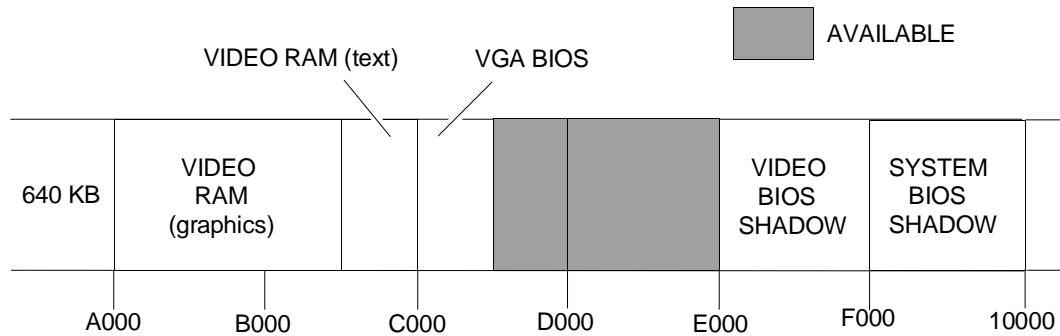
**SOFTWARE COMPATIBILITY**

OPERATING SYSTEMS	NOTES
IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20  IBM Operating System/2 Extended Edition, Ver. 1.10  Olivetti's Microsoft Disk Operating System, Ver. 3.30a Olivetti's Microsoft Disk Operating System, Ver. 4.01 Olivetti's Microsoft OS/2, Ver. 1.10 and 1.20 SCO XENIX 386, Rev. 2.3	During installation on hard disk a formatted DSDD disk is required. PS/2 mouse not acknowledged. PS/2 mouse not acknowledged.

**HARDWARE COMPATIBILITY**

<b>MODEM</b> Hayes Smartmodem 1200B Hayes Smartmodem 2400B Quadram Quadmodem II QM2024 Telenetics Expressdata 24i 24i - 12i VEN-TEI PC modem Half Card PCM-XT Hayes Smartmodem 1200	<b>I/O INTERFACE PRODUCTS</b> FUTURE DOMAIN HOST ADAPTER (MCS-350) IBM PS/2 Dual Async Adapter/A (6450347)
<b>MEMORY EXPANSIONS</b> AST Rampage 286 RAMP286 AST Rampageplus 286 BOCARAM / ATPLUS INTEL Aboveboard plus 8 PCMB4525	<b>MOUSE</b> IBM PS/2 Mouse (6450350) Logitech BUS mouse P7-3F Microsoft BUS Mouse rev.C Microsoft Serial-PS/2 Mouse Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti New Advanced Mouse (GRD 25-025) Olivetti BUS Mouse (GRD 25-019)
<b>DISPLAY UNITS</b> IBM color graphics monitor 5153 IBM enhanced color graphics monitor 5154 IBM monochrome monitor 5151 IBM PS/2 Color Display 8512 IBM PS/2 Color Display 8514 JVC Quad-sync color monitor GD-H6116VFW NEC multisync monitor APC-H431 Princeton RGB monitor HX-12	<b>NETWORKING &amp; LAN PRODUCTS</b> AT&T Starlan Network IBM OS/2 lan server/requester IBM PC Network IBM Token Ring Network Madge Token-ring network Novell Advanced netware ver. 2.15 Novell Netware 386 3COM Network (Ethernet) 3COM 3+ open lan manager 10NET Network
<b>GRAPHICS PRODUCTS</b>	
AST research AST-3G plus AST research AST-VGA plus ATI EGA WONDER EVEREX VIEWPOINT VGA adapter EV-678 Genoa Super EGA Hires Hercules graphics card GB102 Hercules incolor card GB222 IBM Enhanced graphics adapter 5154001	IBM VGA adapter Paradise EGA 480 Paradise VGA Pro card Quadram quad EGA Plus QC8601 Quadram quad VGA spectra QC9001 Tecmar VGA AD Video-7 VEGA deluxe

**SYSTEM MEMORY MAP**



ADDRESS	SIZE	FUNCTION
00 0000 - 09 FFFF	640 K	System RAM
0A 0000 - 0B FFFF	128 K	Video RAM
0C 0000 - 0D FFFF	128 K	I/O ROM
0E 0000 - 0F FFFF	128 K	BIOS ROM
10 0000 - 1F FFFF	1024 K	2 MB RAM configuration
20 0000 - 3F FFFF	2048 K	4 MB RAM configuration
40 0000 - 7F FFFF	8192 K	Memory expansion board
80 0000 - C9 FFFF	4736 K	
CA 0000 - CA 1FFF	8 K	WORM
CA 2000 - FD FFFF	3320 K	
FE 0000 - FF FFFF	128 K	BIOS ROM

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**DMA CHANNELS**

CHANNEL	FUNCTION
DRQ 0	Reserved
DRQ 1	Integrated CD-ROM
DRQ 2	Floppy disk
DRQ 3	Video
DRQ 4	Reserved
DRQ 5	EXP. SLOT
DRQ 6	EXP. SLOT
DRQ 7	EXP. SLOT

**INTERRUPT LEVELS**

LEV.	FUNCTION	LEV.	FUNCTION
RQ0	Channel 0 of output timer	RQ8	Real Time Clock
IRQ1	Keyboard interface	IRQ9*	Reserved
IRQ2	Interrupt from PIC2	IRQ10	Available
IRQ3	Serial port 2	IRQ11	Available
IRQ4	Serial port 1	IRQ12	Mouse
IRQ5	Available	IRQ13	Coprocessor
IRQ6	Floppy disk ctrl	IRQ14	Hard disk controller
IRQ7	Parallel port	IRQ15	Available

\* Redirected via software to IRQ2

**I/O ADDRESS MAP**

<b>ADDRESS</b>	<b>FUNCTION</b>	<b>ADDRESS</b>	<b>FUNCTION</b>
000-01F	DMA controller	2F8-2FF	Serial port 2
020-021	First interrupt controller	300-377	
022-03F	82335 registers (only on reset)	378 - 37B	Parallel port 1
040-043	Timer	37C-3B3	
044-05F		3B4-3B5	Video adapter
060	Keyboard controller	3B6-3B9	
061	System Port B controller	3BA	Video adapter
062-063		3BB-3BF	
064	Keyboard controller	3C0-3CF	Video adapter
065-06F		3D0-3D3	
070-071	RTC/CMOS and NMI mask	3D4-3D5	Video adapter
072-080		3D6-3D9	
081-08F	DMA page registers	3DA	Video adapter
090-09F		3DB-3EF	
0A0-0A1	Interrupt controller 2	3F0-3F7	Floppy disk controller
0A2-0BF		3F8-3FF	Serial port 1
0C0-0DF	DMA registers 4 - 7	400-46E7	
0E0-1EF		46E8	VGA control registers
1F0-1F8	Hard disk drive	46E9-FFFF	
1F9-277		8000F0-8000FF	Coprocessor
278-27B	Parallel port 2		
27C-2F7			



**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
01	Standard 85 ms	10 MB	306	4	128	305	17
02	OPE XM5221 half size	20 MB	615	4	256	700	17
03	WREN II full size	38 MB	925	5	128	924	17
04	CDC WREN 1 35ms full size	28 MB	697	5	128	696	17
05	ST4096	76 MB	1024	9	-1	1023	17
06	OPE XM5340	40 MB	820	6	256	819	17
07	NEC D5146H	40 MB	615	8	128	664	17
08	WREN II slim size	40 MB	981	5	-1	980	17
09	CDC WREN II slim size	40 MB	981	5	128	980	17
10	Micropolis 1324 full size	51 MB	1024	6	-1	1023	17
11	CDC WREN II full size	53 MB	925	7	128	924	17
12	Micropolis 1325 full size	68 MB	1024	8	-1	1023	17
13	CDC WREN II full size	69 MB	925	9	128	924	17
14	Micropolis 1323 A full size	42 MB	1024	5	-1	1023	17
15	RESERVED						
16	OPE XM5220 85 ms half size	20 MB	612	4	128	656	17
17	Tandom TM362 85 ms 3,5"	20 MB	612	4	-1	663	17
18	Seagate ST251 40 ms half size	40 MB	820	6	-1	819	17
19	Rodime RO3055 40 ms 3,5"	43 MB	872	6	0	871	17
20	Miniscribe M8425 3,5"	20 MB	612	4	0	663	17
21	Seagate ST277R	62 MB	820	6	-1	819	26
22	OPE XM5340/60	62 MB	820	6	128	819	26
23	NEC D5147H	62 MB	615	8	384	664	26
24	NEC D5652	136 MB	820	10	-1	822	34
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023	34
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023	34
27	NEC D5452	68 MB	823	10	512	822	17
28	FUJITSU M2227D	40 MB	615	8	512	614	17
29	FUJITSU M2227D RLL	60 MB	615	8	512	614	26
30	CDC 94205-77	62 MB	981	5	-1	980	26
31	CONNER CP3142	40 MB	635	4	-1	639	33
32	CONNER CP3022	20 MB	615	4	-1	614	17
33	CONNER CP3106	100 MB	776	8	-1	775	33
34	Miniscribe 8051	40 MB	745	4	-1	744	28
35	Quantum PC40 AT	40 MB	965	5	-1	964	17
36	CONNER CP346	40 MB	805	4	-1	804	26

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**Where:** CYL: No. of disk cylinders  
T: No. of disk heads  
LZ: Head parking cylinder number  
SET: No. of disk sectors

# P500

## CHARACTERISTICS

Microprocessor	i386SX (P9) 16-bit bus
Clock	16 MHz
Architecture	MICROCHANNEL
Memory	The motherboard supports 16 MB: <b>With 286 KB SIMMs</b> Total memory on system board 1 MB not expandable. <b>With 1 MB SIMMs</b> - 2 banks of 2 MB on motherboard - 4 banks of 2 MB on expansion board <b>MEM 26-503</b> - 4 banks of 2 MB on another memory board. Modules that can be installed in the memory banks are SIMM 1 MB x 9 <b>EXM 26-502</b>
Memory access	100 ns
Coprocessor	I80387 SX
Floppy Disk	1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	40 MB 3.5" NEC 3146H ST506 40 MB NEC D3142 ST506 40 MB FUJITSU M2227 ST506 80 MB 5.25" CDC ESDI 135 MB 5.25" NEC D5655 ESDI 135 MB 5.25" Micropolis 1654-7 ESDI
Streaming Tape	40 MB IRWIN 245 - 80 MB IRWIN 285
AT expansion slots	6 Present - 5 Available
Video adapter	Integrated on System Board - VGA compatible PVGA1
Floppy Disk controller	Integrated on System Board. FDC 8272A
Hard Disk controller	1) GO787 WD1006V ST506 interface 2) GO788 WD1007V ESDI interface 3) GO525 ESDI interface
CMOS RAM	64 bytes for the Set-up and 8 KB expanded CMOS
ROM BIOS	128 Kb (2x27C512)
Mouse	PS/2- AT-compatible GRD 25-025
Keyboard	101/102-key ANK 26-101 ANK 26-102

### MOTHERBOARD

p1.4 BA823 1 MB  
BA827 2 MB

p5 BA242 1 MB  
BA243 2 MB

### BIOS

Last level:  
Rev. 1.18 on all boards.  
For the various versions, see table **Compatibility Notes**

### POWER SUPPLY

PS13A 220 V  
PS13A 110 V

### CONSOLE

CO 131  
1) NASC level

### HARD DISK CONTROLLER

GO787 ST506  
1) Level: NASC  
2) Level: 0.3 MI  
GO788 ESDI  
1) Level: NASC  
GO525 ESDI  
1) Level: NASC  
2) Level: 0.1 MI  
GO564  
1) Level: NASC

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**SYSTEM BOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLERS</b>
<b>BA823</b>	Lev. Nasc.	412445 M	ROM H PB - UDB13 ROM L PB - UDA13 Rev. 1.03	See the table on the next page
	Lev. 0.1 Lev. 0.2		Rev. 1.03 Rev. 1.03	RETROFITTING RETROFITTING
	Lev. 0.3		ROM H PBV1 ROM L PBV2 Rev. 1.05	RETROFITTING
	Lev. 0.4 Lev. 0.5		Rev. 1.05 Rev. 1.05	RETROFITTING RETROFITTING
	Lev. 0.6		ROM H PBV6 ROM L PBV7 Rev. 1.06	Corrects the 3270 problem
	Lev. 0.7		Rev. 1.06	Corrects the ATTACHMATE problem
	Lev. 0.8		ROM H PBV8 ROM L PBV9 Rev. 1.09	Corrects the real time clock problem
	Lev. 0.9		ROM H PPU2 ROM L PPU3 Rev. 1.14	Corrects video problems
	Lev. 10		ROM H PPU4 ROM L PPU5 Rev. 1.16	Corrects system parity
	Lev. 11		ROM H PPJL ROM L PPJH Rev. 1.18	Solves Adapter IBM 8514/A problems, of SW IBM 4700 in banking environment and PS/2-compatible Microsoft mouse.
	Lev. 12		Rev. 1.18	Cutting and trimming to solve problems of the "Parallel Processor AOX" board.
	Lev. 12		Rev. 1.18	To solve configuration problems with the OS/RAM32 board, a 47 pF capacitor has been mounted between pins 4 and 10 of component 74F245 at location UGA12. Applied at field level only.
	<b>BA827</b>	-		This board has evolved in the same way as BA823.

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS
<b>BA242</b>	Lev. Nasc.		ROM H PPU4 ROM L PPU5 Rev. 1.16	See the table on the next page.
	Lev. 0.1		Modified 32.768 KHz oscillator circuit	
	Lev. 0.2		ROM H PPJL ROM L PPJH Rev. 1.18	Solves Adapter IBM 8514/A problems, of SW IBM 4700 in banking environment and PS/2-compatible Microsoft mouse.
	Lev. 0.3		Rev. 1.18	Cutting and trimming to solve problems of the "Parallel Processor AOX" board.
	Lev. 0.3		Rev. 1.18	To solve configuration problems with the OS/RAM32 board, a 47 pF capacitor has been mounted between pins 4 and 10 of component 74F245 at location UGA12. Applied at field level only.
<b>BA243</b>	-		This board has evolved in the same way as BA242.	

INTEGRATED CONTROLLERS	INTEGRATED CONTROLLERS
<b>i386SX</b> CPU <b>80387SX</b> Coprocessor <b>8272</b> Floppy disk Controller <b>8259A</b> Two Interrupt Controllers <b>82308 MCA BUS Control</b> Compatibility with the Microchannel BUS Support for 8 - 16 - or 32-bit data transfers <b>82307 DMA controller and Interrupt Arbiter</b> 8 DMA channels Refresh generation for memory boards on BUS Interface between CPU and Coprocessor Decode of I/O device interrupts DMA controller <b>16550 Serial port controller</b> <b>MV146818</b> RTC and 64 Byte of CMOS RAM	82309 Address BUS Controller RAM refresh cycle management RAM access control ROM BIOS access control Decode of the addresses of devices on the system board Implements the error recovery registers at given I/O addresses <b>82306 Local Channel Support Controller</b> Floppy Disk subsystem support I/O address decode 8254 compatible programmable timer System POS registers Registers for the system board functions NMI logic <b>8742</b> Keyboard controller <b>PVGA1</b> Video adapter

**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU motherboard	BA823	412445 M	P1.4 printed level - 1 MB of memory
CPU motherboard	BA827	412519 P	P1.4 printed level - 2 MB of memory
CPU motherboard	BA242	-	P5 printed level - 1 MB of memory
CPU motherboard	BA243	-	P5 printed level - 1 MB of memory
Console board	CO131	951747 F	
Power supply	PS13A	412446 N	
Hard disk controller	GO787	412449 Z	ST506 controller
Hard disk controller	GO788	412450 W	ESDI controller
Hard disk controller	GO525	412814 F	ESDI controller
Hard disk controller	GO564	-	ESDI controller replaces GO525

**PAL**

CODE	FUNCTION	POSITION	EVOLUTION
PRS4	Reset circuit	UF13A	PLSN
WS	RTC & CMOS RAM	U17C	
SG	Clock circuit	UCC9	
HS	Clock circuit	UD9	
SL	POS registers	UN4	
SK	VGA circuit	UJ5	SM
CSLA	Keyboard controller 872	RT4	

**USER DISKETTE**

LEVEL	COMPATIBILITY
1.06 update 4	BIOS 1.09
1.07 update 2	BIOS 1.14
1.08 update 2	BIOS 1.16 Solves: <ul style="list-style-type: none"> <li>- Video test problems responsible for system crashes</li> <li>- The hard disk test problem which indicates test that has been passed even when the hard disk is not connected.</li> </ul>

**COMPATIBILITY NOTES**

BOARD or HW/SW DEVICE	DESCRIPTION
ROM BIOS 1.06	Solves: Handling problems with IBM 3270 board
ROM BIOS 1.09	For use with the user diskette Ver. 1.06 upd 4 Solves: "Real Time Clock" random errors
ROM BIOS 1.14	Solves: <ul style="list-style-type: none"> <li>- System crashes during initialization of the mouse drive if the network password is enabled. The Keyboard controller can not accept the password</li> <li>- Problem with the Intel chip set during access to the system board port 107h.</li> <li>- Problem with the "Monitor detect routine" when the monitor is not present</li> <li>- Problem in hard disk initialization when an error is found in the configuration of the HD controller even when configured correctly</li> <li>- Problem in initialization of the IBM twin serial port board</li> <li>- Incorrect video management</li> <li>- System slow down caused by operation of Real Time Clock</li> <li>- System crash when the parallel port functions are used under Microsoft OS/2 and the ABIOS interface</li> <li>- ABIOS initialization problems</li> </ul>
ROM BIOS 1.16	Solves: Compatibility problems with standard VGA
ROM BIOS 1.18	Solves: <ul style="list-style-type: none"> <li>- PS/2 mouse faults</li> <li>- IBM 8514/A installation problems</li> <li>- Parity error when BUS is loaded with different boards</li> <li>- SW IBM 4700 problems in banking environment</li> </ul>
GO525/GO564	GO564 replaces GO525 to unify stock
ME064 memory board	Board TECMAR Rev. A (ME064 NA) is changed to solve a parity error problem. Board TECMAR Rev. B (ME064 NA/A) being produced does not have this problem

**HARD DISK CONTROLLER**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
G0787	Nasc.	412449 Z		Replacement of components. No change in functions
	Lev. 0.3 MI			
G0788	Nasc.	412450 W	ROM BIOS Ver. R.2020 Firmware Ver. 7.8	Replaced by the GO525 to solve some problems
G0525	Nasc.	412814 F	ROM BIOS Ver. R.2.031 Firmware Ver. 7.11-02	Solves: <ul style="list-style-type: none"> <li>- Crashes in OS/2 ver. 1.10 environment with 2 units installed.</li> <li>- Incorrect management of accesses to alternative tracks.</li> </ul>
	Lev. 0.1		Firmware Ver. 7.11-05	Solves: <ul style="list-style-type: none"> <li>- Incorrect management of installation of NOVEL Netware 286 v.2.15.</li> <li>- Impossibility of formatting a HDU with a Defect List with only one defect.</li> <li>- Incorrect management of read accesses to alternative sectors even with Retries disabled.</li> </ul>
G0564	Nasc.	-	-	Replaces GO525

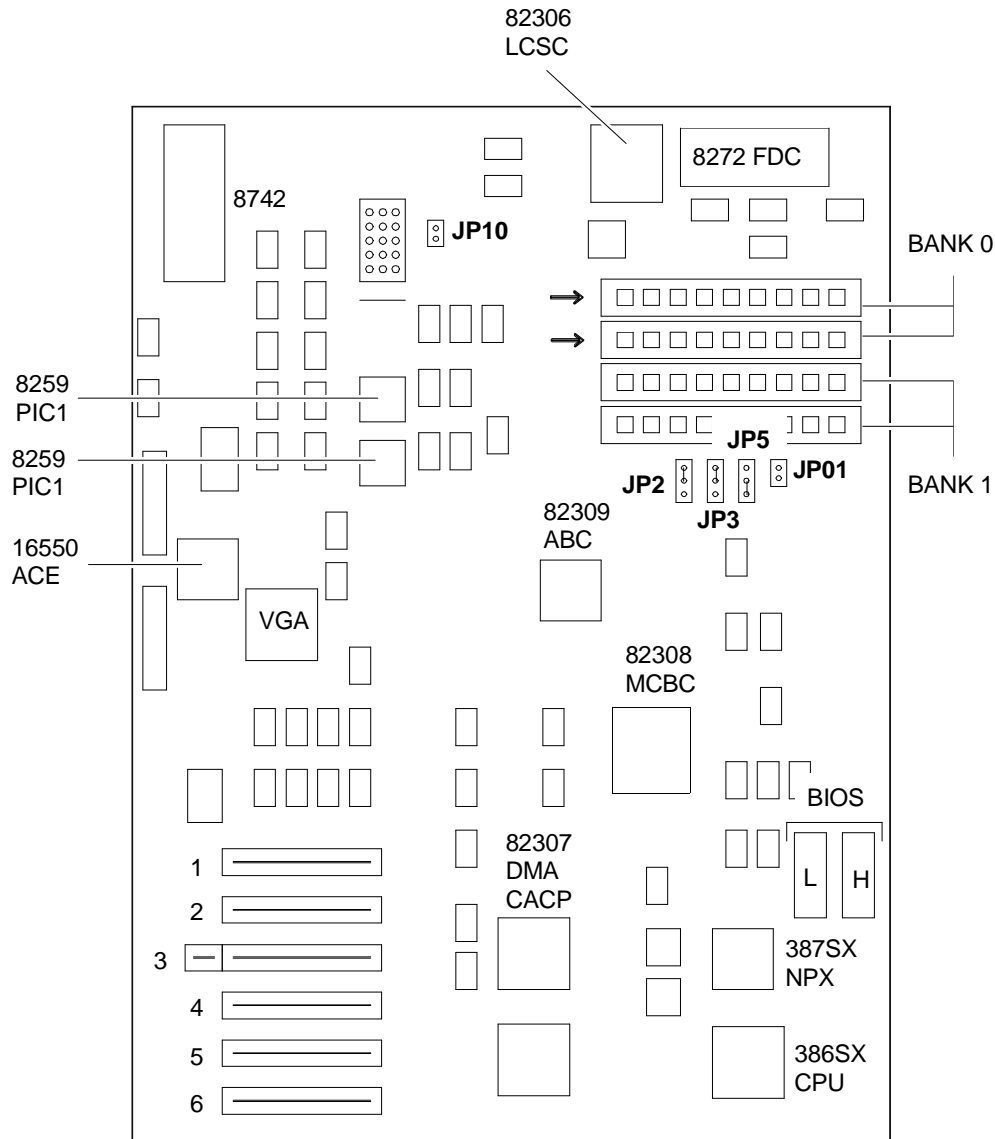
**INSTALLABLE HARD DISKS and BUS ARBITRATION LEVELS**

TYPE	CAPACITY	MODEL	INTERFACE	BUS ARBITRATION LEVEL
6	20 MB	Seagate ST 125	ST506	3
16	20 MB	Miniscribe 8425F	ST506	3
3	40 MB	NEC D3142	ST506	3
13	40 MB	NEC D3146H	ST506	3
22	40 MB	Fujitsu M2227	ST506	3
27	40 MB	Toshiba MK134F	ST506	3
-	80 MB	CDC 94216-106	ESDI	3
-	135 MB	NEC D5655	ESDI	3
-	135 MB	Micropolis 1654-7	ESDI	3





**P5 MOTHBOARD COMPONENTS AND JUMPERS**



- JP01**     **IN**    One memory bank only installed (2 1MB SIMM ). MEM 2 MB  
**OUT**    Two memory banks installed (4 246 Kb SIMMs or 4 1 MB SIMMs)  
           1 or 4 MB memory
  
- JP2 & JP3**    **Position 1-2** 1 MB installed on system board  
**Position 2-3** 2 or 4 MB installed on system board
  
- JP5**            **Position 1-2** 1 MB SIMM Modules  
**Position 2-3** 256 Kb SIMM Modules
  
- JP10**          **IN**     Disables password at power-up  
**OUT**        Normal position

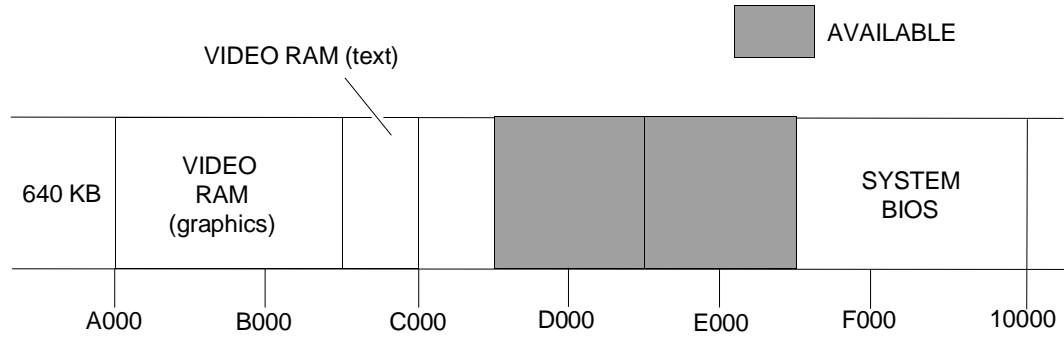
**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Version 4.00	During installation on hard disk, a formatted DSDD disk is required.

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
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)
<b>EXPANSION MEMORIES</b>	<b>MOUSE</b>
IBM PS/2 80286 Memory Exp. Option INTEL Aboveboard/2 Orchid Ramquest extra 16/32	IBM PS/2 Mouse (6450350) Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti New Advanced Mouse (GRD 25-025)
<b>DISPLAY UNITS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
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 Network 3COM Network (Ethernet) 10NET Network
<b>GRAPHICS PRODUCTS</b>	<b>OTHER PRODUCTS</b>
IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller	SOFTWARE SECURITY Parallel Port Block

**SYSTEM MEMORY MAP**



ADDRESS	SIZE	FUNCTION
00000000 - 0009FFFF	640 K	System RAM - Bank 0 on motherboard
000A0000 - 000BFFFF	128 K	Video RAM
000C0000 - 000DFFFF	128 K	I/O ROM
000E0000 - 000FFFFF	128 K	System Board ROM
00100000 - 0025FFFF	1408 K	System RAM Bank 0
00260000 - 0045FFFF	2048 K	System RAM Bank 1
00460000 - 00FDFFFF	11776 K	Memory expansion board
00FE0000 - 00FFFFFF	128 K	System Board ROM

**DMA CHANNELS**

CHANNEL	FUNCTION
0	DMA 0
1	DMA 1
2	Floppy disk
3	DMA 3
4	DMA 4
5	DMA 5
6	DMA 6
7	DMA 7
8	EXP. SLOT
9	EXP. SLOT
A	EXP. SLOT
B	EXP. SLOT
C	EXP. SLOT
D	EXP. SLOT
E	EXP. SLOT
F	386SX CPU

**INTERRUPT LEVELS**

LEVEL	FUNCTION
RQ0	Channel 0 of output timer
IRQ1	Keyboard interface
IRQ2	Interrupt from PIC2
IRQ3	Available
IRQ4	Primary serial port
IRQ5	Parallel port 2
IRQ6	Floppy disk controller
IRQ7	Parallel port 1
RQ8	Real Time Clock
IRQ9*	Reserved
IRQ10	Available
IRQ11	Available
IRQ12	Mouse
IRQ13	Coprocessor
IRQ14	Hard disk controller
IRQ15	Available

\* Redirected via software to IRQ2

**CMOS MEMORY MAP (SETUP)**

BYTE	FUNCTION	BYTE	FUNCTION
00-0D	R.T.C	18	Expansion RAM most significant byte
0E	Reserved	19	Hard disk unit type C
0F	Protected mode or Virtual mode	1A	Hard disk unit type D
10	Floppy disk type	1B-2D	Reserved
11	Reserved	2E-2F	Address control 10-2D
12	Hard disk unit type C and D	30	Least significant byte of RAM Total
13	Reserved	31	Most significant byte of expansion RAM
14	System configuration	32	Information on the data
15	RAM low byte	33-37	Reserved
16	RAM high byte	38-3F	Password
17	Expansion RAM least significant byte		

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000- 01F	DMA controller	0C0-0DF	DMA channel 4-7
020-021	First interrupt controller	100-1EF	POS registers
022-03F		1F0-1FF	Hard disk controller
040	Timer	200-277	
041		2F8-27A	Parallel port 3
042-044	Timer	27B-27F	
045-046		2F8-2FF	Serial port 2
047	Timer	300-377	
048-05F		378 - 37A	Parallel port 2
060	Keyboard controller	37B-3B3	
061	System Port B controller	3B4-3B5	Video adapter
062-063		3B6-3B9	
064	Keyboard controller	3BA	Video adapter
065-06F		3BB	
070-091	RTC/CMOS and NMI mask	3BC - 3BF	Parallel port 1
072-073		3C0-3C9	Video adapter
074-076	CMOS RAM expansion	3CA-3CD	
077-07F		3CE-3CF	Video adapter
080-08F	DMA registers	3D0-3D3	
090	POS registers	3D4-3D5	Video adapter
091	Selected board register	3D6-3D9	
092	System Port A controller	3DA	Video adapter
093		3DB-3EF	
094-095	POS registers	3F0 - 3F7	Hard disk controller
096-097	POS registers	3F8 - 3FF	Serial port 1
098-09F		400-FFFF	
0A0-0A1	Interrupt controller 2	8000F8-	Coprocessor
0A2-0BF		8000FF	

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# P800

## CHARACTERISTICS

Microprocessor	Intel 80386
Clock	25 MHz
Architecture	MICROCHANNEL
Memory	The system board supports 16 MB installed in 4 banks: <ul style="list-style-type: none"> <li>- 2 banks of 4 MB on system board</li> <li>- 2 banks of 4 MB on expansion board <b>MEM 26-804</b></li> <li>- 2 banks of 4 MB on Proprietary memory <b>MEM 26-806</b></li> </ul> Modules that can be installed in memory banks are SIMM 1 MB x 9 <b>EXM 26-805</b> <b>MEM 26-806</b> is a Proprietary memory expansion module of 4 MB expandable to 8 MB with SIMM module kit <b>EXM 26-805</b>
Memory access	80 ns
Coprocessor	1) Intel 80387 2) Weitek 3167
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	150 MB Micropolis 1654-7 150 MB NEC D5655 300 MB Micropolis 1558
Streaming Tape	80 MB IRVIN 285
AT Expansion slots	8 Present 7 Available
Video adapter	Integrated on System Board - Super VGA 82C451
Floppy Disk controller	Integrated on System Board Floppy Disk controller: WD 57C65
Hard Disk controller	1) GO788 WD1007V - MC1 ESDI interface 2) GO525 ESDI interface 3) GO564 ESDI interface
Cache Controller	82385
Cache size	64 KB
Mouse	PS/2- and AT-compatible GRD 25-025
Keyboard	101/102-key ANK26-101 ANK26-102.

### SYSTEM BOARD

BA826

### BIOS

Last level:  
Rev. 1.07

### POWER SUPPLY

PS30B 220V Lev. 08 MI  
PS30B 110V Lev. 06 MIPS30/B1 220V  
Lev. 01 MIPS30/B1 110V  
Lev. 01 MIS.P.S.  
PS30C 220V Lev. 02 MIS.P.S.  
PS30C 110V Lev. 02 MI

### CONSOLE

IF 632  
Level: 02 MI

### HARD DISK CONTROLLER

GO788 ESDI  
Lev.: 01GO525 ESDI  
Lev.: 01 MIGO564 ESDI  
Lev.: NASC

**SYSTEM BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
<b>BA826</b>	Lev. Nasc.	412636 L	ROM L PBZ4 - U118 ROM H PBZ5 - U119 Rev. 1.02	See the following table.
	Lev. 01 MI		ROM L PBZW ROM H PBZX Rev. 1.03	RETROFITTING
	Lev. 03 MI Lev. 0.2 does not exist		ROM L PPU8 ROM H PPU9 Rev. 1.05	<ul style="list-style-type: none"> <li>- Insertion of a <b>PAL GL1G Rev. 2</b> Pos. U129</li> <li>- Replacement of the PAL PLDM rev.1 with a <b>PAL GL1H Rev. 2.</b> Pos. U65</li> <li>- Replacement of the PAL PLDJ rev. 3 with a <b>PAL GL1J Rev. 4.</b> Pos. U159</li> </ul>
	Lev. 04 MI		ROM L PPJ0 ROM H PPJ1 Rev. 1.06	Cutting and trimming to solve the system crash problem after a manual reset
	Lev. 05 MI		Rev. 1.07	Solves the BIOS problems of the W.D. board
	Lev. 06 MI		Rev. 1.07	The RESET4 circuit has been modified to solve the system crash problems after a manual reset
	Lev. 07			A 70 ns PAL has been mounted at U129 to solve the problems concerning DOS 5.0 and WIN 3.1. Applied at field level only.

INTEGRATED CONTROLLERS	INTEGRATED CONTROLLERS
<b>82385</b> <b>82C206</b>  <b>8042</b> <b>82C451</b> <b>16C552</b> <b>WD57C65</b> <b>CMOS RAM</b> <b>82C226</b>  <b>82C231 MCA controller</b>	<b>82C322 Memory Controller</b> Supports 256 KB - 1M DRAM Shadow RAM Supports up to 16 MB Programming of wait states <b>82C325 Data Buffer Controller</b> Bus Conversion and Bus Swapping function Generation and checking of parity errors in DRAM Contains POS register in MCA architecture <b>82C223 DMA Controller</b> Performs DMA operations 8 independent DMA channels Extended mode operations 16 MB memory addressing capacity DMA serial operations Supplies virtual DMA on channels 0 and 4

**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU system board	BA826	412636 L	4 MB of memory
Console interface board	IF632	412637 M	
Memory board	ME937	412936 H	4 MB of on-board memory
Memory board	ME938	612102 W	4 MB of on-board memory
Power supply 220 V		412638 W	
Power supply 110 V		412639 X	
Hard disk controller	GO525	412814 F	ESDI controller
Hard disk controller	GO564	-	ESDI controller
Hard disk controller	GO788	412450 N	ESDI controller

**USER DISKETTE**

LEVEL	COMPATIBILITY
1.00 update 1	From BIOS 1.03
1.00 update 2	From BIOS 1.03 - Solves the faults of previous version
1.01 update 2	From BIOS 1.03 - Solves the Tecmar memory expansion board installation problems

**CONSOLE**

	LEVEL	D.R.S. CODE	ROM BIOS	COMPATIBILITY
IF632	Lev. Nasc.	412637 M	CSQ7 - U4 Rev: 1.3	Compatible with BIOS Rel. 1.03
	Lev. 01 MI			Cutting and trimming taken in and inversion of the signals on connector J2. This version is not compatible with the earlier version.
	Lev. 02 MI		CSQ6 Rev: 1.5	Solves the error message problems of the SPS.  Introduction of the label "Bar Code Traceability". This change does not modify the console level.

**HARD DISK CONTROLLER**

	LEVEL	D.R.S. CODE	ROM BIOS	COMPATIBILITY
GO788	Lev. Nasc.	412637 M	–	Compatible with BIOS 1.02
	Lev. 01		Rel. 7.11-05	Solves: - Crashes under OS/2 ver. 1.10 with 2 units installed. - Incorrect management or access to the alternative tracks
GO525	Lev. Nasc.	412814 F	Rel. 7.11-02	
GO564	Lev. Nasc.	–	–	Replaces GO525

**INSTALLABLE HARD DISKS AND BUS ARBITRATION LEVELS**

TYPE	CAPACITY	MODEL	CYL	T	LZ.	INT	ARBITRATION LEVEL
25	135 MB	Micropolis 1654-7	820	8	822	ESDI	3
24	135 MB	NEC D5655	1021	10	1023	ESDI	3
31	300 MB	Micropolis 1558	814	15	1	ESDI	3
	300 MB	CDC 94186-386				ESDI	3
	80 MB	CDC 94126-106				ESDI	3

Where: CYL: No. of disk cylinders

INT: Interface

LZ: Head parking cylinder number

T: No. of disk heads

WPC: Precompensation cylinder number

**PS30B POWER SUPPLY UNIT**

POWER SUPPLY	LEVEL	NOTES
PS30B 220/110 V	Lev. Nasc.	Solves power up criticality problems Modifications to structure, no change in functions Modification made in order to acquire larger margins on MOS voltage. Solves: - Power up random failure problems - + 12 V auxiliary voltage out of specs problems - + 5 V auxiliary diode breakage
PS30B 220/110 V	Lev. 01 MI	
PS30B 220/110 V	Lev. 02 MI	
PS30B 220/110 V	Lev. 03 MI	
PS30B 220/110 V	Lev. 04 MI	
PS30B 220/110 V	Lev. 05 MI	
PS30B 220V only	Lev. 06 MI	
PS30B 220V only	Lev. 07 MI	
PS30B 220V	Lev. 08 MI	Changes due to telediagnosis (cable through)
PS30B 110V	Lev. 06 MI	Changes due to telediagnosis (cable through)
PS30/B1	Lev. Nasc.	New power supply unit to conform with Northern Countries safety rules (see CP486)
	Lev.: 0.1 MI	Changes due to PEM



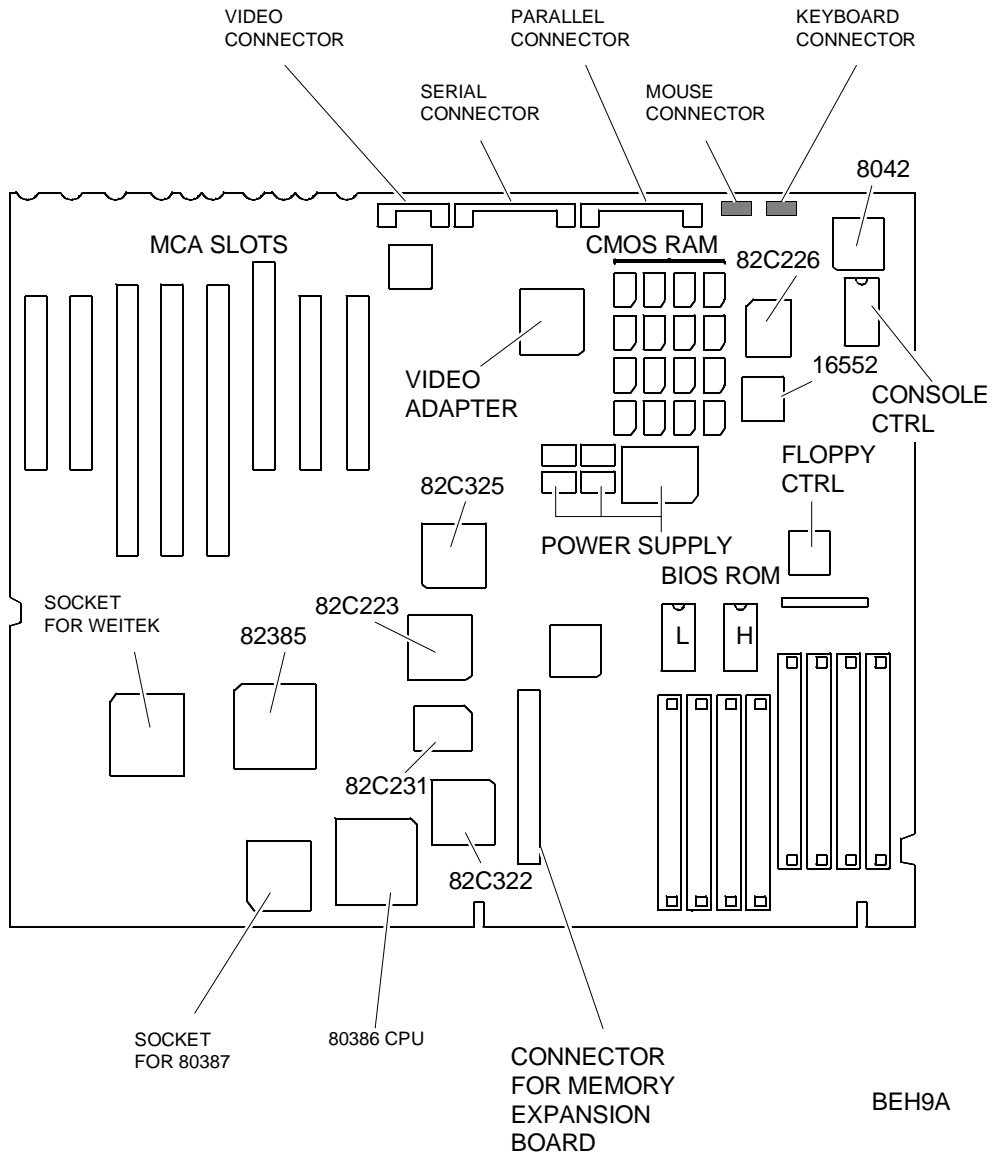
**PS30C S.P.S.**

LEVEL	NOTES
Lev. Nasc. Lev. 01 MI Lev. 02 MI	Solves the output voltage problem that, in previous level, was at tolerance limit.

**COMPATIBILITY NOTES**

BOARD OR HW/SW DEVICE	DESCRIPTION
Console Firmware 1.5	Solves problems of error messages displayed on the console when the SPS is installed
ROM BIOS 1.03	Solves: <ul style="list-style-type: none"> <li>- Diagnostic problems</li> <li>- Messages on screen</li> </ul>
ROM BIOS 1.05	Solves: <ul style="list-style-type: none"> <li>- Disables all memory banks (except for bank 0) when one is found faulty.</li> <li>- Error signalled during the "Parallel Port Test" when an Olivetti parallel printer is connected.</li> <li>- Control of hard disk controller ID during initialization</li> </ul>
BIOS GO525	Solves: <ul style="list-style-type: none"> <li>- System crashes when working in OS/2 ver 1.1 with 2 units installed.</li> <li>- Incorrect management of access to the alternative tracks</li> </ul>
LOW LEVEL FORMAT diskette ver. 1.20	Solves the problem of version 1.10 in which it was not possible to format the entire hard disk if a power failure occurred during formatting.
Hard disk NEC D5655	Incompatibility between hard disk controller GO788 and hard disk NEC D5655 in cases where the hard disk mounts a G8ATE circuit board. There are no problems where the hard disk has a G8ATA board.
Insertion and replacement of PAL's and cutting and trimming made. Lev. 03 System Board	Solve random system crashes during execution of the self-test or during use of the FLIGHT SIMULATOR program.
Level 0.1 of power supply PS30/B1	Change due to PEM introduction on CP486 that uses the same power supply unit
82C451 C&T component Video Controller	Step "C" of this component can be installed on Personal Computer P800. This replacement is to be made in case of failure and is not implemented at the factory by Olivetti.

### SYSTEM BOARD COMPONENTS, JUMPERS



**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 IBM Operating System/2 Extended Edition, Ver. 1.1 and Ver. 1.10 Olivetti's Microsoft OS/2, Ver. 1.10	During installation on hard disk, a formatted DSDD disk is required.

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
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)
<b>EXPANSION MEMORIES</b>	<b>MOUSE</b>
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)
<b>DISPLAY UNITS</b>	<b>NETWORKS &amp; LAN PRODUCTS</b>
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 network Ver.2.12 3COM Network (Ethernet) 10NET Network
<b>GRAPHICS PRODUCTS</b>	<b>OTHER PRODUCTS</b>
IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller	SOFTWARE SECURITY Parallel Port Block

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**SYSTEM MEMORY MAP**

<b>ADDRESS</b>	<b>SIZE</b>	<b>FUNCTION</b>	<b>CACHE</b>
00000000 - 0007FFFF	512 KB	System DRAM	YES
00080000 - 0009FFFF	128 KB	I/O RAM	YES
000A0000 - 000BFFFF	128 KB	Video adapter RAM	NO
000C0000 - 000DFFFF	128 KB	I/O ROM	NO
000E0000 - 000FFFFFF	128 KB	BIOS (SHADOW RAM)	YES
00100000 - 00FFFFFF	15 MB	System RAM	YES
01000000 - BFFFFFFF	15 MB	System RAM	YES
C0000000 - C1FFFFFF		Weitek Coprocessor	UNIMPORTANT
C2000000 - FFFDFFFF	15 MB	System RAM	YES
FFFE0000 - FFFFFFFF	128 KB	ROM BIOS	YES

**DMA CHANNELS**

CHANNEL	FUNCTION	CHANNEL	FUNCTION
0	Reserved	4	Reserved
1	Available for use	5	Available for use
2	Floppy disk	6	Available for use
3	Available for use	7	Available for use

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000- 01F	DMA controller (channels 0-3)	096 - 097	POS, Connector selection
020-021	First interrupt controller 8259A	0A0 - 0A1	Second interrupt controller 8259A
022	System Setup Indexing registers	0C0 - 0DF	DMA controller (4 - 7)
023	System Setup Data registers	0E0	Split address register
040-047	System Timer	0E1	Memory map register
060	Auxiliary device	0E2	Cache control register
061	System Port B controller	0E3 - 0E7	Channel restore registers
064	Auxiliary device	0F0 - 0FF	Coprocessor
070 - 071	RT/CMOS and NMI mask	100 - 107	Programmable option selection
074 - 076	8 KB CMOS RAM expansion Configuration registers 68B50 registers	1F0 - 1F8	Hard disk adapter
081 - 087	DMA registers pages 0 - 3	278 - 27B	Parallel port 3
089 - 08F	DMA registers pages 4 - 7	2F8 - 2FF	Serial port 2 (RS-232-C)
090	Central arbitration control port	378 - 37B	Parallel port 2
091	Response from board selected	3BC - 3BF	Parallel port 1
092	System Port A controller	3B4 - 3C5	Video subsystem
093	Reserved	3CE - 3DA	Video subsystem
094	Boards enable	3C6 - 3C9	Video DAC, Bt471
		3F0 - 3F7	Floppy disk controller
		3F8 - 3FF	Serial port 1 (RS- 232-C)

**INTERRUPT LEVELS**

LEVEL	FUNCTION	LEVEL	FUNCTION
RQ0	Channel 0 of timer output	RQ8	Real Time Clock
IRQ1	Keyboard interface	IRQ9	Redirected via software to IRQ2
IRQ2	Interrupt from PIC2	IRQ10	Available
IRQ3	Optional serial port	IRQ11	Available
IRQ4	Primary serial port	IRQ12	Mouse
IRQ5	Available	IRQ13	Coprocessor
IRQ6	Floppy disk controller	IRQ14	Hard disk controller
IRQ7	Parallel port	IRQ15	Available



# CP486

## CHARACTERISTICS

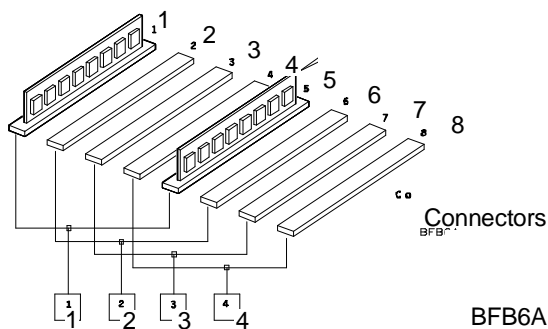
Microprocessor	INTEL 80486
Clock	25 MHz
Architecture	32-bit EISA (Extended Industry Standard Architecture)
Memory	2 or 4 MB on system board expandable up to 16 MB by: <b>EXM 26-482</b> 2 SIMM 1 MB x 9 100 ns <b>EXM 26-484</b> 2 SIMM 2 MB x 9 100 ns
Memory access time	80 ns
Coprocessor	1) Integrated in the INTEL 80486 2) Weitek 4167
Optional processor	INTEL i860
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	150 MB Wren V HH SCSI Micropolis 1674-7 300 MB Wren IV SCSI Seagate ST2383N 600 MB Maxtor XT - 8760S
Streaming Tape	Wangtek 150 MB SCSI
EISA slots	8 Present 6 Available
Video adapter	EISA EVC-1 board GO734 EISA EVC-1 board GO739
Hard Disk and Floppy disk controller	EISA ESC-1 board GO736 EISA ESC-1 board GO738 EISA ESC-1 board GO740
Cache Controller	Integrated in microprocessor
Cache size	8 KB integrated in microprocessor
Mouse	PS/2 and AT compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

## MEMORY EXPANSION

**WARNING:** It is not essential to fill all the memory banks available. Starting from the basic 4 MB, it is thus possible to obtain the following memory configurations: 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64 MB.

The SIMM modules installable are:

EXM 26-484 4 MB  
EXM 26-482 2 MB



## SYSTEM BOARD

BA847 P1.25 - 2 MB  
BA867 P1.7 - 4 MB

## BIOS

BA847: 2.03  
BA867: 2.03

## VIDEO ADAPTER

GO734  
GO739

## HARD DISK - FLOPPY DISK CONTROLLER

GO736  
GO738  
GO740

## CONSOLE

IF632 497860 X  
1) Level: 01MI  
2) Level: 02MI

## POWER SUPPLY

PS30 B 220 V  
Level: 0.8  
PS30 B 110 V  
Level: 0.6  
SP30/B1 220 V  
Level: 01  
PS30/B1 110 V  
Level: 02  
PS30 C 220 V S.P.S.  
Level: 02  
PS30 C 110 V S.P.S.  
Level: 02

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**SYSTEM BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA847</b>	Lev. Nasc.		ME9W 497352V Rev. 1.06	
	Lev. 01		ME9R 497416E Rev. 1.08.2 Rev. 1.08.2	- New BIOS to solve the interrupt 5, SCSI controller and configuration problems - PAL replaced to solve the Data Compare Error problem
	Lev. 02		ME8K 497450U Rev. 1.10.1	- New BIOS for management of INT13 and the power-on diagnostics - PAL replaced to allow management of the i860 processor and solve the DMA parity error and system lock problems
	Lev. 03			- ISP A2 without Piggyback introduced.
The modifications described from this point on have not been implemented in production but in the field only.				
<b>BA847</b>	Lev. 04		PPJ5 498060H Rev. 1.15	- New BIOS to solve the following problems: - Reset of 860 - Proteon P1344 - Format and auto slow with C3 82077 - Win386 - Matrox 1281 - Installation of NETWARE/386 on HDU
	Lev. 05 Lev. 06		Rev. 1.15 Rev. 1.15	- Two PAL changed to eliminate Panic error and parity error in SCO UNIX.
	Lev. 08		Rev. 1.15	- Cut to solve system hang problems on some TORUS (EISA) communication boards and serial port malfunctioning.
	Lev. 09		PPJF 498124J Rev. 2.0	- New BIOS for addition of following features: - Support for more than 2 HDU - Support for several ESC-1 boards - Support for PEM - Support for telediagnostic board - Support for ESDI HDU
	Lev. 10		Rev. 2.0	- Cut to solve system hang problems during P.O.D.
	Lev. 11		PPJR 498155Z Rev. 2.01	- New BIOS for management of the 300 MB ESDI Type 35 hard disk and solve the following problems: - BOOT with non-formatted ESDI HDU - BOOT from diskless system - Compatibility

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
BA847	Lev. 12		Rev. 2.01	- Changes to solve interrupt noise problem of serial port when i486 microprocessor non D0 is installed on motherboard
	Lev. 13		Rev. 2.01	- Keyboard controller 8.01 introduced to replace the 8.0
	Lev. 14		Rev. 2.03	- New BIOS to solve problems of the previous release: <ul style="list-style-type: none"> <li>- Memory over 16 MB</li> <li>- Boot of 720 KB floppy drives</li> <li>- ADAPTEC EISA Controller</li> <li>- MYLEX SCSI Controller</li> </ul>
BA867	Lev. Nasc.	612164 T	PPJ5 498060H Rev. 1.15	- New layout level for recovering cutting and trimming and solve problems of previous board. Board with 4 MB of memory.
	Lev. 01		PPJF 498124J Rev. 2.0	- New BIOS for addition of following features: <ul style="list-style-type: none"> <li>- Support for more than 2 HDU</li> <li>- Support for several ESC-1 boards</li> <li>- Support for PEM</li> <li>- Support for telediagnostic board</li> <li>- Support for ESDI HDU</li> </ul>
	Lev. 02		Rev. 2.0	- Cuts and wirings to solve problem of system locks during the P.O.D. when there are several EISA boards on the BUS
	Lev. 03		PPJR 498155Z Rev. 2.01	- New BIOS for management of the 300 MB ESDI Type 35 hard disk and solve the following problems: <ul style="list-style-type: none"> <li>- BOOT with non-formatted ESDI HDU</li> <li>- BOOT from diskless system</li> <li>- Compatibility</li> </ul>
	Lev. 04		Rev. 2.01	- Serial port problems due to noise on interrupts when using an i486 processor not step D now solved. - Signal BCLK improved
	Lev. 06		Rev. 2.01	- New keyboard controller 8.01 introduced - New 80486-25-D0 introduced to replace the 80486-26-B6 WD component 16C552 Mask D used to replace the previous component.

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
BA867	Lev. 07	612164 T	Rev. 2.01	<ul style="list-style-type: none"> <li>- Allows introduction of step A2 of the EBC 82358 component replacing step A1</li> <li>- Improved BCLK EISA BUS signal and EBC HCLKCPU signals</li> <li>- New BIOS to solve problems of the previous release                             <ul style="list-style-type: none"> <li>- Memory over 16 MB</li> <li>- Boot of 720 KB floppy drives</li> <li>- ADAPTEC EISA Controller</li> <li>- MYLEX SCSI Controller</li> </ul> </li> </ul>

**INTEGRATED CONTROLLERS**

CONTROLLER	FUNCTION
<b>82537 ISP</b>	DMA Controller Interrupt Controller 5 Timers I/O Ports
<b>XL2865</b>	EEPROM Configuration
<b>DS1287</b>	Real Time Clock/Timer
<b>8042/8742</b>	Keyboard and Mouse Controller
<b>WD16C552</b>	Serial and Parallel Port Controller
<b>82358 EBC</b>	EISA BUS Controller

**WARNING:** If hardware or firmware changes should occur on system board, hardware and firmware for hard disk and video controller boards must also be changed if necessary. See table below

**BOARDS, DIAGNOSTIC BIOS AND DRIVERS COMPATIBILITY**

SYSTEM BOARD			HDU CTRL			VIDEO CTRL			DIAGNOSTIC		DRIVER	
BDS	BIOS	LEV.	ESC 1	FW	LEV.	EVC 1	FW	LEV.	S.T.	U.D.	OEM	EVC
847	1.06	Na	736	1.10	01	734	1.02	01	1.20 05	1.10 02	4.08 1.3	1.01
847	1.06	Na	738	1.10	Na	734	1.02	01	1.20 05	1.10 02	4.08 1.3	1.01
847	1.08.2	01	738	1.13	01	734	1.02	02	1.20 1	1.20 04	4.08 1.4	2.01
847	1.08.2	01	738	1.13	03	734	1.02	02	1.20 1	1.10 04	4.08 1.4	2.01
847	1.10.1	02	738	1.22	04/05	734	1.02	03	1.20 1	1.20 01	4.08 1.4 2	2.01 3
847	1.10.1	03	738	1.22	04/05	734	1.02	03	1.20 1	1.20 01	4.08 1.4 2	2.01 3
847	1.10.1	03	738	1.22	08	734	1.02	03	1.20 1	1.20 01	4.08 1.4 2	2.01 3
847	1.10.1	03	740	1.35	Na	734	1.02	03	1.50	1.20 01	4.08 1.4 2	2.01 3
847	1.15	04	738	1.35	09	734	1.03	04	1.50	1.20 01	4.08 1.4 2	2.01 3
867	1.15	Na	740	1.35	Na	739	1.03	Na	1.50	1.20 01	4.08 1.4 2	3.0
867	2.0	01	740	1.42	01	739	1.03	Na	1.50	1.20 01	4.08 1.4 2	4.0 1.3
867	2.01	03	740	1.43	02	739	1.03	Na	1.50	1.20 01	4.08 1.4 2	5.0
867	2.03	07	750	1.43	02	739	1.03	Na	1.50	1.20.01	4.08 1.4 2	5.0



**REFURBISHING KITS**

These KITS allow system board BA847 to be increased to level 05/06, and hard disk controller board GO738 of CP486 to be increased to level 08.

INITIAL LEVEL		KIT TO BE USED
SYSTEM BOARD	HDU CONTROLLER	
BA847 Level Nasc.	GO736 Lev. 01	<b>KIT003-03</b> code 977732 S <b>KIT003-04</b> code 977733 T Composition: Material for BA847 change HDU controller board GO740 Starter kit floppy 3.5" KIT003, floppy 5.25" KIT004
BA847 Level Nasc.	GO738	<b>KIT003-01</b> code 977730 C <b>KIT003-02</b> code 977731 Z Composition: Material for BA847 change HDU controller board GO738 Starter kit floppy 3.5" KIT001, floppy 5.25" KIT002
BA847 Level 02/03	GO738 Lev. 04	<b>KIT003-06</b> code 977803 T Composition: Material for BA847 change Material for GO738 change
BA847 Level 02/03	GO738 Lev. 05	<b>KIT003-06</b> code 977800 C Composition: Material for BA847 change Material for GO738 change

**BA847 I/O DEVICES**

<b>DEVICE</b>	<b>TYPE</b>	<b>LOCATION</b>
Asynchronous communication element	WD16C552	U10
Keyboard and mouse controller	8742AH	U13
Flash EPROM	28F010	U14
Configuration EEPROM	XL2865A	U15
Real time clock	DS1287	U16
PAL CPU reset counter	16R6	U17
I/O controller 3	20L8	U24
PAL keyboard intercept	22V10	U25
I/O controller 2	EP1800	U26
I/O controller 1	EP1800	U27
EISA BUS controller	82358-25	U35
EISA integrated system peripherals		U36
Address decode PAL	20L8	U37
Even RAS driver	16L8	U39
Odd RAS driver	16L8	U40
PAL, Address translation	16L8	U44
PAL, RAM map control	16L8	U46
PAL, AEN(x) generation	22V10	U47
PAL, parity error control	20V8	U69
PAL, Snoop Stroke control	16R4	U70
PAL, Burst address generation	20R4	U74
Odd CAS driver	16L8	U75
Even CAS drive	16L8	U76
PAL, Byte-enable control	16L8	U80
PAL, EISA buffer control	16L8	U81
PAL, host access control	20R6	U82
PAL, latch address control	16L8	U83
PAL, system reset control	16R8	U84
PAL, Burst control	16R4	U85
PAL, CAS control	16R4	U87
PAL, EISA access control	20L8	U96
PAL, RAS control	16R4	U97
PAL, CPU control	20R6	U203
PAL, numeric coprocessor address control	20L8	U204
PAL, numeric coprocessor control	16R8	U205
PAL, BUS arbitration	16R6	U206
PAL, BUS control	20R6	U207
PAL, parity error detection	20L8	U208
PAL2, numeric coprocessor addresses	20L8	U218
PAL3, numeric coprocessor addresses	20L8	U219
PAL1, numeric coprocessor addresses	20L8	U220
WEITEK coprocessor	WTL4167	U232
Microprocessor	I486	U233
Optional microprocessor	I860	U241

**BA867 I/O DEVICES**

<b>DEVICE</b>	<b>TYPE</b>	<b>LOCATION</b>
Asynchronous communication element	WD16C552	U10
Keyboard and mouse controller	8742AH	U13
Flash EPROM	28F010	U14
Configuration EEPROM	XL2865A	U15
Real time clock	DS1287	U16
PAL CPU reset counter	16R6	U17
I/O controller 3	20L8	U24
PAL keyboard intercept	22V10	U25
I/O controller 2	EP1800	U26
I/O controller 1	EP1800	U27
EISA BUS controller	82358-33	U35
EISA integrated system peripherals		U36
Address decode PAL	20L8	U37
Even RAS driver	16L8	U39
Odd RAS driver	16L8	U40
PAL, addresses translation	16L8	U44
PAL, RAM map control	16L8	U46
PAL, AEN(x) generation	22V10	U47
PAL, ISA Master Buffer-Swap	16L8	U56
PAL, parity error control	20V8	U70
PAL, EISA access control	20L8	U71
PAL, Burst address generation	20R4	U72
Odd CAS driver	16L8	U73
Even CAS driver	16L8	U74
PAL, CAS-enable control	20V10	U77
PAL, EISA buffer control	16V8	U78
PAL, host access control	20R8	U79
PAL, latch address control	16L8	U80
PAL, system reset control	16R8	U81
PAL, Snoop control	16R4	U82
PAL, RAS control	16R4	U83
PAL, CAS control	16R4	U84
PAL, CPU control	20R6	U203
PAL, numeric coprocessor address control	20V8	U204
PAL, numeric coprocessor control	16R8	U205
PAL, BUS arbitration	16R6	U206
PAL, BUS control	20R4	U207
PAL, parity error detection	20L8	U208
PAL2, numeric coprocessor addresses	20L8	U218
PAL3, numeric coprocessor addresses	20L8	U219
PAL1, numeric coprocessor addresses	20L8	U220
WEITEK coprocessor	WTL4167	U232
Microprocessor	I486	U233
Optional microprocessor	I860	U241

**VIDEO ADAPTER BOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLERS</b>
<b>G0734</b>	Lev. Nasc.	412783 Q	PBZ2 Rev. 1.01 497534C	<b>82C452</b> super VGA <b>RAM Video</b> - VRAM 100 ns 256 Kx4 Dual-ported
	Lev. 01 MI		PPVC Rev. 1.02 497346X	- New firmware to solve EVC's DAM test error problem - Cuts and wirings to solve overheating and emission out of VDE - FCC/B limitations problems
	Lev. 02 MI		PPVC Rev. 1.02 497346X	- Improvement of performances - Solved problem of 1023rd pixel mixing.
	Lev. 03 MI		PPVC Rev. 1.02 497346X	- Replaced component I74F374 in U36 to improve clock frequency circuit
	Lev. 04 MI		PBZY Rev. 1.03 497461K	- New firmware to support mode 79H function This modification is implemented in field only, not in production.
<b>G0739</b>	Lev. Nasc.		PBZY Rev. 1.03 497461K	New printed circuit to remove cuts and wirings

**POWER SUPPLY UNITS**

<b>POWER SUPPLY UNIT</b>	<b>LEVEL</b>	<b>NOTES</b>
<b>PS30 B 220/110 V</b>	Lev. Nasc.	
PS30 B 220/110 V	Lev. 01	
PS30 B 220/110 V	Lev. 02	
PS30 B 220/110 V	Lev. 03	
PS30 B 220/110 V	Lev. 04	Solves criticality problems at power on
PS30 B 220/110 V	Lev. 05	Frame changes, no change in functions
PS30 B 220/110 V		
PS30 B 220 V only	Lev. 06	Modification made in order to acquire better margins on the MOS voltage.
<b>PS30 B 220 V only</b>	Lev. 07	Solves: Power on random failure problems +12 V auxiliary voltage out of specs problems +5 V auxiliary diode failure problems
PS30 B 220 V only	Lev. 08	Changes due to telediagnosis (cable through)
PS30 B 110 V only	Lev. 06	Changes due to telediagnosis (cable through)
<b>PS30/B1 220/110 V</b>	Lev. Nasc.	New power supply unit to conform with Northern Countries safety rules. Allows PEM device to be installed.
PS30/B1 220/110 V	Lev. 01	Frame change to clear passage for PEM device cable
PS30 C 220/110 V	Lev. Nasc.	S.P.S. device
PS30 C 220/110 V	Lev. 01	
PS30 C 220/110 V	Lev. 02	Changes to improve the output voltage level that is at tolerance limit

**SCSI CONTROLLER BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS
<b>G0736</b>	Lev. 0.1	412784 R	PPUA 497327L PPUB 497328U Rev. 1.10	<b>Processor 80186</b> - Local CPU <b>BIMIC 82355</b> - EISA Bus Master controller <b>82077</b> - Floppy disk controller
	Lev. Nasc.		PPUA 497327L PPUB 497328V Rev. 1.10	<b>80186 CPU</b> - Local CPU <b>BIMIC 82355</b> - EISA Bus Master controller <b>82077</b> - Floppy disk controller
<b>G0738</b>	Lev. 01 MI		PPUD 497366T PPUE 497367U Rev. 1.13	- New firmware to enhance performance - Replaced chip 82355 A1 with 82355 A2 - Replaced FDU controller 82077 C3 with 82077 C4
	Lev. 03 MI		Rev. 1.13	- New 82355 chip to solve timing problems.
	Lev. 04 MI		PPKB 497486D PPKC 497487E Rev. 1.22	- New firmware to support Conner HDUs. - Replaced two PALs to solve noise problems in two components. Implemented on 32 MHz BMIC board It allows use of a 40 MHz oscillator in place of the 32 MHz one
	Lev. 05 MI		Rev. 1.22	- New firmware to support Conner HDUs - Replaced two PALs to solve noise problems in two components. Implemented on 40 MHz BMIC board
	Lev. 08 MI		Rev. 1.22	- Modifications of components, cuts and wirings to solve the "Data Compare Error" during HDU's tests
	Lev. 09 MI		PPKD 497488P PPKE 497489Q Rev. 1.35	- New firmware to manage Olivetti and DEC IDs
	Lev. 10		PPJD 498122Q PPJE 498123R Rev. 1.42	- New firmware to solve the following problems: - AT environment NOVELL DOS driver - 200 MB CONNER and 600 MB MAXTOR HDUs problems - AT mode PEM support
	Lev. 11		PPJP PPJQ Rev. 1.43	- New firmware to solve CONNER HDUs problems
	Lev. 12			New floppy disk controller 82077 CSFM replaces 82077 step C4

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS
<b>GO740</b>	Lev. Nasc.		PPKD 497488P PPKE 497489Q Rev. 1.35	New printed circuit to remove cuts and wirings
	Lev. 01		PPJD 498122Q PPJE 498123R Rev. 1.42	- New firmware to solve the following problems: - AT mode NOVELL DOS driver - 200 MB CONNER and 600 MB MAXTOR HDUs problems - AT mode PEM support
	Lev. 02		PPJP PPJQ Rev. 1.43	- New firmware to solve CONNER HDU problems
	Lev. 03		PPJP PPJQ Rev. 1.43	New BMIC (82355-B0) to replace current 82355 A2. This component can also be installed on the GO738 board.
	Lev. 04		PZDS PZDT Rev. 1.45	Solves some of the faults of the previous version
	Lev. 05			New floppy disk controller 82077 CSFM replaces 82077 step C4

**USER DISKETTE**

LEVEL	COMPATIBILITY
1.00	BIOS 1.02 (not in field)
1.10 upd 2	BIOS 1.06
1.10 upd 4	BIOS 1.08 and subsequent releases
1.20 upd 1	BIOS 1.10 and subsequent releases
1.30 upd 2	BIOS 1.15 and subsequent releases

**SYSTEM TEST**

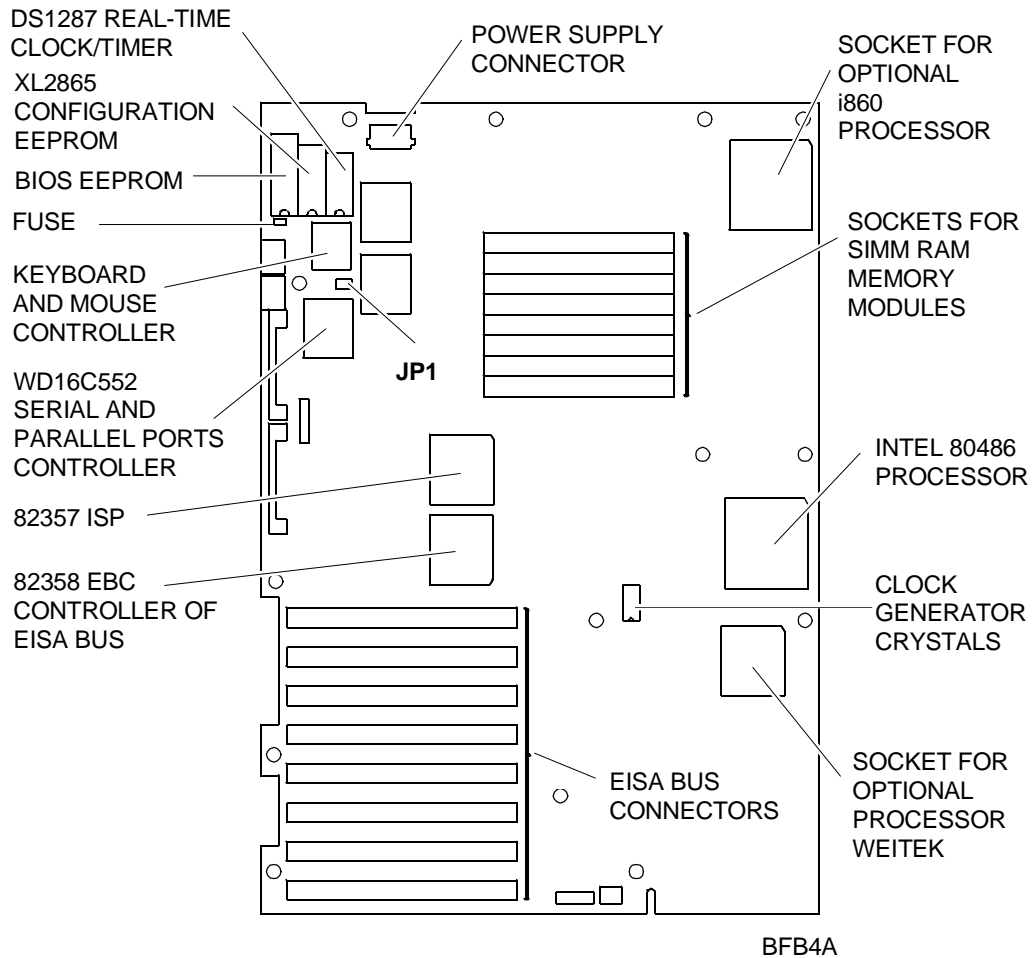
LEVEL	COMPATIBILITY
1.20 upd 5	BIOS 1.06
1.20 upd 1	BIOS 1.08.2 and subsequent releases
1.50	BIOS 1.10 upd 1 and subsequent releases

**COMPATIBILITY NOTES**

<b>BOARD OR HW/SW DEVICE</b>	<b>DESCRIPTION</b>
Console IF632	Level 01MI with console controller CSQ7 13.497118K (U4) does not manage the SPS device. The problem is solved with level 02MI with console controller CSQ6 1.5
OEMM386	Level 4.06 does not acknowledge this Personal Computer. For CP486 use version 4.08 rev. 1.40
ROM BIOS 1.06	Solves: <ul style="list-style-type: none"> <li>- 300 MB hard disk problems</li> <li>- NVRAM SETUP problem</li> <li>- 1.2 and 1.44 MB floppy disk problem</li> </ul>
ROM BIOS 1.08.2	Solves: 600 MB hard disk problem
ROM BIOS 1.10.1	This change on board BA847 is to be simultaneously applied with the GO738 changes which increase its level to 04 MI
Board GO734 (EVC - 1)	When the EVC-1 board operates with direct video access, a VGA compatible controller can be installed on the BUS.
Power supply unit PS30/B1 220 V version	Can be approved at 33 A on +5 (full load) and can comply with the safety norms applied in northern countries
ROM BIOS 1.10.1	Solves: <ul style="list-style-type: none"> <li>- COMPAQ compatibility</li> <li>- Hard disk IRQ13 problems</li> <li>- Power up selftest problems</li> </ul>
SCSI GO738 controller with Firmware 1.20	Via this BIOS it can support CONNER CP486 hard disks
Power supply unit PS30/B	Can not support PEM device. The new power supply unit PS30/B1 can handle this option.
i860 processor	Customer test diskette does not correctly handle the installation of this processor. Possibly new customer test release should handle it.
486 microprocessor	i486 B6 microprocessor is no longer produced. It is replaced by i486 D0 microprocessor that has the same functionalities. On BA847 motherboard, use of a microprocessor different from version D0 causes problems on the parallel port that were solved with level 12.
GO738 (ESC-1)	On hard disk and floppy disk GO738 controller, component 82355 A2 (BMIC) is replaced with component 82355B0 that is functionally compatible with it. This operation is only to be executed in case of malfunctioning in field, board level is not changed.
WD component 16C552 step D	Step D of the WD 16C552 component can be introduced on the BA847 board. Board level is not changed.
EBC component 82358	Step A2 of the EBC 82358 component can be introduced on the BA847 board to replace step A1. Board level does not change.



**SYSTEM BOARD COMPONENTS, JUMPERS**



**JUMPER JP1**

- Disables the system password
  - Cancels the configuration
- If the system is badly configured take the following action:
- 1) Switch off the PC.
  - 2) Move jumper JP1.
  - 3) Switch PC on again. This is the default configuration.
  - 4) Switch off the PC.
  - 5) Put jumper JP1 back to its initial position.
  - 6) Switch the system on and reconfigure with the User Diskette.

Only board  
BA847  
BA859  
BA860

**FUSE F1**

Keyboard and Mouse Fuse 2 A 5 V.

**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20 IBM Operating System/2 Extended Edition, Ver. 1.10 INTERACTIVE 386/ix, Ver. 2.02 Olivetti's Microsoft Disk Operating System, Ver. 3.30a Olivetti's Microsoft Disk Operating System, Ver. 4.01 Olivetti's Microsoft OS/2, Ver. 1.10 and 1.20 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	During installation on hard disk, a formatted DSDD disk is required. PS/2 type mouse not recognised  PS/2 type mouse not recognised

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smartmodem 1200B Hayes Smartmodem 2400B Telenetics Expressdata 24i (24i-12i) Ven-tel PC Modem Half-Card (PCM-XT) Hayes Smartmodem 1200	FUTURE DOMAIN HOST ADAPTER (TMC-830) IBM Asynchronous COM. CARD (1502074) IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL
<b>MULTIPOINT</b>	<b>MOUSE</b>
Anvil Stallion Intelligent 16 Port Controller Chase MSC Connect/AT8 Intelligent 8 Port Computone System Intelliport 16 Port AT16 Computone System Intelliport 16 Port EISA ECC Consensus Powerports 8 Port Intelligent Ctr. Digiboard Digichannel COM/xi Intelligent 8 Port Specialix Si Intelligent I/O Controller	IBM PS/2 Mouse (6450350) Logitech Bus Mouse (PF-3F) Microsoft Bus Mouse, Rev. C Microsoft Serial-PS2 Mouse Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti Bus Mouse (GRD 25-019) Olivetti New Advanced Mouse (GRD 25-025)
<b>GRAPHICS PRODUCTS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
AST RESEARCH AST - 3G PLUS AST RESEARCH AST - VGA PLUS ATI EGA WONDER HERCULES GRAPHICS CARD (GB102) HERCULES INCOLOR CARD (GB222) IBM MONO Display/Printer Adapter (1504900) MATROX PG - 1281 ORCHID PRODESIGNER VGA PLUS PARADISE EGA 480 PARADISE VGA PRO CARD QUADRAM QUAD EGA PLUS (QC 8601) TECMAR VGA AD VIDEO - 7 VEGA DELUXE	CARD (6450215) AT&T Starlan Network IBM OS/2 Lan Server/Requester IBM PC Network IBM Token Ring Network MADGE Token-Ring Network MS OS/2 Lan Manager Novell Advanced netware Ver.2.15 Novell Netware 386 with ISA Adapter Novell Netware 386 with EISA Adapter PROTEON Token Ring Network 3COM 3 + Network /Ethernet) 3COM 3 + Open Lan Manager IONET Network
<b>DISPLAY UNITS</b>	<b>OTHER PRODUCTS</b>
JVC QUAD-SYNC Color (GD-H6116VFW) NEC Multisync Monitor (APC-H431) OLIVETTI HIRES Color (DSM 26-115) PRINCETON RGB Monitor (HX-12) ZENITH RGB/COMPOSITE Monitor (ZVM-135)	OLIVETTI OD-810 WORM (WRM 25-810) PLUS Development 20MB Hardcard SOFTWARE SECURITY Parallel Port Block WELCH-ALLYN Barcode Reader (HBD-100, R. A)

**INTERRUPT LEVELS**

LEV.	NAME	CTRL	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 -10	IRQ2	1	Interrupt to Controller1 from Controller2
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

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
60 h	Keyboard	03F8 - 03FF	COM1 Serial port
70 h	Real time clock. Bit 7 of the real time clock is in the 82357 for NMI	02F8 - 02FF	COM2 Serial port
71 h	Real time clock read/write register	0C00 - 0C05	Configuration registers
92 h	Port A20	0C20 - 0C3F	EEPROM addressing
278 - 2FF	LPT3 Parallel port	0C80 - 0C84	System ID codes
378 - 3FF	LPT2 Parallel port	0CF8 - 0CFF	Console interface
3BC - 3BF	LPT1 Parallel port	0100 - 03FF	Address space for ISA expansion boards

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**SYSTEM MEMORY MAP**

ADDRESS	SIZE	FUNCTION	CACHE
0000 0000 - 000A 0000	640 KB	System RAM	YES
0000 000A - 000C 0000	128 KB	Video memory	NO
000C 0000 - 000E 0000	128 KB	EISA/ISA BUS ROM	YES
000E 0000 - 0010 0000	128 KB	ROM BIOS (copied into the shadow RAM)	YES
00E0 0000 - 0100 0000	13 MB	System RAM	YES
0010 0000 - 00E0 0000	2 MB	Direct video buffer access (location 2)	NO
0100 0000 - 0400 0000	48 MB	System RAM (Maximum memory on system board)	YES
0400 0000 - 1000 0000	192 MB	System RAM (Maximum memory that can be fitted in the cache)	YES
1000 0000 - C000 0000	32 MB	System RAM	YES
C000 0000 - C200 0000	32 MB	Weitek Coprocessor	NO
C200 0000 - D000 0000	224 MB	System RAM	YES
D000 0000 - E000 0000	256 MB	Direct video buffer access (location 1)	NO
E000 0000 - F000 0000	286 MB	SRAM	NO
F000 0000 - FFFE 0000	268 MB	System RAM	YES
FFFE 0000 - 10000 0000	128 KB	ROM BIOS	YES

## M386/25

### CHARACTERISTICS

Microprocessor	Intel 80386
Clock	25 MHz
Architecture	XT/AT
Memory	2 MB soldered on system board Possibility of installing on system board 256 Kb x 9 <b>EXM 26-801</b> and 1M x 9 <b>EXM 26-807</b> SIMM modules to expand memory to 10 MB Possibility of installing a 4 MB memory board expandable up to 8 <b>MEM 26-806</b> . This board can be expanded using kit <b>EXM 26-807</b>
Memory access	80 ns
Coprocessor	1) Intel 80387 2) Weitek 3167
Floppy disk	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Panasonic JU 475-4 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard disk	40 MB Conner CP 3046 - AT Quantum LPS 52 - AT 100 MB Conner CP 30106 - AT Quantum LPS 105 - AT 200 MB Conner CP 3206 - AT
Streaming tape	80 - 120 MB IRWIN 285
AT Expansion slots	5 Present 5 Available
Video adapter	Integrated on System Board - Super VGA 82C452.
Hard disk and floppy disk controller	Integrated on system board FDU controller: National DP8473 HDU controller: Logic ports and MSI Buffers implementing an AT interface for intelligent hard disks.
Cache controller	82385
Cache size	32 KB
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key Compact ANK27-101 ANK27-102.

#### SYSTEM BOARD

BA247

BA255

BA263

#### BIOS

ROM L PEQS - U65

ROM H PEQR - U66

Rev. 1.09

#### POWER SUPPLY

PS14 220 V

Level: 04 MI

PS14 115 V

Level: 04 MI

#### CONSOLE

IF 638

Level: 01 MI

**SYSTEM BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA247</b>	Lev. Nasc.	412907	ROM L PEPY - U65 ROM H PEPX - U66 Rev. 1.04	<b>82385</b> Cache controller <b>82C206</b> Non-volatile RAM NVRAM Real Time Clock RTC DMA controller Interrupt controller  <b>8042</b> Keyboard and mouse controller <b>82C452</b> Super VGA video adapter <b>16C552</b> Serial port controller Parallel port controller  <b>DP8473</b> Floppy disk controller <b>BCU</b> Bus control unit <b>DPU</b> Data path unit <b>MCU</b> Memory control unit <b>IOU</b> Input output unit
	Lev. 01 MI		Rev. 1.04	Solved bootstrap problems after shutdown procedure from UNIX SCO
	Lev. 02 MI		Rev. 1.04	Solved: - EMI problems. Quality improvement. - Parity error problem caused randomly by WE* and CAS* signals.
	Lev. 03 MI		Rev. 1.04	Solved read problems of Bit 4 port 61 (refresh signal)
	Lev. 04 MI		Rev. 1.04	Solved serial port malfunctions
	Lev. 05 MI		Rev. 1.04	Solved RTC and FDC oscillator problems
	Lev. 06 MI		Rev. 1.04	Solved floppy disk bootstrap lock problem caused by FDC 8473 24 MHz oscillator circuit triggering failure
	Lev. 07		ROM L PEQS - U65 ROM H PEQR - U66 Rev. 1.08	New BIOS Changes for field only
	Lev. 08		Rev. 1.08	Replaced video controller 82C452 with video controller 82C452A. This change is only to be executed in case of field failure.
	Lev. 09		ROM L PEQM - U65 ROM H PEQN - U66 Rev. 1.09	Solved compatibility problems with NEC Multisync video and HGC board (high resolution video controller)
	Lev. 10		Rev. 1.09	WD16C551 Step C (LB9U) component is replaced with WD16C551 Step D (LB9V) component. Changes for field only

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA255</b>	Lev. Nasc. Lev. 01 MI		Rev. 1.04 Rev. 1.04	Solved floppy disk bootstrap lock problem caused by FDC 8473 24 MHz oscillator circuit triggering failure
	Lev. 02 MI		ROM L PEQS - U65 ROM H PEQR - U66 Rev. 1.08	New BIOS for video performance improvement, introduced Quantum hard disk and removed password bugs.
	Lev. 03 MI		Rev. 1.08	Replaced video controller 82C452 with video controller 82C452A. This modification to be made only in case of field failure
	Lev. 04 MI		ROM L PEQM - U65 ROM H PEQN - U66 Rev. 1.09	Solved compatibility problems with NEC Multisync video and MATROX board (high resolution video controller)
	Lev. 05 MI		Rev. 1.09	WD16C551 Step C component is replaced with WD16C551 Step D component. Field only modification.
<b>BA263</b>	Lev. Nasc.		Rev. 1.08	New P.C.B. for cutting and trimming recovery
	Lev. 01 MI		Rev. 1.08	Replaced video controller 82C452 with video controller 82C452A.
	Lev. 02 MI		ROM L PEQM - U65 ROM H PEQN - U66 Rev. 1.09	Solved compatibility problems with NEC Multisync video and MATROX board (high resolution video controller)
	Lev. 03 MI		Rev. 1.09	Introduced 16C551 component mask D to replace 16C551 component mask C, no longer produced
	Lev. 04 MI		Rev. 1.09	80386DX-25 step D0 CPU replaced with 80386DX-25 step E CPU

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**USER DISKETTE/SYSTEM TEST/DRIVER**

LEVEL	COMPATIBILITY
User Diskette Ver. 1.01 User Diskette Ver. 1.02 upd 1	BIOS 1.04 BIOS 1.04
EVD driver Ver. 4.0 Rev. 1.3	Added a Windows driver
EVD Ver. 5.0	Added DAM mode support (1024 x 768 x 256) for Windows 3.0, AutoCAD 386 Ver. 10.0 and AutoCAD 386 Ver. 11.0
System Test 1.05 System Test 1.06	BIOS 1.08 BIOS 1.08. New System Test version that allows tests to be executed both in stand alone mode and under manager file control

**CONSOLE**

	LEVEL	D.R.S. CODE	COMPATIBILITY
IF638	Nasc.	497314 P	Compatible with BIOS 1.04
	Lev. 01 MI		Changes that solve the loudspeaker sound problem still audible with volume control potentiometer at MIN position

**PAL**

CODE	FUN.	FUNCTION	NAME	LOC.	VIRGIN FUN.
977000D	GL9A	DMA Decode	PAL16L8D	U70	PLCC20
977013K	GL9Z	MCU PATCH	PAL20L8	U125	DIL24

**COMPATIBILITY**

DEVICE BOARD	COMPATIBILITY
Serial port component WD16C552	This component can be replaced by WD16C551 component which is pin to pin compatible
BIOS 1.08	Video performance improvement, introduced Quantum hard disk and removed password bags
EVD 4.0 Rel. 1.3	New Windows driver added
82C206 component on BA263	TEXAS component 82C206 is available in alternative to the C&T one in use. They are compatible and do not change the level of the system board on which they are used.

**POWER SUPPLY UNIT**

POWER SUPPLY	LEVEL	NOTES	
PS14 Ver. 220 V	Nasc.	Improved ventilation and electrical noise susceptibility.	
	Lev. 01		
	Lev. 02		Introduced a mylar protection between L101 inductance and support for compliance of the power supply unit with safety rules.
	Lev. 03		Removed mylar protection. The safety rules are respected using a new type of inductor.
	Lev. 04		Conformity with the new reinforced insulation rules and improvement of reliability. Modified TL7705 (IC351) component.
	Lev. 05		Compliance to EMI Standards.
PS14 Ver. 115 V	Lev. 06	Renewed power supply drive module.	
	Nasc.	This version has undergone the same modifications as the 220 V version (up to level 04).	
	Lev. 01		
	Lev. 02		
Lev. 03			
	Lev. 04		

**SOFTWARE COMPATIBILITY**

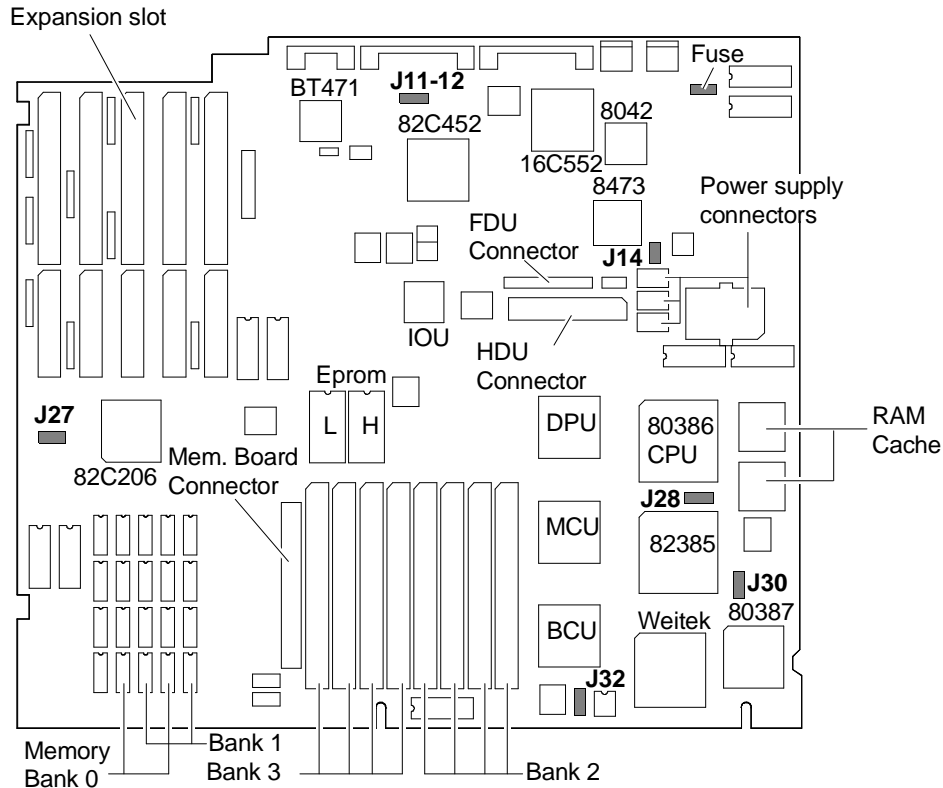
<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20 IBM Operating System/2 Extended Edition, Ver. 1.10 INTERACTIVE 386/ix, Ver. 2.02 Olivetti's Microsoft Disk Operating System, Ver. 3.30a Olivetti's Microsoft Disk Operating System, Ver. 4.01 Olivetti's Microsoft OS/2, Ver. 1.10 and 1.20 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	During installation on hard disk, a formatted DSDD disk is required. PS/2 mouse not recognised PS/2 mouse not recognised

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smartmodem 1200B Hayes Smartmodem 2400B Telenetics Expressdata 24i (24i-12i) Ven-tel PC Modem Half-Card (PCM-XT) Hayes Smartmodem 1200	FUTURE DOMAIN HOST ADAPTER (TMC-830) IBM Asynchronous COM. CARD (1502074) IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL
<b>MULTIPOINT</b>	<b>MOUSE</b>
Anvil Stallion Intelligent 16 Port Controller Chase MSC Connect/AT8 Intelligent 8 Port Computone System Intelliport 16 Port AT16 Consensus Powerports 8 Port Intelligent Ctr. Digiboard Digichannel COM/xi Intelligent 8 Port Specialix Si Intelligent I/O Controller	IBM PS/2 Mouse (6450350) Logitech Bus Mouse (PF-3F) Microsoft Bus Mouse, Rev. C Microsoft Serial-PS2 Mouse Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti Bus Mouse (GRD 25-019) Olivetti New Advanced Mouse (GRD 25-025)
<b>GRAPHICS PRODUCTS</b>	<b>NETWORK &amp; LAN PRODUCTS</b>
AST RESEARCH AST - 3G PLUS AST RESEARCH AST - VGA PLUS ATI EGA WONDER HERCULES GRAPHICS CARD (GB102) HERCULES INCOLOR CARD (GB222) IBM MONO Display/Printer Adapter (1504900) MATROX PG - 1281 ORCHID PRODESIGNER VGA PLUS PARADISE EGA 480 PARADISE VGA PRO CARD QUADRAM QUAD EGA PLUS (QC 8601) TECMAR VGA AD VIDEO - 7 VEGA DELUXE	CARD (6450215) AT&T Starlan Network IBM OS/2 Lan Server/Requester IBM PC Network IBM Token Ring Network MADGE Token-Ring Network MS OS/2 Lan Manager Novell Advanced network Ver.2.15 Novell Netware 386 with ISA Adapter PROTEON Token Ring Network 3COM 3 + Network /Ethernet) 3COM 3 + Open Lan Manager IONET Network
<b>DISPLAY UNITS</b>	<b>OTHER PRODUCTS</b>
JVC QUAD-SYNC Color (GD-H6116VFW) NEC Multisync Monitor (APC-H431) OLIVETTI HIRES Color (DSM 26-115) PRINCETON RGB Monitor (HX-12) ZENITH RGB/COMPOSITE Monitor (ZVM-135)	OLIVETTI OD-810 WORM (WRM 25-810) PLUS Development 20MB Hardcard SOFTWARE SECURITY Parallel Port Block WELCH-ALLYN Barcode Reader (HBD-100, R. A)



**SYSTEM BOARD COMPONENTS, JUMPERS**



BHC8A

JUMPER	POSITION	FUNCTION
J30	OUT * IN	25 MHz 80387 math coprocessor operation. 80387 math coprocessor enabled to tune into clock of optional oscillator to install in U124.
J32	OUT * IN	BIOS EPROM enabled. BIOS EPROM disabled.
J27	OUT * IN	Normal operation. Erases CMOS RAM (before installing this jumper, the battery must be disconnected).
J11-12	OUT * IN	Normal operation. Indicates the RS232 threshold level.
J14	IN	This jumper must always be inserted.
J28	OUT * IN	Normal operation. To be able to use a different model of cache controller 82385.

**FUSE**

2 A, 5 V keyboard and mouse fuse.

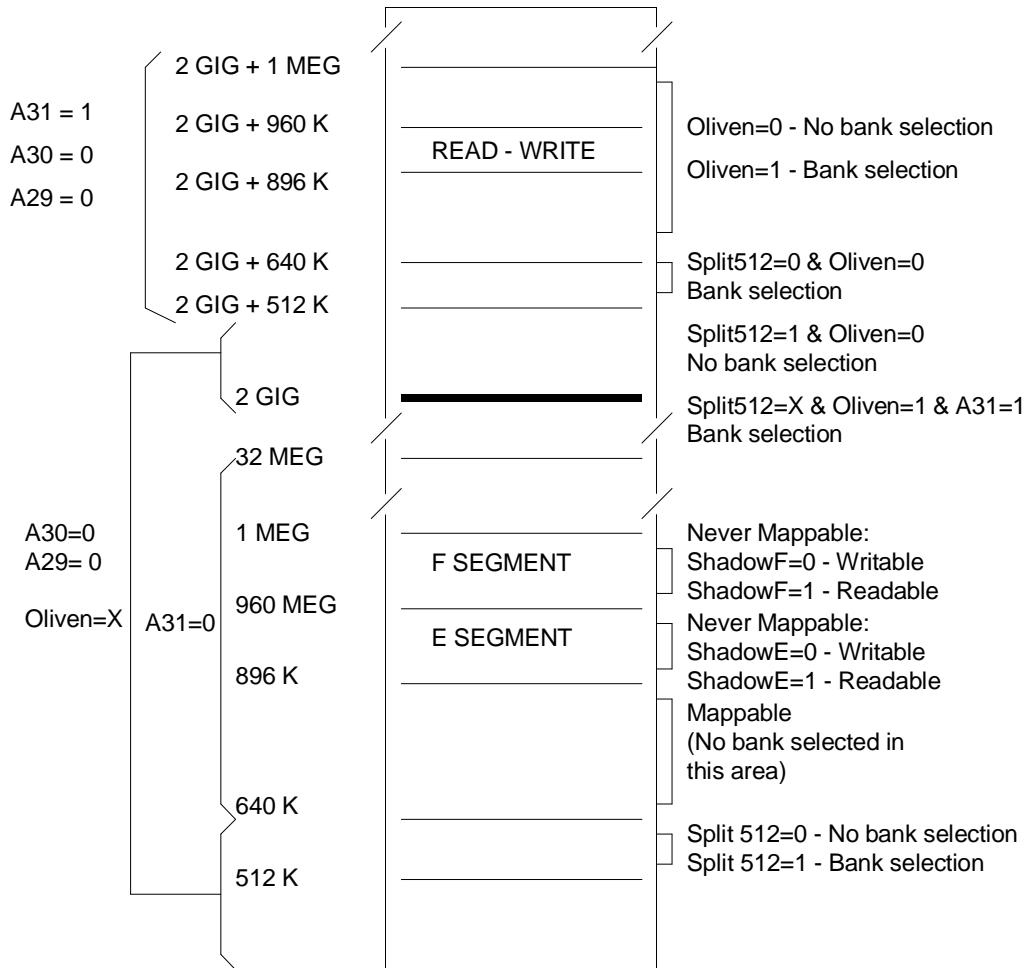
**I/O ADDRESS MAP**

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	Data Keyboard controller	3BA h	Video adapter
61 h	System Control Port B	3C0-3CF h	Video adapter
64 h	Commands Keyboard controller	3D4-3D5 h	Video adapter
70 - 71 h	Real time clock, NMI Mask, CMOS RAM	3DA h	Video adapter
080-08F 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	Timer OUT channel 0
2	IRQ1	1	Keyboard
3 - 10	IRQ2	1	Interrupt to Controller 1 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**



**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	NEC D5146H half size	40 MB	615	8	128	664	17
2	Miniscribe M8425 3,5"	20 MB	612	4	128	663	17
3	Seagate ST277R	62 MB	820	6	-1	819	26
4	NEC D5147H	62 MB	615	8	384	664	26
5	NEC D5652 ES	136 MB	820	10	-1	822	34
6	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023	34
7	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023	34
8	NEC D5452	68 MB	823	10	512	822	17
9	FUJITSU M2227D	40 MB	615	8	512	614	17
10	FUJITSU M2227D RLL	60 MB	615	8	512	614	26
11	ESDI	304 MB	814	15	-1	1	51
12	ESDI	81 MB	977	5	-1	1	34
13	-	136 MB	820	10	-1	1	34
14	CONNER CP3206	200 MB	683	16	-1	682	38
15	RESERVED						
16	CONNER CP3142	40 MB	635	4	-1	639	33
17	CONNER CP346	40 MB	805	4	-1	804	26
18	CONNER CP3106	100 MB	776	8	-1	775	33
19	CONNER CP3206	200 MB	683	16	-1	682	38
20	Quantum LPS105 AT	100 MB	776	8	-1	775	33
21	Quantum PD210 AT	200 MB	873	13	-1	872	36

**Where:** CYL: No. of disk cylinders

T: No. of disk heads

WPC: Precompensation cylinder number

LZ: Head parking cylinder number

SET: No. of disk sectors

# P750

## CHARACTERISTICS

Microprocessor	Intel 486™
Clock	25 MHz
Architecture	MICROCHANNEL
Memory	System board can support 8 MB installed on 2 banks: Two configurations are possible: - <b>2 MB on system board</b> (8 SIMM 256 Kb x 9). Expandable only by replacing these SIMMs with those of 1 Mb x 9 <b>EXM 26-807</b> - <b>4 MB on system board</b> (4 SIMM 1 Mb x 9). Expandable by installing 4 more SIMMs 1 Mb x 9 <b>EXM 26-807</b> System memory can be furtherly expanded via a 4 MB memory expansion board MEM 26-806. This board can be expanded to 8 MB via 4 SIMM 1 Mb x 9 <b>EXM 26-807</b> .
Memory access	80 ns
Coprocessor	Weitek WTL 4167
Floppy Disk	1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	100 MB CONNER 30109 MCA 3.5" 120 MB CONNER 30109 MCA 3.5" 200 MB CONNER 3209 MCA 3.5"
Streaming Tape	80, 120 MB IRVIN 285
Expansion slots	Five available, one 16-bit; one 16-bit with video board extension; three 32-bit.
Video adapter	Integrated on System Board Super VGA 82C452
Floppy Disk controller	Integrated on System Board Floppy Disk controller: WD57C65
Hard Disk controller	Uses intelligent hard disk drives that do not need controllers because BUS is directly interfaced via adapter board for MIS49 signals
Mouse	PS/2- and AT-compatible GRD 25-025
Keyboard	101/102-key ANK27-101 ANK27-102

### SYSTEM BOARD

BA849 - P1.5 - 4 MB  
BA858 - P1.5 - 2 MB

BA880 - P2.1 - Base Assembly  
BA865 - P2.1 - 4 MB  
BA875 - P2.1 - 2 MB

### BIOS

BA 849 & BA 858  
Rev. 1.06

BA 865 & BA875  
Rev. 1.06

### POWER SUPPLY

PS14 220 V  
Level: 04 MI

PS14 110 V  
Level: 04 MI

### CONSOLE

IF 638  
Level: 0.1

### HDU INTERFACE

MI 549

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**MOTHERBOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLER AND MODIFICATIONS</b>
<b>BA849</b>	Nasc.	412935 G	PPUS U118 PPUT U119 Rev. 1.02	See table below. 4 MB boards. There are only 42 boards of this level
	Lev. 0.1		Rev. 1.02	Factory version which corrects floppy disk write problems.
	Lev. 02		Rev. 1.02	Change on timer circuit
	Lev. 03		Rev. 1.06	New BIOS to solve the problem of the 120 MB hard disk during system configuration
<b>BA558</b>	Nasc.	412934 F	PPUS U118 PPUT U119 Rev. 1.02	See table below. 2 MB boards. There are only 42 boards of this level
	Lev. 0.1		Rev. 1.02	This board includes the same modifications made to the previous.
	Lev. 02		Rev. 1.02	
	Lev. 03		Rev. 1.06	
<b>BA880</b>	Printed circuit P2.1 - Base Assembly - Code BA880 identifies the printed circuit P2.1 on which SIMM modules are to be mounted according to memory size. The printed circuit with SIMM modules installed takes the name of the BA boards described below.			
<b>New BA865</b>	Nasc.		PPUS U118 PPUT U119 Rev. 1.02	New printed circuit (BA880) with 4 MB. This board has the same components as BA849.
	Lev. 02		PPJJ U118 PPJK U119 Rev. 1.04	Solves "Parallel Port Test Error" problem at POD, supports the new video modalities and improves 15H interrupt features in CBIOS.
	Lev. 03		Rev. 1.05	Allows the step D0 version of the Intel 80486 processor to be used. New BIOS to solve the problems of: CBIOS    POD, Floppy, INT10 ABIOS    Parallel and serial
	Lev. 04		Rev. 1.05	C&T component F82C452A introduced to replace the F82C452 component. This also involves replacement of the 74F244 component in position U32 with the 74FCT244CT component.
	Lev. 05		Rev. 1.05	
	Lev. 06		Rev. 1.06	New BIOS to solve the problem of the 120 MB hard disk during system configuration.

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLER AND MODIFICATIONS
<b>BA875</b>	Lev. Nasc.		PPUS U118 PPUT U119 Lev. 1.02	New printed circuit (BA880) with 4 MB. This board has the same components as BA849.
	Lev. 02		PPJJ U118 PPJK U119 Lev. 1.04	Solves "Parallel Port Test Error" problem at POD, supports the new video modalities and improves 15H interrupt features in CBIOS.
	Lev. 03		Lev. 1.05	Allows the step D0 version of the Intel 80486 processor to be used New BIOS to solve problems of: CBIOS     POD, Floppy, INT10 ABIOS     Parallel and serial
	Lev. 04		Lev. 1.05	C&T component F82C452A introduced to replace the F82C452 component. This also involves replacement of the 74F244 component in position U32 with the 74FCT244CT component.
	Lev. 05		Rev. 1.05	
	Lev. 06		Rev. 1.06	New BIOS to solve the problem of the 120 MB hard disk during system configuration.

**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU system board	BA858	412934 F	P1.5 - 2 MB
CPU system board	BA849	412935 G	P1.5 - 4 MB
CPU system board	BA865		P2.1 - 4 MB
CPU system board	BA875		P2.1 - 2 MB
Power supply 220 V	PS14	412908 W	
Power supply 110 V	PS14	412909 X	
Console board	IF638	497314 P	
Intelligent HDU interface board	MI549	497272 V	
			120 MB hard disk can replace 100 MB hard disk without any problem

INTEGRATED CONTROLLERS	INTEGRATED CONTROLLERS
<p><b>82C322 Memory Controller</b>                      Supports 256 K - 1M DRAM                      Shadow RAM                      Supports up to 16 MB                      Programming of Wait states</p> <p><b>82C223 DMA Controller</b>                      Performs DMA operations                      8 independent DMA channels                      Extended mode operations                      16 MB memory addressing capacity                      DMA serial operations                      Supplies a virtual DMA on channels 0 and 4</p> <p><b>8042</b> Keyboard and mouse controller  <b>82C452</b> Super VGA Video adapter  <b>NS16550</b> A Serial port controller  <b>WD57C65</b> Floppy disk controller</p>	<p><b>82C325 Data Buffer Controller</b>                      Bus Conversion and Bus Swapping function                      Generation and checking of parity errors in DRAM                      Contains POS registers in MCA architecture</p> <p><b>82C226</b> Non-volatile RAM                      Real Time Clock                      DMA controller                      Interrupt controller</p> <p><b>82C226</b> Two interrupt controllers 8259                      An 8254 compatible timer                      Watchdog timer                      A real time clock compatible with MC146818                      114 bytes of CMOS RAM                      Parallel port controller</p> <p><b>82C231 MCA controller</b>                      MCA Compatibility                      Memory timing                      Bus Converter 32 - 16 bit</p>

**USER DISKETTE/SYSTEM TEST/DRIVER**

LEVEL	COMPATIBILITY
User Diskette Version 1.00	-
User Diskette Version 1.01	Compatible with BIOS 1.02
EVD Driver Version 3.0 Rev. 1.2	-
EVD Driver Version 4.0 Rev. 1.3	Supports Rel. 10 and 11 of ACAD386
EVD Driver Version 5.0 Rev. 5.0	Solves the problem in OS/2 PM 1.2 DAM driver
	This version supports DAM modes (1024 x 768 x 256)
	for Windows 3.0, AutoCAD 386 Ver. 10.0 and
	AutoCAD 386 Ver. 11.0
EVC Driver for ACAD10 and ACAD11	To be used only when requested
D.A.M. Driver for OS/2 P.M.	To be used only when requested

**CONSOLE**

	LEVEL	D.R.S. CODE	COMPATIBILITY
IF638	Lev. Nasc.	497314 P	
	Lev. 01		Change to conform with EMI rules



**PS14/PS14H POWER SUPPLY UNIT**

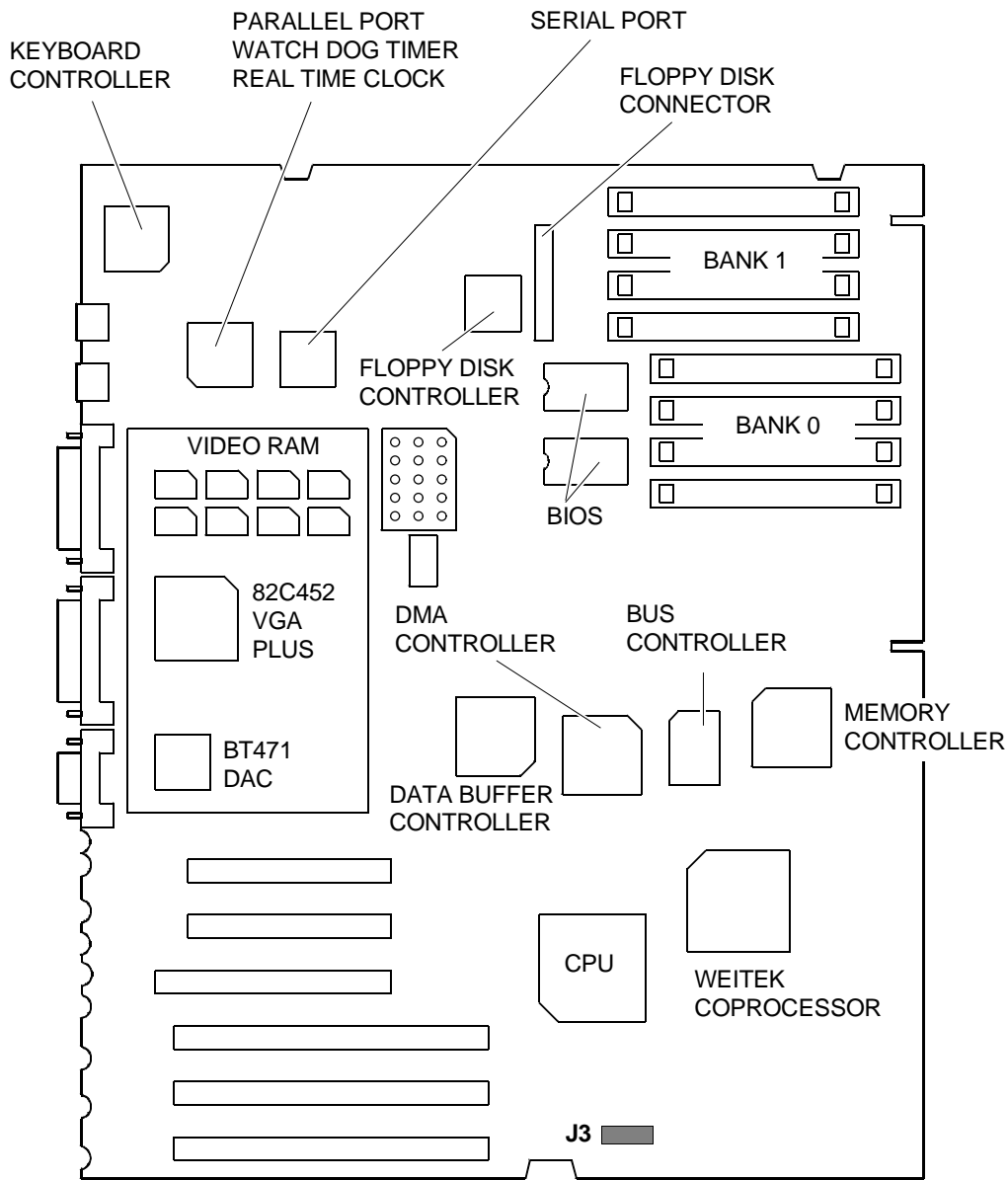
<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>NOTES</b>
PS14 Ver. 220 V HANTAREX	Lev. Nasc. Lev. 01	Improved ventilation and electrical noise susceptibility.
	Lev. 02	Introduced a mylar protection between L101 inductance and support for power supply unit compliance with safety rules.
	Lev. 03	Removed mylar protection. A new type of inductor is used to comply with safety norms.
	Lev. 04	Conforms with the new rules concerning reinforced insulation and reliability improvement. Modified TL7705 (IC351) component.
PS14 Ver. 115 V HANTAREX	Lev. Nasc. Lev. 01 Lev. 02 Lev. 03 Lev. 04	This version has undergone the same modifications as the 220 V version.
	Lev. Nasc.	New type of power supply unit.
	Lev. 01	A capacitor has been replaced to solve the problems with the IR-MA3 board.
	Lev. Nasc. Lev. 01	New type of power supply unit. Same modifications as made to the 220 V version.
PS14 H Ver. 220 V ALITEC	Lev. Nasc.	New supplier for this type of power supply unit.
	Lev. 01	A capacitor has been replaced to solve the problems with the IR-MA3 board.
PS14 H Ver. 220 V ALITEC	Lev. Nasc.	New supplier for this type of power supply.
	Lev. 01	Same modifications as made to the 220 V version.

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**MI549 HARD DISK INTERFACE**

<b>LEVEL</b>	<b>NOTES</b>
Lev. Nasc.	Specific for the P750

**SYSTEM BOARD COMPONENTS, JUMPERS**



BUEOA

**JUMPER J3**

- OUT:** Normal setting
- IN:** Disables password  
Cancels the system configuration and restores the default settings

**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 IBM Operating System/2 Extended Edition, Ver. 1.1 and Ver. 1.10 Olivetti's Microsoft OS/2, Ver. 1.10	During installation on hard disk, a formatted DSDD disk is required.

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>  Hayes Smartmodem 1200P Hayes Smartmodem 2400P IBM PS/2 300/1200 Internal Modem/A (6450349)	<b>I/O INTERFACE PRODUCTS</b>  FUTURE DOMAIN HOST ADAPTER (MCS-350) IBM PS/2 Dual Async Adapter/A (6450347)
<b>EXPANSION MEMORIES</b>  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	<b>MOUSE</b>  IBM PS/2 Mouse (6450350) Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti New Advanced Mouse (GRD 25-025)
<b>DISPLAY UNITS</b>  IBM PS/2 Monochrome Display 8503 IBM PS/2 Color Display 8512 IBM PS/2 Color Display 8513 IBM PS/2 Color Display 8514	<b>NETWORKS &amp; LAN PRODUCTS</b>  IBM PC Network IBM PC Network (Baseband Adapter) IBM Token Ring Network Novell Advanced network Ver. 2.12 3COM Network (Ethernet) 10NET Network
<b>GRAPHICS PRODUCTS</b>  IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller	<b>OTHER PRODUCTS</b>  SOFTWARE SECURITY Parallel Port Block

**SYSTEM MEMORY MAP**

ADDRESS	SIZE	FUNCTION	CACHE
00000000 - 0007FFFF	512 K	System DRAM	YES
00080000 - 0009FFFF	128 K	I/O RAM	YES
000A0000 - 000BFFFF	128 K	Video adapter RAM	NO
000C0000 - 000DFFFF	128 K	I/O ROM	NO
000E0000 - 000FFFFFF	128 K	BIOS (SHADOW RAM)	YES
00100000 - 007FFFFFF		System RAM	YES
00800000 - 00FFFFFF		System RAM	YES
01000000 - BFFFFFF		System RAM	YES
C0000000 - C1FFFFFF		Weitek Coprocessor	NO
C2000000 - DFFFFFF		System RAM	YES
E0000000 - FFFDFFFF		System RAM	YES
FFFE0000 - FFFFFFF	128 K	ROM BIOS	NO

**DMA CHANNELS**

CHANNEL	FUNCTION	CHANNEL	FUNCTION	CHANNEL	FUNCTION
0	Reserved	3	Usable	6	Usable
1	Usable	4	Reserved	7	Usable
2	Floppy disk	5	Usable		

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000 - 01F	DMA controller (channels 0-3)	096 - 097	POS, Connector select
020-021	First interrupt controller 8259A	0A0 - 0A1	Second interrupt controller 8259A
022	System Setup Indexing registers	0C0 - 0DF	DMA controller (4 - 7)
023	System Setup Data registers	0E0	Split address register
040-047	System Timer	0E1	Memory map register
060	Auxiliary device	0E2	Cache control register
061	System Port B controller	0E3 - 0E7	Channel restore registers
064	Auxiliary device	0F0 - 0FF	Coprocessor
070 - 071	RT/CMOS and NMI mask	100 - 107	Programmable option select
074 - 076	8 KB CMOS RAM expansion	1F0 - 1F8	Hard disk adapter
	Registers for configuring registers 68B50	278 - 27B	Parallel port 3
081 - 087	DMA registers pages 0 - 3	2F8 - 2FF	Serial port 2 (RS-232-C)
089 - 08F	DMA registers pages 4 - 7	378 - 37B	Parallel port 2
090	Central arbitration control port	3BC - 3BF	Parallel port 1
091	Response from selected board	3B4 - 3C5	Video subsystem
092	System Port A controller	3CE - 3DA	Video subsystem
093	Reserved	3C6 - 3C9	Video DAC, Bt471
094	Boards enable	3F0 - 3F7	Floppy disk controller
		3F8 - 3FF	Serial port 1 (RS- 232-C)

**INTERRUPT LEVELS**

LEVEL	FUNCTION	LEVEL	FUNCTION
IRQ0	Channel 0 of timer output	RQ8	Real Time Clock
IRQ1	Keyboard interface	IRQ9	Redirected via software to IRQ2
IRQ2	Interrupt from PIC2	IRQ10	Available
IRQ3	Optional serial port	IRQ11	Available
IRQ4	Primary serial port	IRQ12	Mouse
IRQ5	Available	IRQ13	Coprocessor
IRQ6	Floppy disk controller	IRQ14	Hard disk controller
IRQ7	Parallel port	IRQ15	Available

**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	N.C.	10 MB	306	4	128	305	17
2	Seagate ST225 half size	20 MB	615	4	256	700	17
3	WREN 2 full size	38 MB	925	5	128	924	17
4	CDC WREN 1	28 MB	697	5	128	696	17
5	ST4096	76 MB	1024	9	-1	1023	17
6	OPE XM5340	40 MB	820	6	256	819	17
7	NEC D5146H	40 MB	615	8	128	664	17
8	TM755 slim size	40 MB	981	5	-1	980	17
9	CDC WREN II slim size	40 MB	981	5	128	980	17
10	Micropolis 1324 full size	51 MB	1024	6	128	980	17
11	CDC WREN II full size	53 MB	925	7	128	924	17
12	Micropolis 1325 full size	68 MB	1024	8	-1	1023	17
13	CDC WREN II full size	69 MB	925	9	128	924	17
14	Micropolis 1323-A full size	42 MB	1024	5	-1	1023	17
15	RESERVED						
16	OPE XM5220 85 ms	20 MB	612	4	128	656	17
17	TANDON TM 362 85 ms	20 MB	612	4	-1	663	17
18	Seagate ST251 40 ms	40 MB	820	6	-1	819	17
19	Rodime RO3055 40 ms	43 MB	872	6	0	871	17
20	Miniscribe M8425 68 ms	20 MB	612	4	0	663	17
21	Seagate ST277TR	62 MB	820	6	-1	819	26
22	OPE XM5340/60	62 MB	820	6	128	819	26
23	NEC D5147H	62 MB	615	8	384	664	26
24	NEC D5652	136 MB	820	10	-1	822	34
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023	34
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023	34
27	NEC D5452	68 MB	823	10	512	822	17
28	Fujitsu M2227D	40 MB	615	8	512	614	17
29	Fujitsu M2227D RLL	60 MB	615	8	512	614	26
30	CDC 94205-77	62 MB	981	5	-1	980	26
31	Formatted, ESDI full size	304 MB	814	15	-1	1	-
32	Formatted, ESDI half size	81 MB	977	5	-1	1	-
33	N.A.	136 MB	820	10	-1	1	-
34	CDC 94196-766	600 MB	1623	15	-1	1	-
35 - 45	RESERVED						

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**Where:** CYL: No. of disk cylinders  
T: No. of disk heads  
WPC: Precompensation cylinder number  
LZ: Head parking cylinder number  
SET: No. of disk sectors

# M486 SCSI

## CHARACTERISTICS

Microprocessor	INTEL 80486
Clock	25 MHz
Architecture	32-bit EISA
Memory	2, 4 or 8 MB on system board expandable up to 32 MB by: <b>EXM 26-482</b> 2 MB - 2 SIMM 1 Mb x 9 <b>EXM 26-484</b> 4 MB - 2 SIMM 512 Kb x 36 <b>EXM 6108</b> 8 MB - 2 SIMM 1 Mb x 36 System memory can be expanded up to 64 MB using 8 MB SIMM modules when available
Memory access	100 ns / 80 ns
Coprocessor	Integrated in the INTEL 80486, Weitek 4167
Optional processor	INTEL i860
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Panasonic JU 475-4 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	105 MB CONNER 30100 210 MB CONNER 3200 300 MB WREN IV 94171 320 MB SEAGATE ST2383 600 MB MAXTOR XT8760S
Streaming Tape	Wangtek 150 MB SCSI
EISA slots	8 Present - 6 Available
Video adapter	EISA EVC-1 board GO739
Hard disk and Floppy disk controller	EISA ESC-1 board GO740
Cache Controller	Integrated in microprocessor
Cache size	8 KB integrated in microprocessor
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

### SYSTEM BOARD

BA859 P1.25 2 MB  
 BA860 P1.25 4 MB  
 BA868 P1.7 2 MB  
 BA869 P1.7 4 MB  
 BA882 P1.7 8 MB

### BIOS

Revision 2.03

### VIDEO ADAPTER

GO734  
 GO739

### HARD DISK - FLOPPY DISK CONTROLLER

GO738  
 GO740

### POWER SUPPLY

PS20 A 220 V  
 Level: 01 MI  
 PS20 A 110 V  
 Level: 01 MI

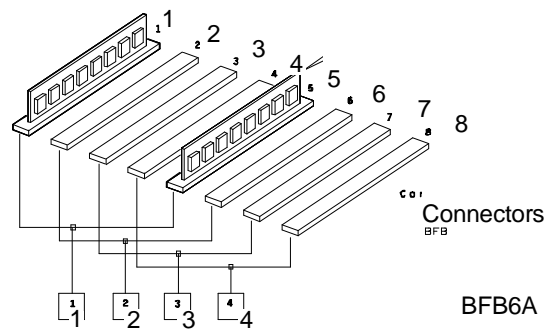
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## MEMORY EXPANSION

**WARNING:** It is not essential to fill all the memory banks available. Starting from the basic 4 MB, it is thus possible to obtain the following memory configurations: 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64 MB.

The SIMM modules installable are:

EXM 26-484 4 MB  
 EXM 26-482 2 MB  
 EXM 6108 8 MB



**SYSTEM BOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLERS / NOTES</b>
<b>BA859</b>	Lev. Nasc.	412930 P	ME8K 497450U Rev. 1.10.1	Board with 2 MB memory  All the modifications are field only and are not implemented at the factory.
	Lev. 01 MI		PPJ5 Rev. 1.15 498060H	- New BIOS for installation of NETWARE/386 on the hard disk
	Lev. 02 MI		Rev. 1.15	- Two PALs replaced to solve the Parity Error problem in UNIX SCO
	Lev. 04 MI		Rev. 1.15	- Cuts and wirings made to solve system hang problems with some TORUS communication boards and the serial port problem
	Lev. 05 MI		PPJF Rev. 2.0 498124J	- New BIOS to implement new features: - support for more than two HDUs - support for several ESC-1 boards - support for PEM - support for telediagnostic board - support for ESDI HDU controller
	Lev. 06 MI		Rev. 2.0	Cuts and wirings made to solve the system lock problem in the P.O.D. with several EISA boards on the BUS
	Lev. 07 MI		PPJR Rev. 2.01	- New BIOS for management of the 300 MB ESDI Type 35 hard disk and to solve the following problems: - BOOT with unformatted ESDI HDU - BOOT from diskless system - Compatibility
	Lev. 08 MI		Rev. 2.01	- This change solves the interrupt noise problem of the serial port when a 486 micro-processor non-D0 is present.
	Lev. 09 MI		Rev. 2.01	Keyboard Controller Rel. 8.01 introduced to replace the 8.0 Keyboard Controller
	Lev. 10		PPJX Rev. 2.03	New BIOS to solve the problems of the previous release: - Memory above 16 MB - Boot from 720 KB floppy drives - ADAPTEC EISA Controller - MYLEX SCSI Controller
<b>BA860</b>		412932 D		Same as BA859 but with a different 4 MB memory slice

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA867</b>	Lev. Nasc.	612164 T	PPJ5 498060H Rev. 1.15	New layout level for recovering cutting and trimming and removal of previous board problems. Board with 4 MB of memory
	Lev. 01		PPJF 498124J Rev. 2.0	- New BIOS to implement new features: - support for more than two HDUs - support for several ESC-1 boards - support for PEM - support for telediagnostic board - support for ESDI HDU controller
	Lev. 02		Rev. 2.0	- Cuts and wirings made to solve the system lock problem in the P.O.D. with several EISA boards on the BUS
	Lev. 03		PPJR 498155Z Rev. 2.01	- New BIOS for management of the 300 MB ESDI Type 35 hard disk and to solve the following problems: - BOOT with unformatted ESDI HDU - BOOT from diskless system - Compatibility
	Lev. 04		Rev. 2.01	- This change solves the interrupt noise problem of the serial port when on motherboard a 486 microprocessor non step D is present. - Signal BCLK improved
	Lev. 06		Rev. 2.01	- Keyboard Controller Rel. 8.01 introduced - New 80486-25-D0 introduced to replace the current 804286-26-B6 WD 16C552 Mask D component used to replace the previous component
	Lev. 07		PPJX Rev. 2.03	- Allows introduction of step A2 of the EBC 82358 component to replace step A1 - EISA BUS BCLK and EBC HCLKCPU signals improved - New BIOS to solve the problems of the previous release: - Memory above 16 MB - Boot from 720 KB floppy drives - ADAPTEC EISA Controller - MYLEX SCSI Controller
<b>BA868</b>				Same as BA867 but with a different 2 MB memory slice



	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA882</b>	Lev. Nasc.		PPJF 498124J Rev. 2.0	New board with 8 MB memory
	Lev. 01		Rev. 2.0	- Cuts and wirings made to solve the system lock problem in the P.O.D. with several EISA boards on the BUS
	Lev. 02		PPJR Rev. 2.01	- New BIOS for management of the 300 MB ESDI Type 35 hard disk and to solve the following problems: - BOOT with unformatted ESDI HDUs - BOOT from diskless system - Compatibility
	Lev. 03		Rev. 2.01	- This change solves the interrupt noise problem of the serial port
	Lev. 04		Rev. 2.01	- Keyboard Controller Rel. 8.01 introduced - New 80486-25-D0 introduced to replace the current 804286-26-B6 - WD 16C552 Mask D component used to replace the previous component
	Lev. 05		Rev. 2.01	- Introduction of step A2 of the EBC 82358 component to replace step A1 - EISA BUS BCLK and EBC HCLKCPU signals improved
	Lev. 06		PPJX Rev. 2.03	- New BIOS to solve the problems of the previous release: - Memory above 16 MB - Boot from 720 KB floppy drives - ADAPTEC EISA Controller - MYLEX SCSI Controller

**INTEGRATED CONTROLLERS**

CONTROLLER	FUNCTION
<b>82357 ISP</b>	DMA Controller Interrupt Controller 5 Timers I/O Ports
<b>XL2865</b>	EEPROM configuration
<b>DS1287</b>	Real Time Clock/Timer
<b>8042/8742</b>	Keyboard and Mouse Controller
<b>WD16C552</b>	Serial and Parallel Port Controller
<b>82358 EBC</b>	EISA Bus Controller

**WARNING:** If hardware or firmware changes should occur on system board, hardware and firmware for hard disk and video controller boards must also be changed if necessary. See table below.

**BOARDS, DIAGNOSTIC BIOS AND DRIVERS COMPATIBILITY**

SYSTEM BOARD			HDU CTRL			VIDEO CTRL			DIAGNOSTIC		DRIVER	
BDS	BIOS	LEV.	ESC 1	FW	LEV.	EVC 1	FW	LEV.	S.T.	U.D.	OEM	EVC
859/860	1.10.1	Na	738	1.22	04/05	734	1.02	03	No drw	1.0 3	4.08 1.4 2	2.02 1
859/860	1.10.1	Na	738	1.22	08	734	1.02	03	No drw	1.0 3	4.08 1.4 2	2.02 1
859/860	1.10.1	Na	740	1.35	Na	734	1.02	03	1.50	1.0 3	4.08 1.4 2	2.02 1
868/867	1.15	Na	740	1.35	Na	739	1.03	Na	1.50	1.0 3	4.08 1.4 2	3.0
868/867	2.0	01	740	1.42	01	739	1.03	Na	1.50	1.30 1	4.08 1.4 2	4.0
868/867	2.0	02	740	1.42	01	739	1.03	Na	1.50	1.30 1	4.08 1.4 2	4.0
882	2.0	Na	740	1.42	01	739	1.03	Na	1.50	1.30 1	4.08 1.4 2	4.0
882	2.0	01	740	1.42	01	739	1.03	Na	1.50	1.30 1	4.08 1.4 2	4.0
882	2.01	02	740	1.43	02	739	1.03	Na	2.10	1.30 1	4.08 1.4 2	5.0
882	2.01	03	740	1.43	02	739	1.03	Na	2.10	1.30 1	4.08 1.4 2	5.0
882	2.01	04	740	1.43	03	739	1.03	Na	2.10	1.30 1	4.08 1.4 2	5.0
882	2.01	05	740	1.43	03	739	1.03	Na	2.10	1.30 1	4.08 1.4 2	5.0
882	2.03	06	740	1.43	03	739	1.03	Na	2.10	1.40 1	4.081.4 2	5.0

**REFURBISHING KITS**

These KITS allow system board BA859/60 to be increased to level 02, and hard disk controller board GO738 of M486 to be increased to level 08.

INITIAL LEVEL		KIT TO BE USED
SYSTEM BOARD	HDU CONTROLLER	
BA859/60 Lev. Nasc.	GO736 Lev. 05	<b>KIT003-03</b> code 977732 S <b>KIT003-05</b> code 977800 C Composition: Material for BA859/60 change Material for GO738 change

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**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU system board	BA859	412930 P	P1.25 2 MB
CPU system board	BA860	412932 D	P1.25 4 MB
CPU system board	BA868		P1.7 2 MB
CPU system board	BA867	612164 T	P1.7 4 MB
CPU system board	BA882		P1.7 8 MB
Power supply 220 V	PS20	412915 C	
Power supply 110 V	PS20	412914 B	
Console board	IF637	497112 D	

**BA859/60 I/O DEVICES**

<b>DEVICE</b>	<b>TYPE</b>	<b>LOCATION</b>
Asynchronous communication element	WD16C552	U10
Keyboard and mouse controller	8742AH	U13
Flash EPROM	28F010	U14
Configuration EEPROM	XL2865A	U15
Real time clock	DS1287	U16
PAL CPU reset counter	16R6	U17
I/O controller 3	20L8	U24
PAL keyboard intercept	22V10	U25
I/O controller 2	EP1800	U26
I/O controller 1	EP1800	U27
EISA BUS controller	82358-25	U35
EISA integrated system peripherals		U36
Address decode PAL	20L8	U37
Even RAS driver	16L8	U39
Odd RAS driver	16L8	U40
PAL, Address translation	16L8	U44
PAL, RAM map control	16L8	U46
PAL, AEN(x) generation	22V10	U47
PAL, parity error control	20V8	U69
PAL, Snoop Stroke control	16R4	U70
PAL, Burst address generation	20R4	U74
Odd CAS driver	16L8	U75
Even CAS driver	16L8	U76
PAL, Byte-enable control	16L8	U80
PAL, EISA buffer control	16L8	U81
PAL, host access control	20R6	U82
PAL, latch address control	16L8	U83
PAL, system reset control	16R8	U84
PAL, Burst control	16R4	U85
PAL, CAS control	16R4	U87
PAL, EISA access control	20L8	U96
PAL, RAS control	16R4	U97
PAL, CPU control	20R6	U203
PAL, numeric coprocessor address control	20L8	U204
PAL, numeric coprocessor control	16R8	U205
PAL, BUS arbitration	16R6	U206
PAL, BUS control	20R6	U207
PAL, parity error detection	20L8	U208
PAL2, numeric coprocessor addresses	20L8	U218
PAL3, numeric coprocessor addresses	20L8	U219
PAL1, numeric coprocessor addresses	20L8	U220
WEITEK coprocessor	WTL4167	U232
Microprocessor	i486	U233
Optional microprocessor	i860	U241

**BA867/68 I/O DEVICES**

<b>DEVICE</b>	<b>TYPE</b>	<b>LOCATION</b>
Asynchronous communication element	WD16C552	U10
Keyboard and mouse controller	8742AH	U13
Flash EPROM	28F010	U14
Configuration EEPROM	XL2865A	U15
Real time clock	DS1287	U16
PAL CPU reset counter	16R6	U17
I/O controller 3	20L8	U24
PAL keyboard intercept	22V10	U25
I/O controller 2	EP1800	U26
I/O controller 1	EP1800	U27
EISA BUS controller	82358-33	U35
EISA integrated system peripherals		U36
Address decode PAL	20L8	U37
Even RAS driver	16L8	U39
Odd RAS driver	16L8	U40
PAL, address translation	16L8	U44
PAL, RAM map control	16L8	U46
PAL, AEN(x) generation	22V10	U47
PAL, ISA Master Buffer-Swap	16L8	U56
PAL, parity error control	20V8	U70
PAL, EISA access control	20L8	U71
PAL, Burst address generation	20R4	U72
Odd CAS driver	16L8	U73
Even CAS driver	16L8	U74
PAL, CAS-enable control	20V10	U77
PAL, EISA buffer control	16V8	U78
PAL, host access control	20R8	U79
PAL, latch address control	16L8	U80
PAL, system reset control	16R8	U81
PAL, Snoop control	16R4	U82
PAL, RAS control	16R4	U83
PAL, CAS control	16R4	U84
PAL, CPU control	20R6	U203
PAL, numeric coprocessor address control	20V8	U204
PAL, numeric coprocessor control	16R8	U205
PAL, BUS arbitration	16R6	U206
PAL, BUS control	20R4	U207
PAL, parity error detection	20L8	U208
PAL2, numeric coprocessor addresses	20L8	U218
PAL3, numeric coprocessor addresses	20L8	U219
PAL1, numeric coprocessor addresses	20L8	U220
WEITEK coprocessor	WTL4167	U232
Microprocessor	i486	U233
Optional microprocessor	i860	U241

**VIDEO ADAPTER BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>G0734</b>	Lev. Nasc.	412783 Q	PBZ2 Rev. 1.01 497534C	<b>82C452</b> super VGA <b>RAM Video</b> - VRAM 100 ns 256 Kx4 Dual-ported
	Lev. 01 MI		PPVC Rev. 1.02 497346X	- New firmware to solve problem of error on EVC DAM test - Cuts and wirings made to solve problems of overheating and VDE FCC/B emission out of range
	Lev. 02 MI		Rev. 1.02	- Performance improvement - Solved problem of missing 1023 pixel
	Lev. 03 MI		Rev. 1.02	- Replaced component 174F374 in U36 to improve clock frequency circuit
	Lev. 04 MI		PBZV Rev. 1.03 497461K	- New firmware to support the 79H mode function This change is implemented at field level, not at factory level
<b>G0739</b>	Lev. Nasc.		PBZV Rev. 1.03 497461K	New printed circuit to absorb cuts and wirings of the previous one

**POWER SUPPLY UNIT**

MODEL	LEVEL	NOTES
PS20A	Lev. Nasc.	
	01	Solves problem of insulation safety standards Solves problem of fan minimum speed too slow

**SCSI CONTROLLER BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>G0738</b>	Lev. Nasc.		PPUA 497327L PPUB 497328V Rev. 1.10	<b>Processor 80186</b> - Local CPU <b>BIMIC 82355</b> - EISA Bus Master Controller <b>82077</b> - Floppy disk controller
	Lev. 01 MI		PPUD 497366T PPUE 497367U Rev. 1.13	- New firmware to improve performance - Chip 82355 A1 replaced by chip 82355 A2 - FDU controller 82077 C3 replaced by FDU controller 82077 C4
	Lev. 03 MI		Rev. 1.13	- New 82355 chip to solve timing problems
	Lev. 04 MI		PPKB 497486D PPKC 497487E Rev. 1.22	- New firmware to support CONNER hard disks - Two PALs replaced for noise problem on signals of two components implemented on board with 32 MHz BIMIC. This allows the 40 MHz oscillator to be used instead of 32 MHz oscillator
	Lev. 05 MI		Rev. 1.22	- New firmware to support CONNER hard disks Two PALs replaced for noise problem on signals of two components implemented on board with BIMIC and the 40 MHz oscillator.
	Lev. 08 MI		Rev. 1.22	- Changes to components, wirings and cuts to solve Data compare error problem during HDU test.
	Lev. 09 MI		PPKD 497488P PPKE 497489Q Rev. 1.35	- New firmware for management of Olivetti and DEC identifiers
	Lev. 10		PPJD 498122Q PPJE 498123R Rev. 1.42	- New firmware to solve the problems: - NOVELL DOS driver in AT mode - Problems on 200 MB CONNER and 600 MB MAXTOR hard disks - Support for PEM in AT mode
	Lev. 11		PPJP PPJQ Rev. 1.43	- New firmware to solve the CONNER hard disk problems
	Lev. 12			New floppy disk controller 82077 CSFM replaces 82077 step C4

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>GO740</b>	Lev. Nasc.		PPKD 497488P PPKE 497489Q Rev. 1.35	New printed circuit to absorb cuts and wirings on previous one.
	Lev. 01		PPJD 498122Q PPJE 498123R Rev. 1.42	New firmware to solve the problems: <ul style="list-style-type: none"> <li>- NOVELL DOS driver in AT mode</li> <li>- Problems on 200 MB CONNER and 600 MB MAXTOR hard disks</li> <li>- Support for PEM in AT mode</li> </ul>
	Lev. 02		PPJP PPJQ Rev. 1.43	New firmware to solve the CONNER hard disk problems
	Lev. 03		PPJP PPJQ Rev. 1.43	Introduced new 82355-B0 (BMIC) component to replace 82355-A2. This component can also be installed on the GO738 board.
	Lev. 04		PZDS PZDT Rev. 1.45	Solves some of the problems experienced with the previous version
	Lev. 05			New floppy disk controller 82077 CSFM replaces 82077 step C4

**USER DISKETTE**

LEVEL	COMPATIBILITY
1.00 upd 2 1.00 upd 3	Solved hard disk problem that can be damaged by the test contained in the previous diskette version. Includes BA868/69
1.1 upd 1 1.2	
1.10 upd 1 1.20	Supports Weitek diagnostics ESDI HDU management
1.30 upd 1	Recovers correct capacity of 320 MB hard disk
1.40 upd 1	Introduced in the hard disk table, the specific TYPE for 320 MB ESDI hard disk Corrected error messages for German version

**SYSTEM TEST**

LEVEL	COMPATIBILITY
1.50 upd 1	1.15

**COMPATIBILITY NOTES**

<b>BOARD OR HW/SW DEVICE</b>	<b>DESCRIPTION</b>
OEMM386	Level 4.06 does not acknowledge this Personal Computer. For M486 use version 4.08 rev. 1.40
ROM BIOS 1.06	Solves: 300 MB hard disk problems NVRAM SETUP problem 1.2 and 1.44 MB floppy disk problem
ROM BIOS 1.08.2	Solves: 600 MB hard disk problem
Board GO734 (EVC - 1)	When the EVC-1 board operates with direct video access, a VGA compatible controller can be installed on the BUS.
Board GO738 (ESC - 1)	Can work with a 40 or 32 MHz oscillator.
User Diskette 1.30 upd 1	Recovers correct capacity of 320 MB hard disk (1.2 version recovered 304 MB)
EVC driver 4.0 1.3	Driver to support ACAD10 and ACAD11, changed DAM driver for OS/2 P.M.
i860 coprocessor	Can be installed on BA867/BA868 boards only.
EVD Version 5.0	Version 5.0 of EVD allows supporting in DAM mode (1024 x 768 x 256) Windows 3.0, AutoCAD 386 Rev. 10.0 and AutoCAD 386 Rev. 11.0.
GO738	On hard disk and floppy disk controller, component 82355A2 (BMIC) is replaced with component 82355B0 that is functionally compatible with it. This operation is only to be made in case of malfunctioning in field.
486 microprocessor	486 B6 microprocessor is no longer produced. It is replaced by 486 D0 microprocessor that has the same functionalities. On BA859 and BA860 motherboards, use of a microprocessor different from version D0 causes problems on the parallel port that were solved with level 08.
Component WD16C552 step D	It is possible to introduce step D of the WD 16C552 component on the BA859 and BA860 boards. Board level does not change.
Component 82358 EBC	It is possible to introduce step A2 of the 82358 EBC component on the BA859 and BA860 boards to replace step A1. Board level does not change.
Component 82355	Component 82355-A2 is replaced by component 82355B1.



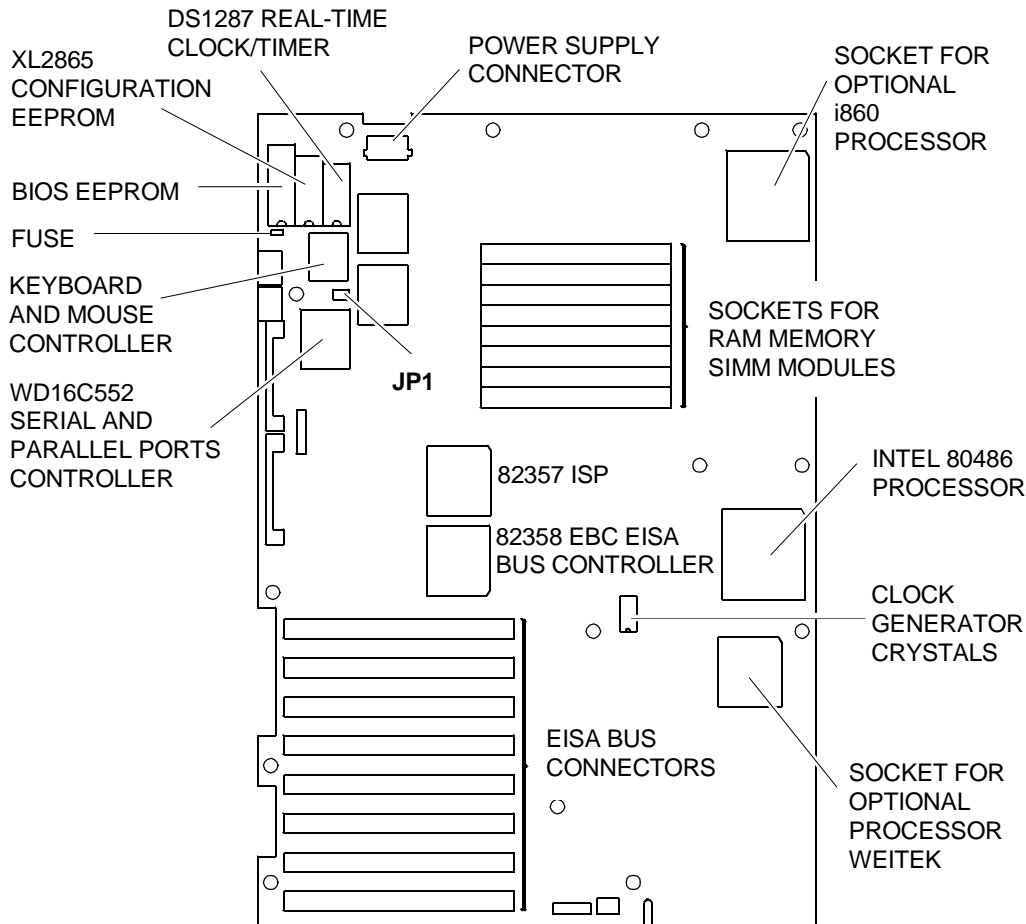
**SOFTWARE COMPATIBILITY**

OPERATING SYSTEMS	NOTES
IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 e 1.20 IBM Operating System/2 Extended Edition, Ver. 1.10 INTERACTIVE 386/ix, Ver. 2.02 Olivetti's Microsoft Disk Operating System, Ver. 3.30a Olivetti's Microsoft Disk Operating System, Ver. 4.01 Olivetti's Microsoft OS/2, Ver. 1.10 and 1.20 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	During installation on hard disk, a formatted DSDD disk is required. PS/2 type mouse not recognised PS/2 type mouse not recognised

**HARDWARE COMPATIBILITY**

MODEMS	I/O INTERFACE PRODUCTS
Hayes Smartmodem 1200B Hayes Smartmodem 2400B Telenetics Expressdata 24i (24i-12i) Ven-tel PC Modem Half-Card (PCM-XT) Hayes Smartmodem 1200	FUTURE DOMAIN HOST ADAPTER (TMC-830) IBM Asynchronous COM. CARD (1502074) IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL
MULTIPOINT	MOUSE
Anvil Stallion Intelligent 16 Port Controller Chase MSC Connect/AT8 Intelligent 8 Port Computone System Intelliport 16 Port AT16 Computone System Intelliport 16 Port EISA ECC Consensys Powerports 8 Port Intelligent Ctr. Digiboard Digichannel COM/xi Intelligent 8 Port Specialix Si Intelligent I/O Controller	IBM PS/2 Mouse (6450350) Logitech Bus Mouse (PF-3F) Microsoft Bus Mouse, Rev. C Microsoft Serial-PS2 Mouse Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti Bus Mouse (GRD 25-019) Olivetti New Advanced Mouse (GRD 25-025)
GRAPHICS PRODUCTS	NETWORKS & LAN PRODUCTS
AST RESEARCH AST - 3G PLUS AST RESEARCH AST - VGA PLUS ATI EGA WONDER HERCULES GRAPHICS CARD (GB102) HERCULES INCOLOR CARD (GB222) IBM MONO Display/Printer Adapter (1504900) MATROX PG - 1281 ORCHID PRODESIGNER VGA PLUS PARADISE EGA 480 PARADISE VGA PRO CARD QUADRAM QUAD EGA PLUS (QC 8601) TECMAR VGA AD VIDEO - 7 VEGA DELUXE	CARD (6450215) AT&T Starlan Network IBM OS/2 Lan Server/Requester IBM PC Network IBM Token Ring Network MADGE Token-Ring Network MS OS/2 Lan Manager Novell Advanced netware Ver.2.15 Novell Netware 386 with ISA Adapter Novell Netware 386 with EISA Adapter PROTEON Token Ring Network 3COM 3 + Network /Ethernet) 3COM 3 + Open Lan Manager IONET Network
DISPLAY UNITS	OTHER PRODUCTS
JVC QUAD-SYNC Color (GD-H6116VFW) NEC Multisync Monitor (APC-H431) OLIVETTI HIRES Color (DSM 26-115) PRINCETON RGB Monitor (HX-12) ZENITH RGB/COMPOSITE Monitor (ZVM-135)	OLIVETTI OD-810 WORM (WRM 25-810) PLUS Development 20MB Hardcard SOFTWARE SECURITY Parallel Port Block WELCH-ALLYN Barcode Reader (HBD-100, R. A)

**SYSTEM BOARD COMPONENTS, JUMPERS**



BFB4A

**JUMPER JP1**

only for boards  
BA859  
BA860

- Disables the system password
  - Cancels the configuration
- If the system is badly configured take the following action:
- 1) Switch off the PC.
  - 2) Move jumper JP1.
  - 3) Switch PC on again. This is the default configuration.
  - 4) Switch off the PC.
  - 5) Put jumper JP1 back to its initial position.
  - 6) Switch the system on and reconfigure with the User Diskette.

**FUSE F1**

Keyboard and Mouse Fuse 2 A 5 V.

**INTERRUPT LEVELS**

LEV.	NAME	CTRL	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 -10	IRQ2	1	Interrupt to Controller 1 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

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
60 h	Keyboard	03F8 - 03FF	COM1 Serial port
70 h	Real time clock. Bit 7 of the real time clock is in the 82357 for NMI	02F8 - 02FF	COM2 Serial port
71 h	Real time clock read/write register	0C00 - 0C05	Configuration registers
92 h	Port A20	0C20 - 0C3F	EEPROM addressing
278 - 2FF	LPT3 Parallel port	0C80 - 0C84	System ID codes
378 - 3FF	LPT2 Parallel port	0CF8 - 0CFF	Console interface
3BC - 3BF	LPT1 Parallel port	0100 - 03FF	Address space for ISA expansion boards

**SYSTEM MEMORY MAP**

ADDRESS	SIZE	FUNCTION	CACHE
0000 0000 - 000A 0000	640 KB	System RAM	YES
0000 000A - 000C 0000	128 KB	Video memory	NO
000C 0000 - 000E 0000	128 KB	EISA/ISA BUS ROM	YES
000E 0000 - 0010 0000	128 KB	ROM BIOS (copied into shadow RAM)	YES
00E0 0000 - 0100 0000	13 MB	System RAM	YES
0010 0000 - 00E0 0000	2 MB	Direct video buffer access (location 2)	NO
0100 0000 - 0400 0000	48 MB	System RAM (Maximum memory on system board)	YES
0400 0000 - 1000 0000	192 MB	System RAM (Maximum memory that can be fitted in cache)	YES
1000 0000 - C000 0000	32 MB	System RAM	YES
C000 0000 - C200 0000	32 MB	Weitek Coprocessor	NO
C200 0000 - D000 0000	224 MB	System RAM	YES
D000 0000 - E000 0000	256 MB	Direct video buffer access (location 1)	NO
E000 0000 - F000 0000	286 MB	SRAM	NO
F000 0000 - FFFE 0000	268 MB	System RAM	YES
FFFE 0000 - 10000 0000	128 KB	ROM BIOS	YES

# M486 ESDI

## CHARACTERISTICS

Microprocessor	INTEL 80486
Clock	25 MHz
Architecture	32-bit EISA
Memory	2, 4 or 8 MB on system board expandable up to 32 MB by: <b>EXM 26-482</b> 2 MB - 2 SIMM 1 Mb x 9 <b>EXM 26-484</b> 4 MB - 2 SIMM 512 Kb x 36 <b>EXM 6108</b> 8 MB - 2 SIMM 1 Mb x 36 System memory can be expanded up to 64 MB using 8 MB SIMM modules when available
Memory access time	100 ns / 80 ns
Coprocessor	Integrated in INTEL 80486, Weitek 4167
Optional processor	INTEL i860
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Panasonic JU 475-4 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	Micropolis 1654-7 ESDI 136 MB Seagate ST 2383E ESDI 330 MB NEC D5655 ESDI 136 MB
Streaming Tape	IRWIN 80/120 MB floppy interface
EISA slots	8 Present - 6 Available
Video adapter	EISA EVC-1 board GO739 EISA OVC board GO481
Hard disk and Floppy disk controller	WD1009-SE2 combo controller
Cache Controller	Integrated in microprocessor
Cache size	8 KB integrated in microprocessor
Mouse	PS/2 and AT compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

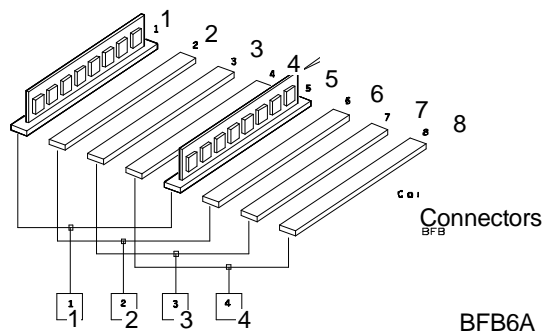
<b>SYSTEM BOARD</b>
BA859 P1.25 2 MB
BA860 P1.25 4 MB
BA868 P1.7 2 MB
BA869 P1.7 4 MB
<b>BIOS</b>
Rev. 2.03
<b>VIDEO ADAPTER</b>
GO734
GO739
GO481
<b>HARD DISK - FLOPPY DISK CONTROLLER</b>
GO740
GO565
<b>POWER SUPPLY</b>
PS20 A 220 V Level: 01 MI
PS20 A 110 V Level: 01 MI

## MEMORY EXPANSION

**WARNING:** It is not essential to fill all the memory banks available. Starting from the basic 4 MB, it is thus possible to obtain the following memory configurations: 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64 MB.

The SIMM modules installable are:

- EXM 26-484 4 MB
- EXM 26-482 2 MB
- EXM 6108 8 MB



**SYSTEM BOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLERS / NOTES</b>
<b>BA859</b>	Lev. Nasc.	412930 P	ME8K 497450U Rev. 1.10.1	Board with 2 MB memory  These changes are implemented in the field only, and not in the factory
	Lev. 01 MI		PPJ5 Rev. 1.15 498060H	- New BIOS for installation of NETWARE/386 on hard disk
	Lev. 02 MI		Rev. 1.15	- Two PALs replaced to solve the Parity Error problem in UNIX SCO
	Lev. 04 MI		Rev. 1.15	- Cuts and wirings made to solve system hang problem with some TORUS communication boards and the serial port problem
	Lev. 05 MI		PPJF Rev. 2.0 498124J	- New BIOS for implementation of new features - support for more than two HDU - support for several ESC-1 boards - support for PEM - support for telediagnostic board - support for ESDI HDU controller
	Lev. 06 MI		Rev. 2.0	- Cuts and wirings made to solve system lock problem during P.O.D. with several EISA boards on the BUS
	Lev. 07 MI		PPJR Rev. 2.01	- New BIOS for management of 300 MB ESDI Type 3 hard disk and solve the following problems: - Booth with unformatted ESDI - BOOT from diskless - Compatibility
	Lev. 08 MI		Rev. 2.01	- This change solves the problem of noise on the serial port interrupt when there is a non D0 486 microprocessor on the main board
	Lev. 09 MI		Rev. 2.01	- Keyboard Controller Rel. 8.01 introduced to replace Keyboard Controller Rel. 8.0
	Lev. 10		PPJX Rev. 2.03	- New BIOS to solve problems of the previous release: - memory above 16 MB - Boot of 720 KB floppy drives - ADAPTEC EISA Controller
<b>BA860</b>		412932 D		Same as BA859 but with 4 MB memory

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA867</b>	Lev. Nasc	612164 T	PPJ5 498060H Rev. 1.15	New layout level for recovering cutting and trimming and removal of previous board problems. Board with 4 MB of memory
	Lev. 01		PPJF 498124J Rev. 2.0	- New BIOS for implementation of new features: - Support for more than two HDU - Support for several ESC-1 boards - Support for PEM - Support for telediagnostic board - Support for ESDI HDU controller
	Lev. 02		Rev. 2.0	- Cuts and wirings made to solve system lock problem during P.O.D. with several EISA boards on the BUS
	Lev. 03		PPJR 498155Z Rev. 2.01	- New BIOS for management of 300 MB ESDI Type 35 hard disk and solve the following problems: - BOOT with unformatted ESDI HDU - BOOT from diskless system - Compatibility
	Lev. 04		Rev. 2.01	- This change solves the problem of noise on the serial port interrupt when there is a non-step D i486 microprocessor - Signal BCLK improved
	Lev. 06		Rev. 2.01	- Keyboard Controller Rel. 8.01 introduced - Introduced 80486-25-D0 component to replace 80486-25-B6 - Introduced WD 16C552 Mask D component to replace the previous one
	Lev. 07		PPJX Rev. 2.03	- Allows introduction of step A2 of the 82358 EBC component to replace step A1 - EISA BUS BCLK and EBC HCLKCPU signals improved - New BIOS to solve problems of previous release: - Memory above 16 MB - Boot of 720 KB floppy disks - ADAPTEC EISA Controller - MYLEX SCSI Controller
<b>BA868</b>				Same as BA867 but with a 2 MB memory

**INTEGRATED CONTROLLERS**

<b>CONTROLLER</b>	<b>FUNCTION</b>
<b>82357 ISP</b>	DMA Controller Interrupt Controller 5 Timers I/O Ports
<b>XL2865</b>	EEPROM Configuration
<b>DS1287</b>	Real Time Clock/Timer
<b>8042/8742</b>	Keyboard and Mouse Controller
<b>WD16C552</b>	Serial and Parallel port controller
<b>82358 EBC</b>	EISA BUS controller

**BOARDS**

<b>FUNCTION</b>	<b>DESCRIPTION</b>	<b>D.R.S. CODE</b>	<b>CHARACTERISTICS</b>
CPU system board	BA859	412930 P	P1.25 2 MB
CPU system board	BA860	412932 D	P1.25 4 MB
CPU system board	BA867	612164 T	P1.7 4 MB
CPU system board	BA868		P1.7 2 MB
Power supply 220 V	PS20	412915 C	
Power supply 110 V	PS20	412914 B	
Console board	IF637	497112 D	
Video adapter	GO481	412444 L	Compatible ISA OVC board



**BA859/60 I/O DEVICES**

They are the same as those for Personal Computer M486 (see page 16-6).

**BA868/69 I/O DEVICES**

They are the same as those for Personal Computer M486 (see page 16-7).

**VIDEO ADAPTER BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>GO734</b>	Lev. Nasc.	412783 Q	PBZ2 Rev. 1.01 497534C	<b>82C452</b> super VGA <b>RAM Video</b> - VRAM 100 ns 256 Kx4 Dual-ported
	Lev. 01 MI		PPVC Rev. 1.02 497346X	New BIOS
	Lev. 02 MI		PPVC Rev. 1.02 497346X	Performance improvement
	Lev. 03 MI		PPVC Rev. 1.02 497346X	Replaced a component in U36
	Lev. 04 MI		PBZY Rev. 1.03 497461K	New BIOS. This change is implemented at field level only, and not at factory level
<b>GO739</b>	Lev. Nasc.		PBZV Rev. 1.03 497461K	Circuitry improvements
<b>GO481</b>	Lev. Nasc.		PDP5 - PDP7 Rev. 1.06	ISA analog OVC video adapter board

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**POWER SUPPLY**

MODEL	LEVEL	NOTES
PS20 A	Lev. Nasc.	
	01	Complies with insulation safety norms Solves the problem of the fan's minimum speed being too slow.

**HARD DISK/FLOPPY DISK CONTROLLER BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>G0738</b>	Lev. Nasc.		PPUA 497327L PPUB 497328V Rev. 1.10	<b>0186 CPU</b> - Local CPU <b>BIMIC 82355</b> - EISA Bus Master controller <b>82077</b> - Floppy disk controller
	Lev. 01 MI		PPUD 497366T PPUE 497367U Rev. 1.13	- New firmware to enhance performances - Replaced chip 82355 A1 with 82355 A2 - Replaced FDU controller 82077 C3 with 82077 C4
	Lev. 03 MI		Rev. 1.13	- New 82355 chip to solve timing problems.
	Lev. 04 MI		PPKB 497486D PPKC 497487E Rev. 1.22	- New firmware to support Conner HDUs. - Replaced two PALs to solve noise problems in two components. Implemented on 32 MHz BMIC board. It allows use of a 40 MHz oscillator in place of the 32 MHz one.
	Lev. 05 MI		Rev. 1.22	- New firmware to support Conner HDUs. - Replaced two PALs to solve noise problems in two components. Implemented on 40 MHz BMIC board
	Lev. 08 MI		Rev. 1.22	- Modifications of components, cuts and wirings to solve the "Data Compare Error" during HDU's tests.
	Lev. 09 MI		PPKD 497488P PPKE 497489Q Rev. 1.35	- New firmware to manage Olivetti and DEC IDs
	Lev. 10		PPJD 498122Q PPJE 498123R Rev. 1.42	- New firmware to solve the following problems: - AT environment NOVELL DOS driver - 200 MB CONNER and 600 MB MAXTOR HDUs problems - PEM support in AT mode
	Lev. 11		PPJP PPJQ Rev. 1.43	- New firmware to solve CONNER HDU problems
	Lev. 12			New floppy disk controller 82077 CSFM replaces 82077 step C.

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>GO740</b>	Lev. Nasc.		PPKD 497488P PPKE 497489Q Rev. 1.35	New printed circuit to absorb cuts and wirings of previous one.
	Lev. 01		PPJD 498122Q PPJE 498123R Rev. 1.42	- New firmware to solve following problems: - NOVELL DOS driver in AT mode - Problems with 200 MB CONNER and 600 MB MAXTOR hard disks. - Support for PEM in AT mode
	Lev. 02		PPJP PPJQ Rev. 1.43	- New firmware to solve CONNER hard disk problems
	Lev. 03		PPJP PPJQ Rev. 1.43	Introduced new 82355-B0 (BMIC) component to replace 82355-A2. This component can also be installed on the G0378 board
	Lev. 04		PZDS PZDT Rev. 1.45	Solves some of the faults of the previous version
	Lev. 05			New floppy disk controller 82077 CSFM replaces 82077 step C4.
<b>GO565</b>	Lev. Nasc.		Rev. 2.0	ESDI hard disk controller board

**USER DISKETTE**

LEVEL	COMPATIBILITY
1.20 1.30 upd 1 1.40 upd 1	BIOS 1.15  Introduced in the hard disk table, the specific TYPE for 320 MB ESDI hard disk Corrected error messages for German version

**17****SYSTEM TEST**

LEVEL	COMPATIBILITY
Lev. 2.10	BIOS 2.01 on system board Firmware 2.0 on GO565 board Firmware 1.03 on GO739 board Firmware 1.06 on GO481 board

**COMPATIBILITY NOTES**

<b>BOARD OR HW/SW DEVICE</b>	<b>DESCRIPTION</b>
OEMM386	Level 4.06 does not acknowledge this Personal Computer. For M486 use version 4.08 rev. 1.40
ROM BIOS 1.06	Solves: 300 MB hard disk problems NVRAM SET UP problem 1.2 and 1.44 MB floppy disk problem
ROM BIOS 1.08.2	Solves: 600 MB hard disk problem
Board GO734 (EVC - 1)	When the EVC-1 board operates with direct video access, a VGA compatible controller can be installed on the BUS.
Board GO738 (ESC - 1)	Can work with a 40 or 32 MHz oscillator.
EVC driver 4.0 1.3	Driver to support ACAD10 and ACAD11, changed DAM driver for OS/2 P.M.
i860 coprocessor	Can be installed on BA867/BA868 boards only.
EVD Version 5.0	Version 5.0 of EVD allows supporting in DAM mode (1024 x 768 x 256) Windows 3.0, AutoCAD 386 Rev. 10.0 and AutoCAD 386 Rev. 11.0.
486 microprocessor	486 B6 microprocessor is no longer produced. It is replaced by 486 D0 microprocessor that has the same functionalities. On BA859 and BA860 motherboards, use of a microprocessor different from version D0, causes problems on the parallel port that were solved with level 08.
Component WD16C552 step D	Possible to introduce step D of the WD16C552 component on boards BA859 and BA860. Board level does not change.
Component 82358 EBC	Possible to introduce step A2 of the 82358 EBC component on boards BA859 and BA860 to replace step A1. Board level does not change
Component 82355	Component 82355-A2 is replaced by component 82355-B1.

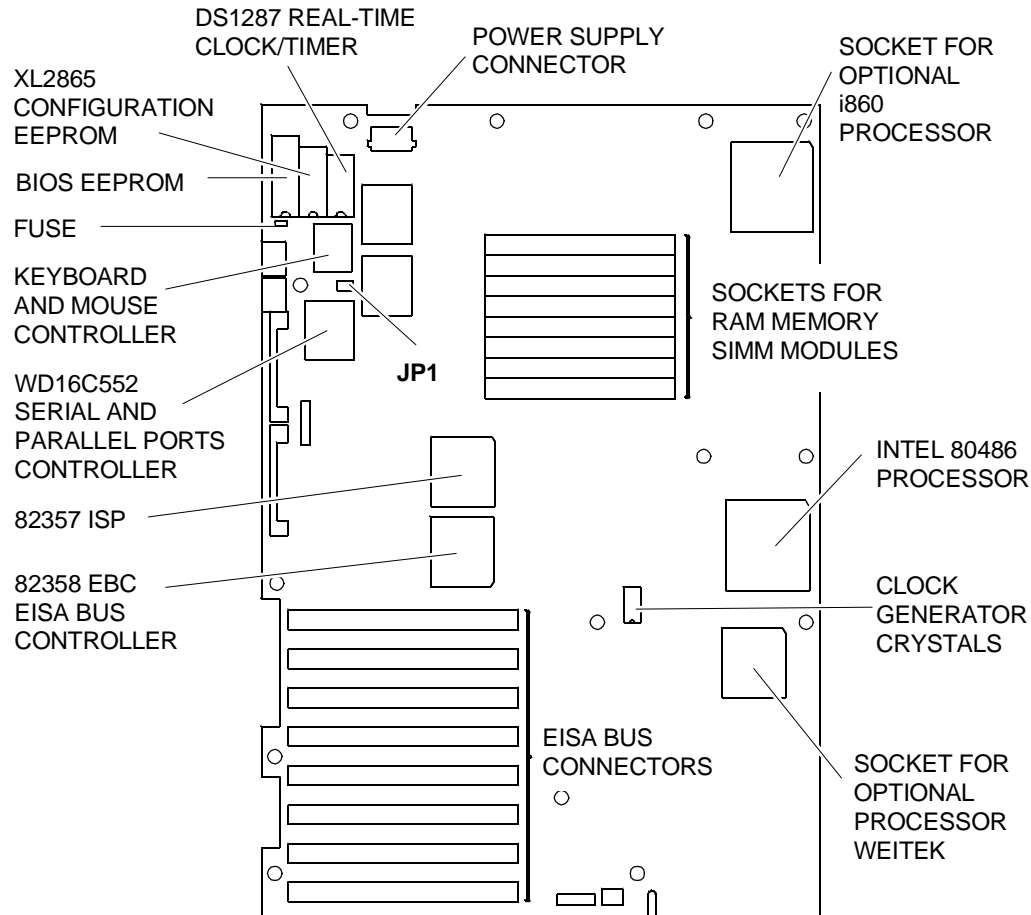
**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20 IBM Operating System/2 Extended Edition, Ver. 1.10 INTERACTIVE 386/ix, Ver. 2.02 Olivetti's Microsoft Disk Operating System, Ver. 3.30a Olivetti's Microsoft Disk Operating System, Ver. 4.01 Olivetti's Microsoft OS/2, Ver. 1.10 and 1.20 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	During installation on hard disk, a formatted DSDD disk is required. PS/2 type mouse not recognised  PS/2 type mouse not recognised

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smartmodem 1200B Hayes Smartmodem 2400B Telenetics Expressdata 24i (24i-12i) Ven-tel PC Modem Half-Card (PCM-XT) Hayes Smartmodem 1200	FUTURE DOMAIN HOST ADAPTER (TMC-830) IBM Asynchronous COM. CARD (1502074) IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL
<b>MULTIPOINT</b>	<b>MOUSE</b>
Anvil Stallion Intelligent 16 Port Controller Chase MSC Connect/AT8 Intelligent 8 Port Computone System Intelliport 16 Port AT16 Computone System Intelliport 16 Port EISA ECC Consensus Powerports 8 Port Intelligent Ctr. Digiboard Digichannel COM/xi Intelligent 8 Port Specialix Si Intelligent I/O Controller	IBM PS/2 Mouse (6450350) Logitech Bus Mouse (PF-3F) Microsoft Bus Mouse, Rev. C Microsoft Serial-PS2 Mouse Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti Bus Mouse (GRD 25-019) Olivetti New Advanced Mouse (GRD 25-025)
<b>GRAPHICS ADAPTERS</b>	<b>NETWORKS &amp; LAN PRODUCTS</b>
AST RESEARCH AST - 3G PLUS AST RESEARCH AST - VGA PLUS ATI EGA WONDER HERCULES GRAPHICS CARD (GB102) HERCULES INCOLOR CARD (GB222) IBM MONO Display/Printer Adapter (1504900) MATROX PG - 1281 ORCHID PRODESIGNER VGA PLUS PARADISE EGA 480 PARADISE VGA PRO CARD QUADRAM QUAD EGA PLUS (QC 8601) TECMAR VGA AD VIDEO - 7 VEGA DELUXE	CARD (6450215) AT&T Starlan Network IBM OS/2 Lan Server/Requester IBM PC Network IBM Token Ring Network MADGE Token-Ring Network MS OS/2 Lan Manager Novell Advanced netware Ver.2.15 Novell Netware 386 with ISA Adapter Novell Netware 386 with EISA Adapter PROTEON Token Ring Network 3COM 3 + Network /Ethernet) 3COM 3 + Open Lan Manager IONET Network
<b>DISPLAY UNITS</b>	<b>OTHER PRODUCTS</b>
JVC QUAD-SYNC Color (GD-H6116VFW) NEC Multisync Monitor (APC-H431) OLIVETTI HIRES Color (DSM 26-115) PRINCETON RGB Monitor (HX-12) ZENITH RGB/COMPOSITE Monitor (ZVM-135)	OLIVETTI OD-810 WORM (WRM 25-810) PLUS Development 20MB Hardcard SOFTWARE SECURITY Parallel Port Block WELCH-ALLYN Barcode Reader (HBD-100, R. A)

**SYSTEM BOARD COMPONENTS, JUMPERS**



BFB4A

**JUMPER JP1**

- Disables the system password
- Cancels the configuration

(only for boards  
BA859  
BA860)

If the system is badly configured take the following action:

- 1) Switch off the PC.
- 2) Move jumper JP1.
- 3) Switch PC on again. This is the default configuration.
- 4) Switch off the PC.
- 5) Put jumper JP1 back to its initial position.
- 6) Switch the system on and reconfigure with the User Diskette.

**FUSE F1**

Keyboard and Mouse Fuse 2 A 5 V.

**INTERRUPT LEVELS**

LEV.	NAME	CTRL	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 -10	IRQ2	1	Interrupt to Controller 1 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

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
60 h	Keyboard	03F8 - 03FF	COM1 Serial port
70 h	Real time clock. Bit 7 of the real time clock is in the 82357 for NMI	02F8 - 02FF	COM2 Serial port
71 h	Real time clock read/write register	0C00 - 0C05	Configuration registers
92 h	Port A20	0C20 - 0C3F	EEPROM addressing
278 - 2FF	LPT3 Parallel port	0C80 - 0C84	System ID codes
378 - 3FF	LPT2 Parallel port	0CF8 - 0CFF	Console interface
3BC - 3BF	LPT1 Parallel port	0100 - 03FF	Address space for ISA expansion boards

**SYSTEM MEMORY MAP**

<b>ADDRESS</b>	<b>SIZE</b>	<b>FUNCTION</b>	<b>CACHE</b>
0000 0000 - 000A 0000	640 KB	System RAM	YES
0000 000A - 000C 0000	128 KB	Video memory	NO
000C 0000 - 000E 0000	128 KB	EISA/ISA BUS ROM	YES
000E 0000 - 0010 0000	128 KB	ROM BIOS (copied into shadow RAM)	YES
00E0 0000 - 0100 0000	13 MB	System RAM	YES
0010 0000 - 00E0 0000	2 MB	Direct video buffer access (location 2)	NO
0100 0000 - 0400 0000	48 MB	System RAM (Maximum memory on system board)	YES
0400 0000 - 1000 0000	192 MB	System RAM (Maximum memory that can be fitted in cache)	YES
1000 0000 - C000 0000	32 MB	System RAM	YES
C000 0000 - C200 0000	32 MB	Weitek Coprocessor	NO
C200 0000 - D000 0000	224 MB	System RAM	YES
D000 0000 - E000 0000	256 MB	Direct video buffer access (location 1)	NO
E000 0000 - F000 0000	286 MB	SRAM	NO
F000 0000 - FFFE 0000	268 MB	System RAM	YES
FFFE 0000 - 10000 0000	128 KB	ROM BIOS	YES





## M300-05

### CHARACTERISTICS

Microprocessor	INTEL 386SX
Clock	16 MHz
Architecture	XT AT addressing 32-bit
Memory	From 1 MB to 11 MB on motherboard Bank 1 1 MB soldered chip 256 Kb x 4 Bank 2 Two sockets, for SIMM modules: 1 Mb x 9 <b>EXM 26-502</b> or 4 Mb x 9 <b>EXM 26-809</b> or 1 Mb x 9 <b>EXM 25-532</b> Bank 3 Same as bank 2
Memory access	100 ns / 80 ns
Coprocessor	16 MHz 80387SX
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Panasonic JU 475-4 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	40 MB CONNER CP3046 40 MB Quantum LPS 52 AT 120 MB CONNER CP30126 40 MB W.D. AC 140 120 MB W.D. AC 2120
Streaming Tape	40 MB IRWIN 245 floppy interface 80/120 MB IRWIN 285 floppy interface
Slots	Three 16-bit connectors on expansion board of BUS IN283
Video adapter	PVGA1B integrated on motherboard VGA compatible
Hard Disk and Floppy disk controller	Integrated on motherboard Floppy disk controller: National DP8473 Hard disk interface:MSI buffer and logic ports
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

### MOTHERBOARD

BA 267  
Lev. 03 MI

BA 271  
Lev. 06 MI

BA 274  
Lev. 06 MI

BA 288  
Lev. 05 MI

### BIOS

Rev. 1.08

### EXPANSION BUS

IN283  
Lev. 03

IN124  
Lev. 01

### POWER SUPPLY

PS11 220 V  
Lev. 06

PS11 115 V  
Lev. 04

PS11 220 V only  
ASTEC Lev. 05

**MOTHERBOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLERS / NOTES</b>
<b>BA267</b>	Nasc.		Rev. 1.03	Board produced in small quantities as replaced immediately by BA 271
	Lev. 01 MI		Rev. 1.06 PZCF	Changes at field level only as board is no longer in production. The changes are: <ul style="list-style-type: none"> <li>- AMD CPU alternative to the INTEL CPU</li> <li>- Component IPC82C206 alternative to the "Texas" component</li> <li>- W.D. 16C551 step C replaced by step D</li> <li>- Keyboard controller changed from Rev. 7.02 to Rev. 10.01 for introduction of the security features. This release functions only with the 1.06 BIOS or subsequent versions</li> <li>- New BIOS 1.06</li> </ul> All these changes update BA267 but do not make it functionally equivalent to BA 288 level 03
	Lev. 01 MI No change of level		Rev. 1.07 PZCK	New BIOS to remedy the slow mouse problem in WINDOWS 3.0 in floppy disk access simultaneous with mouse movement
	Lev. 02 MI		Rev. 1.08 PZCL	New BIOS to remedy problems with the DEPCA board on some monochrome monitors when displaying the 132 column mode. Field change only
	Lev. 03 MI		Rev. 1.08	Component WD 16C551 Rev. C replaced by the WD 16C551 Rev. D component

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
BA271	Nasc.		Rev. 1.03 PEQT	Replaces BA267. Components are the same
	Lev. 01 MI		Rev. 1.04 PEQP	New BIOS
	Lev. 02 MI		Rev. 1.04 PEQP	Replace PAL BCONV GLZ5 at location U91 with PAL GLZ8 to eliminate malfunctioning of some boards on the bus during refresh cycles.
	Lev. 03 MI		Rev. 1.05 PUN2	New BIOS and hardware changes to solve problems for Duplicator software and PCTOOLS 6.0
	Lev. 04 MI		Rev. 1.06 PZCF	Changes at field level only as board is no longer being produced. The changes are: <ul style="list-style-type: none"> <li>- AMD CPU alternative to the INTEL CPU</li> <li>- Component IPC82C206 alternative to the "Texas component"</li> <li>- W.D. 16C551 step C replaced by step D</li> <li>- Keyboard controller changed from Rev. 7.02 to Rev. 10.01 for introduction of the security features. This release functions only with the 1.06 BIOS or subsequent versions</li> <li>- New BIOS 1.06</li> </ul> All these changes update BA 271 but do not make it functionally equivalent to BA 288 level 03
	Lev. 04 MI No change of level		Rev. 1.07 PZCK	New BIOS to remedy the slow mouse problem in WINDOWS 3.0 in floppy disk access simultaneous with mouse movement
	Lev. 05 MI		Rev. 1.08 PZCL	New BIOS to remedy problems with the DEPCA board on some monochrome monitors when displaying the 132 column mode. Field change only
	Lev. 06 MI		Rev. 1.08	Cuts, wirings and replacment of PAL GLZB in position U96 with PAL GLWK to solve problem of the QBASIC software when the numeric coprocessor is installed.

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA274</b>	Nasc.	612205 D	Rev. 1.03 PEQP	Replaces BA267. Integrated controllers are the same
	Lev. 01 MI		Rev. 1.04 PEQP	New BIOS
	Lev. 02 MI		Rev. 1.04 PEQP	Replace PAL BCONV GLZ5 at location U91 with PAL GLZ8 to eliminate malfunctioning of some boards on the bus during refresh cycles.
	Lev. 03 MI		Rev. 1.05 PUN2	New BIOS and hardware changes to solve problems for Duplicator software and PCTOOLS 6.0 Field change only.
	Lev. 04 MI		Rev. 1.06 PZCZ	Changes at field level only as board is no longer being produced. The changes are: <ul style="list-style-type: none"> <li>- AMD CPU alternative to the INTEL CPU</li> <li>- Component IPC82C206 alternative to the "Texas" component</li> <li>- W.D. 16C551 step C replaced by step D</li> <li>- Keyboard controller changed from Rev. 7.02 to Rev. 10.01 for introduction of the security features. This release functions only with the 1.06 BIOS or later</li> <li>- New BIOS 1.06</li> </ul> All these changes update BA 274 but do not make it functionally equivalent to BA 288 level 03
	Lev. 04 MI No change of level		Rev. 1.07 PZCK	New BIOS to remedy the slow mouse problem in WINDOWS 3.0 in floppy disk access simultaneous with mouse movement
	Lev. 05 MI		Rev. 1.08 PZCL	New BIOS to remedy problems with the DEPCA board on some monochrome monitors when displaying the 132 column mode. Field change only
	Lev. 06 MI		Rev. 1.08	Cuts, wirings and replacment of PAL GLZB in position U96 with PAL GLWK to solve problem of the QBASIC software when the numeric coprocessor is installed.

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA288</b>	Nasc.	612454 W	Rev. 1.04 PEQP	New board for trimming recovery
	Lev. 01 MI		Rev. 1.05 PUN2	<ul style="list-style-type: none"> <li>- New BIOS</li> <li>- Introduced TEXAS IPC 82C206 component in alternative to the C&amp;T IPC 82C206.</li> <li>- The TEXAS component becomes the primary source and the C&amp;T component the secondary source.</li> <li>- The WD16C551 Rev. C is replaced with WD16C551 Rev. D component.</li> <li>- Introduced AMD CPU in alternative to the Intel CPU</li> </ul>
	Lev. 02 MI		Rev. 1.06 PZCF	<ul style="list-style-type: none"> <li>- New BIOS to handle keyboard password and System Password</li> <li>- Introduction of Keyboard Controller Revision 10.01 to handle these passwords.</li> <li>- To correctly handle these passwords use User Diskette Version 1.04</li> </ul>
	Lev. 03 MI No change of level		Rev. 1.07 PZCK	New BIOS to remedy the slow mouse problem in WINDOWS 3.0 in floppy disk access simultaneous with mouse movement
	Lev. 04 MI		Rev. 1.08 PZCL	New BIOS to remedy problems with the DEPCA board on some monochrome monitors when displaying the 132 column mode.
	Lev. 05 MI		Rev. 1.08 <u>PZCL</u>	Cuts and wirings to solve problem of the QBASIC software when the numeric coprocessor is installed.

**MOTHERBOARD INTEGRATED CONTROLLERS**

<b>MOTERBOARD</b>	<b>INTEGRATED CONTROLLERS</b>	
BA267	<b>8742</b> <b>PVGA1B</b> <b>82C206</b>  <b>WD16C552</b> <b>DP8473</b> <b>MSI buffer</b> <b>NORD Gate Array</b>  <b>SUD Gate Array</b>	Keyboard and Mouse controller VGA super video adapter Non-volatile RAM Real Time Clock DMA controller Interrupt controller Serial and parallel port controller Floppy disk controller Intelligent hard disk interface READY signal generation Intel 387SX interface RESET generation BUS addresses control Slow speed work session Memory address control Address map decode Interface for refresh Shadow RAM support DMA controller Data BUS controller Clock generator Parity control BUS controller Read/write logic decode Signal generation A20GATE
BA271	These boards have the same controllers as BA267	
BA274		
BA288		

**BOARDS**

<b>FUNCTION</b>	<b>DESCRIPTION</b>	<b>D.R.S. CODE</b>	<b>CHARACTERISTICS</b>
CPU system board	BA267		
CPU system board	BA271		
CPU system board	BA274	612205 D	
CPU system board	BA288	612454 W	
Power supply 220 V	PS11	412957 N	
Power supply 110 V	PS11	412958 X	
BUS Adapter board	IN283	977913 Q	
BUS Adapter board	IN124	978265 P	

**USER DISKETTE**

<b>LEVEL</b>	<b>COMPATIBILITY</b>
Lev. 1.01 Lev. 1.02 Lev. 1.03 Lev. 1.04	BIOS 1.04  BIOS 1.05 BIOS 1.06 - Keyboard Controller Revision 10.01 This User Diskette allows: <ul style="list-style-type: none"> <li>- Management of Western Digital 40 MB and 120 MB hard disks</li> <li>- Management of keyboard Passwords introduced with new Keyboard controller Revision 10.01</li> <li>- Management of System Password</li> <li>- Updating of message system</li> </ul>

**SYSTEM TEST**

<b>LEVEL</b>	<b>COMPATIBILITY</b>
Lev. 1.02	BIOS 1.04
Lev. 1.03	New tests organisation, now they can run singly or via a file manager
Lev. 1.06	The MS-DOS 4.01 files have been introduced in this version. The new release also includes: <ul style="list-style-type: none"> <li>- The security features</li> <li>- New Keyboard Controller test to support releases 10.01 and later</li> <li>- Tables for management of W.D.40 MB and 120 MB hard disks</li> </ul>

**COMPATIBILITY NOTES**

<b>BOARD OR HW/SW DEVICE</b>	<b>DESCRIPTION</b>
BUS adapter board IN283 Lev. 01	Solves malfunctioning problems of some boards on the AT bus during refresh cycles
BUS adapter board IN283 Lev. 02	Solves the problems with RETIX board
BUS adapter board IN124 Original Lev.	New printed circuit absorbing cuts and wirings of the IN283
BUS adapter board IN124 Lev. 01	Introduction of terminators on the board
Intel 386SX CPU	Intel will no longer supply the 386SX Step C CPU, it is replaced with Step D that has the same electrical and mechanical characteristics as Step C. Board level does not change
CONNER and QUANTUM hard disks	The following hard disks: 120 MB CONNER CP30126 19 ns 210 MB CONNER CP3206 16 ns 40 MB QUANTUM LPS 52 AT 19 ns can only function with BIOS release 1.05 or later
BIOS 1.05	Solves: <ul style="list-style-type: none"> <li>- Memory problems after POD</li> <li>- Incorrect initialization of POD for an eventual optional ROM</li> <li>- Loading problems of video parameters</li> <li>- Parallel port problems after a reset (CTRL-ALT-DEL)</li> <li>- Management of new hard disks</li> </ul>
AMD CPU	The AMD CPU can be used as an alternative to the INTEL CPU.
TEXAS 82C206 Component	The C&T 82C206 component is replaced by the TEXAS 82C206 component. The two components are interchangeable.



**POWER SUPPLY UNIT**

<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
PS11 ASTEC 220 V	Nasc. Lev. 01	Only version 220 V Extended magnetic peripheral cables
	Lev. 02	Following problem solved: system fails to switch on if the printer connected is switched on before the system. Problem occurs especially on printers shared with other systems. A zener diode and a resistor have been added to the fan drive circuit to increase the power supply's immunity to external voltages.
	Lev. 03	The box and lid have ben modified
	Lev. 04	A capacitor has been added and a resistor replaced to solve production problems.
	Lev. 05	Inductor L5 has been added near the mains input and changes have been made to the circuitry to eliminate EMI problems and random voltage drops.
PS11 Plessey 220 V	Nasc.	Improved RESET signal
	Lev. 01	Reduced acoustic noise
	Lev. 02	Solves temperature problems
	Lev. 03	Reduced acoustic noise with MITSUBISHI fans
	Lev. 04	Solves temperature problems
	Lev. 05	Extended magnetic peripheral cables
Lev. 06	Replaced printed circuit material to improve transportability	
PS11 Plessey 110 V	Nasc.	This power supply has evolved in the same way as the 220 V model.
	Lev. 01	
	Lev. 02	
	Lev. 03 Lev. 04	

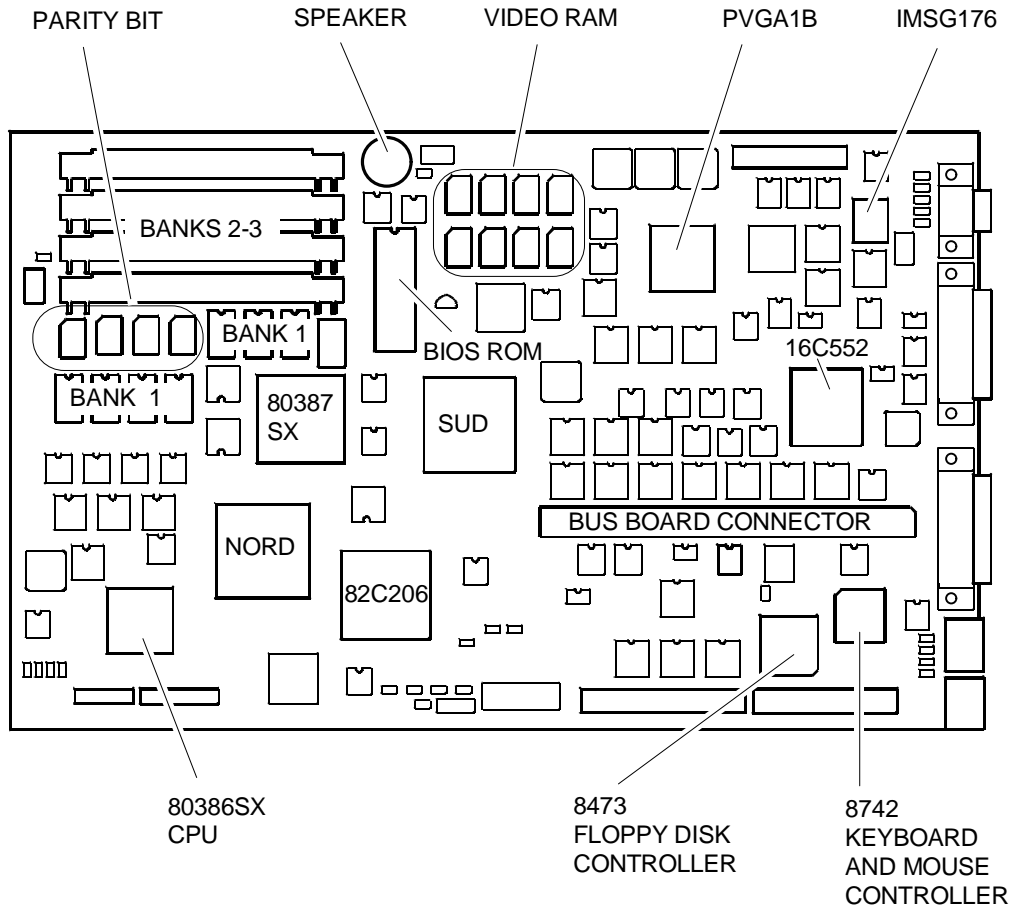
**SOFTWARE COMPATIBILITY****18**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20  IBM Operating System/2 Extended Edition, Ver. 1.10/1.20 INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	  During installation on hard disk, a formatted DSDD disk is required. PS/2 mouse not recognised  PS/2 mouse not recognised
<b>WINDOWS</b>	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<p><b>MODEMS</b></p> <p>Hayes Smartmodem 2400B                  FAXY PC MAXTER                  FURY 2400 PC MODEM                  AT&amp;T 2224 CEO MODEM                  FURY 2400 MAXTER MODEM                  FURY 2400 TI/MNP                  Hayes Smartmodem 1200 B</p>	<p><b>I/O INTERFACE PRODUCTS</b></p> <p>IBM PRINTER ADAPTER (1505200)                  STB 4-ON THE FLOOR</p>
<p><b>MULTIPOINT</b></p> <p>CHASE AT 8                  COMPUTONE AT 8                  COMPUTONE AT 16                  INTEL Bell ICC.6                  SPECIALIX SI / 8</p>	<p><b>MOUSE</b></p> <p>IBM PS/2 Mouse (6450350)                  IBM PS/2 Mouse Serial                  Logitech Bus Mouse (PF-3F)                  Logitech 3 button mouse                  MS-BUS mouse                  MS-MOUSE serial</p>
<p><b>GRAPHICS PRODUCTS</b></p> <p>AST VGA PLUS                  FASTWRITE 1024i                  FASTWRITE VGA                  HERCULES GRAPHICS CARD                  IBM VGA Adapter                  MATROX PG - 1281                  MAXON MVGA - 16 Adapter                  ORCHID PRODESIGNER VGA PLUS                  HERCULES INCOLOR CARD (GB222)                  PARADISE VGA PRO CARD</p>	<p><b>NETWORKING &amp; LAN PRODUCTS</b></p> <p>10 NET INTERFACE BOARD 200 series                  3COM Etherlink adapter 3C501                  3COM Etherlink II adapter 3C503                  3COM Etherlink plus adapter 3C505                  3COM Etherlink plus adapter 3C505                  DECNET PCSA adapter                  IBM PC NETWORK adapter II                  IBM TOKEN RING 16/4 adapter                  IBM TOKEN RING adapter II                  MADGE AT RING NODE adapter                  MICOM NP1000 adapter                  NOVELL NE1000 adapter                  NOVELL NE2000 adapter</p>
<p><b>DISPLAY UNITS</b></p>	
<p>IBM enhanced graphics monitor 5151                  IBM color graphics monitor 5153                  IBM PS/2 Monochrome display 8503                  IBM PS/2 color display 8512                  IBM PS/2 color display 8513                  IBM PS/2 color display 8514                  NEC MULTISYNC II</p>	<p>NEC MULTISYNC 2A                  NEC MULTISYNC 3D                  NEC MULTISYNC 4D                  NEC MULTISYNC 5D                  PHILIPS 7BM749                  PHILIPS 9CM082</p>

**SYSTEM BOARD COMPONENTS**



BKG1A

**INTERRUPT LEVELS**

LEVEL	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3-10	IRQ2	1	Interrupt to Controller 1 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

**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	Data keyboard controller	3BA h	Video adapter
61 h	System Controller Port B	3C0-3CF h	Video adapter
64 h	Commands keyboard 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)	–	

## SYSTEM MEMORY MAP

AT standard has a basic memory of 512 KB, expandable up to 640 KB, in which remapping of physical memory areas is not requested.

With a basic memory expansion beyond 640 KB, a logic addressing conflict arises because the physical memory between 640 KB and 1 MB occupies the logic addressing space reserved for BIOS ROM addressing. This addressing space between 640 KB and 1 MB is called *AT compatibility gap*.

In order not to lose this memory space, in these systems a remapping function has been introduced which makes it possible to have this memory portion available by addressing it beyond the MB.

This memory remapping function also includes a *Shadow RAM* function that allows BIOS ROM to be recopied by the system into the system memory at the same logic address locations in order to speed up the system.

These operation generates adjacent physical address space (physical memory map) from which a logic address space can be configured, these logic addresses may be not adjacent (logic memory map). In this case, for instance, it is possible to intercalate portions of memory resident on boards installed on BUS with portions of memory of system board.

## LIMITATIONS FOR MEMORY CONFIGURATION

There are some limitations when using these system memory configuration function.

Limitations are as follows:

**AT Compatibility Gap** - system needs this GAP

External memory can not be mapped in the logic address area reserved for this gap (0A000h to 0FFFFF h).

**128 KB memory segment size** - this function works only for memory segments of 128 KB.

**The first 258 KB is always used by system internal memory** - this 256 KB is reserved for BIOS during Power-On procedure. This memory space requires that the physical address be equal to logic address. This means that the first two memory segments of 128 KB must belong to system memory.

If these limitations are violated, automatically the system gives priority to physical memory map, ignoring the logic memory map. As a result, the external memory installed is ignored.

Another case is to be taken into consideration: when the **maximum memory is installed, i.e. 16 MB**.

In this case there is logic addressing space to remap the AT compatibility Gap which, therefore, will be a usual read/write RAM memory. In this situation, the user memory available depends on how the Shadow RAM option is used.

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### Shadow RAM disabled

512 KB of AT compatibility Gap is ignored by the system and is lost.

System total memory is therefore 15.872 KB ( $16.384 - 512 = 15.872$ ).

Therefore, system loses 512 KB.

### Only video BIOS in shadow RAM

64 KB of AT compatibility gap is recovered because it is remapped.

64 KB of video BIOS are set in shadow RAM. System total memory is therefore 16.000 KB ( $16.384 - 512 + 64$  recovered  $+64$  in shadow = 16.000).

Therefore, system loses 384 KB.

### System BIOS and video BIOS in shadow RAM

32 KB of AT compatibility gap is recovered because it is remapped. 96 KB of system BIOS and video BIOS are set in shadow RAM. System total memory, therefore, is 16.000

( $16.384 - 512 + 32$  recovered  $+ 96$  in shadow = 16.000). Therefore, system loses 384 KB.

**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	Standard 85 ms	10 MB	306	4	128	305	17
2	OPE XM5221 half size	20 MB	615	4	256	700	17
3	WREN 2 full size	38 MB	925	5	128	924	17
4	CDC WREN 1	28 MB	697	5	128	696	17
5	ST4096	76 MB	1024	9	-1	1023	17
6	OPE XM5340	40 MB	820	6	256	819	17
7	NEC D5146H	40 MB	615	8	128	664	17
8	TM755 slim size	40 MB	981	5	-1	980	17
9	CDC WREN II slim size	40 MB	981	5	128	980	17
10	Micropolis 1324 full size	51 MB	1024	6	128	980	17
11	CDC WREN II full size	53 MB	925	7	128	924	17
12	Micropolis 1325 full size	68 MB	1024	8	-1	1023	17
13	CDC WREN II full size	69 MB	925	9	128	924	17
14	Micropolis 1323-A full size	42 MB	1024	5	-1	1023	17
15	RESERVED						
16	OPE XM5220 85 ms	20 MB	612	4	128	656	17
17	TANDON TM 362 85 ms	20 MB	612	4	-1	663	17
18	Seagate ST251 40 ms	40 MB	820	6	-1	819	17
19	Rodime RO3055 40 ms	43 MB	872	6	0	871	17
20	Miniscribe M8425 68 ms	20 MB	612	4	0	663	17
21	Seagate ST277TR	62 MB	820	6	-1	819	26
22	OPE XM5340/60	62 MB	820	6	128	819	26
23	NEC D5147H	62 MB	615	8	384	664	26
24	NEC D5652 Fujitsu M2246	136 MB	820	10	-1	822	34
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023	34
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023	34
27	NEC D5452	68 MB	823	10	512	822	17
28	Fujitsu M2227D	40 MB	615	8	512	614	17
29	Fujitsu M2227D RLL	60 MB	615	8	512	614	26
30	CDC 94205-77	62 MB	981	5	-1	980	26
31	CONNER CP3142	40 MB	635	4	-1	639	33
32	CONNER CP3022	20 MB	615	4	-1	614	17
33	CONNER CP3106	100 MB	776	8	-1	775	33
34	Quantum P40 AT	40 MB	745	4	-1	744	28
35	Miniscribe 8051A	40 MB	965	5	-1	964	17
36	CONNER CP346	40 MB	805	4	-1	804	26
37	Quantum LPS105 AT	100 MB	776	8	-1	775	33
38	Quantum LPD210 AT	199 MB	873	13	-1	872	36
39	CONNER CP30064	58 MB	762	4	-1	761	39
40	CONNER CP30124	116 MB	762	8	-1	761	39
41	CONNER CP3206	202 MB	683	16	-1	682	38
42	W.D. AC-140	40 MB	980	5	-1	980	17
43	W.D. AC -2120	116 MB	762	8	-1	762	39

**Where:** CYL: No. of disk cylinders

T: No. of disk heads

WPC: Precompensation cylinder number

LZ: Head parking cylinder number

SET: No. of disk sectors.



# M300-10

## CHARACTERISTICS

Microprocessor	INTEL 386SX or AMD 386SX
Clock	20 MHz
Architecture	XT AT addressing 32-bit
Memory	From 2 MB to 12 MB on system board Bank 1 2 MB soldered chip 256 Kb x 4 Bank 2 Two sockets, for SIMM modules: 1 Mb x 9 <b>EXM 26-502</b> or 4 Mb x 9 <b>EXM 26-809</b> Bank 3 Same as bank 2
Memory access	100 ns / 80 ns
Coprocessor	20MHz 80387 SX
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Panasonic JU 475-4 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk	40 MB Quantum LPS 52 AT 40 MB 40 MB W.D. AC 140 40 MB 120 MB CONNER CP 30126 120 MB 120 MB W.D. AC 2120 120 MB 210 MB Quantum LPS 240 AT 210 MB 200 MB CONNER CP 3206 / CP 3204F
Streaming Tape	40 MB IRWIN 245 floppy interface 80/120 MB IRWIN 285 floppy interface
Slots	Four 16-bit connectors on expansion board of BUS IN283
Video adapter	Integrated in PVGA1B system board VGA-compatible
Hard Disk and Floppy disk controller	Integrated in system board Floppy disk controller: National DP8473 Hard disk interface: MSI buffer and logic ports
Cache	Cache controller 82385 16 KB cache capacity
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

### SYSTEM BOARD

BA 250  
Level 03 MI

BA 275  
Level 04 MI

BA 279  
Level 05 MI

BA 289  
Level 02 MI

BA 303  
Level 01

### BIOS

Rev. 1.00 for BA 250  
Rev. 1.02 for BA 275  
Rev. 1.04 for BA 279  
Rev. 1.06 for BA 289  
Rev. 1.06 for BA 303

### EXPANSION BUS

IN283 Level 03  
IN124 Level 01

### POWER SUPPLY

PS11 220 V  
Level 06

PS11 115 V  
Level 04

PS11 220 V only  
ASTEC Level 05

### CONSOLE

IF469  
Level 01

**SYSTEM BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES	
<b>BA250</b>	Lev. Nasc.	412998 Q	Rev. 1.01 PZBA	<b>8742</b> Keyboard and Mouse controller <b>PVGA1B</b> VGA super video adapter <b>82C206</b> Non-volatile RAM Real Time Clock DMA controller Interrupt controller <b>WD16C552</b> Serial and parallel port controller <b>DP8473</b> Floppy disk controller <b>MSI buffer</b> Intelligent hard disk interface <b>NORD Gate Array</b> READY signal generation Intel 387SX interface RESET generation BUS address control Slow speed work session Memory addresses control Address map decode Interface for refresh Shadow RAM support <b>SUD Gate Array</b> DMA controller Data BUS controller Clock generator Parity control BUS controller Read/write logic decode Signal generation A20GATE <b>82385</b> Cache controller	
	Lev. 01		Rev. 1.02 PZBC	Replaced PAL 20L8B at location U85 with PAL 20R4B GL8G, executed cutting and trimming to eliminate faults on some boards on the AT BUS caused by an incorrect IOCHRDY management	
	Lev. 02		Rev. 1.04 PZCG	New BIOS	
	Lev. 03		Rev. 1.04	Keyboard controller 10.01 introduced	
	Lev. Nasc.		612295 X	Rev. 1.02 PZBC	Replaces BA250 with same integrated controllers
<b>BA275</b>	Lev. 01		Rev. 1.02 PZBC	Replaced PAL 20R4B GL8G at location U85 with PAL GL8H and replaced R40 and R25 resistors to eliminate faults on DEPCA board caused by an incorrect IOCHRDY management	
	Lev. 02			Solves system crashing in OS/2 Olivetti rel. 1.21 environment during format "A" when the system contains more than 6 MB. Field only, it is not factory applied.	
	Lev. 03			Rev. 1.04 PZCG	New BIOS, field only
	Lev. 04			Rev. 1.04	Keyboard controller 10.01 introduced



	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
BA279	Lev. Nasc.	612400 D	Rev. 1.02 PZBC	Replaces BA275 with same integrated controllers
	Lev. 01			Solves malfunctioning of some printers connected to parallel interface
	Lev. 02			Solves system crashes in OS/2 Olivetti rel. 1.21 environment during format "A" when the system contains more than 6 MB.
	Lev. 03		Rev. 1.04 PZCG	WD 16C551 component is no longer produced. It is replaced with WD 16C551 rev. D. They are functionally equivalent.
	Lev. 04			<ul style="list-style-type: none"> <li>- Introduction of Keyboard Controller Rev. 10.01 to handle Keyboard Password and System Password</li> <li>- New BIOS. To allow the correct management of these passwords and install new Western Digital hard disks</li> <li>- To correctly manage the passwords it is necessary to use version 1.02 upd 1 of User Diskette</li> </ul>
	Lev. 05		Rev. 1.04	Cuts and trimmings to allow introduction of the AMD 386SX processor as an alternative to the INTEL 386SX
BA289	Lev. Nasc.	612473 Z	Rev. 1.04 PZCG	<ul style="list-style-type: none"> <li>- New board for trimming recovering</li> <li>- Replaced sockets for SIMM modules to improve factory process and quality of system board</li> <li>- Management of Keyboard Passwords and System Password</li> </ul>
	Lev. 01			Rev. 1.06 PZCJ
	Lev. 02		Rev. 1.06	<ul style="list-style-type: none"> <li>- Cuts and trimmings made to allow introduction of the AMD 386SX processor as an alternative to the INTEL 386SX processor</li> </ul>
BA303	Lev. Nasc.	553062 V	Rev. 1.06 PZCJ	Replaces BA 289. <ul style="list-style-type: none"> <li>- Can use the INTEL CPU or AMD CPU irrespectively.</li> <li>- Can house a VL16C551 component in place of a WD16C551 component</li> </ul>
	Lev. 01			The 330pF capacitor in position C141 has been removed to contain costs.

**POWER SUPPLY UNIT**

<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
PS11 ASTEC 220 V	Lev. Nasc. Lev. 01	Only version 220 V Extended magnetic peripheral cables
	Lev. 02	Following problem solved: system fails to switch on if the printer connected is switched on before the system. Occurs especially where printers are shared with other printers. A zener diode and a resistor have been added to the fan drive circuit to increase the power supply's immunity to external voltages.
	Lev. 03	The box and lid have been modified.
	Lev. 04	A capacitor has been added and a resistor removed to solve production problems.
	Lev. 05	Inductor L5 has been added to the main input area and the circuitry has been modified to eliminate EMI problems and random voltage drops.
PS11 Plessey 220 V	Lev. Nasc. Lev. 01	Improved RESET signal Reduced acoustic noise
	Lev. 02	Solves temperature problems
	Lev. 03	Reduced acoustic noise with MITSUBISHI fans
	Lev. 04	Solves temperature problems
	Lev. 05	Extended magnetic peripheral cables
	Lev. 06	Replaced printed circuit material to improve the transportability
PS11 Plessey 110 V	Lev. Nasc. Lev. 01	This power supply has evolved in the same way as the 220 V model.
	Lev. 02	
	Lev. 03	
	Lev. 04	

**BOARDS**

<b>FUNCTION</b>	<b>DESCRIPTION</b>	<b>D.R.S. CODE</b>	<b>CHARACTERISTICS</b>
CPU system board	BA 250	412998 Q	BIOS 1.00 - 1.02
CPU system board	BA 275	612295 X	
CPU system board	BA 279	612400 D	
CPU system board	BA 289	612473 Z	
CPU system board	BA 303	553062 V	
Console	IF469	977930 V	
Power supply 220 V	PS11	412957 N	
Power supply 110 V	PS11	412956 X	
BUS Adapter board	IN283	977913 Q	
BUS Adapter board	IN124	978265 P	

**USER DISKETTE**

<b>LEVEL</b>	<b>COMPATIBILITY</b>
Lev. 1.0 Lev. 1.01 upd 1	Solves SETUP problems
Lev. 1.02 upd 1	<ul style="list-style-type: none"> <li>- Solves hard disk test malfunctioning</li> <li>- Allows management of Keyboard Passwords and System Password. To have these security features, the system must contain keyboard controller Rev. 10.01 and BIOS 1.04</li> <li>- Corrects some errors in message system</li> </ul>

**SYSTEM TEST**

<b>LEVEL</b>	<b>COMPATIBILITY</b>
Lev. 1.0 Lev. 1.01 upd 1	BIOS 1.00
Lev. 1.02	<ul style="list-style-type: none"> <li>- This version includes the security features and can therefore only be used if the Personal Computer mounts keyboard controller Rev. 10.01 and BIOS 1.04</li> <li>- Tables have been included for management of the Western Digital 40 MB, 120 MB and 210 MB hard disks</li> </ul>

**COMPATIBILITY NOTES**

<b>BOARD OR HW/SW DEVICE</b>	<b>DESCRIPTION</b>
BUS adapter board IN283 Lev. 02	Solves problems with the RETIX board
BUS adapter board IN283 Lev. 02	Terminators have been mounted on the board
BA 250	Does not correctly handle 3COM + Open ver. 1.1 software. Problem is solved by disabling video shadow memory. Problem solved on BA 275 with BIOS 1.02
BUS adapter board IN124 Original level	Replaces IN283 for trimming recovering
BUS adapter board IN124 Lev. 01	Terminators have been mounted on the board
IF469	Level 01 solves: Mounting problems of system console Loudspeaker problem still audible when potentiometer is at MIN position
386SX microprocessor	386SX step C microprocessor is no longer produced. New version is step D. They are functionally equivalent.
BIOS 1.04	Used with keyboard controller Rev. 10.01 and User Diskette Version 1.02 upd 1
W.D. component 16C551	Mask C of this component has been replaced by mask D. Board level is changed
82C206 component	The CHIPS & TECHNOLOGIES component 82C206 has been replaced by a TEXAS component. The two components are interchangeable
i386SX microprocessor	The INTEL 386SX microprocessor can be replaced by the AMD processor.

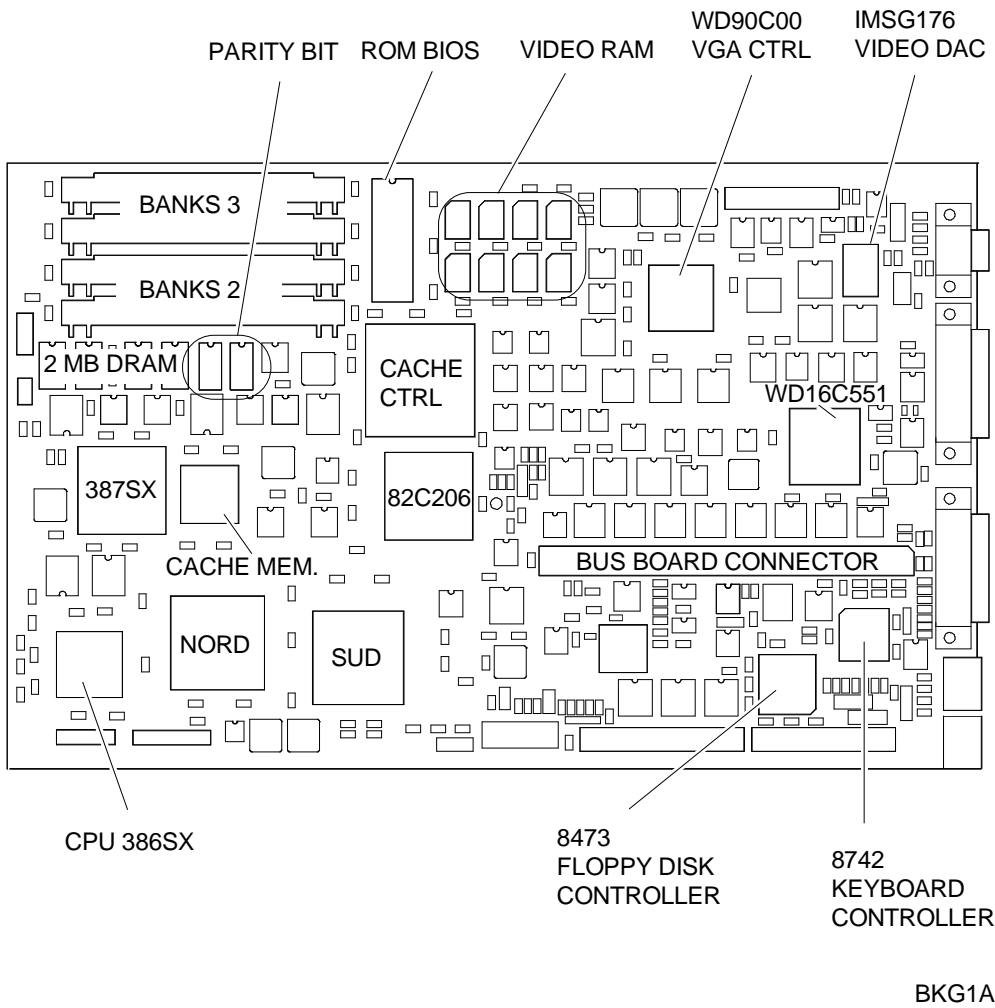
**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20  IBM Operating System/2 Extended Edition, Ver. 1.10 and 1.20 INTERACTIVE 386/ix, Ver. 2.02	During installation on hard disk, a formatted DSDD disk is required. PS/2 mouse not recognised PS/2 mouse not recognised
<b>WINDOWS</b>	
DESQL-VIEW 386 Ver. 2.2 GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
FURY 2400 PC MODEM FURY 2400 MAXTER MODEM Hayes Smartmodem 1200 B Hayes Smartmodem 2400 B TELENETICS EXPRESSDATA 24i (24i - 12i)	IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL Adapter STB 4-ON THE FLOOR
<b>MULTIPOINT</b>	<b>MOUSE</b>
CHASE AT 8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
<b>GRAPHICS PRODUCTS</b>	<b>NETWORKS &amp; LAN PRODUCTS</b>
AST VGA PLUS FASTWRITE 1024i FASTWRITE VGA HERCULES GRAPHICS CARD IBM VGA Adapter IBM EGA Adapter MATROX PG - 1281 MAXON MVGA - 16 Adapter ORCHID PRODESIGNER VGA PLUS PARADISE VGA PRO CARD	10 NET INTERFACE BOARD 200 series 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C505 DECNET PCSA adapter IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter MICOM NP1000 adapter NOVELL NE1000 adapter NOVELL NE2000 adapter
<b>DISPLAY UNITS</b>	
IBM enhanced graphics monitor 5151 IBM color graphics monitor 5153 IBM enhanced graphics monitor 5154 IBM PS/2 Monochrome display 8503 IBM PS/2 color display 8512 IBM PS/2 color display 8513 IBM PS/2 color display 8514	NEC MULTISYNC II NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D PHILIPS 7BM749 PHILIPS 9CM082

**SYSTEM BOARD COMPONENTS**



**INTERRUPT LEVELS**

LEV.	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3-10	IRQ2	1	Interrupt to Controller 1 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

**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	Data keyboard controller	3BA h	Video adapter
61 h	System Controller Port B	3C0-3CF h	Video adapter
64 h	Commands keyboard 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)	-	

## SYSTEM MEMORY MAP

AT standard has a basic memory of 512 KB, expandable up to 640 KB, in which remapping of physical memory areas is not requested.

With a basic memory expansion beyond 640 KB, a logic addressing conflict arises because the physical memory between 640 KB and 1 MB occupies the logic addressing space reserved for ROM BIOS addressing. This addressing space between 640 KB and 1 MB is called *AT compatibility gap*.

In order not to lose this memory space, in these systems a remapping function has been introduced which makes it possible to have this memory portion available by addressing it beyond the MB.

This memory remapping function also includes a *Shadow RAM* function that allows ROM BIOS to be recopied by the system into the system memory at the same logic address locations in order to speed up the system.

These operation generates adjacent physical address space (physical memory map) from which a logic address space can be configured, these logic addresses may be not adjacent (logic memory map). In this case, for instance, it is possible to intercalate portions of memory resident on boards installed on the BUS with portions of memory of system board.

## LIMITATIONS FOR MEMORY CONFIGURATION

There are some limitations when using these system memory configuration function. Limitations are as follows:

**AT Compatibility Gap** - system needs this GAP

External memory can not be mapped in the logic address area reserved for this gap (0A000h to 0FFFFF h).

**128 KB memory segment size** - this function works only for memory segments of 128 KB.

**The first 256 KB is always used by system internal memory** - this 256 KB is reserved for BIOS during Power-On procedure. This memory space requires that the physical address be equal to logic address. This means that the first two memory segments of 128 KB must belong to system memory.

If these limitations are violated, automatically the system gives priority to physical memory map, ignoring the logic memory map. As a result, the external memory installed is ignored.

Another case is to be taken into consideration: when the **maximum memory is installed, i.e. 16 MB**.

In this case there is logic addressing space to remap the AT compatibility Gap which, therefore, will be a usual read/write RAM memory. In this situation, the user memory available depends on how the Shadow RAM option is used.

### Shadow RAM disabled

512 KB of AT compatibility Gap is ignored by the system and is lost.  
System total memory is therefore 15.872 KB ( $16.384 - 512 = 15.872$ ).  
Therefore, system loses 512 KB.

### Only video BIOS in shadow RAM

64 KB of AT compatibility gap is recovered because it is remapped.  
64 KB of video BIOS is set in shadow RAM. System total memory is therefore is 16.000 KB ( $16.384 - 512 + 64 \text{ recovered} + 64 \text{ in shadow} = 16.000$ ).  
Therefore, system loses 384 KB.

### System BIOS and video BIOS in shadow RAM

32 KB of AT compatibility gap is recovered because it is remapped. 96 KB of system BIOS and video BIOS is set in shadow RAM. System total memory, therefore, is 16.000 ( $16.384 - 512 + 32 \text{ recovered} + 96 \text{ in shadow} = 16.000$ ).  
Therefore, system loses 384 KB.



**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	Standard 85 ms	10 MB	306	4	128	305	17
2	OPE XM5221 half size	20 MB	615	4	256	700	17
3	WREN 2 full size	38 MB	925	5	128	924	17
4	CDC WREN 1 35 ms full size	28 MB	697	5	128	696	17
5	ST4096	76 MB	1024	9	-1	1023	17
6	OPE XM5340	40 MB	820	6	256	819	17
7	NEC D5146H	40 MB	615	8	128	664	17
8	WREN II slim size	40 MB	981	5	-1	980	17
9	CDC WREN II slim size	40 MB	981	5	128	980	17
10	Micropolis 1324 full size	51 MB	1024	6	128	980	17
11	CDC WREN II full size	53 MB	925	7	128	924	17
12	Micropolis 1325 full size	68 MB	1024	8	-1	1023	17
13	CDC WREN II full size	69 MB	925	9	128	924	17
14	Micropolis 1323-A full size	42 MB	1024	5	-1	1023	17
15	RESERVED						
16	OPE XM5220 85 ms	20 MB	612	4	128	656	17
17	TANDON TM 362 85 ms	20 MB	612	4	-1	663	17
18	Seagate ST251 40 ms	40 MB	820	6	-1	819	17
19	Rodime RO3055 40 ms	43 MB	872	6	0	871	17
20	Miniscribe M8425 68 ms	20 MB	612	4	0	663	17
21	Seagate ST277TR	62 MB	820	6	-1	819	26
22	OPE XM5340/60	62 MB	820	6	128	819	26
23	NEC D5147H	62 MB	615	8	384	664	26
24	NEC D5652	136 MB	820	10	-1	822	34
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023	34
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023	34
27	NEC D5452	68 MB	823	10	512	822	17
28	Fujitsu M2227D	40 MB	615	8	512	614	17
29	Fujitsu M2227D RLL	60 MB	615	8	512	614	26
30	CDC 94205-77	62 MB	981	5	-1	980	26
31	CONNER CP3142	40 MB	635	4	-1	639	33
32	CONNER CP3022	20 MB	615	4	-1	614	17
33	CONNER CP3106	100 MB	776	8	-1	775	33
34	Miniscribe 8051A	40 MB	745	4	-1	744	28
35	Quantum P40 AT	40 MB	965	5	-1	964	17
36	CONNER CP346	40 MB	805	4	-1	804	26
37	Quantum LPS105 AT	100 MB	776	8	-1	775	33
38	Quantum LPD210 AT	200 MB	873	13	-1	872	36
39	CONNER CP30064	60 MB	762	4	-1	761	39
40	CONNER CP30124	120 MB	762	8	-1	761	39
41	CONNER CP3206	210 MB	683	16	-1	682	38
42	W.D. AC-140	40 MB	980	5	-1	980	17
43	W.D. AC -2120	116 MB	762	8	-1	762	39

**Where:** CYL: No. of disk cylinders

T: No. of disk heads

WPC: Precompensation cylinder number

LZ: Head parking cylinder number

SET: No. of disk sectors

# M300-01

## CHARACTERISTICS

Microprocessor	INTEL 386 SX
Clock	16 MHz
Architecture	16-bit XT/AT
Memory	1 MB to 11 MB on system board Bank 1 1 MB soldered chip 256 Kb x 4 Bank 2 Two sockets for SIMM modules: 1 Mb x 9 <b>EXM 26-502</b> or 4 Mb x 9 <b>EXM 26-809</b> Bank 3 Same as bank 2
Memory access	100 ns / 80 ns
Coprocessor	16 MHz 80387 SX
Floppy Disk (Optional)	1.2 MB 5.25" Panasonic JU 475-3 1.2 MB 5.25" Panasonic JU 475-4 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C
Hard Disk (Optional)	40 MB CONNER CP3046 40 MB Quantum LPS 52 AT 120 MB CONNER CP30126 210 MB CONNER CP3206 40 MB W.D. AC 140 120 MB W.D. AC 2120
Streaming Tape (Optional)	40 MB IRWIN 245 with floppy interface 80/120 MB IRWIN 285 floppy interface
Slots	Three 16-bit connectors on expansion board of BUS IN283
Video Adapter	Integrated in PVGA1B system board VGA compatible
Hard Disk and Floppy Disk controller	Integrated in system board Floppy disk controller: National DP8473 Hard disk interface: MSI buffer and logic ports
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102
Network boards	<b>NCU 9142</b> (Ethernet) This board uses remote bootstrap EPROM RPL 3C503 ver. 1.5 <b>NCU 9172</b> (Token Ring) This board uses remote bootstrap EPROM TRR 9209 ver. 1.03

### SYSTEM BOARD

BA 271  
 Lev. 06 MI

BA 274  
 Lev. 06 MI

BA 288  
 Lev. 05 MI

### BIOS

Rev. 1.08

### EXPANSION BUS

IN283  
 Lev. 02

IN124  
 Lev. 01

### POWER SUPPLY

PS11 220 V  
 Lev. 06

PS11 115 V  
 Lev. 04

PS11 220 V only  
 ASTEC Lev. 05

**SYSTEM BOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLERS / NOTES</b>
<b>BA271</b>	Lev. Nasc.		Rev. 1.03 PEQT	The integrated components are described in the tables that follow
	Lev. 01 MI		Rev. 1.04 PEQP	New BIOS
	Lev. 02 MI		Rev. 1.04	Replace PAL BCONV GLZ5 at location U91 with PAL GLZ8 to eliminate the faults of some boards on the bus during refresh cycles.
	Lev. 03 MI		Rev. 1.05 PUN2	New BIOS and hardware changes to solve problems of Duplicator software and PCTOOLS 6.0
	Lev. 04 MI		Rev. 1.06 PZCF	This change applies only at field level as the board is no longer produced. The changes are: - AMD CPU in alternative to the INTEL CPU - IPC82C206 component alternative to the "Texas" component - W.D. 16C551 step C replaced by step D - Keyboard controller moves up from Rev. 7.02 to Rev. 10.01 for introduction of the security feature. This release works only with BIOS 1.06 or later - New BIOS 1.06. All these changes update BA 271 and make it functionally equivalent to BA 288 level 03
	Lev. 04 MI No change of level		Rev. 1.07 PZCK	New BIOS to solve slow mouse problem in Windows 3.0 environment when there is floppy disk access simultaneous with mouse movement
	Lev. 05 MI		Rev. 1.08 PZCL	New BIOS to solve problems with DEPCA board on some monochrome monitors when displaying the 132-column mode Applied only at field level
	Lev. 06 MI		Rev. 1.08	Cuts, wirings and replacement of PAL GLZB in position U96 with PAL GLWK to solve the problems with the QBAIC software when the numeric coprocessor is installed

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA274</b>	Lev. Nasc.	612205 D	Rev. 1.03 PEQP	Replaces BA 271 with the same integrated components
	Lev. 01 MI		Rev. 1.04 PEQP	New BIOS
	Lev. 02 MI			Replace PAL BCONV GLZ5 at location U91 with PAL GLZ8 to eliminate the faults of some boards on the bus during refresh cycles.
	Lev. 03 MI		Rev. 1.05 PUN2	New BIOS and hardware changes to solve problems of Duplicator software and PCTOOLS 6.0
	Lev. 04 MI		Rev. 1.06 PZCZ	This change applies only at field level as the board is no longer produced. The changes are: <ul style="list-style-type: none"> <li>- AMD CPU in alternative to the INTEL CPU</li> <li>- IPC82C206 component alternative to the "Texas" component</li> <li>- W.D. 16C551 step C replaced by step D</li> <li>- Keyboard controller moves up from Rev. 7.02 to Rev. 10.01 for introduction of the security features</li> </ul> This release works only with BIOS 1.06 or later <ul style="list-style-type: none"> <li>- New BIOS 1.06.</li> </ul> All these changes update BA 274 and make it functionally equivalent to BA288 level 03
	Lev. 04 MI No change of level		Rev. 1.07 PZCK	New BIOS to solve slow mouse problem in Windows 3.0 environment when there is floppy disk access simultaneous with mouse movement
	Lev. 05 MI		Rev. 1.08 PZCL	New BIOS to solve problems with DEPCA board on some monochrome monitors when displaying the 132-column mode Applied only at field level
	Lev. 06 MI		Rev. 1.08	Cuts, wirings and replacement of PAL GLZB in position U96 with PAL GLWK to solve the problem of the QBASIC software when the numeric coprocessor is installed

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA288</b>	Lev. Nasc.	612454 W	Rev. 1.04 PEQP	New board for trimming recovering
	Lev. 01 MI		Rev. 1.05 PUN2	<ul style="list-style-type: none"> <li>- New BIOS</li> <li>- Introduced TEXAS IPC 82C206 component in alternative to C&amp;T IPC 82C206.</li> <li>- The TEXAS component becomes the primary source and the C&amp;T component the secondary source.</li> <li>- The WD16C551 Rev. C is replaced with WD16C551 Rev. D component.</li> <li>- AMD CPU alternative to the INTEL CPU</li> </ul>
	Lev. 02 MI		Rev. 1.06 PZCF	<ul style="list-style-type: none"> <li>- New BIOS to handle keyboard password and System Password</li> <li>- Introduction of Keyboard Controller Revision 10.01 to handle these passwords.</li> <li>- To correctly handle these passwords use User Diskette Version 1.04</li> </ul>
	Lev. 03 MI No change of level		Rev. 1.07 PZCK	New BIOS to solve slow mouse problem in Windows 3.0 environment when there is floppy disk access simultaneous with mouse movement
	Lev. 04 MI		Rev. 1.08 PZCL	New BIOS to solve problems with DEPCA board on some monochrome monitors when displaying the 132-column mode
	Lev. 05 MI		Rev. 1.08	Cuts and wirings to solve problems with the QBASIC software when the numeric coprocessor is installed

SYSTEM BOARD	INTEGRATED CONTROLLERS
BA 271	<b>8742</b> Keyboard and Mouse controller <b>PVGA1B</b> Super VGA video controller <b>82C206</b> Non-volatile RAM Real Time Clock DMA controller Interrupt controller  <b>WD16C552</b> Serial and parallel port controller <b>DP8473</b> Floppy disk controller <b>MSI buffer</b> Intelligent hard disk interface <b>NORD Gate Array</b> READY signal generation Intel 387SX interface RESET generation BUS addresses control Slow speed work session Memory address control Address map decode Interface for refresh RAM shadow support  <b>SUD Gate Array</b> DMA controller Data BUS controller Clock generator Parity control BUS controller Read/write logic decode Signal generation A20GATE
BA 274	These boards have the same controllers as BA 271
BA 288	

**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU system board	BA 271		
CPU system board	BA 274	612205 D	
CPU system board	BA 288	612454 W	
Power supply 220 V	PS11	412957 N	
Power supply 110 V	PS11	412956 X	
BUS Adapter board	IN283	977913 Q	
BUS Adapter board	IN124	978265 P	

**USER DISKETTE**

LEVEL	COMPATIBILITY
Lev. 1.00 upd 1 Lev. 1.01	BIOS 1.04 BIOS 1.06 - Keyboard Controller Revision 10.01 This User Diskette allows: <ul style="list-style-type: none"> <li>- Management of Western Digital 40 MB and 120 MB hard disks</li> <li>- Management of keyboard Passwords introduced with new Keyboard controller Revision 10.01</li> <li>- Management of System Password</li> <li>- Updating of message system</li> </ul>

**SYSTEM TEST**

LEVEL	COMPATIBILITY
Lev. 1.00 upd 1	The M300-01 must be connected to a HOST PC

**NETWORK BOARD DIAGNOSTICS**

Test for NCU 9142

Test for NCU 9172

**COMPATIBILITY NOTES**

BOARD OR HW/SW DEVICE	DESCRIPTION
BUS adapter board IN283 Lev. 01	Solves the faults of some boards on the AT bus during refresh cycles
BUS adapter board IN283 Lev. 02	Solves the problems with the RETIX board
BUS adapter board IN124 Original level	New printed circuit with the cuts and trimmings of IN283
BUS adapter board IN124 Lev.01	Introduction of terminators on the board
Intel 386SX CPU	Intel will no longer supply the 386SX Step C CPU, it is replaced with Step D that has the same electrical and mechanical characteristics as Step C. Board level does not change
Hard disk CONNER and QUANTUM	The following hard disks: 120 MB CONNER CP30126, 19 ns 210 MB CONNER CP3206, 16 ns 40 MB QUANTUM LPS 52, AT 19 ns can only function with a release of BIOS 1.05 or later
BIOS 1.05	Solves: <ul style="list-style-type: none"> <li>- Memory problems after POD</li> <li>- Incorrect POD initialization of an optional ROM</li> <li>- Video parameters loading problems</li> <li>- Parallel port problems after a reset (CTRL-ALT-DEL)</li> <li>- Management of new hard disks</li> </ul>
AMD CPU	The AMD CPU can be used as an alternative to the INTEL CPU
TEXAS component 82C206	The C&T component 82C206 is replaced by the TEXAS 82C206 component. The two components are interchangeable.

**POWER SUPPLY UNIT**

<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
PS11 ASTEC 220 V	Lev. Nasc. Lev. 01	Only version 220 V Extended magnetic peripheral cables
	Lev. 02	Following problem solved: the system does not switch on if the printer connected is switched on before the system. Occurs especially where the printers are shared with other systems. A zener diode and a resistor have been added to the fan drive circuit to increase the power supply's immunity to external voltages.
	Lev. 03	The box and lid have been changed
	Lev. 04	A capacitor has been added and a resistor removed to solve production problems.
	Lev. 05	Inductor L5 has been added to the mains input area and modifications have been made to the circuitry to eliminate EMI problems and random voltage drops.
PS11 Plessey 220 V	Lev. Nasc.	Improved RESET signal
	Lev. 01	Reduced acoustic noise
	Lev. 02	Solves temperature problems
	Lev. 03	Reduced acoustic noise with MITSUBISHI fans
	Lev. 04	Solves temperature problems
	Lev. 05	Extended magnetic peripheral cables
Lev. 06	Replaced printed circuit material to improve the transportability	
PS11 Plessey 110 V	Lev. Nasc.	This power supply has evolved in the same way as the 220 V version
	Lev. 01	
	Lev. 02	
	Lev. 03 Lev. 04	

**SOFTWARE COMPATIBILITY**

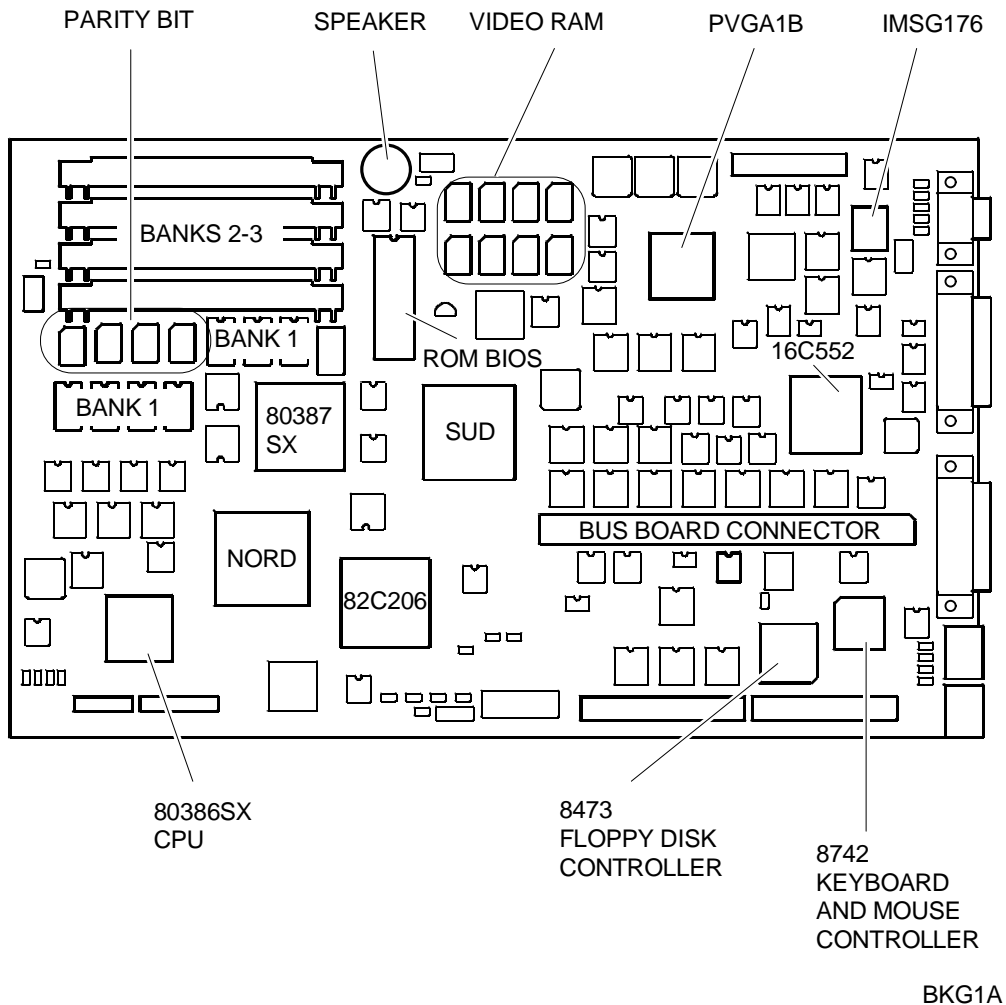
<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20  IBM Operating System/2 Extended Edition, Ver. 1.10/1.20 INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	During installation on hard disk, a formatted DSDD disk is required. PS/2 mouse not recognised PS/2 mouse not recognised
<b>WINDOWS</b>	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0



**HARDWARE COMPATIBILITY**

<p><b>MODEMS</b></p> <p>Hayes Smartmodem 2400B                  FAXY PC MAXTER                  FURY 2400 PC MODEM                  AT&amp;T 2224 CEO MODEM                  FURY 2400 MAXTER MODEM                  FURY 2400 TI/MNP                  Hayes Smartmodem 1200 B</p>	<p><b>I/O INTERFACE PRODUCTS</b></p> <p>IBM PRINTER ADAPTER (1505200)                  STB 4-ON THE FLOOR</p>
<p><b>MULTIPOINT</b></p> <p>CHASE AT 8                  COMPUTONE AT 8                  COMPUTONE AT 16                  INTEL Bell ICC.6                  SPECIALIX SI / 8</p>	<p><b>MOUSE</b></p> <p>IBM PS/2 Mouse (6450350)                  IBM PS/2 Mouse Serial                  Logitech Bus Mouse (PF-3F)                  Logitech 3 button mouse                  MS-BUS mouse                  MS-MOUSE serial</p>
<p><b>GRAPHICS PRODUCTS</b></p> <p>AST VGA PLUS                  FASTWRITE 1024i                  FASTWRITE VGA                  HERCULES GRAPHICS CARD                  IBM VGA Adapter                  MATROX PG - 1281                  MAXON MVGA - 16 Adapter                  ORCHID PRODESIGNER VGA PLUS                  HERCULES INCOLOR CARD (GB222)                  PARADISE VGA PRO CARD</p>	<p><b>NETWORKS &amp; LAN PRODUCTS</b></p> <p>10 NET INTERFACE BOARD 200 series                  3COM Etherlink adapter 3C501                  3COM Etherlink II adapter 3C503                  3COM Etherlink plus adapter 3C505                  3COM Etherlink plus adapter 3C505                  DECNET PCSA adapter                  IBM PC NETWORK adapter II                  IBM TOKEN RING 16/4 adapter                  IBM TOKEN RING adapter II                  MADGE AT RING NODE adapter                  MICOM NP1000 adapter                  NOVELL NE1000 adapter                  NOVELL NE2000 adapter</p>
<p><b>DISPLAY UNITS</b></p>	
<p>IBM enhanced graphics monitor 5151                  IBM color graphics monitor 5153                  IBM PS/2 Monochrome display 8503                  IBM PS/2 color display 8512                  IBM PS/2 color display 8513                  IBM PS/2 color display 8514                  NEC MULTISYNC II</p>	<p>NEC MULTISYNC 2A                  NEC MULTISYNC 3D                  NEC MULTISYNC 4D                  NEC MULTISYNC 5D                  PHILIPS 7BM749                  PHILIPS 9CM082</p>

SYSTEM BOARD COMPONENTS



**INTERRUPT LEVELS**

LEV.	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3-10	IRQ2	1	Interrupt to Controller 1 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

**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	Data keyboard controller	3BA h	Video adapter
61 h	System Controller Port B	3C0-3CF h	Video adapter
64 h	Commands keyboard 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)	-	

## SYSTEM MEMORY MAP

AT standard has a basic memory of 512 KB, expandable up to 640 KB, in which remapping of physical memory areas is not requested.

With a basic memory expansion beyond 640 KB, a logic addressing conflict arises because the physical memory between 640 KB and 1 MB occupies the logic addressing space reserved for ROM BIOS addressing. This addressing space between 640 KB and 1 MB is called *AT compatibility gap*.

In order not to lose this memory space, in these systems a remapping function has been introduced which makes it possible to have this memory portion available by addressing it beyond the MB.

This memory remapping function also includes a *Shadow RAM* function that allows ROM BIOS to be recopied by the system into the system memory at the same logic address locations in order to speed up the system.

These operation generates adjacent physical address space (physical memory map) from which a logic address space can be configured, these logic addresses may be not adjacent (logic memory map). In this case, for instance, it is possible to intercalate portions of memory resident on boards installed on the BUS with portions of memory of system board.

## LIMITATIONS FOR MEMORY CONFIGURATION

There are some limitations when using these system memory configuration function. Limitations are as follows:

### **AT Compatibility Gap** - system needs this GAP

External memory can not be mapped in the logic address area reserved for this gap (0A000h to 0FFFFFF h).

**128 KB memory segment size** - works only for 128 KB memory segments.

**The first 258 KB is always used by system internal memory** - this 256 KB is reserved for BIOS during Power-On procedure. This memory space requires that the physical address be equal to logic address. This means that the first two memory segments of 128 KB must belong to system memory.

If these limitations are violated, automatically the system gives priority to physical memory map, ignoring the logic memory map. As a result, the external memory installed is ignored.

Another case is to be taken into consideration: when the **maximum memory is installed, i.e. 16 MB**.

In this case there is logic addressing space to remap the AT compatibility Gap which, therefore, will be a usual read/write RAM memory. In this situation, the user memory available depends on how the Shadow RAM option is used.

### **Shadow RAM disabled**

512 KB of AT compatibility Gap is ignored by the system and is lost.  
System total memory is therefore 15.872 KB (16.384 - 512 = 15.872).  
Therefore the system loses 512 KB.

### **Only video BIOS in shadow RAM**

64 KB of AT compatibility gap is recovered because it is remapped.  
64 KB of video BIOS is set in shadow RAM. System total memory is therefore is 16.000 KB (16.384 - 512 + 64 recovered +64 in shadow = 16.000).  
Therefore the system loses 384 KB.

### **System BIOS and video BIOS in shadow RAM**

32 KB of AT compatibility gap is recovered because it is remapped. 96 KB of system BIOS and video BIOS is set in shadow RAM. System total memory, therefore, is 16.000 (16.384 - 512 + 32 recovered + 96 in shadow = 16.000).  
Therefore the system loses 384 KB.

**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	Standard 85 ms	10 MB	306	4	128	305	17
2	OPE XM5221 half size	20 MB	615	4	256	700	17
3	WREN 2 full size	38 MB	925	5	128	924	17
4	CDC WREN 1	28 MB	697	5	128	696	17
5	ST4096	76 MB	1024	9	-1	1023	17
6	OPE XM5340	40 MB	820	6	256	819	17
7	NEC D5146H	40 MB	615	8	128	664	17
8	TM755 slim size	40 MB	981	5	-1	980	17
9	CDC WREN II slim size	40 MB	981	5	128	980	17
10	Micropolis 1324 full size	51 MB	1024	6	128	980	17
11	CDC WREN II full size	53 MB	925	7	128	924	17
12	Micropolis 1325 full size	68 MB	1024	8	-1	1023	17
13	CDC WREN II full size	69 MB	925	9	128	924	17
14	Micropolis 1323-A full size	42 MB	1024	5	-1	1023	17
15	RESERVED						
16	OPE XM5220 85 ms	20 MB	612	4	128	656	17
17	TANDON TM 362 85 ms	20 MB	612	4	-1	663	17
18	Seagate ST251 40 ms	40 MB	820	6	-1	819	17
19	Rodime RO3055 40 ms	43 MB	872	6	0	871	17
20	Miniscribe M8425 68 ms	20 MB	612	4	0	663	17
21	Seagate ST277TR	62 MB	820	6	-1	819	26
22	OPE XM5340/60	62 MB	820	6	128	819	26
23	NEC D5147H	62 MB	615	8	384	664	26
24	NEC D5652 Fujitsu M2246	136 MB	820	10	-1	822	34
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023	34
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023	34
27	NEC D5452	68 MB	823	10	512	822	17
28	Fujitsu M2227D	40 MB	615	8	512	614	17
29	Fujitsu M2227D RLL	60 MB	615	8	512	614	26
30	CDC 94205-77	62 MB	981	5	-1	980	26
31	CONNER CP3142	40 MB	635	4	-1	639	33
32	CONNER CP3022	20 MB	615	4	-1	614	17
33	CONNER CP3106	100 MB	776	8	-1	775	33
34	Quantum P40 AT	40 MB	745	4	-1	744	28
35	Miniscribe 8051A	40 MB	965	5	-1	964	17
36	CONNER CP346	40 MB	805	4	-1	804	26
37	Quantum LPS105 AT	100 MB	776	8	-1	775	33
38	Quantum LPD210 AT	199 MB	873	13	-1	872	36
39	CONNER CP30064	58 MB	762	4	-1	761	39
40	CONNER CP30124	116 MB	762	8	-1	761	39
41	CONNER CP3206	202 MB	683	16	-1	682	38
42	W.D. AC-140	40 MB	980	5	-1	980	17
43	W.D. AC -2120	116 MB	762	8	-1	762	39

**Where:** CYL: No. of disk cylinders

T: No. of disk heads

WPC: Precompensation cylinder number

LZ: Head parking cylinder number

SET: No. of disk sectors.



# M380-40

## CHARACTERISTICS

Microprocessor	Intel 80386 with 32-bit addressing
Clock	33 MHz
Architecture	AT
Memory	<p>4 MB to 52 MB</p> <ul style="list-style-type: none"> <li>- 1 bank of 4 MB soldered on motherboard (8 DRAM 1M x 4 chips+ 4 DRAM chips 1Mx1 parity)</li> <li>- 3 banks of 4 sockets each , where the following SIMM modules can be installed:                             <ul style="list-style-type: none"> <li>- SIMM 256K x 9 <b>EXM 26-801</b></li> <li>- SIMM 1M x 9 <b>EXM 26-807</b></li> <li>- SIMM 4M x 9 <b>EXM 26-809</b></li> </ul> </li> </ul> <p>In these 3 banks different capacity SIMMs can be installed but they cannot be mixed within one bank. Banks can be left free</p>
Memory access	80 ns
Coprocessor	<p>1) Intel 80387 (33 MHz)</p> <p>2) Weitek 3167 (33 MHz)</p>
Floppy disk	<p>1.2 MB 5.25" Panasonic JU 475-3/-4</p> <p>1.2 MB 5.25" Toshiba ND 08 DE</p> <p>1.44 MB 3.5" Panasonic J-257</p> <p>1.44 MB 3.5" Sony MP-F17</p> <p>1.44 MB Mitsubishi MF355C</p>
Hard disk	<p>120 MB CONNER CP30126 19 ms</p> <p>210 MB CONNER CP3206 19 ms</p> <p>40 MB W.D. AC 140</p> <p>40 MB QUANTUM LPS52 AT 19 ms</p> <p>340 MB CONNER CP3304 12 ms</p> <p>510 MB CONNER CP3504 13 m</p>
Streaming tape	<p>80/120 MB IRWIN 285 500 Mb/s</p> <p>80/120 MB IRWIN 287 1 Mb/s</p> <p>80/120 MB IRWIN 3125 1 Mb/s</p> <p>150 MB WANGTEK SCSI</p>
AT Expansion slots	4 Present - 4 Available
Video adapter	Integrated on motherboard - 82C452
Hard disk and floppy disk controller	<p>Integrated on motherboard</p> <p>FDU controller: Intel 82077</p> <p>HDU controller: Logic ports and MSI Buffers implementing an AT interface for intelligent hard disks</p>
Cache controller	82385 - 64 KB cache
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key Compact ANK 27-101 ANK 27-102

<p><b>MOTHERBOARD</b></p> <p>BA 262</p> <p>BA 281</p>
<p><b>BIOS</b></p> <p>ROM BIOS is a FLASH EPROM.</p> <p>The BIOS Code is supplied on diskettes and must be copied into flash EPROM.</p> <p>Rel. 1.09</p>
<p><b>POWER SUPPLY</b></p> <p>PS11/A 220 V PLESSEY</p> <p>PS11/A 115 V PLESSEY</p> <p>PS11/A - 220 V ASTEC only</p> <p>PS11/AR - 220V ASTEC - MAGNETEK</p> <p>PS11/AR - 110V MAGNETEK</p>
<p><b>CONSOLE</b></p> <p>IF 469</p>
<p><b>BUS EXPANSION BOARD</b></p> <p>IN284</p>

**MOTHERBOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA262</b>	Nasc.		Rel. 1.00 ROM BIOS is a FLASH EPROM. The BIOS code is supplied on diskettes and must be copied in flash EPROM. The BIOS loading utility allows the AMB, Mitsubishi and Intel Flash EPROMs to be programmed.	<b>Intel 80386</b> Processor <b>82385</b> Cache controller <b>Intel 80387</b> Optional coprocessor <b>WTL 3167</b> Optional coprocessor <b>82C206</b> Real Time Clock RAM 128 KB with battery DMA controller Interrupt controller <b>8742</b> Keyboard controller <b>82C452</b> Video controllerr <b>WD16C551</b> Serial port interface Parallel port interface Floppy disk controller <b>82077</b> <b>CHIP SET</b> <b>BCUE</b> I/O signal generation BUS timing control <b>MCUE</b> Memory logic controller <b>DPU</b> Data buffer Parity control 32- to 16-bit data conversion <b>IOU</b> Signal decode logic Chip select signal Open logic
	Lev. 01 MI		Lev. 1.00	Solves EMI criticality with FCC/B rule
	Lev. 02 MI		Lev. 1.03	- Possible to replace the 82C452 component with 82C452A component. They are alternatives. - The WD 16C551 mask C component has been replaced with the WD 16C551 mask D component. These are alternatives. Field change only.
	Lev. 03 MI		Lev. 1.07	Cuts and trimmings made in order to use the AMD 80386 DX processor
	Lev. 04 MI		Lev. 1.07	Corrects read problems in VIDEO RAM
	Lev. 05 MI		Lev. 1.07	New floppy disk controller
	Lev. 06		Lev. 1.07	-
	Lev. 07		Lev. 1.07	- A resistor is added and the pins of the parallel port are reconfigured to solve the problems with the streaming tape. - Capacitors at location C16, C21 and C24 are replaced to solve the problem with Interactive UNIX when connected to the DM124 parallel printer.

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA281</b>	Nasc.	612399 F	Lev. 1.03	Replaces BA262. Adds EYE component and new security features
	Lev. 01		Lev. 1.03	Hardware changes to solve problem of FCC/B rule not respected and random system crashes.
	Lev. 02	612399 F	Lev. 1.03	<ul style="list-style-type: none"> <li>- Possible to replace 82C452 component with 82C452A component. They are alternatives. Board level does not change</li> <li>- Printed circuit modified to solve instability problems in the EM characteristics. The pcb changes to level 01</li> <li>- TEXAS 82C206 component as alternative to C&amp;T 82C206 component</li> </ul>
	Lev. 03		Lev. 1.06	<ul style="list-style-type: none"> <li>- Replaced WD16C551 component mask C with WD16C551 component mask D</li> <li>- Sockets for the SIMM modules replaced to improve productivity</li> <li>- Keyboard controller 10.01 replaces the 8.00 keyboard controller which did not manage the security features and had problems with some software packages</li> <li>- New BIOS code, for management of: 40 MB and 120 MB W.D. hard disks Security features DOS function (only rel. 5.0) int 15 "Support A29 gate" video error codes (factory only)</li> </ul>
	Lev. 04		Lev. 1.07	<ul style="list-style-type: none"> <li>- Printed circuit changed from 01 to 02</li> <li>- New BIOS to solve the serial port FIFO reset problems, and 132-column video mode. This BIOS manages the HDU RDY/BSY signals.</li> </ul>
	Lev. 05		Lev. 1.07	The socket for the 82385 DX cache controller eliminated, the component now being soldered directly on the board.
	Lev. 06		Lev. 1.07	Cuts and trimmings in order to use the AMD 80386 DX processor.
	Lev. 07		Lev. 1.07	New printed circuit to recover cuts and trimmings. Level changes from CS 02 to CS 03.
	Lev. 08		Lev. 1.07	Cuts and trimmings to solve the 82C452 video controller problem, not to specs.



	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
BA281	Lev. 9	612399 F	Lev. 1.09	The Intel 82077AA-1 FDU component is replaced with the new 82077SL-1. With this new component, the 4.7 nF capacitor at location U114 must be removed.
	Lev. 10		Lev. 1.09	Printed circuit board 03 trimmings have been recovered thus changing level to 04.  This BIOS release solves some of the problems with the previous release. In release 1.07, the colors changed when running the WINDRAW application in super VGA mode. Since only the BIOS was modified, the board level does not change.
	Lev. 11		Lev. 1.09	Component DAC BT471 has been replaced by the Samsung component KD0471. This solves the problem of wrong colors displayed when the WINDOWS AFTERDARK application is used. Change made at field level only.
	Lev. 12 MI		Lev. 1.09	Vengono sostituiti i condensatori da 2200 pF C16, C21, C54 con altri da 220 pF. Questa modifica risolve il problema dell'impossibilità di stampare sulla stampante DM124 con INTERACTIVE UNIX
	Lev. 12 SI		Lev. 1.09	Questa modifica risolve il problema dello streaming tape IRWIN A250EP-05 che, collegato alla porta parallela con il software EZTAPE e EZINFO, non funziona. 1 Nel caso in cui la porta parallela sia configurata come LPT1 occorre: - Alzare il pin 11 di RP4 - Collegare una resistenza assiale da 10 K Ohm tra il pin 83 e il pin 74 del componente 82C206 in U34 2 Nel caso in cui la porta parallela sia configurata come LPT2 occorre: - Alzare il pin 8 di RP4 - Collegare una resistenza assiale da 10 K Ohm tra il pin 1 e il pin 12 del componente 82C206 in U34

**USER DISKETTE/SYSTEM TEST/DRIVER**

LEVEL	COMPATIBILITY
User Diskette Rel. 1.00 User Diskette Rel. 1.02 User Diskette Rel. 1.04	Changed messages and help files Allows management of Security Features. Must be used with BIOS 1.06 and Keyboard Controller 10.01
OEMM Ver. 4.08 Ver. 1.40 upd 2	
EVD Video Driver Ver. 4.00 Rev. 1.3 EVD Video Driver Ver. 5.0	Allows Windows 3.0, AutoCAD 386 Ver. 10.0 and AutoCAD 386 Ver. 11.0 to be supported in DAM mode (1024 x 768 x 256)
EVD Video Driver Ver. 7.0 rev. 2.0	Update of the previous release
System Test Rel. 1.02 System Test Rel. 1.03 System Test Rel. 1.05	Solves some problems relative to the password utility

**CONSOLE**

	LEVEL	D.R.S. CODE	COMPATIBILITY
IF469	Nasc.	977930 V	
	Lev. 01 MI		Solves the speaker sound problem still audible when the volume control potentiometer is at the MIN position

**COMPATIBILITY**

<b>DEVICE BOARD</b>	<b>COMPATIBILITY</b>
Serial port component WD16C551	This component can be replaced by WD16C551 component which is pin to pin compatible
Video adapter component 82C452	This component can be replaced by 82C452A that has an equivalent function
80386 DX-33 Microprocessor	An alternative to the INTEL 80386 DX-33, it is possible to use an equivalent AMD (CS4T) processor
Component WD16C551	Replaced component WD16C551 mask C with component WD16C551 mask D. They are in alternative for BA 262
IN284 BUS expansion board	Changes to improve productivity and reduce costs. Board passes to level 01 MI
Intel 80386DX CPU	The Intel 80386DX-33 MHz CPU Step E can be used as an alternative to the Intel 80386DX-33 MHz CPU Step D, which will no longer be produced. This change does not cause board level to change
Keyboard controller Rev. 10.01	Keyboard Controller Rev. 10.01 is stored in ROM. Board levels do not change.

**POWER SUPPLY UNIT**

POWER SUPPLY	D.R.S. CODE	LEVEL	DESCRIPTION
PS11/A ASTEC 220 V	612184Q	Nasc. Lev. 01	Only 220 V Extended magnetic peripheral cables
		Lev. 02	Changes to reduce fan noise and make it easier to fit the power supply into the system
		Lev. 03	Change to solve problem of system not switching on when connected to a device (parallel printer or drive installed on the BUS) that is already on
		Lev. 04	A capacitor has been added and a resistor replaced to solve production problems.
PS11/A Plessey 220 V		Nasc. Lev. 01	Improved temperature conditions Corrects the problems with the +5 V
		Lev. 02	- Extended magnetic peripheral cables
		Lev. 03	- Replaced printed circuit material to improve transportability
PS11/A Plessey 110 V	612183P	Nasc. Lev. 01 Lev. 02 Lev. 03	This power supply includes the same modifications made to the 220 V version.
PS11/AR ASTEC 220 V		Nasc.	To cut costs, new power supply as an alternative to the others
PS11/AR 220 V PS11/AR 110 V		Nasc. Nasc.	Manufactured by MAGNETIK Manufactured by MAGNETIK

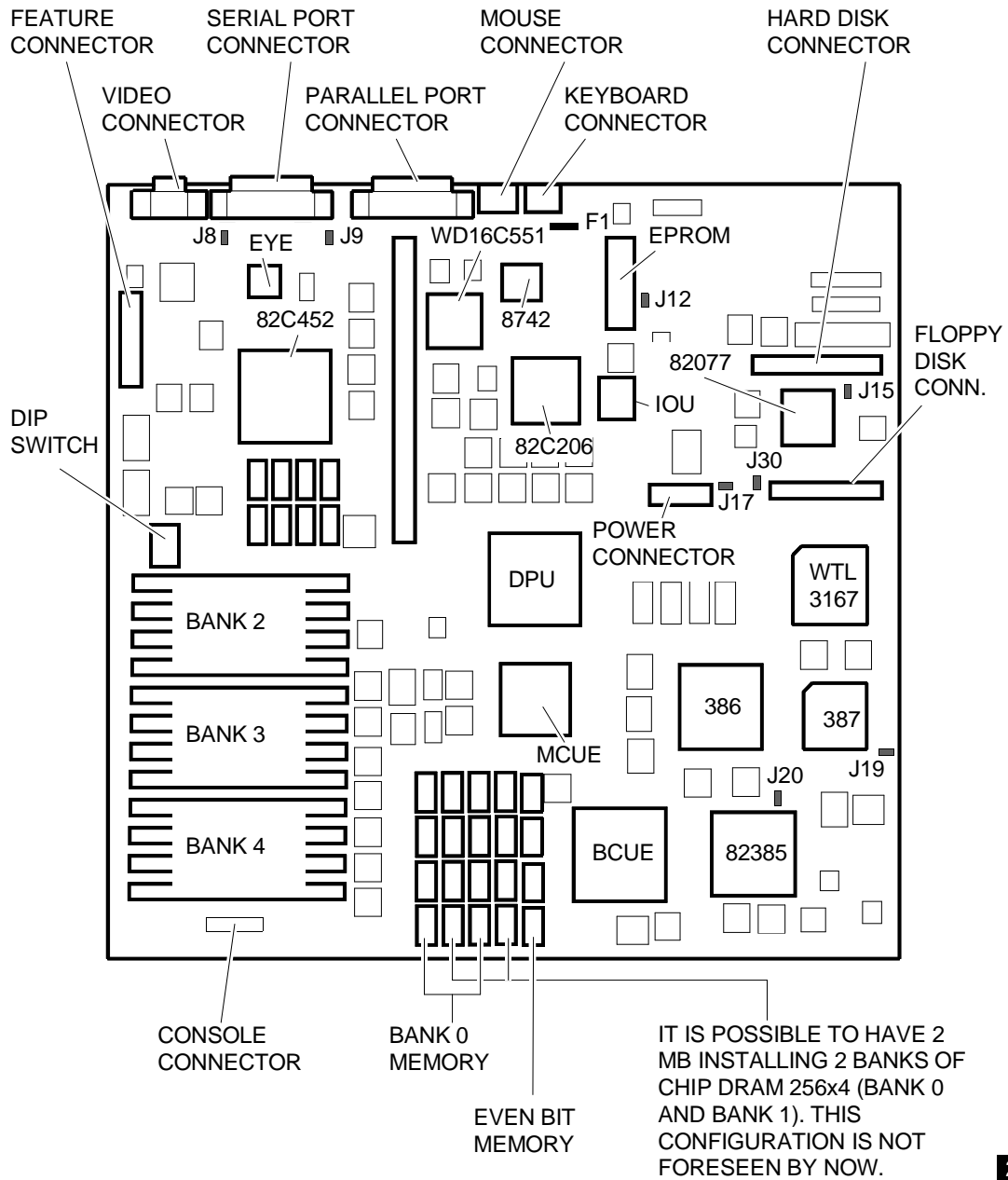
**SOFTWARE COMPATIBILITY**

OPERATING SYSTEMS	NOTES
IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20 IBM Operating System/2 Extended Edition, Ver. 1.10 INTERACTIVE 386/ix, Ver. 2.02 SCO XENIX 386, Rel. 2.3.2 Olivetti's Microsoft Disk Operating System, Ver. 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 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	During installation on hard disk, a formatted DSDD disk is required. PS/2 mouse not recognised PS/2 mouse not recognised
<b>WINDOWS</b>	
DESQ-VIEW 386 Ver. 2.24 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**

<p><b>MODEMS</b></p> <p>Hayes Smartmodem 2400B/1200B                  Telenetics Expressdata 24i (24i-12i)                  Ven-tel PC Modem Half-Card (PCM-XT)                  Fax Card                  Fury 2400 PC modem/Fury 2400 master                  AT&amp;T 2224 CEO modem</p>	<p><b>I/O INTERFACE PRODUCTS</b></p> <p>FUTURE DOMAIN HOST ADAPTER (TMC-830)                  IBM Asynchronous COM. CARD (1502074)                  IBM PRINTER ADAPTER (1505200)                  IBM SERIAL/PARALLEL</p>
<p><b>MULTIPOINT</b></p> <p>Anvil Stallion Intelligent 16 Port Controller                  Chase MSC Connect/AT8 Intelligent 8 Port                  Computone System Intelliport 16 Port AT16                  Computone System Intelliport 8 port AT8                  Consensus Powerports 8 Port Intelligent Ctr.                  Digiboard Digichannel COM/xi Intelligent 8 Port                  Specialix Si Intelligent I/O Controller</p>	<p><b>MOUSE</b></p> <p>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)</p>
<p><b>GRAPHICS PRODUCTS</b></p> <p>AST RESEARCH AST - VGA PLUS                  FASTWRITE 1024I                  FASTWRITE VGA                  HERCULES GRAPHICS CARD                  IBM EGA ADAPTER                  IBM VGA ADAPTER                  STB POWER GRAPH VGA                  STB VGA EM 16                  HERCULES GRAPHICS STATION CARD                  MATROX PG - 1281                  ORCHID PRODESIGNER VGA PLUS                  PARADISE VGA PRO CARD</p>	<p><b>NETWORKING &amp; LAN PRODUCTS</b></p> <p>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</p>
<p><b>DISPLAY UNITS</b></p> <p>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</p>	<p><b>OTHER PRODUCTS</b></p> <p>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 POSTSCRIPT CONTROLLER                  OMTI 8627 ESDI ADAPTER                  OMTI 8627 RLL ADAPTER                  SCANMAN PLUS                  WD1007A ADAPTER                  WD1007V ADAPTER                  WD1007V-SE2 ADAPTER</p>

**COMPONENTS AND JUMPERS ON MOTHERBOARD BA262 AND BA281**



FEC5A

THE EYE COMPONENT IS PRESENT ON BOARD BA281 ONLY

**FUSE F1**

2 A 5 V keyboard and mouse fuse.

**JUMPERS AND FUSE ON MOTHERBOARD BA262**

<b>JUMPER</b>	<b>POSITION</b>	<b>FUNCTION</b>
J8	IN OUT *	RING Indicator signal (RS232 threshold voltage) FAIL-SAFE disabled RING Indicator signal (RS232 threshold voltage) FAIL-SAFE enabled
J9	IN OUT *	Input signals (RS232 threshold voltage) FAIL-SAFE disabled Input signals (RS232 threshold voltage) FAIL-SAFE enabled
J12	OUT IN *	ROM BIOS disabled ROM BIOS enabled
J15	IN * OUT	Floppy disk oscillator enabled Floppy disk oscillator disabled
J17	OUT * IN	Normal operation Erases CMOS RAM
J19	OUT * IN	33 MHz 80387 numeric coprocessor Enable 80387 numeric coprocessor to see optional oscillator clock to be installed on U99
J20	IN * OUT	Normal operation Possibility of using a different 82385 cache controller model
J30	IN * OUT	Only one hard disk installed Two hard disks installed

IN: Jumper installed

OUT: Jumper not installed

(\*) shows default setting

**DIP-SWITCH BLOCK U515**

<b>SWITCH</b>	<b>POSITION</b>	<b>FUNCTION</b>
1	ON * OFF	NOT USED
2	ON * OFF	NOT USED
3	ON * OFF	Normal operation Disables floppy disk write operations
4	ON OFF	NOT USED

(\*) shows default setting

**JUMPERS AND FUSE ON SYSTEM BOARD BA281**

JUMPER	POSITION	FUNCTION
J8	IN OUT *	RING Indicator signal (RS232 threshold voltage) FAIL-SAFE disabled RING Indicator signal (RS232 threshold voltage) FAIL-SAFE enabled
J9	IN OUT *	Input signals (RS232 threshold voltage) FAIL-SAFE disabled Input signals (RS232 threshold voltage) FAIL-SAFE enabled
J12	OUT IN *	ROM BIOS disabled ROM BIOS enabled
J15	IN * OUT	Floppy disk oscillator enabled Floppy disk oscillator disabled
J17	OUT * IN	Normal operation Erases CMOS RAM
J19	OUT * IN	33 MHz 80387 numeric coprocessor Enable 80387 numeric coprocessor to see optional oscillator clock to be installed on U99
J30	IN * OUT	Only one hard disk installed Two hard disks installed

IN: Jumper installed  
 OUT: Jumper not installed  
 (\*) shows default setting

**DIP-SWITCH BLOCK U515**

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

(\*) shows default setting



**I/O ADDRESS MAP**

<b>ADDRESS</b>	<b>FUNCTION</b>	<b>ADDRESS</b>	<b>FUNCTION</b>
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	Data Keyboard controller	3BA h	Video adapter
61 h	System Control Port B	3C0-3CF h	Video adapter
64 h	Commands Keyboard 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)		

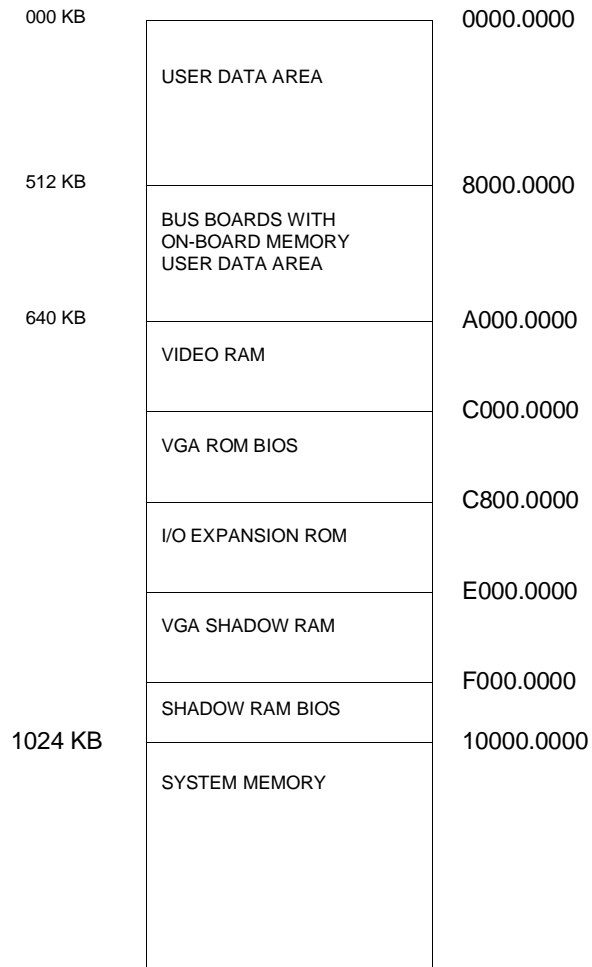
**INTERRUPT LEVELS**

<b>LEVEL</b>	<b>NAME</b>	<b>CONTROLLER</b>	<b>FUNCTION</b>
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 - 10	IRQ2	1	Interrupt to Controller 1 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**

System memory map can change according to configurations given to system by User Diskette or System Test.

The following diagram gives a configuration example of the first MegaByte of memory.



**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	NEC-D5146H half size	40 MB	615	8	128	664	17
2	Miniscribe M8425 68 ms 3,5"	20 MB	612	4	128	663	17
3	Seagate ST277R	62 MB	820	6	-1	819	26
4	NEC D5147H	62 MB	615	8	384	664	26
5	NEC D5652 ES	136 MB	820	10	-1	822	34
6	MICROPOLIS 1355 ESDI	135 MB	1021	8	-1	1023	34
7	MICROPOLIS 1353 ESDI	67 MB	1021	4	-1	1023	34
8	NEC D5452	68 MB	823	10	512	822	17
9	Fujitsu M2227D	40 MB	615	8	512	614	17
10	Fujitsu M2227D RLL	60 MB	615	8	512	614	26
11	ESDI	304 MB	814	15	-1	1	51
12	ESDI	81 MB	977	5	-1	1	34
13		136 MB	820	10	-1	1	34
14	CONNER CP3206	200 MB	683	16	-1	682	38
15	RESERVED						
16	CONNER CP3142	40 MB	635	4	-1	639	33
17	CONNER CP346	40 MB	805	4	-1	804	26
18	CONNER CP3106	100 MB	776	8	-1	775	33
19	Quantum LPS105 AT	100 MB	776	8	-1	775	33
20	Quantum PD210 AT	200 MB	873	13	-1	872	36
21	CONNER CP30064	60 MB	762	4	-1	761	39
22	CONNER CP30126	120 MB	762	8	-1	761	39
23	W.D. AC-140	40 MB	980	5	-1	980	17
24	W.D. AC-2120	120 MB	762	8	-1	762	39

**Where:** CYL: No. of disk cylinders

T: No. of disk heads

WPC: Precompensation cylinder number

LZ: Head parking cylinder number

SET: No. of disk sectors.



## M290-30

### CHARACTERISTICS

Microprocessor	HARRIS /AMD 80286
Clock	20 MHz
RAM access time	100 ns
Capacity min/max	The system can address up to 17 MB BANK A 1 MB of soldered RAM BANK 1 Two sockets, where 1 MB x 9 <b>EXM 25-532</b> or 4 MB x 9 <b>EXM 26-809</b> SIMMs can be installed BANK 2 Same as bank 1
Coprocessor	INTEL 80287
ROM BIOS	Chip 27C010 with 128 K x 8 capacity
Floppy Disk	1.44 MB 3.5" Panasonic JU-257 1.44 MB 3.5" Sony MP-F17W 1.44 MB 3.5" Mitsubishi MF355 1.2 MB 5.25" Toshiba ND08 DE 1.2 MB 5.25" Panasonic JU 475-3
Hard Disk	120 MB CONNER CP30126 19 ms 40 MB Quantum LPS 52 AT 19 ms 40 MB CONNER CP3046 19 ms 40 MB W.D. AC 140 19 ms 120 MB W.D. AC 2120 19 ms
Streaming Tape	40 MB IRWIN 245 80 MB IRWIN 285
AT expansion slots	4 Present - 4 Available
Video adapter	Integrated in system board with WD90C11 component
Hard Disk and Floppy disk controller	Integrated on motherboard FDU controller: NATIONAL PC87310 HDU controller: Logic ports and MSI buffer implementing an AT interface for intelligent hard disks
Mouse	PS/2- and AT-compatible
Keyboard	Compact 101/102-key ANK 27-101, ANK 27-102

#### MOTHERBOARD

BA 278

#### BIOS

Rel. 2.01

#### POWER SUPPLY

PS11A - 220 V  
PLESSEYPS11A - 115 V  
PLESSEYPS11A - 220 V only  
ASTEC

#### EXPANSION BUS

IN123  
IN127

#### MEMORY BOARD

ME066

#### MOUSE I/O BOARD AND KEYBOARD

IF468

**MOTHERBOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA278</b>	Nasc.	612301D	Rev. 1.09	<p><b>Intel 80286</b> Processor  <b>Intel 80287</b> Math coprocessor  <b>27C010</b> ROM BIOS  <b>8742</b> Keyboard and mouse controller  <b>WD90C11</b> Video adapter</p> <p><b>TOPCAT CHIP SET</b>  <b>VL82C320</b> - Coprocessor interface                      - Shadow RAM                      - Programmable DRAM timing                      - Data buffer                      - BUS conversion cycle                      - EEMS handling support  <b>VL82C331</b> - Asynchronous DMA operations                      - Page address register                      - Timer                      - Interrupt controller                      - Refresh generation                      - Logic port A                      - Real Time Clock</p> <p><b>PC87310 NATIONAL</b> - Two 8250 / 16450 UARTs                      - PD7650 floppy disk controller                      - One-way parallel port                      - Hard Disk and Chip Set address decoding                      - Game Port and Port Select address decoding                      - Register configuration                      - Address decoding for all board functions</p>
	Lev. 01 MI			Solves the ACK signal problems on the parallel port
	Lev. 02 MI			New oscillator introduced
	Lev. 03		Rev. 1.09	Corrects some system faults.
	Lev. 04		Rev. 2.01	New BIOS to solve the following problems: - Random system crashes - No system bootstrapping - S RAM board malfunctions - Faulty management of the A20 Gate signal Field level only. Production stopped at BIOS release 1.09.

**BUS EXPANSION BOARD**

<b>BUS EXPANSION BOARD</b>	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>NOTES</b>
IN123	Nasc.	978260 W	
	Lev. 01		Solves video noise problems
	Lev. 02		Solves signal ground BUS criticality problems
IN127	Nasc.	978644 K	New board implementing all changes of IN123. It is interchangeable with IN123
	Lev. 01		Solves video disturbance

**MEMORY EXPANSION BOARD**

<b>BOARD NAME</b>	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>NOTES</b>
ME066	Nasc.	977932 K	The board has no RAM. Modules to be installed: 1 Mb x 9 <b>EXM 25-532</b> 4897181 or 4 Mb x 9 <b>EXM 26-809</b> 4897194 E

**KEYBOARD AND MOUSE I/O BOARD**

<b>BOARD NAME</b>	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>NOTES</b>
IF468	Nasc.	977928 X	

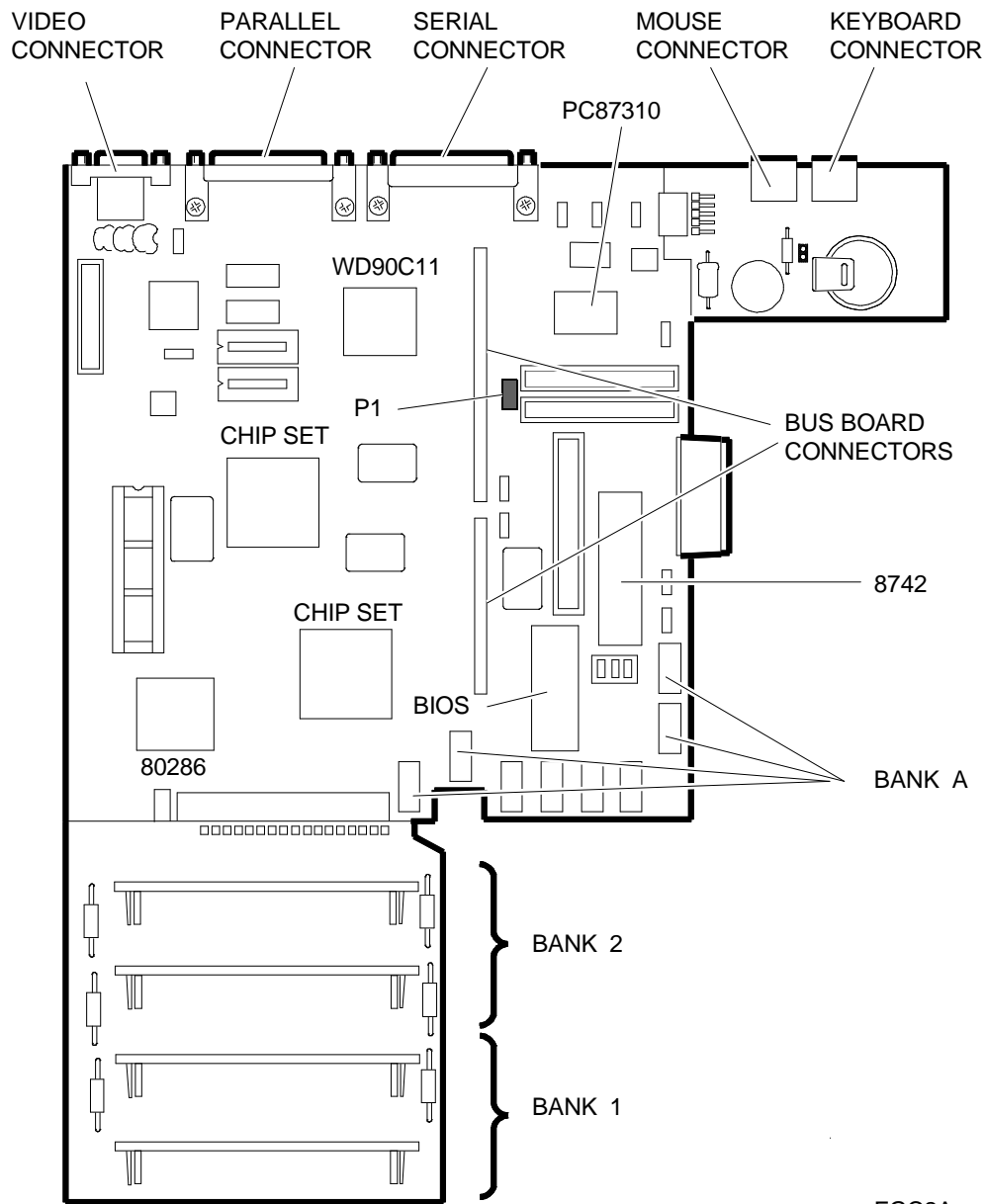
**POWER SUPPLY UNIT**

<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
PS11 B ASTEC 220 V	Nasc. Lev. 01	Only version 220 V Extended magnetic peripheral cables
	Lev. 02	Following problem solved: the system fails to switch on if the printer connected is switched on before the system. Occurs especially on printers shared with other systems. A zener diode and resistor have been added to the fan drive circuit to improve the power supply's immunity to external voltages
	Lev. 03	The box and lid have been changed
PS11 B Plessey 220 V	Nasc.	Improved RESET signal
	Lev. 01	Noise reduced
	Lev. 02	Temperature problems solved
	Lev. 03	Noise with MITSUBISHI fans reduced
	Lev. 04	Extended magnetic peripheral cables
	Lev. 05	Changed pcb materials to improve transportability
PS11 B Plessey 110 V	Nasc.	This power supply has evolved in the same way as the 220 V model

**USER DISKETTE / SYSTEM TEST / DRIVER**

<b>LEVEL</b>	<b>COMPATIBILITY</b>
User Diskette Rel. 1.67 System Test Rel. 1.88	




**COMPONENTS AND JUMPERS ON THE MOTHERBOARD**



This Personal Computer has a jumper (P1) used to disable the password; all settings can be made via User Diskette or BUILT-IN-SETUP or EXTENDED SETUP programs which are described in the following pages.





-  Indicates that a coprocessor is installed
-  Indicates that system batteries are low
-  Indicates a real time clock failure

### EXTENDED SETUP PROGRAM

Extended SETUP program menu includes all BUILT IN SETUP program functions, and icons that identify advanced functions. To change these parameters, after selecting the function, press the space bar.

The program can be recalled at any time by pressing the SHIFT, CTRL, ALT, DEL keys simultaneously.

#### EXTENDED SETUP

<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>F1</p> <p>9 L 3</p> <p>6</p> </div> <p>10:25:32</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>F2</p> <p>10</p> <p>M o r</p> </div> <p>21/03/1991</p>		
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>F3</p> <p>HDU</p> <p>AT</p> </div> <p>03-080Mb - Mb PARKING</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>F4</p> <p>FDU</p> </div> <p>1.44-1.2- A - B</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>F5</p> <p>VDU</p> </div> <p>80x25 EXT</p>	
<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>F6</p> <p>SHAD</p> <p>TEST</p> <p>EMS</p> </div> <p>128 + VGA 3 2048/ 128</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>F7</p> <p>RAM</p> <p>I/O</p> </div> <p>20 12</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>F8</p> <p>chr/s</p> <p>beep</p> <p>paral</p> </div> <p>30 7 0</p>	<div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <p>F9</p> <p>TTT</p> </div>
<div style="border: 1px solid black; padding: 5px;"> <p>F10</p> <p>I</p> </div>			

Exit | Select | Confirm CR | Restart | Messages  
Press F1F2F3F4F5F6F7F8F9F10

The following parameters can be changed:

- F1** Changes hour, minutes and seconds
- F2** Changes day, month and year
- F3** Changes hard disk type and hard disk heads in landing zone. When there are two hard disks, two fields are present. To move from one field to another, press the TAB key
- F4** Changes floppy disk type. When there are two hard disks, two fields are present. To move from one field to another, press the TAB key
- F5** Changes video format at system power on

- F6** Memory - There are 3 fields that indicate respectively:
  - Memory portion dedicated to shadow RAM
  - Duration of the POD memory test
  - Extended and expanded memory sizes
 To move from one field to another, press the TAB key
  
- F7** System speed. A field allowing to select the speed at which data is exchanged between memory and CPU; another field allows to select the speed at which data exchanged between CPU and peripherals. To move from one field to another, press the TAB key
  
- F8** Selects 3 fields that allow the following parameters to be changed:
  - Character repeat speed
  - Buzzer volume
  - Parallel port operation mode setting (The parallel port is not bidirectional; it can be set in either Input or Output)
  
- F9** Stores a system or network password
  
- F10** Selects country keyboard

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller	102	VGA controller
020-021F	Interrupt controller 1	278-27b	Parallel port 2
040-043	Timer	2F8-2FF	Serial port 2
060	Data keyboard controller	378-37B	Parallel port 1
061	Control port B	3B4-3B5	Video adapter
064	Comands keyboard controller	3BA	Video adapter
070-071	RTC, NMI registers and CMOS RAM	3C0-3CF	Video adapter
080-08F	DMA page register	3D4-3D5	Video adapter
0A0-0A1	Interrupt controller 2	3DA	Video adapter
0C0-0DF	DMA channels 4-7	3F0-3F7	Floppy disk controller
0EC-0ED	TOPCAT chip set	3F8-3FF	Serial port 1
0F9 and 0FB	TOPCAT chip set	46E8	VGA control registers

**INTERRUPT LEVELS**

LEVEL	FUNCTION
IRQ0	Timer
IRQ1	Keyboard controller
IRQ2	Interrupt from interrupt controller 2
IRQ3	Serial port 2
IRQ4	Serial port 1
IRQ5	Parallel port 2
IRQ6	Floppy disk controller
IRQ7	Parallel port 1
IRQ8	RTC
IRQ9	Available
IRQ10	Available
IRQ11	Available
IRQ12	Mouse
IRQ13	80287
IRQ14	Hard disk controller
IRQ15	Available

**DMA CHANNELS**

CHANNEL	FUNCTION
DMA0	8-BIT
DMA1	8-BIT
DMA2	8-BIT
DMA3	8-BIT
DMA4	16-BIT
DMA5	16-BIT
DMA6	16-BIT
DMA7	16-BIT

**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20  IBM Operating System/2 Extended Edition, Ver. 1.10 and 1.20 INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	During installation on hard disk, a formatted DSDD disk is required. PS/2 mouse not recognised  PS/2 mouse not recognised
<b>WINDOWS</b>	
GEM/3 desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<p><b>MODEMS</b></p> <p>HAYES SMARTMODEM (1200B)          QUADRAM QUADMODEM II (QM2024)          TELENETICS EXPRESSDATA 24i (24i-12i)          VEN-TEL PC MODEM HALF-CARD (PCM XT)          AT&amp;T 2200 SERIES MODEM (2224-CD0)          HAYES SMARTMODEM 1200</p>	<p><b>MEMORY EXPANSIONS</b></p> <p>AST RAMPAGE/286 (RAMP286)          BOCARAM/AT          IBM 128 KB/512 KB EXPANSION MEMORY OPTION (6450338)          IBM 512 KB/2 MB EXPANSION MEMORY OPTION (6450343)          IBM ENHANCED MEMORY EXPANSION ADAPTER (74X8635)          INTEL ABOVEBOARD/286 (PCMB4020)</p>
<p><b>DISPLAY UNITS</b></p> <p>IBM COLOR GRAPHICS DISPLAY (5153)          IBM ENHANCED GRAPHICS MONITOR (5154)          IBM MONOCHROME MONITOR (5151)          IBM PS/2 COLOR DISPLAY (8512)          NEC MULTISYNC MONITOR (APC-H431)          PRINCETON RGB DISPLAY (HX-12)          ZENITH RGB/COMPOSITE DISPLAY (ZVM-135)</p>	<p><b>MOUSE</b></p> <p>AT&amp;T BUS MOUSE (459420)          LOGITECH BUS MOUSE (P7-3F)          MICROSOFT BUS MOUSE, REV. C          MICROSOFT SERIAL MOUSE          MOUSE SYSTEMS PC MOUSE (M1)</p>
<p><b>NETWORKING &amp; LAN PRODUCTS</b></p> <p>AT&amp;T STARLAN NETWORK          IBM PC NETWORK          IBM TOKEN RING NETWORK          NOVELL NETWORK          3COM NETWORK</p>	<p><b>I/O INTERFACE PRODUCTS</b></p> <p>APPARAT PARALLEL/SERIAL CARD (7950), REV. 1          IBM ASYNCHRONOUS COMMUNICATIONS CARD (1502074)          IBM MONO DISPLAY/PRINTER ADAPTER (1504900)          IBM PRINTER ADAPTER (1505200)          IBM SERIAL/PARALLEL CARD (6450215)</p>
<p><b>GRAPHICS PRODUCTS</b></p>	
<p>AST RESEARCH AST-3G PLUS          ATI EGA WONDER          GENOA SUPER EGA HIRES          HERCULES COLOR CARD (GB200)          HERCULES GRAPHICS CARD (GB102)          IBM ENHANCED GRAPHICS ADAPTER (5154001)          IBM VGA ADAPTER          PARADISE EGA 480</p>	<p>PARADISE MODULAR GRAPHICS CARD (06-1, Revision 02)          PARADISE MULTI-DISPLAY CARD (05-1)          QUADRAM QUAD EGA PLUS          TECMAR GRAPHICS MASTER BOARD (20037, REV. C)          VIDEO-7 VEGA DELUXE          325 INC. ADVANTAGE GRAPHICS INTERFACE (325 SHADOW)</p>



## M300-25

### CHARACTERISTICS

Microprocessor	i386SX (P9) 16-bit BUS
Clock	20 MHz
Architecture	MICROCHANNEL
Memory	Two banks, each with two sockets: BANK 1: the following are installable: - SIMM 1 Mb x 9 <b>EXM 25-532</b> (2 SIMMs = 2 MB) - SIMM 4 Mb x 9 <b>EXM 26-809</b> (2 SIMMs = 8 MB) BANK 2: same as bank 1 Memory installed on motherboard can have the following sizes: 2 MB 2 1 Mb x 9 SIMMs installed 4 MB 4 1 Mb x 9 SIMMs installed 8 MB 2 4 Mb x 9 SIMMs installed 16 MB 4 4 Mb x 9 SIMMs installed This system does not support mixed configurations: when SIMMs 1 Mb x 9 are installed, SIMMs 4 Mb x 9 can not be installed
Memory access time	80 ns for motherboard SIMMs 100 ns for memory board SIMMs
Memory expansion board	<b>MEM 26-503</b> - 2 MB memory board expandable to 8 MB by SIMM modules 1 Mb x 9 <b>EXM 25-502</b>
Coprocessor	20 MHz i387SX
Floppy Disk	1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB 3.5" Mitsubishi MF355C 1.2 MB 5.25" Toshiba ND08 DE 1.2 MB 5.25" Panasonic JU475-3/4/5 1.44 MB 3.5" Y-E Data YD-702B
Hard Disk	60 MB CONNER CP30069 120 MB CONNER CP30129
Streaming Tape	80 MB IRWIN 245 - 80 MB IRWIN 285
AT expansion slots	4 Present - 3 Available
Video adapter	Integrated on System Board VGA-compatible 82C452
Floppy Disk controller	Integrated on system board 82077
Hard Disk controller	Only BUFFER for intelligent hard disks
CMOS RAM	128 KB powered by internal lithium battery
ROM BIOS	128 KB EPROM
Mouse	PS/2- and AT-compatible GRD 25-025
Keyboard	101/102-key ANK 27-101/N ANK 27-102/N

#### MOTHERBOARD

BA 856  
BASE ASSEMBLY  
BA 888  
BA 889

#### BIOS

Last level: 1.03

#### POWER SUPPLY

PS11 PLESSEY 220 V  
PS11 PLESSEY 110 V  
PS11 ASTEC 220 V only

#### NETWORK BOARDS

(Installable on Diskless version)

**OLICOM 16/4 MCA Token Ring NCU 9174**  
with RPL ROM on board

**IMB Token Ring Network Adapters (4, 4/16 Mbps)**  
with on-board RPL ROM

**IBM Ethernet Adapter**  
with on-board RPL ROM

In the PC standard version other types of network boards can be installed. They can be configured using the configuration diskettes supplied with the boards. The diskettes cannot be used in the Diskless version since it does not configure any magnetic peripheral.

**MOTHERBOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLERS / NOTES</b>
<b>BA856</b>	Nasc.	-	-	For the integrated controllers, see the following table.
	Lev. 01			Cuts and wirings implemented to solve the signal ARB/GNT drive problem.
	Lev. 02			Component 74F373 added at location SP3 No. 1 to solve incorrect hard disk arbitration.
	Lev. 03			<ul style="list-style-type: none"> <li>- 35 ns PAL GLBS 16R4 replaced by the 15 ns PAL GKCH 16R4.</li> <li>- Vcc and GND 10 mF filter capacitors replaced</li> </ul>
	Lev. 04			<ul style="list-style-type: none"> <li>- Floppy disk controller 82077AA-1 is replaced by 82077SL and therefore the capacitor in position C47 is removed.</li> <li>- 80386 step C CPU is replaced by the 80386 step D CPU.</li> <li>- Component 16C552 mask C is replaced by the same component mask D.</li> </ul>
	Lev. 05			Component 16C552 is no longer produced and is replaced by the STARTECH component. To use this new component a cut has to be made between this component's pin 43 and ground, and a wiring inserted between the same pin and pin 1 of resistor R35.
<p>Base Assembly - Code BA856 identifies the printed circuit board on which the SIMMs are mounted according to their memory size. The printed circuit board with the SIMMs installed assumes the name of the different BAs described further on.</p>				

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA888</b>	Lev. Nasc.	612420 Y	Rev. 1.01	Board with 2 MB of memory installed. Unless indicated otherwise, the levels and the modifications made are the same as those of the base assembly.
	Lev. 01		Rev. 1.01	Cuts and wirings implemented to solve the signal ARB/GNT drive problem.
	Lev. 02		Rev. 1.01	Component 74F373 added at location SP3 No. 1 to solve incorrect hard disk arbitration.
	Lev. 03		Rev. 1.01	<ul style="list-style-type: none"> <li>- 35 ns PAL GLBS 16R4 replaced by the 15 ns PAL GKCH 16R4.</li> <li>- Vcc and GND 10 mF filter capacitors replaced</li> </ul>
	Lev. 04		Rev. 1.03	<ul style="list-style-type: none"> <li>- New BIOS to solve the problems with the 120 MB hard disk during system configuration.</li> </ul>
	Lev. 05		Rev. 1.03	<ul style="list-style-type: none"> <li>- Floppy disk controller 82077AA-1 is replaced by 82077SL-1 and therefore the capacitor in position C47 is removed.</li> <li>- 80386 step C CPU is replaced by the 80386 step D CPU.</li> </ul>
	Lev. 06		Rev. 1.03	Component 16C552 is no longer produced and is replaced by the STARTECH component. To use this new component a cut has to be made between this component's pin 43 and ground, and a wiring between the same pin and pin 1 of resistor R35.
	Lev. 06		Rev. 1.03	<p>New Samsung KMM59100BN-7 SIMMs (3-chip, 1 MBx9, 80 ns SIMMs) in alternative to the Samsung KMM591000C-8 SIMMs (9-chip, 1 MBx9, 80 ns SIMMs) which are no longer available on the market.</p> <p>The board does not change level.</p>



	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA889</b>	Nasc.	612421 M	Rev. 1.01	Board with 8 MB of memory installed. Unless indicated otherwise, the levels and the modifications made are the same as those of the base assembly.
	Lev. 01		Rev. 1.01	Cuts and wirings implemented to solve the signal ARB/GNT drive problem.
	Lev. 02		Rev. 1.01	Component 74F373 added at location SP3 No. 1 to solve incorrect hard disk arbitration.
	Lev. 03		Rev. 1.01	<ul style="list-style-type: none"> <li>- 35 ns PAL GLBS 16R4 replaced by the 15 ns PAL GKCH 16R4.</li> <li>- Vcc and GND 10 mF filter capacitors replaced</li> </ul>
	Lev. 04		Rev. 1.03	<ul style="list-style-type: none"> <li>- New BIOS to solve the problems with the 120 MB hard disk during system configuration.</li> </ul>
	Lev. 05		Rev. 1.03	<ul style="list-style-type: none"> <li>- Floppy disk controller 82077AA-1 is replaced by 82077SL-1 and therefore the capacitor in position C47 is removed.</li> <li>- 80386 step C CPU is replaced by the 80386 step D CPU.</li> <li>- Component 16C552 mask C is replaced by the mask D version.</li> </ul>
	Lev. 06		Rev. 1.03	Component 16C552 is no longer produced and is replaced by the STARTECH component. To use this new component a cut has to be made between this component's pin 43 and ground, and a wiring inserted between the same pin and pin 1 of resistor R35.

INTEGRATED CONTROLLERS		INTEGRATED CONTROLLERS	
<b>i386</b>	20 MHz CPU	<b>QFP132</b>	- Gate array implementing
<b>i387</b>	20 MHz math coprocessor	<b>ASIC ADB</b>	Addressing Buffers and data Buffers
<b>DS1287</b>	- 128 KB non volatile RAM powered by internal lithium battery		- Implements swapping function between 16 and 8 bits
	- Real Time Clock	<b>82303</b>	- Local I/O support
	- DMA controller		- Implements the SETUP registers
	- Interrupt controller		- Interfaces peripherals and bus
<b>8742</b>	Keyboard and mouse controller	<b>82307</b>	- DMA controller
<b>LM386</b>	Speaker controller		- BUS arbiter control
<b>WD16C552</b>	Serial port and parallel port interface		- Memory Refresh
<b>82077</b>	Floppy disk controller		- Coprocessor interface
<b>82C452</b>	Super VGA video adapter	<b>82308</b>	BUS controller
<b>82304</b>	- Interrupt controller	<b>82309</b>	- BUS address controller
	- I/O peripherals support		- Memory control
	- Programmable timer		- Integrates I/O ports and registers

**BOARDS**

NAME	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
OLICOM Token Ring NCU 1974	16/4 Mbps network board	-	Remote Program Load (RPL) EPROM can be on-board, it allows operating system to be loaded from network
IBM Token Ring Network Adapter	4, 4/16 Mbps network board	-	
IBM Ethernet Adapter		-	
BUS adapter board	MI542	497236 R	
BUS adapter board	MI620	498152 W	BUS adapter board for the diskless version

**USER DISKETTE**

LEVEL	COMPATIBILITY
Lev. 1.02	Compatible with BIOS 1.01
Lev. 1.03	Change in the M300-25 logo
Lev. 1.04	Compatible with BIOS 1.03
Lev. 1.05	Replaces the previous version to correct the error in the calculation of extended memory when the board configures 16 MB of memory and an XGA board is installed on the bus.

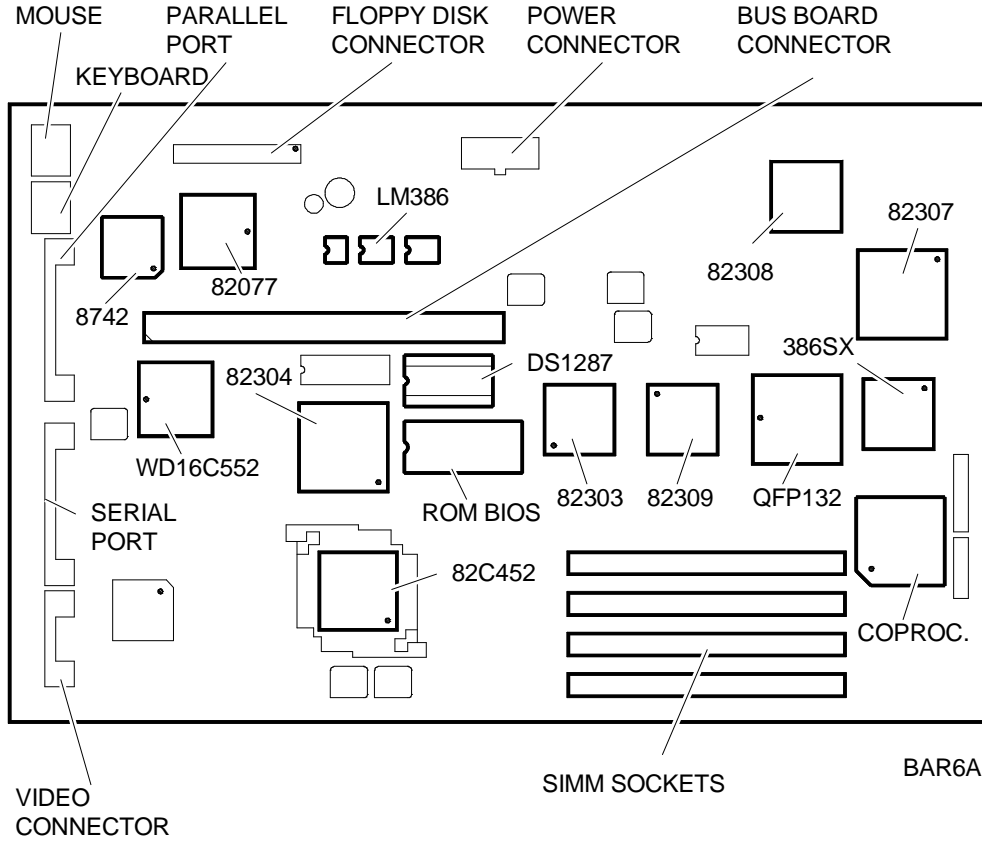
**POWER SUPPLY UNIT**

<b>POWER SUPPLY UNIT</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
PS11 ASTEC 220 V	Nasc. Lev. 01	Only version 220 V Extended magnetic peripheral cables
	Lev. 02	Following problem solved: the system fails to switch on if the printer connected is switched on before it. Occurs especially if the printer is shared with other systems. A zener diode and resistor have ben added to the fan drive circuit to improve the power supply's immunity to external voltages.
	Lev. 03	The box and lid have been changed
	Lev. 04	A resistor has been replaced and capacitor has been added to optimize productivity.
	Lev. 05	Inductance L5 has been added to the mains input area and a new printed circuit board is used to improve operational margins in the event of radio interference and random voltage drops.
PS11 Plessey 220 V	Nasc. 01	RESET signal improved
	02	Noise reduced
	03	Solves temperature problems
	04	Noise with MITSUBISHI fans reduced
	05	Extended magnetic peripheral cables
	06	Replaced printed circuit material to improve transportability
PS11 Plessey 110 V	Nasc. 01	This power supply has evolved in the same way as the 220 V model
	02	
	03	
	04	

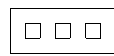
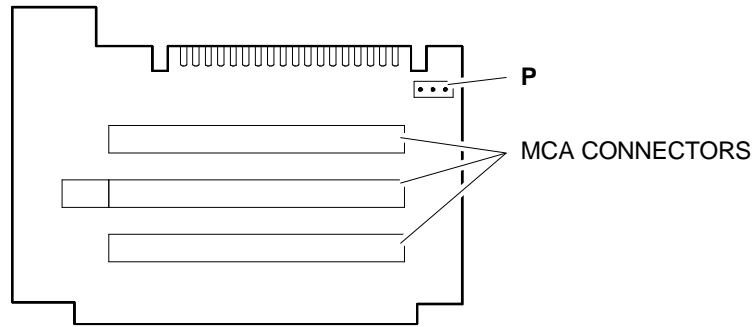
**COMPATIBILITY NOTES**

<b>BOARD or HW/SW DEVICE</b>	<b>DESCRIPTION</b>

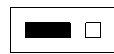
**MOTHERBOARD COMPONENTS AND JUMPERS**



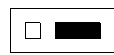
**BUS ADAPTER BOARD JUMPERS**



If jumper P is removed the CMOS is erased — Erasing the CMOS



Default setting



To delete the password, move jumper P to the position opposite its starting position

Erasing the password

**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Version 4.00	During installation on hard disk, a formatted DSDD disk is required.

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
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)
<b>MEMORY EXPANSIONS</b>	<b>MOUSE</b>
IBM PS/2 80286 Memory Exp. Option INTEL Aboveboard/2 Orchid Ramquest extra 16/32	IBM PS/2 Mouse (6450350) Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti New Advanced Mouse (GRD 25-025)
<b>DISPLAY UNITS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
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 Network 3COM Network (Ethernet) 10NET Network
<b>GRAPHICS PRODUCTS</b>	<b>OTHER PRODUCTS</b>
IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller	SOFTWARE SECURITY Parallel Port Block

**SYSTEM MEMORY MAP**

ADDRESS	SIZE	FUNCTION
0000 0000 - 0009 FFFF	640 KB	System RAM (System board Bank 0)
000A 0000 - 000B FFFF	128 KB	VIDEO RAM (System board Bank 0)
000C 0000 - 000D FFFF	128 KB	I/O expansion ROM
000E 0000 - 000F FFFF	128 KB	BIOS
0010 0000 - 00FD FFFF	14 MB + 896 KB	System RAM (System board Bank 0 and 1)
00FE 0000 - 00FF FFFF	128 KB	BIOS

**DMA CHANNELS**

CHANNEL	I/O DEVICE
0	Channel 0 DMA (Can be programmed with the lowest priority)
1	Channel 1 DMA
2	Channel 2 DMA (Floppy disk controller)
3	Channel 3 DMA
4	Channel 4 DMA (Can be programmed with another priority)
5	Channel 5 DMA
6	Channel 6 DMA
7	Channel 7 DMA
8	Master expansion slot
9	Master expansion slot
A	Master expansion slot
B	Master expansion slot
C	Master expansion slot
D	Master expansion slot
E	Master expansion slot
F	Intel 386 SX CPU

**INTERRUPT LEVELS**

INTERRUPT LEVEL	PIC 1 MASTER	PIC 2 SLAVE	FUNCTION
NMI	-	-	Parity, I/O channels control, Arbiter timeout, Watchdog timer
IRQ0	IR0	-	Channel 0 output timer
IRQ1	IR1	-	Keyboard interface
IRQ2	IR2	-	Interrupt PIC 2 to PIC 1
IRQ8	-	IR0	Real Time Clock
IRQ9 *	-	IR1	Available
IRQ10	-	IR2	Available
IRQ11	-	IR3	Available
IRQ12	-	IR4	Mouse
IRQ13	-	IR5	Math coprocessor
IRQ14	-	IR6	Hard disk controller
IRQ15	-	IR7	Available
IRQ3	IR3		Secondary serial port
IRQ4	IR4		Primary serial port
IRQ5	IR5		Available
IRQ6	IR6		Floppy disk controller
IRQ7	IR7		Parallel port

**I/O ADDRESS MAP**

<b>ADDRESS</b>	<b>FUNCTION</b>	<b>REGISTER LOCATION</b>
90	BUS arbiter control register	82307
96	MicroChannel selection register	82304
91		82304
3F0 to 3F7	Board feedback info register	
00 to 1F, C0 to DF	Installed in selected microchannel	3F3 is in discrete logic, all the rest in
81, 82, 83, 87, 89, 8A, 8B, 8E	Floppy disk control registers	82077
E3 to E7	DMA control registers	82307
20, 21	DMA page registers	82309
A0, A1	Error trace registers	82304
64	Interrupt 1 controller	82304
60	Interrupt 2 controller	8742
E0, E1	Keyboard command/status register	8742
100 to 107	Keyboard data register	82309
94	Memory control registers	102 and 106 are in 82304, all the rest in discrete logic.
70, bit 7 only	POS registers	82304
97, 104, 105, 107	System board SETUP register	82304
74, 75, 76		Used in diskless version only
F0 to FF	Non maskable interrupt enable register	Intel 387 SX
3BC to 3BF	NOT USED	WD 16C552
378 to 37B	RESERVED	WD 16C552
278 to 27B		WD 16C552
40, 42, 43, 44, 47	Math coprocessor registers	82304
70, 71		DS 1278
93	Parallel port 1	Discrete logic
3F8 to 3FF	Parallel port 2	WD 16C552
2F8 to 2FF	Parallel port 3	WD 16C552
92	Programmable timer registers	82304
61	Real Time Clock and CMOS RAM registers	82304
3C6 to 3C9	RESERVED	BT472
3B4, 3B5, 3BA, 3C0 to 3C5	Serial port 1	3C3 bit 0 and in 82304, all the rest in
3CE, 3CF, 3D4, 3D5, 3DA	Serial port 2	82C452
	System A control register	
	System B control register	
	DAC video	
	I/O system video	



# M480-30

## CHARACTERISTICS

Microprocessor	Intel 486
Clock	25 MHz
Architecture	MICROCHANNEL
Memory	The motherboard supports 8 MB installed on 2 banks. Configurations: <b>4 MB on system board</b> (4 1 Mbx9 SIMMs) Expandable to 8 MB through <b>KIT EXM 26-807</b> (4 1 Mbx9 SIMMs) Expandable only with the 4 MB memory expansion board <b>MEM26-804</b> . This board can be expanded to 8 MB using <b>KIT EXM 26-807</b> , to 20 MB using <b>2 EXM 26-809 KITS</b> (2 4 Mbx9 SIMM), or to 32 MB by removing the SIMMs installed on the board and installing <b>4 EXM 26-809 KITS</b>
Memory access	80 ns
Coprocessor	Weitek WTL 4167
Floppy Disk	1.44 MB 3.5" panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C 1.44 MB 3.5" Y-E Data YD-702B
Hard Disk This Personal Computer can mount either MCA intelligent hard disks (with ESDI interface) or SCSI hard disks	<b>ESDI interface MCA hard disks</b> 3.5" 100 MB CONNER CP30109 MCA 3.5" 200 MB CONNER CP3209 MCA 3.5" 60 MB CONNER CP30129 MCA 3.5" 120 MB CONNER CP30129 MCA <b>SCSI hard disks</b> 210 MB CONNER CP3200F/CP30200 210 MB SEAGATE 270 MB QUANTUM 340 MB CONNER CP3300 / CP3360 510 MB CONNER CP3500 / CP3540 525 MB CONNER CP30540
Streaming Tape	80,120 MB IRWIN 285
Expansion Slots	5 available: One 16-bit; one 16-bit with video board extension; three 32-bit
Video Adapter	82C452 integrated on motherboard
Floppy Disk Controller	WD57C65 integrated on motherboard
Hard Disk Controller	<b>MCA version</b> - Intelligent hard disk drives <b>SCSI version</b> - SCSI hard disk controller <b>GO582-GO610</b>
Mouse	PS/2- and AT-compatible GRD 25-025
Keyboard	Compact 101/102-key ANK27-101 ANK27-102

<p><b>MOTHERBOARD</b></p> <p>BA880 - P2.1 - Base Assembly BA865 - P2.1 - 4 MB BA900 - P2.1 - 8 MB</p> <p>BA951 - Base Assembly BA952 - 4 MB BA953 - 8 MB</p>
<p><b>BIOS</b></p> <p>Rev. 1.06</p>
<p><b>POWER SUPPLY</b></p> <p>HANTAREX</p> <p>PS14 220 V - Lev. 04 MI PS14 115 V - Lev. 04 MI</p> <p>ALITEC</p> <p>PS14 H 220 V - Lev. 01 PS12 H 115 V - Lev. 01</p>
<p><b>CONSOLE</b></p> <p>IF 638            Lev. 01 IF 469            Lev. 01</p>
<p><b>HDU INTERFACE</b></p> <p>GO582 - SCSI version</p> <p>GO610 - SCSI version</p> <p>Intelligent MCA interface buffers</p>



**MOTHERBOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS AND MODIFICATIONS
<b>BA880</b>	Base Assembly - Code BA880 identifies the printed circuit on which the SIMM modules are mounted according to memory size. The pcb with SIMM modules installed takes the name of the different BAs described below.			
	Nasc.		PPUS U118 PPUT U119 Rev. 1.02	Printed circuit (BA880) with 4 MB For a description of the components see the table below
	Lev. 02		PPJJ U118 PPJK U119 Rev. 1.04	Solves the Parallel Port Test Error problem at POD, supports the new video modes and improves performance of interrupt 15H in CBIOS
	Lev. 03		Rev. 1.05	Allows use of Intel 80486 processor step D0 New BIOS to solve problems of: CBIOS    POD, Floppy, INT 10 ABIOS    Parallel and serial
	Lev. 04		Rev. 1.05	C&T component F82C452A introduced replacing component F82C452. This also involves replacing the 74F244 at location U32 with the 74FCT244CT
	Lev. 05 Lev. 06		Rev. 1.05 Rev. 1.06	New BIOS to solve the problem with the 120 MB hard disk during system configuration
<b>BA900</b>	Nasc.		Rev. 1.05	Printed circuit (BA880) with 8 MB. This board has the same components as BA865
	Lev. 01		Rev. 1.05	C&T component F82C452A introduced replacing component F82C452. This also involves replacing the 74F244 at location U32 with the 74FCT244CT
	Lev. 02			
	Lev. 03		Rev. 1.06	New BIOS to solve the problem with the 120 MB hard disk during system configuration

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS AND MODIFICATIONS
BA951	Base Assembly - Code BA951 identifies the printed circuit on which the SIMM modules are mounted according to memory size. The pcb with the SIMM modules installed takes the name of the different BAs described below. This printed circuit replaces BA880.			
BA952	Nasc.	553013 L	Rev. 1.05	Printed circuit (BA951) with 4 MB. This board has the same components as the BA865 - replaces BA865.
	Lev. 01 MI		Rev. 1.05	Component 74F245 at location U50 replaced by component 74LS245 to solve the floppy disk write error problems
	Lev. 02 MI		Rev. 1.05	<ul style="list-style-type: none"> <li>- Component 16550A at location U47 (NMOS technology) replaced by component 16550C (CMOS technology)</li> <li>- The 10 mF Vcc - GND filter capacitors are replaced by the corresponding ones with T = -20/+80</li> </ul>
	Lev. 03		Rev. 1.06	<ul style="list-style-type: none"> <li>- New BIOS to solve the problems with the 120 MB hard disk during system configuration.</li> <li>- To improve functional margins, a capacitor was installed at location C9413 and a resistor at location R148.</li> </ul>
	Lev. 03		Rev. 1.06	New Samsung KMM59100BN-7 SIMMs (3-chip, 1 MBx9, 80 ns SIMMs) in alternative to the Samsung KMM59100C-8 SIMMs (9-chip, 1 MBx9, 80 ns SIMMs) which are no longer available on the market. The board does not change level.

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS AND MODIFICATIONS
BA953	Nasc.	553014 M	Rev. 1.05	Printed circuit (BA951) with 8 MB. This board has the same components as BA 865. Replaces BA900
	Lev. 01 MI		Rev. 1.05	Component 74F245 at location U50 replaced by component 74LS245 to solve the floppy disk write error problems
	Lev. 02 MI		Rev. 1.05	<ul style="list-style-type: none"> <li>- Component 16550A at location U47 (NMOS technology) replaced by component 16550C (CMOS technology)</li> <li>- The 10 mF Vcc - GND filter capacitors are replaced by the corresponding ones with T = -20/+80</li> </ul>
	Lev. SINF Suppressed		Rev. 1.05	<b>This board will no longer be produced.</b> The different memory expansions, differentiating the BA952 from the BA953, will be implemented at system level so that only the BA952 will continue to exist.
	Lev. 02 SI		Rev. 1.05	New BIOS to solve the problems with the 120 MB hard disk during system configuration
	Lev. 02 SI		Rev. 1.05	New Samsung KMM59100BN-7 SIMMs (3-chip, 1 MBx9, 80 ns SIMMs) in alternative to the Samsung KMM591000C-8 SIMMs (9-chip, 1 MBx9, 80 ns SIMMs) which are no longer available on the market. The board does not change level.

**BOARDS**

NAME	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU System board	BA865		P2.1 - 4 MB
CPU System board	BA900		P2.1 - 8 MB
CPU System board	BA952	553013 L	4 MB
CPU System board	BA953	553014 M	8 MB
220 V power supply	PS 14	412909 X	
110 V power supply	PS 14	497314 P	
Console board	IF638	497272 P	
Console board	IF469	977930 V	
Interface board	MI549	497272 V	
SCSI hard disk controller	GO582	553004 U	
SCSI hard disk controller	GO610	557933 P	Replaces GO582

INTEGRATED CONTROLLERS	INTEGRATED CONTROLLERS
<p><b>Memory Controller 82C322</b>                      Supports 256 K-1 M of DRAM                      Shadow RAM                      Supports up to 16 MB                      Wait state programming</p> <p><b>DMA controller 82C223</b>                      Performs DMA operations                      8 independent DMA channels                      Performs extended mode operations                      Memory addressing capacity of 16 MB                      Performs DMA serial operations                      Provides virtual DMA on channel 0 and channel 4</p> <p><b>8042</b> Keyboard and mouse controller  <b>82C452</b> Super V.G.A. video controller  <b>NS16550A</b> Serial port controller  <b>WD57C65</b> Floppy disk controller</p>	<p><b>Data Buffer Controller 82C325</b>                      Bus Conversion and Bus Swapping functions                      Parity generation and error checking in the DRAM                      Contains the MCA architecture POS registers</p> <p><b>82C226</b> Non-Volatile RAM                      Real Time Clock                      DMA Controller                      Interrupt Controller</p> <p><b>82C226</b> Two 8259 interrupt controllers                      8254 compatible timer                      Watchdog timer                      Real Time Clock compatible with the MC146818                      114 byte CMOS RAM                      Parallel port controller</p> <p><b>MCA Controller 82C231</b>                      MCA compatibility                      Memory timing                      32-bit - 16-bit bus converter</p>

**USER DISKETTE / SYSTEM TEST / DRIVERS**

LEVEL	COMPATIBILITY
User Disk lev. 1.01 User Disk lev. 1.03.1	User Disk used only for 100 systems. Solves the configuration conflict with the OLICOM board
User Disk lev. 1.04	Replaces the previous version in order to correct the calculation of extended memory when 16 MB are already installed on the system board and an XGA board is installed on the bus.
User Disk lev. 2.0	New User Disk to solve the configuration problems caused by the incorrect management of ADF files when Token Ring and SCSI boards are present.
EVC driver for ACAD10 and ACAD11 D.A.M. driver for OS/2 and PageMaker	
EVD driver ver. 7.1 rev. 2.0	Solves the problems relating to the ACAD mode and 72 real mode driver of the previous EVD versions.

**CONSOLE**

	LEVEL	D.R.S. CODE	COMPATIBILITY
IF638	Nasc. Lev. 01	497314 P	Changes to adequately comply with EMI standards.
IF469	Lev. 01 MI	977930 V	Console of the M380-40 Personal Computer

**PS14/PS14H POWER SUPPLY UNIT**

<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
PS14 ver. 220 V HANTAREX	Nasc.	Improved ventilation and electric noise immunity.  Mylar protection set between inductor L101 and the support for compliance with safety standards.  Mylar protection removed. Safety standards respected by using a new type of inductor.  Adapted to comply with the new standards for reinforced insulation and reliability improvements. Changes to component TL7705 (IC351).
	Lev. 01	
	Lev. 02	
	Lev. 03	
PS14 ver. 115 V HANTAREX	Nasc.	This version has evolved in exactly the same way as the 220 V version
	Lev. 01	
	Lev. 02	
	Lev. 03	
PS14 H ver. 220 V HANTAREX	Nasc.	New type of power supply unit.  A capacitor has been replaced to solve the problems with the IR-MA3 board.
	Lev. 01	
PS14 H ver. 115 V HANTAREX	Nasc.	New type of power supply unit. This version has evolved in exactly the same way as the 220 V version
	Lev. 01	
PS14 H ver. 220 V ALITEC	Nasc.	New supplier.  A capacitor has been replaced to solve the problems with the IR-MA3 board.
	Lev. 01	
PS14 H ver. 110 V ALITEC	Nasc.	New supplier. This version has evolved in exactly the same way as the 220 V version.
	Lev. 01	

**MCA INTELLIGENT HARD DISK INTERFACE MI 549**

<b>LEVEL</b>	<b>NOTES</b>
Lev. Nasc.	Specific for the P750 and M480-30

**COMPATIBILITY**

<b>BOARD/DEVICE</b>	<b>COMPATIBILITY</b>
SCSI hard disk signals cable	Cable has been modified for easier insertion of the SCSI terminator
Terminator	The GO610 no longer requires the installation of a terminator on the SCSI cable since it already has incorporated terminators.

**SCSI HARD DISK INTERFACE**

<b>BOARD</b>	<b>D.R.S. CODE</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
GO582	553004 U	Nasc.	SCSI hard disk controller
		Lev. 01	New board layout
GO610	557933 P	Nasc.	Replaces GO582 Following are the differences between the two boards: <ul style="list-style-type: none"> <li>- The termination resistances are incorporated on board GO610 so it does not need the installation of external terminators on the cable as board GO582 does.</li> <li>- A different printed circuit board is used.</li> <li>- New BIOS</li> </ul>

**GO582 BOARD CONFIGURATION**

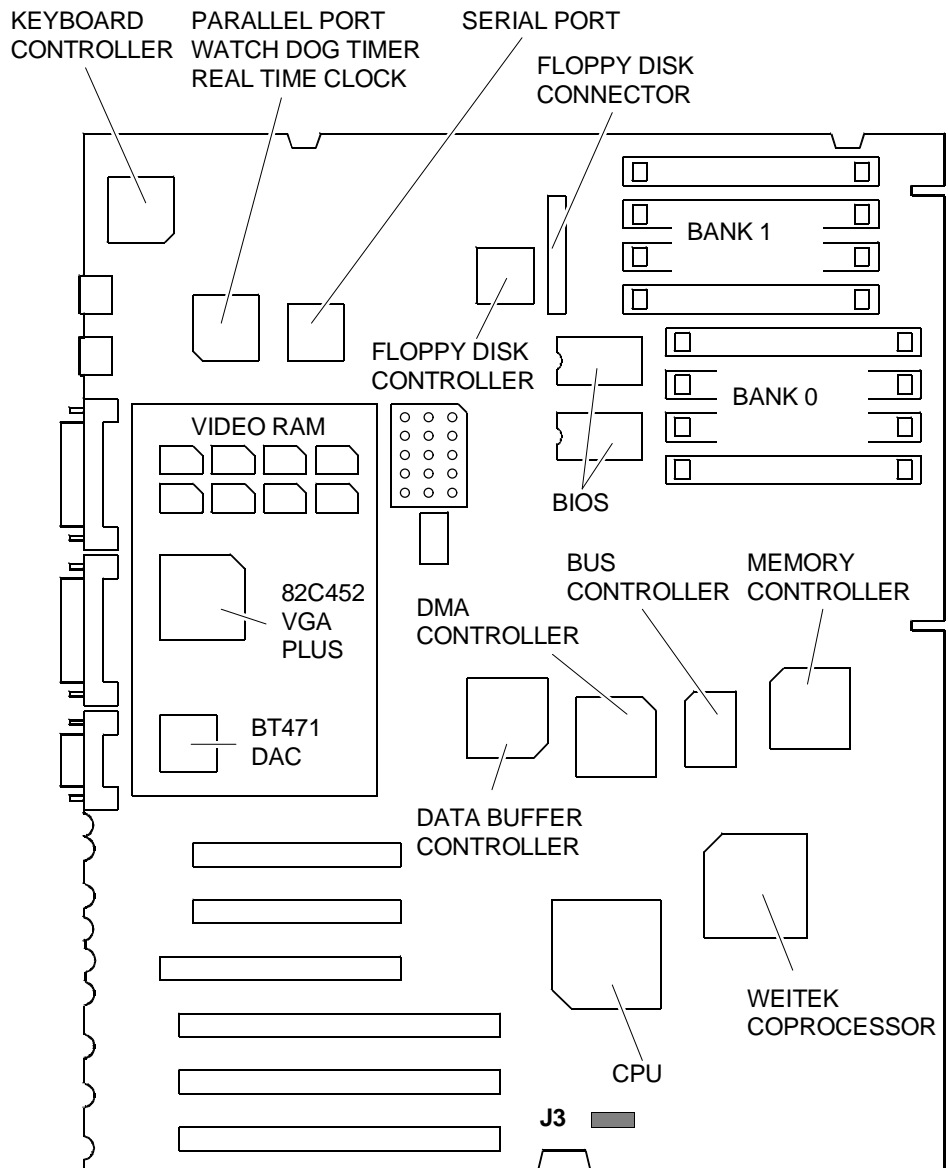
The GO582 board must be configured with identifier **7** and must have the terminator inserted. The terminator is on the cable.

The first hard disk of the system must be configured with identifier **6** and have the terminators inserted.

A second hard disk can be configured with any identifier from **0** to **5**.

<b>SCSI IDENTIFIER</b>	<b>USE</b>
0	Available for expansions
1	Available for expansion - Used by second HDU
2	Available for expansions
3	Available for expansions
4	Available for expansions
5	Available for expansions
6	First hard disk installed in system
7	Identifier of the GO582 controller

**MOTHERBOARD COMPONENTS AND JUMPERS**



BUE0A

**Jumper J3**

- OUT:** Normal position
- IN:** Disables the password  
Erases the system configuration restoring the default configuration



**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 IBM Operating System/2 Extended Edition, Ver. 1.1 and Ver. 1.10 Olivetti's Microsoft OS/2, Ver. 1.10	Requires a formatted DSDD diskette during installation on hard disk

**HARDWARE COMPATIBILITY**

<b>MODEM</b>	<b>I/O INTERFACE PRODUCTS</b>
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)
<b>EXPANSION MEMORIES</b>	<b>MOUSE</b>
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 25-052)
<b>DISPLAY UNITS</b>	<b>UNITS, NETWORKING &amp; LAN PRODUCTS</b>
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 network ver. 2.12 3COM Network (Ethernet) 10NET Network
<b>GRAPHIC PRODUCTS</b>	<b>OTHER PRODUCTS</b>
IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller	SOFTWARE SECURITY Parallel Port Block

**SYSTEM MEMORY MAP**

ADDRESS	SIZE	FUNCTION	CACHE
00000000 - 0007FFFF	512 KB	System DRAM	YES
00080000 - 0009FFFF	128 KB	I/O RAM	YES
000A0000 - 000BFFFF	128 KB	Video controller RAM	NO
000C0000 - 000DFFFF	128 KB	I/O ROM	NO
000E0000 - 000FFFFFF	128 KB	BIOS (SHADOW RAM)	YES
00100000 - 007FFFFFF		System RAM	YES
00800000 - 00FFFFFF		System RAM	YES
01000000 - BFFFFFF		System RAM	YES
C0000000 - C1FFFFFF		Weitek Coprocessor	NO
C2000000 - DFFFFFF		System RAM	YES
E0000000 - FFFDFFFF		System RAM	YES
FFFE0000 - FFFFFFF	128 KB	System ROM BIOS	NO

**DMA CHANNELS**

CHANNEL	FUNCTION	CHANNEL	FUNCTION	CHANNEL	FUNCTION
0	Reserved	3	Available	6	Available
1	Available	4	Reserved	7	Available
2	Floppy disk	5	Available		

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F	DMA controller (channels 0-3)	096 - 097	POS, Connector selection
020-021	First interrupt controller 8259A	0A0 - 0A1	Second 8259A interrupt controller
022	System Setup Indexing registers	0C0 - 0DF	DMA controller (4 - 7)
023	System Setup Data registers	0E0	Split address registers
040-047	System timer	0E1	Memory map register
060	Auxiliary device	0E2	Cache control register
061	System port B controller	0E3 - 0E7	Channel restore registers
064	Auxiliary device	0F0 - 0FF	Coprocessor
070-071	RT/CMOS and NMI mask	100 - 107	Programmable option selection
074-076	8 KB CMOS RAM extension	1F0 - 1F8	Hard disk adapter
	Configuration registers	278 - 27B	Parallel port 3
	68B50 Registers	2F8 - 2FF	Serial port 2 (RS-232-C)
081-087	DMA page registers 0 - 3	378 - 37B	Parallel port 2
089-08F	DMA page registers 4 - 7	3BC - 3BF	Parallel port 1
090	Central arbitration control port	3B4 - 3C5	Video subsystem
091	Selected board response	3CE - 3DA	Video subsystem
092	System port A controller	3C6 - 3C9	DAC video, Bt471
092	Reserved	3F0 - 3F7	Floppy disk controller
094	Board enable	3F8 - 3FF	Serial port 1 (RS-232-C)

**INTERRUPT LEVELS**

LEVEL	FUNCTION	LEVEL	FUNCTION
IRQ0	Output timer channel 0	IRQ8	Real Time Clock
IRQ1	Keyboard interface	IRQ9	Redirected via software to IRQ2
IRQ2	PIC2 interrupt	IRQ10	Available
IRQ3	Optional serial port	IRQ11	Available
IRQ4	Primary serial port	IRQ12	Mouse
IRQ5	Available	IRQ13	Coprocessor
IRQ6	Floppy disk controller	IRQ14	Hard disk controller
IRQ7	Parallel port	IRQ15	Available

**COMPATIBLE HARD DISKS**

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	N.C.	10 MB	306	4	128	305	17
2	Seagate ST225 half size	20 MB	615	4	256	700	17
3	WREN 2 full size	38 MB	925	5	128	924	17
4	CDC WREN 1	28 MB	697	5	128	696	17
5	ST4096	76 MB	1024	9	-1	1023	17
6	OPE XM5340	40 MB	820	6	256	819	17
7	NEC D5146H	40 MB	615	8	128	664	17
8	TM755 slim size	40 MB	981	5	-1	980	17
9	CDC WREN II slim size	40 MB	981	5	128	980	17
10	Micropolis 1324 full size	51 MB	1024	6	128	980	17
11	CDC WREN II full size	53 MB	925	7	128	924	17
12	Micropolis 1325 full size	68 MB	1024	8	-1	1023	17
13	CDC WREN II full size	69 MB	925	9	128	924	17
14	Micropolis 1323-A full size	42 MB	1024	5	-1	1023	17
15	RESERVED						
16	OPE XM5220 85 ms	20 MB	612	4	128	656	17
17	TANDON TM 362 85 ms	20 MB	612	4	-1	663	17
18	Seagate ST251 40 ms	40 MB	820	6	-1	819	17
19	Rodime RO3055 40 ms	43 MB	872	6	0	871	17
20	Miniscribe M8425 68 ms	20 MB	612	4	0	663	17
21	Seagate ST277TR	62 MB	820	6	-1	819	26
22	OPE XM5340/60	62 MB	820	6	128	819	26
23	NEC D5147H	62 MB	615	8	384	664	26
24	NEC D5652	136 MB	820	10	-1	822	34
25	Micropolis 1355 ESDI	135 MB	1021	8	-1	1023	34
26	Micropolis 1353 ESDI	67 MB	1021	4	-1	1023	34
27	NEC D5452	68 MB	823	10	512	822	17
28	Fujitsu M2227D	40 MB	615	8	512	614	17
29	Fujitsu M2227D RLL	60 MB	615	8	512	614	26
30	CDC 94205-77	62 MB	981	5	-1	980	26
31	Formatted, ESDI full size	304 MB	814	15	-1	1	-
32	Formatted, ESDI half size	81 MB	977	5	-1	1	-
33	N.A.	136 MB	820	10	-1	1	-
34	CDC 94196-766	600 MB	1623	15	-1	1	-
35 - 45	RESERVED						
46 - 47	SCSI drivers #1 and #2						

**Where:** CYL: No. of disk cylinders

T: No. of disk heads

WPC: Precompensation cylinder number

LZ: Head parking cylinder number

SET: No. of disk sectors.



# M400-10

## CHARACTERISTICS

Microprocessor	Intel 486SX with 32-bit addressing
Clock	25 MHz
Architecture	AT
Memory	From 4 MB to 52 MB <ul style="list-style-type: none"> <li>- One bank of 4 MB soldered (8 1M x 4 DRAM chips plus 4 1Mx1 parity DRAM chips)</li> <li>- Three banks, each with 4 sockets, in which the following SIMM modules can be installed: <ul style="list-style-type: none"> <li>- SIMM 1M x 9 <b>EXM 26-807</b></li> <li>- SIMM 4M x 9 <b>EXM 26-809</b></li> </ul> </li> </ul> Different capacity SIMMs can be installed in the three banks, but not inside the same bank. Banks can be left empty.
Memory access	80 ns
Coprocessor	1- Intel 487SX (25 MHz) for implementation of the floating point unit <ul style="list-style-type: none"> <li>- In BA901 the 487SX replaces the CPU</li> <li>- In BA301 the 487SX has only one socket</li> </ul> 2- Weitek WTL (4167, 25 MHz) BA901 only
Floppy disk	1.2 MB Panasonic JU475-3-4-5 1.2 MB Toshiba ND08DE 1.44 MB Panasonic J-257 A / Sony MP-F17 W 1.44 MB Mitsubishi MF355 / MITSUMI D359T3 1.44 MB YE DATA YD-702B / 702D 2.88 MB Sony MP-F40 W (BA301)
Hard disk	85 MB CONNER CP30084 120 MB CONNER CP30126 120 MB W.D. AC 2120 170 MB CONNER CP30174E 210 MB CONNER CP3206 3204F 210 MB QUANTUM LPS 240 AT 210 MB CONNER CP30204 (BA301)/CP30256 340 MB CONNER CP3304/CONNER CP3364 340 MB SEAGATE ST1401A 340 MB W.D. AC2340 510 MB CONNER CP3504 / CONNER CP3544
Streaming tape	80/120 MB IRWIN 285 - 287 - 3125 150 MB WANGTEK - 320 MB WANGTEK SCSI
Expansion slots	4 Present, 4 Available ( <b>IN284 Board</b> )
Video adapter	Integrated on motherboard - 82C452A
Hard disk and floppy disk controller	Integrated on motherboard. FDU controller: Intel 82077AA-1 HDU controller: Logic gates and MSI Buffer implementing an AT interface for intelligent HDUs.
Cache controller	Integrated in CPU with 8 KB
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key, compact ANK 27-101 ANK 27-102

### MOTHERBOARD

#### Printed Circuit

##### BA901:

BA296 4 MB

BA297 8 MB

BA309 4 MB

#### Printed Circuit

##### BA301:

BA313 4 MB

BA312 8 MB

### BIOS

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

BA296

BA297 Rel. 1.08

BA309

BA312

Rel. 2.08

BA313

### 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

**MOTHERBOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLERS/NOTES</b>
<b>BA296</b>	Nasc.	Use the code of BA 297	The ROM BIOS is a Flash EPROM. The BIOS code is supplied on diskettes and must be copied into Flash EPROM. Rev. 1.01  Rev. 1.04  Rev. 1.05  Rev. 1.06 Rev. 1.07 Rev. 1.08	For the integrated controllers, see the following table. Board with 4 MB soldered.
	Lev. 01 MI			Cuts and trimmings to solve the problem with the 340 MB CONNER hard disk.
				New BIOS. The characteristics of the different BIOS versions and the problems solved are explained further on in this chapter.
				New BIOS
				New BIOS New BIOS New BIOS
				<b>This board will no longer be produced.</b> The different memory expansion, which is the main difference between BA269 and BA297, will be implemented at system level.
<b>BA297</b>	Nasc.	553000C	Rev. 1.01  Rev. 1.04  Rev. 1.05  Rev. 1.06 Rev. 1.07 Rev. 1.08	This board the same as BA 296 but has 8 MB of memory. Four SIMMs have already been installed at the factory.
	Lev. 01 MI			Cuts and trimmings to solve the problem with the 340 MB CONNER hard disk.
				New BIOS
				New BIOS
				New BIOS New BIOS New BIOS
				<b>This board will no longer be produced.</b> Only BA 131 will continue to exist.
<b>BA309</b>	Nasc.		Rev. 1.01  Rev. 1.04  Rev. 1.05  Rev. 1.06 Rev. 1.07 Rev. 1.08	Board installed for Italy only.
	Lev. 01 MI			Cuts and trimmings to solve the problem with the 340 MB CONNER hard disk.
				New BIOS
				New BIOS
				New BIOS New BIOS New BIOS

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS/NOTES
BA312	Nasc.		Rev. 2.04	This board is the same as BA 313but has 8 MB of memory. Four SIMMs have already been installed at the factory. Replaces board BA 927.
			Rev. 2.05	New BIOS
			Rev. 2.06	New BIOS
			Rev. 2.08	New BIOS
BA313	Nasc.	553060 F	Rev. 2.04	4 MB soldered. Replaces BA 296.
			Rev. 2.05	<ul style="list-style-type: none"> <li>- New BIOS</li> <li>- 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.</li> <li>- The ROM version of keyboard controller Rev. 10.01 is also introduced to cut costs.</li> </ul>
	Lev. 01		Rev. 2.06	New BIOS to correct the problems with the CONNER 340 MB hard disk and with the power on password
			Rev. 2.06	The floppy disk controller INTEL component 82077-AA1 is replaced with the floppy disk controller INTEL component 82007SL-1.
			Rev. 2.08	New BIOS to correct the problems with IBM OS/2 version 2.0.
	Lev. 02		Rev. 2.08	<ul style="list-style-type: none"> <li>- Component 74F224 in position U37 is replaced by component 74F240 to solve the "snow" effect on high resolution monitors.</li> </ul>
			Lev. 03	Rev. 2.08

**MAJOR COMPONET**

MOTHERBOARD	PRINTED CIRCUIT	MAIN COMPONENTS
BA296	<p>BA901 This printed circuit does not allow the management of 2.88 MB floppy disk drives nor monitors with a 72 Hz vertical refresh rate (ergonomic monitors). Also, this printed circuit does not have the Performance Upgrade Processor socket so the i487SX coprocessor has to be installed in place of the system CPU.</p> <p>The systems on which this printed circuit is installed do not have the hard disk self-acknowledge feature but use the BUILT IN SETUP utility for the configuration of the hard disks.</p>	<ul style="list-style-type: none"> <li>- 25 MHz Intel <b>486SX</b> processor</li> <li>- Intel <b>487SX</b> numeric coprocessor (must be installed in place of the CPU)</li> <li>- Socket for the 25 MHz <b>Weitek WTL 4167</b> numeric coprocessor</li> <li>- <b>82C206:</b> Real time clock 128 byte non-volatile RAM Timer DMA controller Interrupt controller</li> <li>- <b>8742</b> OPT PLCC keyboard mouse controller</li> <li>- <b>82C452A</b> video controller</li> <li>- <b>WD16C551-D:</b> 16C550-compatible serial port AT/PS2-compatible parallel port</li> <li>- <b>82077 AA-1</b> floppy disk controller</li> <li>- Buffer for intelligent hard disks</li> <li>- BIOS Flash EPROM (1 Mbit)</li> <li>- Chip set consisting of 4 gate arrays:                         <ul style="list-style-type: none"> <li>- BCUE bus controller</li> <li>- MCUE memory controller</li> <li>- DPU data flow controller</li> <li>- IOU I/O controller</li> </ul> </li> <li>- System memory (from 4 to 52 MB)</li> <li>- EYE <b>GA4Q</b> component</li> <li>- 50 MHz oscillator</li> </ul>
BA297	BA901	This board is the same as BA 296 but has an 8 MB memory.
BA309	BA901	This board is only installed for Italy.
BA313	<p>BA301 This printed circuit allows the management of a 2.88 MB drive and a monitor with a 72 Hz vertical refresh rate.</p> <p>The systems on which this printed circuit is installed use the hard disk self-acknowledge feature and therefore do not have the BUILT IN SETUP utility</p>	<p>This board is the same as BA 296 with the exception of the following:</p> <ul style="list-style-type: none"> <li>- There is no socket for the Weitek coprocessor which therefore cannot be installed.</li> <li>- The Performance Upgrade Processor socket for the i487SX coprocessor is present so there is no need to install this coprocessor in place of the CPU.</li> <li>- Shielded keyboard and mouse connectors.</li> </ul>
BA312	BA301	This system board is the same as BA 313 but has an 8 MB memory.

**USER DISKETTE / SYSTEM TEST / DRIVERS**

<b>LEVEL</b>	<b>COMPATIBILITY / NOTES</b>
USER DISKETTE Rev. 1.00 USER DISKETTE Rev. 2.01	This user diskette has a new user interface and can also be used on the M400-40 and M400-60 Personal Computers
USER DISKETTE Rev. 2.02	Alignment with BIOS 2.05. Only for the system boards BA312 and BA313 with PCB BA301
USER DISKETTE Rev. 2.03	The problems with the keyboard, mouse and high resolution monitor are solved.
Enhanced video drivers ver. 5.00	
Enhanced video drivers ver. 7.1 rev. 2.0	Update of the previous version
USER DISKETTE for Streaming tape Rev. 1.02 Provided in the STU 26-082/A kit	This release allows installation of the streaming tape unit on the M400-10 with system board PCB BA301 for 2.88 MB floppy disk management
USER DISKETTE for Streaming Tape Rev. 1.03 ver. 1 provided in the STU 26-082/A kit	Version 1.02 of this User Diskette was in conflict with the second floppy drive. Problem solved with version 1.03
SYSTEM TEST Rev. 2.00	The System Test release is also used on the M400-40 Personal Computer and works properly only with BIOS Rel. 2.02.
SYSTEM TEST Rev. 2.00 Upd. 1	Allows execution of tests on the cache memory .
SYSTEM TEST Rev. 2.01	Some bugs of the previous release removed
SYSTEM TEST Rev. 2.02	This System Test release is used on the M400-10, M400-40 and M400-60 Personal Computers. This release works properly only with BIOS Rel. 2.04
SYSTEM TEST Rev. 2.03	This release supports tests on the i486DX2 CPU and works properly only with BIOS Rel. 2.05. Some problems concerning monitors with a 72 Hz vertical refresh rate have also been solved
USER DISKETTE for EOD400 rel. 1.03	Release 1.03 was 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**

DEVICE BOARD	COMPATIBILITY
Streaming tape with floppy disk interface	The software for streaming tape unit management may enter into conflict with the floppy disk controller when the latter is programmed for operation in "perpendicular - mode" (programming for 2.88 MB floppy disks). BIOS 1.07 solves this problem. In any case, it is possible to use this streaming tape by jumpering it in position ID 4 to avoid the programming conflict between the EZTAPE management program and the floppy disk controller.
Motherboard with PCB BA901 replaced by system board with PCB BA301	Replacement of motherboard PCB BA901 with PCB BA 301 may result in problems with the management of 340 MB hard disks. When changing board the hard disk should be reformatted (low level format). If this is not possible, because the hard disk contains data that cannot be lost, it is still possible to use it with the new system board by configuring it as a non- standard hard disk and giving the following parameters: HDU 340 MB Conner CP3304 Cyl. = 726      Land. zone = 726      Auxiliary = 112 Heads = 15      Sectors = 61 There are no such problems with the 210 MB hard disk
EYE1 component	EYE2 is introduced as the alternative of EYE1. The level of the boards does not change.
INTEL component PDL 85C220-7	Component PALCE 16V8-7 AMD (GKTC) is introduced as the alternative of the INTEL component PDL 85C220-7 (GLZX). The level of the boards does not change.

**EVOLUTION OF BIOS BA296, BA297 and BA309 (PCB BA901)**

LEVEL	EVOLUTION
Rev. 1.00	BIOS level not present in the field.
Rev. 1.01	Solves some problems of release 1.00 and adds the following new features: - Implements the GOFAST, GOSLOW and AUTOSLOW utilities - Changed password management - Implements video modes 32, 33, 3A and 3B
Rev. 1.04	This release solves the problems of the second serial port (serial board installed on the BUS)
Rev. 1.06	Addition of the 200 MB QUANTUM LPS 240 AT hard disk (entry 27) in the hard disk table
Rev. 1.07	Solves the operation problem of a streaming tape when the handling software enters into conflict with programming of the floppy disk controller in "perpendicular-mode" (2.88 MB floppy disks)
Rev. 1.08	This release corrects: - the incorrect operation of IBM OS/2 ver. 2.0 within a DOS window - warm boot problems when using an Ethernet board - the extended wait state of the hard disk's data request signal in order to guarantee compatibility with the new Conner hard disks.

**EVOLUTION OF BIOS BA312 and BA313 (PCB BA301)**

<b>LEVEL</b>	<b>EVOLUTION</b>
Rev. 2.00	This release introduces the following features: <ul style="list-style-type: none"> <li>- Automatic HDU acknowledgement selecting the "standard" function which will be included in the user diskette release 2.02.</li> <li>- Management of the new VESA 72.8 Hz monitors.</li> <li>- Management of 2.88 MB drives</li> </ul>
Rev. 2.01	This release has the following variations with respect to the previous one: <ul style="list-style-type: none"> <li>- Change at Security level so that the Power-On password is copied on the Keyboard password, only when there is a Power-On and not when there is a Soft-reset (Ctrl-Alt-Del) or a Jump to F000:FFF0.</li> <li>- Banner change for introduction of the new type P24 50/66 MHz CPU</li> <li>- The "ROM checksum error" error on rebooting after the SETUP has been removed.</li> <li>- Various faults concerning new HDU management have been corrected.</li> <li>- New corrections made to 2.88 MB floppy drive management.</li> <li>- A new video table has been introduced for the 11h,12h,79h 72Hz modes due to VESA.N.B. timing problems.</li> </ul> <p>This release does not yet implement the the facility by which the user has the possibility of setting non-standard hard disks and presents faults on HDUs when working in Shadow disabled mode (condition not much used).</p>
Rev. 2.02	Corrected the faults with the OLICOM "V24 LPU 2100/2400/3500/3600" board.
Rev. 2.03	Corrected problem of the "Memory refresh error" appearing randomly after a Ctrl-Alt-Del reset.
Rev. 2.04	<ul style="list-style-type: none"> <li>- Corrected the "Keyboard Error" problem appearing randomly during the POD after a Ctrl-Alt-Del.</li> <li>- Corrected problem of failure to Bootstrap from floppy disk when disconnecting an HDU previously installed on other systems.</li> <li>- Some corrections made in management of 2.88 MB floppy disks.</li> <li>- Some system faults with Shadow memory disabled have been corrected.</li> <li>- Problems concerning management of non-standard Hard Disks with high capacity (600 MB) have been solved.</li> </ul>
Rev. 2.05	This release has the following variations with respect to the previous release: <ul style="list-style-type: none"> <li>- Corrected message concerning CPU type 486DX2.</li> <li>- Corrected message concerning Dedicated memory when disabling the memory between 512K and 640K and performing a controlled reset.</li> <li>- Corrected malfunctioning of the interrupt controller and refresh tests caused by the increase in clock frequency of the computer (486DX2 for M400-60).</li> <li>- Correction to eliminate malfunctioning of the floppy disk running Windows 3.0 in standard mode.</li> </ul> <p>Windows release 3.1 does not have this problem.</p> <ul style="list-style-type: none"> <li>- Change made for management of the 6K between C680 and C7FF as ROM option.</li> </ul> <p>This BIOS revision is also extended to the M400-60 personal computer so subsequent issues of the BIOS will be attributed to all systems of the M400-10, M400- 40 and M400-60 family.</p>
Rev. 2.06	This release corrects the following: <ul style="list-style-type: none"> <li>- Bootstrapping delays with CP3304 HDUs and other MASTER HDUs</li> <li>- Spurious characters when a password is typed using slow keyboards</li> <li>- Cache for compatibility with COMPUTONE AT 8/16 boards</li> <li>- Cancelled the hidden partitions message displayed after the POD</li> </ul>
Rev. 2.08	This release corrects the malfunctioning of IBM OS/2 ver 2.0 in a DOS window

**HARD DISK SELF-ACKNOWLEDGEMENT FEATURE**

M400-10 systems with motherboard BA312 or BA313 have the hard disk self-acknowledgement feature. This feature is not included on BA926 and BA927, which still have the BUILT IN SETUP utility. Using the SETUP utility of the System Test or Customer Test, the type of hard disk installed in the system can be defined. Having selected the SETUP utility, select the option hard disk #1 and #2. The following values can be defined in this field:

- Not Present:** If 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 including the self-acknowledge device and have 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 with the self-acknowledge device and which are 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 compatible with the system but which do not have the self-acknowledge device, or hard disks which do have this feature but which have previously been used on other systems. If this option is chosen, a list of hard disks with preset parameters will be displayed. Check that the parameters defined match with those on the label of the hard disk being installed. The types of hard disk are as follows:

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	CDC WREN I, Full, 35 ms
03	30 MB	697	5	17	128	696	WREN I, 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	104 MB	776	8	33	-1	775	CONNER CP3106 *
12	104 MB	776	8	33	-1	775	QUANTUM LPS 105 AT *
13	121 MB	762	8	39	-1	762	W.D. AC2120 *
14	340 MB	726	15	61	-1	726	CONNER CP3304 *

\* These hard disks have the self-acknowledgement feature. The values of the table must be used only if bringing on to these systems a disk formatted on a "previous system", keeping the data recorded. If the hard disk is new, the self-acknowledgement feature can be used.

Later BIOS versions implement a new hard disks table that does not have hard disks with the self-acknowledgement feature and that may have been used previously on other systems.

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	CDC WREN I, Full, 35 ms
03	30 MB	697	5	17	128	696	WREN I, 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 any self-acknowledgement feature and that is not included in the list of compatible hard disks. The following table lists the parameters of the hard disks that are supported by the system BIOS.

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	NEC-D5146H half size	40 MB	615	8	128	664	17
2	Miniscribe M8425 68 ms 3,5"	20 MB	612	4	128	663	17
3	Seagate ST277R	62 MB	820	6	-1	819	26
4	NEC D5147H	62 MB	615	8	384	664	26
5	NEC D5652 ES	136 MB	820	10	-1	822	34
6	MICROPOLIS 1355 ESDI	135 MB	1021	8	-1	1023	34
7	MICROPOLIS 1353 ESDI	67 MB	1021	4	-1	1023	34
8	NEC D5452	68 MB	823	10	512	822	17
9	Fujitsu M2227D	40 MB	615	8	512	614	17
10	Fujitsu M2227D RLL	60 MB	615	8	512	614	26
11	ESDI	304 MB	814	15	-1	1	51
12	ESDI	81 MB	977	5	-1	1	34
13		136 MB	820	10	-1	1	34
14	CONNER CP3206	200 MB	683	16	-1	682	38
15	RESERVED						
16	CONNER CP3142	40 MB	635	4	-1	639	33
17	CONNER CP346	40 MB	805	4	-1	804	26
18	CONNER CP3106	100 MB	776	8	-1	775	33
19	Quantum LPS105 AT	100 MB	776	8	-1	775	33
20	Quantum PD210 AT	200 MB	873	13	-1	872	36
21	CONNER CP30064	60 MB	762	4	-1	761	39
22	CONNER CP30126	120 MB	762	8	-1	761	39
23	W.D. AC-140	40 MB	980	5	-1	980	17
24	W.D. AC-2120	120 MB	762	8	-1	762	39
25	CONNER CP3304	340 MB	726	15	-1	726	61
25	Seagate ST-1401A	340 MB	726	15	-1	726	61
26	CONNER CP3504	510 MB	989	16	-1	989	63
27	Quantum LPS 240 AT	205 MB	635	13	-1	634	51

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**Where:** CYL: No. of disk cylinders  
WPC: Precompensation cylinder number  
SET: No. of disk sectors

T: No. of disk heads  
LZ: Head parking cylinder number

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

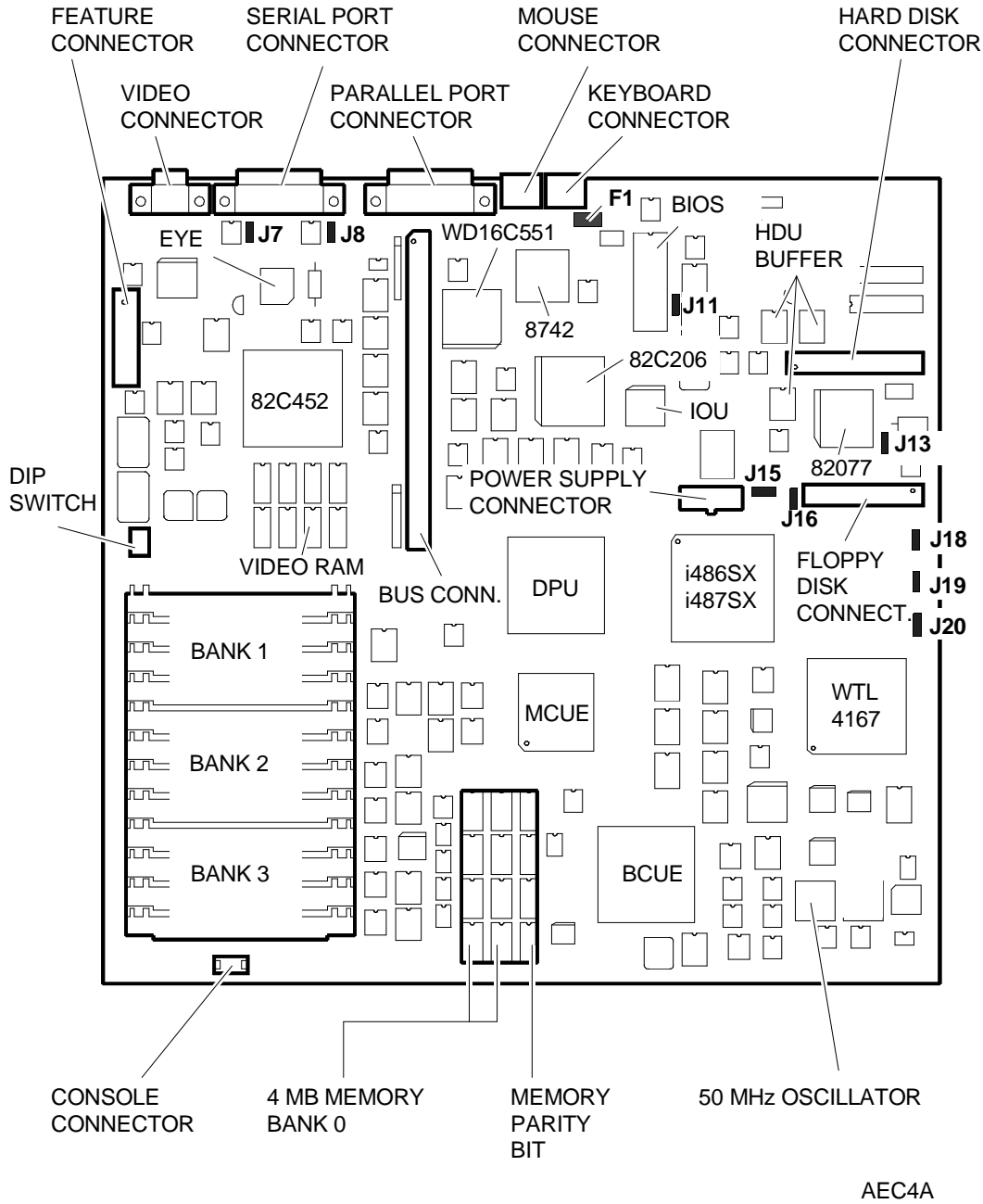
**SOFTWARE COMPATIBILITY**

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 required during installation on hard disk.
<b>WINDOWS</b>	
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**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
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
<b>MULTIPOINT</b>	<b>MOUSE</b>
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)
<b>GRAPHIC PRODUCTS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
AST RESEARCH AST - VGA PLUS FASTWRITE 1024I FASTWRITE VGA HERCULES GRAPHICS CARD IBM EGA ADAPTER IBM VGA ADAPTER HERCULES GRAPHICS STATION CARD Olivetti AGC Olivetti 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
<b>DISPLAY UNITS</b>	<b>OTHER PRODUCTS</b>
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 POSTSCRIPT CONTROLLER OMTI 8627 ESDI ADAPTER OMTI 8627 RLL ADAPTER SCANMAN PLUS WD1007A ADAPTER WD1007V ADAPTER WD1007V-SE2 ADAPTER

**COMPONENTS AND JUMPERS ON BA296 BA297 BA309 (PCB BA901) MOTHERBOARD**



**FUSE F1**  
2 A 5 V keyboard and mouse fuse.

**JUMPERS AND FUSE ON BA926 BA927 BA309 (PCB BA901) MOTHERBOARD****JUMPERS J18, J19 AND J20 FOR PROCESSOR SELECTION**

<b>JUMPER</b>	<b>POSITION</b>	<b>FUNCTION</b>
J18 3-way jumper	1-2 2-3 OUT *	Processor i486DX is installed in the system Processor i487SX (floating point unit) is installed in the system Processor i486SX is installed in the system
J19	IN OUT *	Processor i486DX or i487SX installed in the system Processor i486SX installed in the system
J20 3-way jumper	1-2 2-3 *	Processor i486DX or i487SX installed in the system Processor i486SX installed in the system

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

<b>JUMPER</b>	<b>POSITION</b>	<b>FUNCTION</b>
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	Signals in input (RS232 threshold voltage) FAIL-SAFE disabled Signals in input (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	Only one hard disk installed Two hard disks installed
F1		Keyboard protection fuse

**DIP-SWITCHES**

<b>SWITCH</b>	<b>POSITION</b>	<b>FUNCTION</b>
1	ON * OFF	Serial port enabled Serial port disabled
2	ON * OFF	BUILT IN SETUP enabled BUILT IN SETUP disabled
3	ON * OFF	Normal operation Disables floppy disk write operations
4	ON OFF	NOT USED

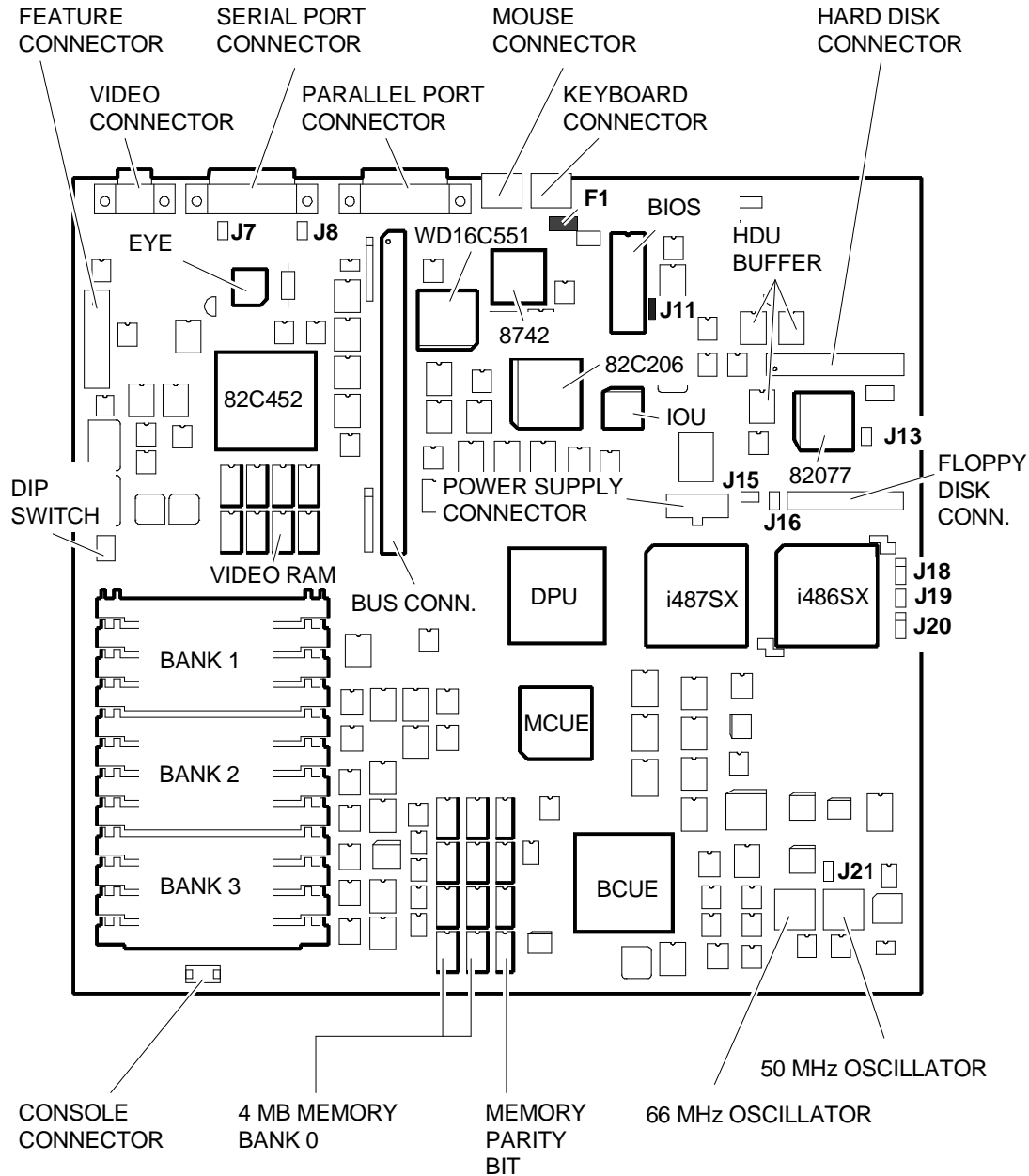
IN: Jumper installed

OUT: Jumper not installed

The asterisk indicates the default setting.



**COMPONENTS AND JUMPERS BA312 BA313 (PCB BA301) MOTHERBOARD**



AJA2A

**FUSE F1**

2 A 5 V keyboard and mouse fuse.

**JUMPERS AND FUSE ON BA312 BA313 (PCB BA301) MOTHERBOARD****JUMPERS J18, J19 AND J20 FOR PROCESSOR SELECTION**

<b>JUMPER</b>	<b>POSITION</b>	<b>FUNCTION</b>
J18 3-way jumper	1-2 2-3 OUT *	Processor i486DX installed in system Processor i487SX (floating point unit) installed in system Processor i486SX installed in system
J19	IN OUT *	Processor i486DX or i487SX installed in system Processor i486SX installed in system
J20 3-way jumper	1-2 * 2-3	Processor i486DX 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**

<b>JUMPER</b>	<b>POSITION</b>	<b>FUNCTION</b>
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 RING Indicator signal (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 CMOS RAM
J16	IN * OUT	Only one hard disk installed Two hard disks installed
F1		Keyboard protection fuse

**DIP-SWITCHES**

<b>SWITCH</b>	<b>POSITION</b>	<b>FUNCTION</b>
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**

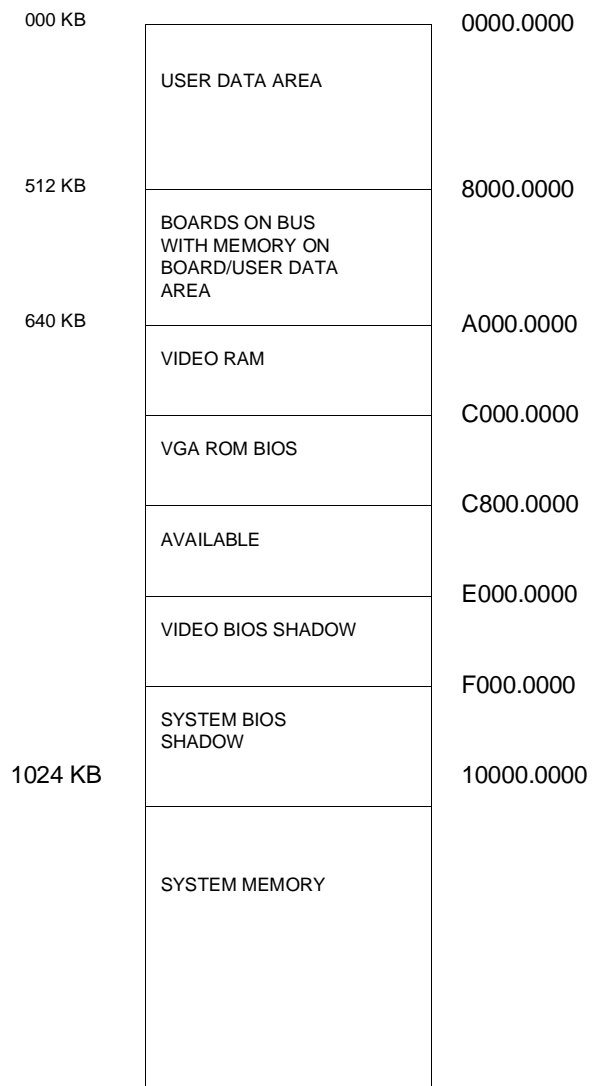
<b>ADDRESS</b>	<b>FUNCTION</b>	<b>ADDRESS</b>	<b>FUNCTION</b>
000-01F h	DMA controller (all channels)	2F8-2FF h	Serial Port COM2 (alternate)
020-021F h	Interrupt Controller 1	378-37B h	Parallel Port 1
040-043 h	Timer	3B4-3B5 h	Video controller
60 h	Keyboard Data controller	3BA h	Video controller
61 h	System control port B	3C0-3CF h	Video controller
64 h	Keyboard Commands controller	3D4-3D5 h	Video controller
70-71 h	Real time clock, NMI Mask, CMOS RAM	3DA h	Video controller
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**

<b>LEVEL</b>	<b>NAME</b>	<b>CONTROLLER</b>	<b>FUNCTION</b>
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 depending on the configuration given the system through the User Diskette or System Test. Consequently only an example of the configuration of the first MegaByte of memory is given below.



## M400-40

### CHARACTERISTICS

Microprocessor	Intel 486DX with 32-bit addressing
Clock	33 MHz
Architecture	AT
Memory	From 4 MB to 52 MB <ul style="list-style-type: none"> <li>- One bank of 4 MB soldered on the system board (8 1M x 4 DRAM chips plus 4 1Mx1 parity DRAM chips)</li> <li>- Three banks, of 4 sockets each, in which the following SIMM modules are installed: <ul style="list-style-type: none"> <li>- SIMM 1M x 9 <b>EXM 26-807</b></li> <li>- SIMM 4M x 9 <b>EXM 26-809</b></li> </ul> </li> </ul> SIMMs 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 processor i486DX
Floppy disk	1.2 MB Panasonic JU475-3-4-5 1.2 MB Toshiba ND08DE 1.44 MB Panasonic J-257 A 1.44 MB Sony MP-F17 W 1.44 MB Mitsubishi MF355 / MITSUMI D359T3 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 / W.D. AC2340 510 MB CONNER CP3504 510 MB CONNER 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
Video adapter	Integrated on system board - 82C452A.
Integrated hard disk and floppy disk controller	FDU controller: Intel 82077AA-1 HDU controller: Logic gates and MSI Buffer implementing an AT interface for IDE HDUs
Cache controller	Integrated in the CPU with 8 KB
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key, compact ANK 27-101 ANK 27-102

### SYSTEM BOARD

Printed Circuit

BA301:

BA314            8 MB

BA315            4 MB

### BIOS

The ROM BIOS is a FALSE 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  
ASTECC

PS11/AR - 220 V  
ASTECC

### SCSI PERIPHERALS CONTROLLER

ASC - 1

## SYSTEM BOARD

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
BA315	Lev. Nasc.	553029U	Rev. 2.04	Board with 4 MB soldered.
			Rev. 2.05	New BIOS
	Lev. 01		Rev. 2.05	Cuts and trimmings, in addition to the replacement of the DPGSEL (GL9A) PAL with the DPGSEL12 (GKCL) PAL, to solve the problems with the video controller during the reading of VIDEO RAM. The ROM version of keyboard controller rev. 10.01 is also introduced to cut costs.
	Lev. 02		Rev. 2.05	The floppy disk controller INTEL component 82077-AA1 is replaced by the INTEL component 82077SL-1.
			Rev. 2.06	New BIOS
	Lev. 03		Rev. 2.06	Component 74F224 at location U37 is replaced with component 74F240 to solve the "snow" effect on high resolution monitors.
			Rev. 2.08	New BIOS
BA314	Lev. Nasc.	553034R	Rev. 2.04	This board is identical to BA315 but has 8 MB of memory. 4 SIMM modules have already been installed at the factory.
			Rev. 2.05	New BIOS. The characteristics and problems solved by the different BIOS versions are explained further on in this chapter.
			Rev. 2.06	New BIOS.  <b>This board will no longer be produced.</b> The different memory expansion, constituting the difference between BA315 and BA314, will be implemented at system level. Consequently only BA315 will continue to exist
			Rev. 2.08	New BIOS.

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**MAIN COMPONENTS OF THE SYSTEM BOARD**

<b>SYSTEM BOARD</b>	<b>PRINTED CIRCUIT</b>	<b>MAIN COMPONENTS</b>
BA315	BA301	<ul style="list-style-type: none"> <li>- 33 MHz Intel <b>486DX</b> processor</li> <li>- Numeric coprocessor integrated in the i486DX</li> <li>- Performance upgrade processor socket</li> <li>- <b>82C206:</b> Real time clock 128 Byte Non-Volatile RAM Timer DMA controller Interrupt controller</li> <li>- Keyboard/mouse controller <b>8742</b> OPT PLCC</li> <li>- Video controller <b>82C452A</b></li> <li>- <b>WD16C551-D:</b> 16C550-compatible serial port AT/PS2-compatible parallel port</li> </ul> <p>Floppy disk controller <b>82077 AA1</b></p> <ul style="list-style-type: none"> <li>- Buffer for intelligent hard disks</li> <li>- Flash Eprom for the BIOS (1 Mbit)</li> <li>- Chip set consisting of 4 gate arrays: <ul style="list-style-type: none"> <li>- BCUE BUS controller</li> <li>- MCUE memory controller</li> <li>- DPU data flow controller</li> <li>- IOU Input/Output controller</li> </ul> </li> <li>- System memory (between 4 and 52 MB)</li> <li>- EYE component <b>GA4Q</b></li> <li>- 66 MHz oscillator</li> </ul>
BA314	BA301	This system board is identical to BA315 but has 8 MB memory

**USER DISKETTE / SYSTEM TEST / DRIVERS**

<b>LEVEL</b>	<b>COMPATIBILITY / NOTES</b>
USER DISKETTE Rev. 1.00 USER DISKETTE Rev. 2.01	This user diskette has a new user interface and can also be used on the M400-40 and M400-60 Personal Computers
USER DISKETTE Rev. 2.02	Alignment with BIOS 2.05
USER DISKETTE Rev. 2.03 Enhanced video drivers Rev. 5.00	Problems with the keyboard, mouse and high resolution monitor have been solved.
Enhanced video drivers Ver. 7.1 Rev. 2.0	Update of the previous version
USER DISKETTE for Streaming Tape Rev. 1.03 Ver. 1 provided in the STU 26-082/A kit	With this release it is possible to install a Streaming Tape drive when a 2.88 MB floppy disk drive is already installed in the system
USER DISKETTE for Streaming Tape 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 disk drive. This problem has been solved with version 1.03
SYSTEM TEST Rev. 1.00	With this System Test release, a new user interface has been implemented.
SYSTEM TEST Rev. 2.00	This System Test release is also used on Personal Computer M400-10 with PCB 301. This release works properly only with BIOS Rel. 2.02.
SYSTEM TEST Rev. 2.00 Upd. 1	Allows execution of the cache memory tests.
SYSTEM TEST Rev. 2.01	Some bugs of the previous release have been eliminated
SYSTEM TEST Rev. 2.02	This System Test release is used on the M400-10, M400-40 and M400-60 Personal Computers. This release works properly only with BIOS Rel. 2.04
SYSTEM TEST Rev. 2.03	This release supports the i486DX2 CPU tests and works properly only with BIOS Rel. 2.05. Some problems linked to monitors with the 72 Hz vertical refresh frequency have been solved.
USER DISKETTE for EOD Rel. 1.03	Release 1.03 has been replaced by 1.05 that implements the ASPI4DOS.SYS driver that supports multitasking Windows 3.xx V86 and the ASPIDISK.SYSY driver that supports the DOS 3.31 extended partition.



**COMPATIBILITY**

<b>BOARD / DEVICE</b>	<b>COMPATIBILITY</b>
User Disk 2.01 System Test 2.02	Solves problems concerning management of non- standard and high capacity HDUs (600 MB). It must be used with BIOS 2.04.
EYE1 component	EYE2 is introduced as the alternative of EYE1. The level of the boards does not change.
INTEL component PDL 85C220-7	AMD Component PALCE 16V8-7 (GKCT) is introduced as the alternative of the INTEL component PDL 85C220-7 (GLZX). The level of the boards does not change.

**POWER SUPPLY UNIT**

<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
PS11/A ASTEC 220 V	Lev. 02	This power supply has already been used on other Personal Computer (see earlier chapters). The level shown is that used on this system.
	Lev. 03	Change to solve the problem of system failing to switch 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 were made to the circuitry in order to solve problems with EMI radio interferences and random voltage drops.
	Lev. 05	New inductor and printed circuit. <b>NOTE:</b> Given the new printed circuit, the power supplies of previous levels cannot be upgraded to this 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**

<b>LEVEL</b>	<b>EVOLUTION</b>
Rev. 2.00	<p>This release introduces the following features:</p> <ul style="list-style-type: none"> <li>- Automatic HDU acknowledgement selecting the "standard" function which will be included in the user diskette release 2.02.</li> <li>- Management of the new VESA 72.8 Hz monitors.</li> <li>- Management of 2.88 MB drives</li> </ul>
Rev. 2.01	<p>This release has the following variations with respect to the previous:</p> <ul style="list-style-type: none"> <li>- Change at Security level so that the Power-On password is copied on the Keyboard password, only when there is a Power-On and not when there is a Soft-reset (Ctrl-Alt-Del) or a Jump to F000:FFF0.</li> <li>- Banner change for introduction of the new P24 50/66 MHz CPUs</li> <li>- The "ROM checksum error" error on rebooting after the setup has been removed.</li> <li>- Various malfunctionings concerning new HDU management have been corrected.</li> <li>- New corrections made to 2.88 MB floppy drive management.</li> <li>- A new video table has been introduced for the 11h,12h,79h 72Hz modes due to VESA.N.B. timing problems.</li> </ul> <p>This release does not yet implement the facility by which the user has the possibility of setting non-standard hard disks and presents HDU faults when working with a disabled shadow (condition not much used).</p>
Rev. 2.02	Corrected the fault with the OLICOM "V24 LPU 2100/2400/3500/3600" board.
Rev. 2.03	Corrected the "Memory Refresh Error" appearing randomly after a Ctrl-Alt-Del reset.
Rev. 2.04	<ul style="list-style-type: none"> <li>- Corrected the "Keyboard Error" appearing randomly during the POD after a Ctrl-Alt-Del.</li> <li>- Corrected problem of failure to Bootstrap from floppy disk when a HD previously installed on other systems is disconnected.</li> <li>- Some corrections made in management of 2.88 MB floppy disks.</li> <li>- Some malfunctionings of the computer with the Shadow memory disabled have been corrected.</li> <li>- Problems concerning management of non-standard Hard Disks with high capacity (600 MB) have been solved.</li> </ul>
Rev. 2.05	<p>This release has the following variations with respect to the previous release:</p> <ul style="list-style-type: none"> <li>- Corrected message concerning CPU type 486DX2.</li> <li>- Corrected message concerning Dedicated memory when disabling the memory between 512K and 640K and performing a controlled reset.</li> <li>- Corrected malfunctioning of the interrupt controller and refresh tests caused by the increase in clock frequency of the computer (486DX2 for M400-60).</li> <li>- Correction to eliminate malfunctioning of the floppy disk running Windows 3.0 in standard mode.</li> <li>- Windows release 3.1 does not have this problem.</li> <li>- Change made for management of the 6K between C680 and C7FF as ROM option.</li> </ul> <p>This BIOS revision is also extended to the M400-60 personal computer so subsequent BIOS issues will be attributed to all systems of the M400-10, M400-40 and M400-60 family.</p>
Rev. 2.06	<p>This release corrects the following:</p> <ul style="list-style-type: none"> <li>- Bootstrapping delays with CP3304 HDUs or other MASTER HDUs</li> <li>- Spurious characters when the password is entered on slow keyboards</li> <li>- Cache for compatibility with COMPUTONE AT 8/16 boards</li> <li>- Cancelled the message at the end of the POD indicating hidden partitions</li> </ul>
Rev. 2.08	Corrected the problem with IBM OS/2 ver. 2.0 in a DOS window.

## HARD DISK SELF-ACKNOWLEDGE FEATURE

This system have the hard disk self-acknowledge feature.

Using the SETUP utility of the System Test or Customer Test, the type of hard disk installed in the system can be defined. Having selected the SETUP utility, select the option hard disk #1 and #2. The following values can be defined in this field:

- Not Present:** If 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 including the self-acknowledge device and have 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 with the self-acknowledge device and which are 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 compatible with the system but which do not have the self-acknowledge device, or hard disks which do have this feature but which have previously been used on other systems. If this option is chosen, a list of hard disks with preset parameters will be displayed. Check that the parameters defined match with those on the label of the hard disk being installed. The following table lists these hard disks:

TYPE	CAPACITY	CYLINDERS	HEADS	SECTORS PER TRACK	WPC	LZ	MODEL
01	10 MB	306	4	17	128	305	STANDARD 10 MB, 85 ms
02	40 MB	925	5	17	128	924	WREN II, Full, 35 ms
03	30 MB	697	5	17	128	696	CDC 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	104 MB	776	8	33	-1	775	CONNER CP3106 *
12	104 MB	776	8	33	-1	775	QUANTUM LPS 105 AT *
13	121 MB	762	8	39	-1	762	W.D. AC2120 *
14	340 MB	726	15	61	-1	726	CONNER CP3304 *

\* These hard disks have the self-acknowledge feature. The values of the table must only be used if a disk formatted on a "previous system" is installed on this system and the data recorded is maintained. If the hard disk is new, the self-acknowledge feature can be used.

Later BIOS versions implement a new hard disks table that does not have hard disks with the self-acknowledge feature and that may have been used previously on other systems.

TYPE	CAPACITY	CYLINDERS	HEADS	SECTORS PER TRACK	WPC	LZ	MODEL
01	10 MB	306	4	17	128	305	STANDARD 10 MB, 85 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 any self-acknowledge feature and that is not included in the list of compatible hard disks. The following table lists the parameters of the hard disks supported by the system BIOS.

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
1	NEC-D5146H half size	40 MB	615	8	128	664	17
2	Miniscribe M8425 68 ms 3,5"	20 MB	612	4	128	663	17
3	Seagate ST277R	62 MB	820	6	-1	819	26
4	NEC D5147H	62 MB	615	8	384	664	26
5	NEC D5652 ES	136 MB	820	10	-1	822	34
6	MICROPOLIS 1355 ESDI	135 MB	1021	8	-1	1023	34
7	MICROPOLIS 1353 ESDI	67 MB	1021	4	-1	1023	34
8	NEC D5452	68 MB	823	10	512	822	17
9	Fujitsu M2227D	40 MB	615	8	512	614	17
10	Fujitsu M2227D RLL	62 MB	615	8	512	614	26
11	ESDI	304 MB	814	15	-1	1	51
11*	CONNER CP3106	100 MB	776	8	-1	775	33
12	ESDI	81 MB	977	5	-1	1	34
12*	Quantum LPS 105 AT	100 MB	776	8	-1	775	33
13		136 MB	820	10	-1	1	34
13*	W.D. AC 2120	116 MB	762	8	-1	762	39
14	CONNER CP3206	202 MB	683	16	-1	682	38
14 *	CONNER CP3304	324 MB	726	15	-1	726	61
15	RESERVED						

**Where:** CYL: No. of disk cylinders  
 LZ: Head parking cylinder number  
 WPC: Precompensation cylinder number  
 SET: No. of disk sectors  
 T: No. of disk heads

\* These hard disks have the self-acknowledge feature. The values in the table must only be used if a hard disk formatted on a previous system is going to be installed on this system while maintaining the data stored.

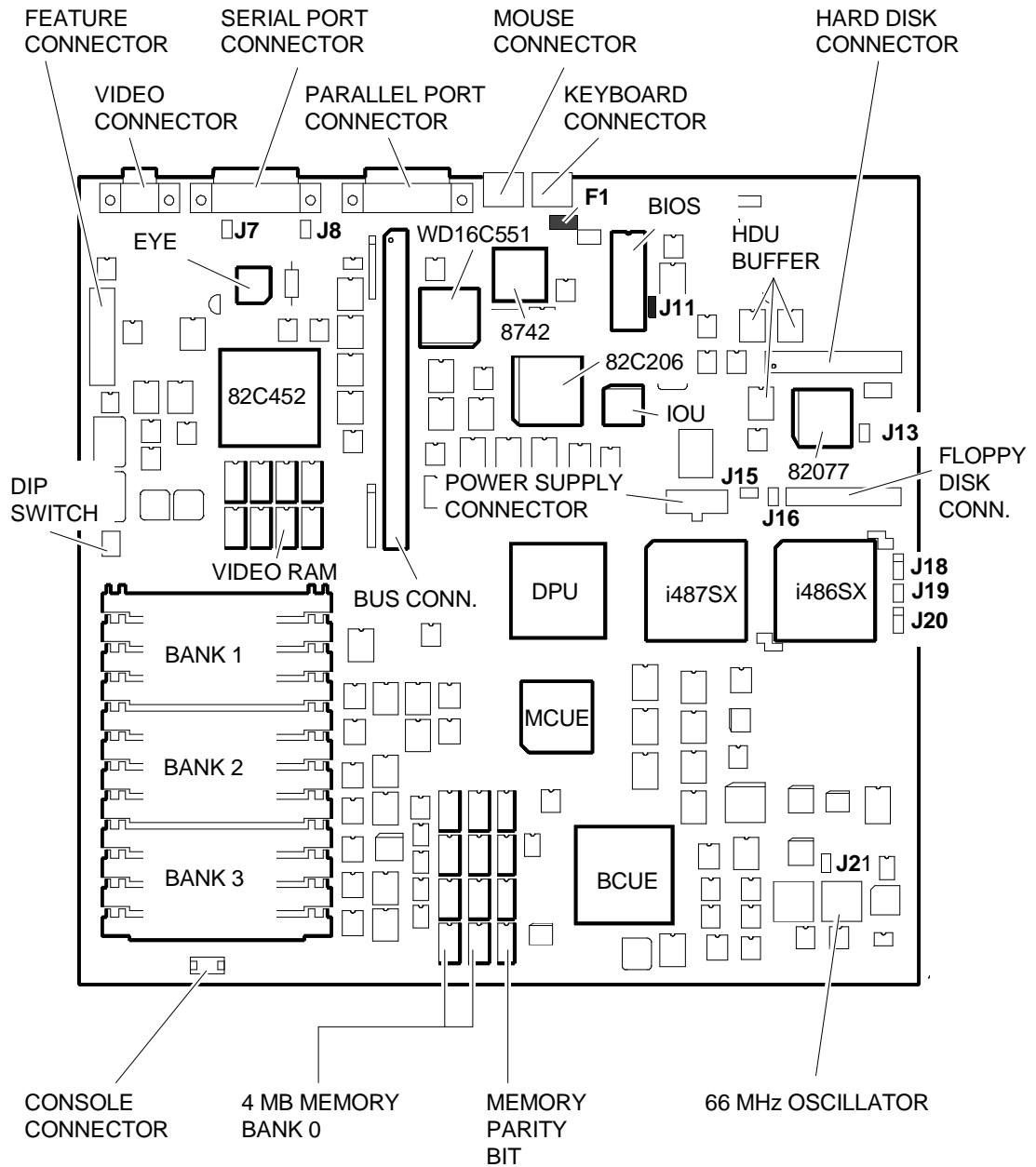
**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
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 Versione 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 installation.
<b>WINDOWS</b>	
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**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
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
<b>MULTIPOINT</b>	<b>MOUSE</b>
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)
<b>GRAPHIC PRODUCTS</b>	<b>NETWORK &amp; LAN PRODUCTS</b>
AST RESEARCH AST - VGA PLUS FASTWRITE 1024I FASTWRITE VGA HERCULES GRAPHICS CARD IBM EGA ADAPTER IBM VGA ADAPTER HERCULES GRAPHICS STATION CARD Olivetti AGC Olivetti 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
<b>DISPLAY UNITS</b>	<b>OTHER PRODUCTS</b>
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 POSTSCRIPT CONTROLLER OMTI 8627 ESDI ADAPTER OMTI 8627 RLL ADAPTER SCANMAN PLUS WD1007A ADAPTER WD1007V ADAPTER WD1007V-SE2 ADAPTER

**COMPONENTS, JUMPERS ON SYSTEM BOARD BA315 BA314 (PCB BA301)**



AJA2A

**FUSE F1**

2 A 5 V keyboard and mouse fuse.

**JUMPERS AND FUSE ON SYSTEM BOARD BA315 BA314 (PCB BA301)****JUMPERS J18, J19 AND J20 FOR PROCESSOR SELECTION**

<b>JUMPER</b>	<b>POSITION</b>	<b>FUNCTION</b>
J18 3-way jumper	1-2 * 2-3 OUT	Processor i486DX installed in the system Processor i487SX (floating point unit) installed in the system Processor i486SX installed in the system
J19	IN * OUT	Processor i486DX or i487SX installed in the system Processor i486SX installed in the system
J20 3-way jumper	1-2 * 2-3	Processor i486DX 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**

<b>JUMPER</b>	<b>POSITION</b>	<b>FUNCTION</b>
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	Only one hard disk installed Two hard disks installed
F1		Keyboard protection fuse

**DIP-SWITCHES**

<b>SWITCH</b>	<b>POSITION</b>	<b>FUNCTION</b>
1	ON * OFF	Serial port enabled Serial port disabled
2	ON * OFF	NOT USED
3	ON * OFF	Normal operation Disables the 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**

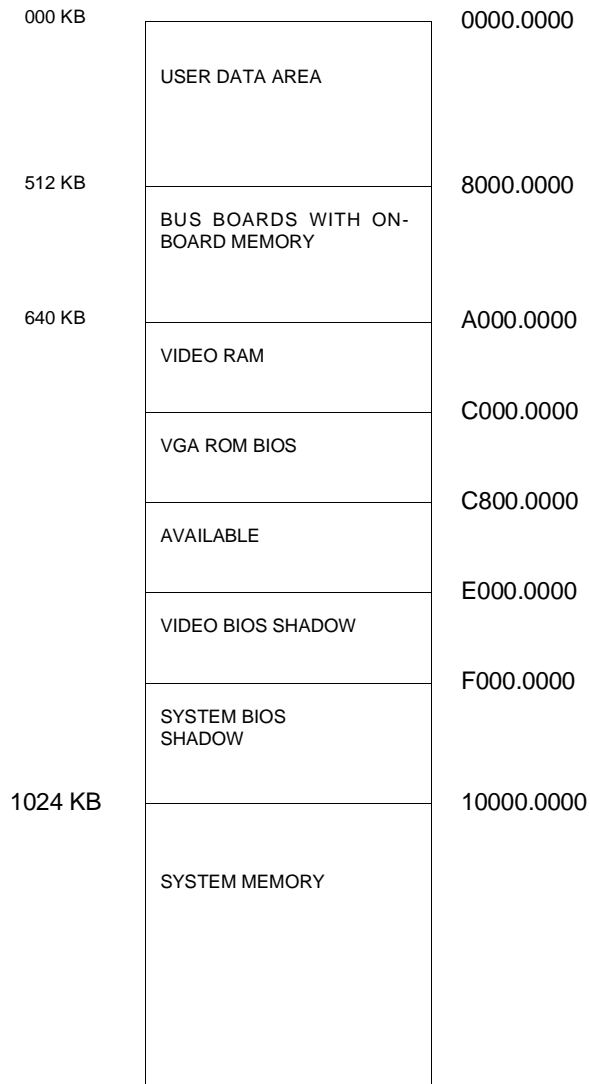
ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller (all channels)	2F8-2FF h	Serial Port COM2 (alternate)
020-021F h	Interrupt controller 1	378-37B h	Parallel Port 1
040-043 h	Timer	3B4-3B5 h	Video controller
60 h	Keyboard data controller	3BA h	Video controller
61 h	System Control Port B	3C0-3CF h	Video controller
64 h	Keyboard commands controller	3D4-3D5 h	Video controller
70-71 h	Real time clock, NMI Mask, CMOS RAM	3DA h	Video controller
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	4E8 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 given the system through the User Diskette or System Test. Consequently an example only of configuration of the first MegaByte of memory is given below.



# M400-60

## CHARACTERISTICS

27

Microprocessor	Intel 486DX2 with 32-bit addressing
Clock	50 MHz
Architecture	AT
Memory	<p>From 4 MB to 52 MB</p> <ul style="list-style-type: none"> <li>- One bank of 4 MB soldered on system board (8 1M x 4 DRAM chips plus 4 1Mx1 parity DRAM chips)</li> <li>- Three banks, each of 4 sockets, in which the following SIMM modules can be installed:             <ul style="list-style-type: none"> <li>- 1M x 9 <b>EXM 26-807</b> SIMM</li> <li>- 4M x 9 <b>EXM 26-809</b> SIMM</li> </ul> </li> </ul> <p>SIMM of different sizes can be installed in the three banks but not inside the same bank. banks can be left empty.</p>
Memory access.	80 ns
Coprocessor	Integrated in i486DX2 processor
Floppy disk	<p>1.2 MB Panasonic JU475-3-4-5</p> <p>1.2 MB Toshiba ND08DE</p> <p>1.44 MB Panasonic J-257 A / MITSUMI D359T3</p> <p>1.44 MB Sony MP-F17 W - Mitsubishi MF355</p> <p>1.44 MB YE DATA YD-702B / 702D</p> <p>2.88 MB Sony MP-F40 W</p>
Hard disk	<p>85 MB CONNER CP30084</p> <p>120 MB CONNER CP30126</p> <p>120 MB QUANTUM ELS 127 AT</p> <p>170 MB CONNER CP30174E</p> <p>210 MB QUANTUM LPS 240 AT</p> <p>210 MB CONNER CP30204 / CP30256</p> <p>240 MB CONNER CP30254</p> <p>340 MB CONNER CP3304 / CP3364</p> <p>340 MB SEAGATE ST1401A</p> <p>340 MB W.D. AC2340</p> <p>510 MB CONNER CP3504 / CP3544</p> <p>510 MB CONNER CP30544</p>
Streaming tape	<p>80/120 MB IRWIN 285 500 Mb/s</p> <p>80/120 MB IRWIN 287 1 Mb/s</p> <p>80/120 MB IRWIN 3125 1 Mb/s</p> <p>150 MB WANGTEK SCSI</p> <p>320 MB WANGTEK SCSI</p>
Expansion slots	4 Present 4 Available <b>(IN 284 board)</b>
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  
ASTECC

PS11/AR - 220 V  
ASTECC

### SCSI PERIPHERAL CONTROLLER

ASC - 1

### GRAPHICS ACCELERATOR

ATI 8514 Ultra

**SYSTEM BOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	INTEGRATED CONTROLLERS / NOTES
<b>BA334</b>	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	<ul style="list-style-type: none"> <li>- Floppy disk controller INTEL component 82077-AA1 is replaced by the floppy disk controller INTEL component 82077SL-1.</li> <li>- 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.</li> </ul>
			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	<ul style="list-style-type: none"> <li>- 50 MHz Intel <b>486DX2</b> processor</li> <li>- Numeric coprocessor integrated in the i486DX2</li> <li>- Performance upgrade processor socket</li> <li>- <b>82C206:</b> Real time clock 128 Byte Non-Volatile RAM Timer DMA controller Interrupt controller</li> <li>- Keyboard and mouse controller <b>8742</b> OPT PLCC</li> <li>- Video controller <b>82C452A</b></li> <li>- <b>WD16C551-D:</b> 16C550-compatible serial port AT/PS2-compatible parallel port</li> <li>- Floppy disk controller <b>82077 AA-1</b></li> <li>- Buffer for intelligent hard disks</li> <li>- BIOS Flash EPROM (1 Mbit)</li> <li>- Chip set consisting of 4 gate arrays:                             <ul style="list-style-type: none"> <li>- BCUE BUS controller</li> <li>- MCUE Memory controller</li> <li>- DPU Data flow controller</li> <li>- IOU Input/Output controller</li> </ul> </li> <li>- System memory (from 4 to 52 MB)</li> <li>- EYE component <b>GA4Q</b></li> <li>- 50 MHz oscillator</li> </ul>

**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**

<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
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. <b>NOTE:</b> 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**

<b>LEVEL</b>	<b>EVOLUTION</b>
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: <ul style="list-style-type: none"> <li>- Delayed bootstrapping with CP3304 HDUs or other Master HDUs</li> <li>- Spurious characters when entering a password on slow keyboards</li> <li>- Cache for compatibility with COMPUITONE AT 8/16 boards</li> <li>- Eliminates the message on hidden partitions that is displayed after the POD</li> </ul>
Rev. 2.08	This release corrects IBM OS/2 ver. 2.0 faults in DOS windows.

**HARD DISK SELF-ACKNOWLEDGE FEATURE**

This system has the hard disk self-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**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
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.
<b>WINDOWS</b>	
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

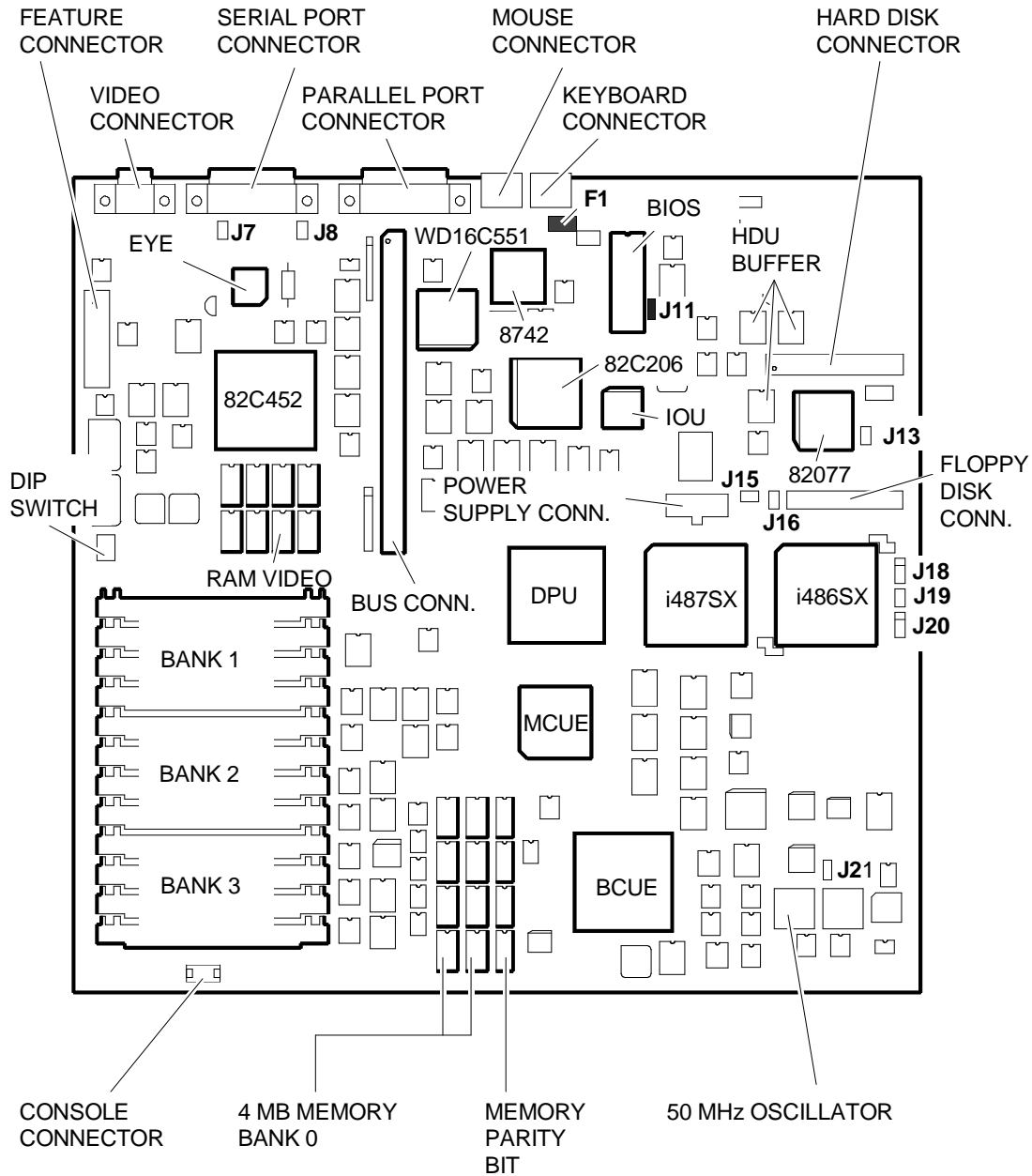


**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
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
<b>MULTIPOINT</b>	<b>MOUSE</b>
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)
<b>GRAPHIC PRODUCTS</b>	<b>NETWORK &amp; LAN PRODUCTS</b>
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
<b>DISPLAY UNITS</b>	<b>OTHER PRODUCTS</b>
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 JETSRIPT QMS POSTSCRIPT CONTROLLER OMTI 8627 ESDI ADAPTER OMTI 8627 RLL ADAPTER SCANMAN PLUS WD1007A ADAPTER WD1007V ADAPTER WD1007V-SE2 ADAPTER

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**COMPONENTS AND JUMPERS ON SYSTEM BOARD BA334 (PCB BA301)**



AJA2A

**FUSE F1**

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

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**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**

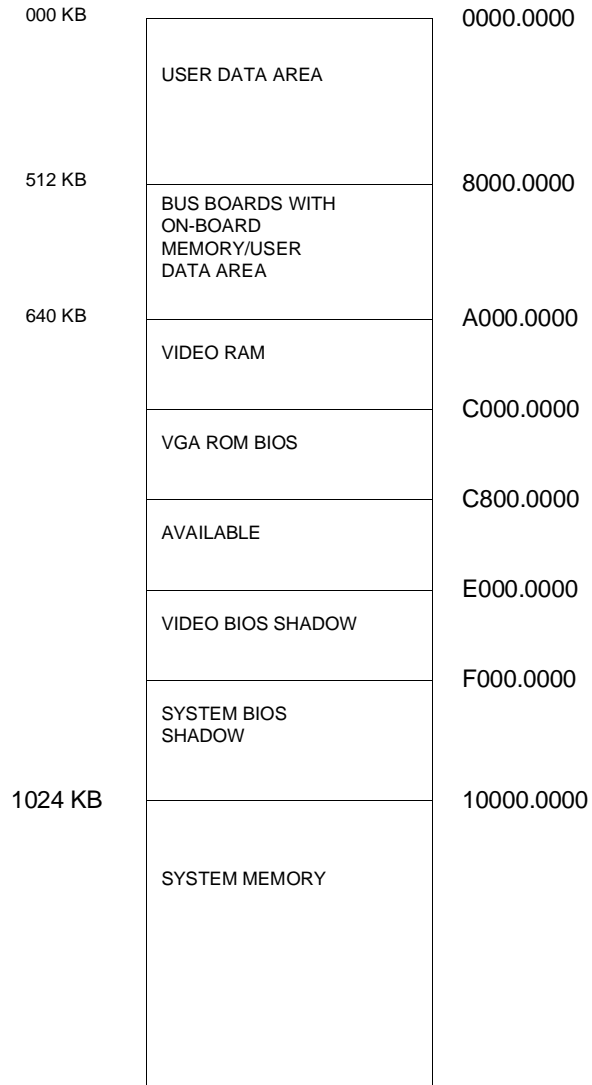
<b>ADDRESS</b>	<b>FUNCTION</b>	<b>ADDRESS</b>	<b>FUNCTION</b>
000-01F h	DMA controller (all channels)	2F8-2FF h	Serial port COM2 (alternate)
020-021F h	Interrupt controller 1	378-37B h	Parallel port 1
040-043 h	Timer	3B4-3B5 h	Video adapter
60 h	Keyboard data controller	3BA h	Video adapter
61 h	System 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**

<b>LEVEL</b>	<b>NAME</b>	<b>CONTROLLER</b>	<b>FUNCTION</b>
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.



## M300-08

### CHARACTERISTICS

Microprocessor	INTEL 386SX
Clock	20 MHz
Architecture	16-bit XT/AT
Memory	From 2 MB on 16 MB on system board Bank 0 2 MB soldered 1MB x 4 bit chips Bank 1 Two sockets on which SIMM modules can be installed: 1 M x 9 <b>EXM 27-820</b> (2 MB) 4 M x 9 <b>EXM 27-821</b> (8 MB) Bank 2 Identical to bank 1 Banco 3 Identical to bank 1 <b>NOTES:</b> 6 and 12 MB configurations are not possible. When 16 MB are installed, the 2 MB soldered are lost
Video memory	256 KB expandible to 512 KB with the <b>VGA-MEM</b> kit (Two 265 Kbx4 chips) - 70 ns
Memory access	80 ns - 70 ns
Coprocessor	20 MHz i387SX
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3-4-5 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C 1.44 MB YE DATA YD-702B
Hard Disk	40 MB QUANTUM LPS 52 AT 40 MB W.D. AC 140 40 MB QUANTUM Pioneer ELS42 AT 85 MB W.D. Caviar 280 85 MB CONNER CP 30084 85 MB QUANTUM Pioneer ELS85 AT 85 MB 120 MB CONNER CP 30126 120 MB W.D. AC 2120 120 MB QUANTUM Pioneer ELS127 AT
Streaming Tape	80/120 MB IRWIN 287 with floppy interface 80/120 MB IRWIN 3125 with floppy interface
Slots	Four 16-bit connectors on the BUS expansion board
Video controller	OAK OTI067 integrated on system board V.G.A. Compatible
HDU and FDU controller	Integrated on system board Floppy disk controller: National 87C310 Hard disk interface: MSI buffer and logic gates
Mouse	PS/2- and AT-compatible
Keyboard	101/102-keys ANK 26-101, ANK 26-102

#### SYSTEM BOARD

BA 319  
 BA 325 4 MB  
 BA 324 2 MB

#### BIOS

Rev. 1.07

#### EXPANSION BUS

IN133

#### POWER SUPPLY

PS11 R 220 V  
 PS11 R 115 V  
 PS11 AR 220 V  
 PS11 AR 110 V

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## SYSTEM BOARD

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA324	Lev. Nasc.		Rev. 1.04 PZCR	System board with 2 MB soldered
	Lev. 01		Rev. 1.06 PD7X	New BIOS. The differences between the two releases are illustrated in the BIOS section of this chapter
	Lev. 02		Rev. 1.07 PD5A	<ul style="list-style-type: none"> <li>- Cuts and trimmings made to solve the parity error that occurs when boards working in master mode are installed on the bus.</li> <li>- New BIOS</li> </ul>
	Lev. 03		Rev. 1.07	For improved EMI margins, the four 100 pF LC filters on the keyboard mouse interface have been replaced by 470 pF filters.
BA325	Lev. Nasc.	553026 R	Rev. 1.04	<p>System board with 4 MB, 2 soldered and 2 provided by SIMM modules.</p> <p><b>This board will no longer be produced.</b> The different memory expansion, which constitutes the difference between BA324 and BA325, will be implemented at system level and consequently only BA324 will continue to exist.</p>

**CONTROLLERS INTEGRATED ON THE SYSTEM BOARD**

SYSTEM BOARD	INTEGRATED CONTROLLERS	
Printed circuit BA319	<b>386SX CPU</b> Socket for <b>i387SX</b> <b>8042</b> <b>OAK OTI067</b> <b>82C206</b>  <b>87310</b> <b>NATIONAL</b> <b>MSI buffer</b> <b>27C010</b> <b>OPTI 82C283</b>  <b>EYE</b>	20 MHz microprocessor numeric coprocessor Keyboard and mouse controller V.G.A. video controller 128 Byte Non-Volatile RAM with battery back-up Real Time Clock DMA controller Interrupt controller Timer Serial and parallel ports controller Floppy disk controller Intelligent hard disk interface BIOS Eprom Memory controller AT BUS controller Data BUS controller For execution of video subsystem tests

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**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU system board	BA 324		2 MB
CPU system board	BA 325	553026R	2 MB
220 V power supply	PS11 R	553028T	
110 V power supply	PS11 R	553027J	
BUS Adapter board	IN133	978844C	

**USER DISKETTE**

LEVEL	COMPATIBILITY
Rel. 1.00	This release has the following limitations: The SIC 2635 Single Port is tested only if it is set as first serial port. The 132-column special mode is not yet operational.
Rel. 1.01	This release needs BIOS Rel. 1.01 or later to work properly. The video drivers for OS/2 72 Hz mode are available in the OS2DRV directory. Tests have been added to the "High Resolution graphics" 640x480 and 1024x768 video mode. The "kp" utility does not work if built-in setup was used to configure the system. The following hard disk configurations have been eliminated: High capacity - OS/2 IBM High capacity - MS-DOS High capacity - OS/2 Olivetti
Rel. 1.02	This release needs BIOS Rel. 1.01 or later to work properly. The video drivers for WIndows 72 Hz mode are available in the WIN_30 directory. The tests on the floppy disk have been modified. The help messages have been modified
Rel. 1.03	This release needs BIOS Rel. 1.02 or later to work properly.



**SYSTEM TEST**

<b>LEVEL</b>	<b>COMPATIBILITY</b>
Rev. 1.00	System Test with a new type of interface. This release is compatible with MS-DOS rel. 5.00 ver. 2.00. With this release, tests can still not be carried out on the VESA modes of operation.
Rev. 1.01	This release is compatible with MS-DOS rel. 5.00 ver. 2.00. This release needs BIOS Rel. 1.01 or later to work properly. The floppy disk tests have been improved.
Rev. 1.02	This release is compatible with MS-DOS rel. 5.00 ver. 2.00. This release needs BIOS Rel. 1.02 or later to work properly. Tests have been added for the 640x480 and 1024x768 high resolution graphic modes and the EYE component tests have been improved

**POWER SUPPLY UNIT**

<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
PS11 R 110 V	Lev. Nasc.	Manufactured by ASTEC - For production reasons, this power supply unit was never available at NASC level.
PS11 R 220 V	Lev. Nasc.	Manufactured by ASTEC
	Lev. 01	A capacitor has been added and a resistor has been replaced for increased productivity.
	Lev. 02	<ul style="list-style-type: none"> <li>- Inductor L5 has been added to the mains input area for improved EMI radio interference margins.</li> <li>- New printed circuit board to solves the problem of random voltage drops.</li> </ul>
PS11 R 110 V	Lev. Nasc.	Manufactured by HANTAREX.
PS11 R 220 V	Lev. Nasc.	Manufactured by HANTAREX.
PS11 AR 220 V	Lev. 01	Manufactured by ASTEC - For production reasons, this power supply unit was never available at NASC level
	Lev. 02	Jumper J103 has been replaced with a 10 Ohm resistance to solve the problem of the ripple not reflecting the specified values during minimum load conditions on the +5 V line.
PS11 AR 110 V	Lev. Nasc.	Manufactured by MAGNETEK
PS11 AR 220 V	Lev. Nasc.	Manufactured by MAGNETEK

**COMPATIBILITY NOTES**

<b>BOARD OR HW/SW DEVICE</b>	<b>DESCRIPTION</b>
OS/2 video driver	The video drivers for OS/2 72 Hz mode are available in the OS2DRV directory on the user diskette
EOD 400 USER DISKETTE Rel. 1.03	Release 1.03 has been replaced by 1.05 which implements the ASPI4DOS.SYS driver that supports multitasking Windows 3.xx V86 and the ASPIDISK.SYS driver that supports DOS 3.31 extended partition.
85 MB and 170 MB CONNER and 85 MB Western Digital hard disks	The CONNER 85 and 170 MB hard disks are not compatible with the Western Digital 85 MB hard disks.

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**SOFTWARE DRIVERS**

<b>DRIVER</b>	<b>NOTES</b>
EVD Rel. 1.00 for WINDOWS 3.0	These drivers must be installed using the WINDOWS SET UP utility. The resolutions available are: <ul style="list-style-type: none"> <li>- 640 x 480, 256 colors (mode 53h)</li> <li>- 1024 x 768, 16 colors (mode 56h)</li> </ul>
EVD Rel. 2.00 for WINDOWS 3.0	Improves the performance of the previous version

**BIOS**

<b>LEVEL</b>	<b>NOTES</b>
Rev. 1.00	This BIOS release can only be installed on systems with BA317 or BA302 updated to the same level.
Rev. 1.01	This release removes some bugs on the previous release and solves: <ul style="list-style-type: none"> <li>- Problems with the KP.EXE utility in the CUSTOMER DISK Rev. 1.00</li> <li>- Problems with the GOSLOW/AUTOSLOW utility. For correct use of the GOSLOW/GOFAST features, updating is also required of the utilities of the CUSTOMER DISK as those present in release Rev.1.00 do not work</li> </ul>
Rev. 1.03	This release removes some bugs on the previous BIOS release (Rev. 1.02) <ul style="list-style-type: none"> <li>- Video modes 72h and 79h have been removed</li> <li>- Problems with Windows 3 Video Mode 53h at 72Hz</li> <li>- Problems in enabling the high resolution</li> </ul> <p>BIOS Rev. 1.03 supports the non-standard HDU feature activated from the USER DISK. This change has also entailed a change in the tables of HDU parameters integrated in the BIOS. The hard disks with the self-acknowledge feature have been eliminated from the hard disk tables (see the following tables).</p>
Rev. 1.04	This BIOS release is identical to the previous BIOS as regards the system BIOS code part. As for the video BIOS, an adjustment has been made to programming of the FIFO on the video controller of the OAK, so as to improve use depending on the video modes selected.
Rev. 1.05	This BIOS release solves problems arising in the previous versions: <ul style="list-style-type: none"> <li>- Incorrect initialization of the VGA AST board during POD</li> <li>- Keyboard interrupt management.</li> <li>- Bug on procedures for buzzer volume management</li> <li>- With shadow RAM disabled, the system does not configure correctly if the BUS is particularly full.</li> <li>- Management of the video test error code.</li> <li>- System crash following a Soft Reset with the video off.</li> </ul>
Rev. 1.06	This BIOS release solves critical problems of the POD arising in the previous version.
Rev. 1.07	During the POD, the DOC clock in the BIOS DATA AREA is initialized, before relinquishing control to any ROM options installed in the system

**HARD DISK SELF-ACKNOWLEDGE FEATURE**

The M300-08 system has the hard disk self-acknowledge feature. Using the BUILT IN SETUP or the SET UP utility of the System Test or Customer Test, it is possible to define the type of hard disk installed in the system.

**BUILT IN SETUP**

The BUILT IN SETUP offers a number of options:

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**AUTO** This option is for installation of a hard disk with the self-acknowledge feature.

**Hard disk types** This list is for installation of hard disks without the self-acknowledge feature or hard disks which have the feature but which have been used previously on systems other than the M300-08. These types are illustrated in the following table:

TYPE	CAPACITY	CYL.	HEADS	SECTORS	WPC	LZ	MODEL
01	10 MB	306	4	17	128	305	STANDARD 10 MB, 85 ms
02	40 MB	925	5	17	128	924	CDC WREN I, Full, 35 ms
03	30 MB	697	5	17	128	696	WREN I, 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	104 MB	776	8	33	-1	775	CONNER CP3106 *
12	104 MB	776	8	33	-1	775	QUANTUM LPS105 AT *
13	121 MB	762	8	39	-1	762	W.D. AC2120 *
14	340 MB	726	15	61	-1	726	CONNER CP3304 *

\* These hard disks have the self-acknowledge feature. The value in the table must only be used if bringing to these systems a disk formatted on an "earlier system", keeping that data that was recorded on it.

If the hard disk is new, the self-acknowledge feature can be used.

A new hard disk table has been implemented in subsequent BIOS versions.

TYPE	CAPACITY	CYL.	HEADS	SECTORS	WPC	LZ	MODEL
01	10 MB	306	4	17	128	305	STANDARD 10 MB, 85 ms
02	40 MB	925	5	17	128	924	CDC WREN I, Full, 35 ms
03	30 MB	697	5	17	128	696	WREN I, 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

**SYSTEM TEST - CUSTOMER TEST**

Having selected the SETUP utility of the Customer Test or System Test, select the option hard disk #1 and #2. The following values can be defined in this field:

- Not Present** If 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 that have the self-acknowledge feature and have a capacity of less than 526 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 526 MB with the self-acknowledge feature and which have to be used with operating systems Olivetti OS/2/IBM OS/2 and MS-DOS.
- Compatible** This is the option to be used for hard disks that are compatible with the system but do not have the self-acknowledge feature. If this option is selected, a list will be displayed of hard disks with preset parameters (see the BUILT IN SETUP table).  
Check that the parameter preset values correspond to those on the label of the hard disk being installed.
- Not Standard** This option allows the service engineer to personally define the parameters of a hard disk without the self-acknowledge feature and which is not included in the list of compatible hard disks.

**SHADOW MEMORY FEATURE AND MEMORY REMAPPING**

These are utilities that can be selected from the Customer Test or System Test

**Shadow memory feature:**

For faster system BIOS access. The ROM BIOS code is copied to the same logic addresses into the system RAM (Shadow RAM).

It is possible to select which part of the BIOS code to copy into Shadow RAM:

Only the 64 KB system BIOS

000 Only the 32 KB video BIOS

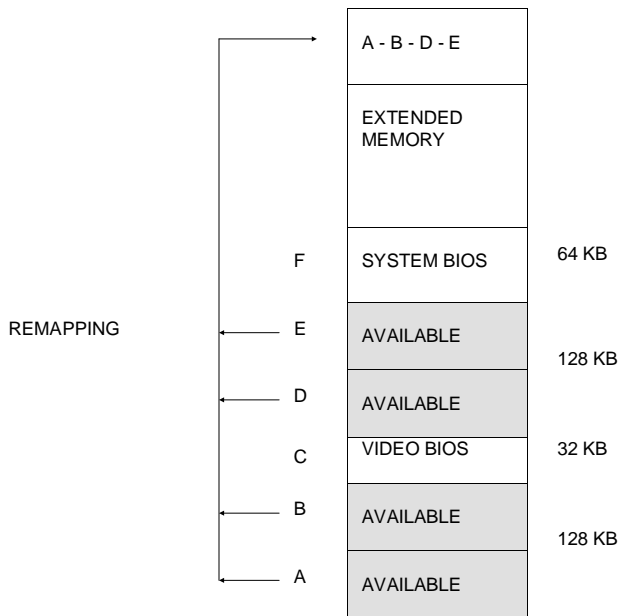
800 Only the 32 KB video BIOS

System BIOS and video BIOS

The possibility of copying the video BIOS to two different addresses derives from the fact that some boards use segment C000 to run their functions (the MATROX video controller, for instance) and as this result this segment cannot be used to copy the video BIOS into.

**Remapping**

This feature grants recovery of 256 KB of system memory which would otherwise be lost. The first MegaByte of memory has the following structure.



As can be seen from the figure, there are two free memory areas, of 128 KB each which cannot be used by the system

With the remapping feature, these two areas can be remapped to the end of the system memory extension and in this way are no longer lost.

The remapping feature can be programmed with the System Test or the Customer Test as shown below:

SHADOW RAM FEATURE			REMAPPING FEATURE
SYSTEM BIOS	VIDEO BIOS IN C000	VIDEO BIOS IN E800	
DISABLED	DISABLED	DISABLED	256 KB REMAPPED
ENABLED	DISABLED	DISABLED	256 KB REMAPPED
ENABLED	ENABLED	DISABLED	256 KB REMAPPED
ENABLED	DISABLED	ENABLED	REMAPPING NOT POSSIBLE

The table shows that if segment E800 is used to copy the video BIOS, remapping is no longer possible and the feature should be disabled.

**SOFTWARE COMPATIBILITY**

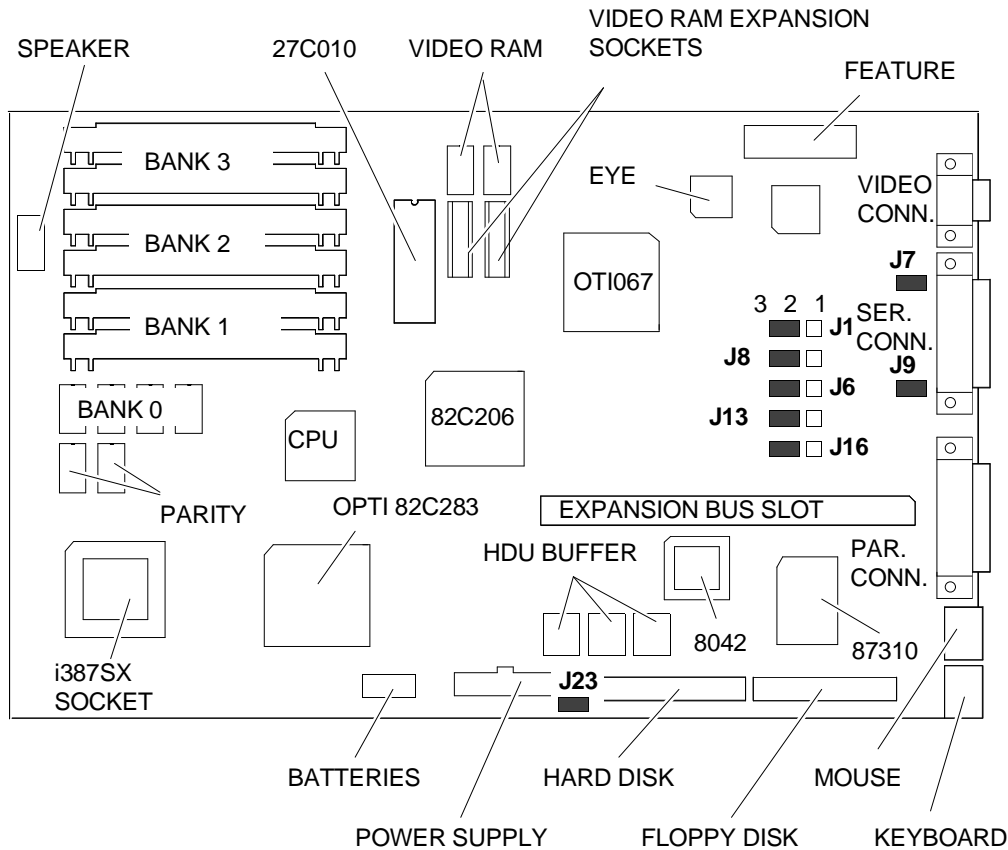
<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20  IBM Operating System/2 Extended Edition, Ver. 1.10 e 1.20 INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	A formatted DSDD diskette is required during installation on the hard disk The PS/2 mouse is not acknowledged The PS/2 mouse is not acknowledged
<b>WINDOWS</b>	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smart modem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 GEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
<b>MULTIPOINT</b>	<b>MOUSE</b>
CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) IBM PS/2 Mouse Serial Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
<b>GRAPHICS PRODUCTS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
AST VGA plus FASTWRITE 1024i FASTWRITE VGA HERCULES GRAPHICS CARD IBM VGA Adapter MATROX PG - 1281 MAXON MVGA-16 Adapter ORCHID PRODESIGNER VGA PLUS HERCULES INCOLOR CARD (GB222) PARADISE VGA PRO CARD	10 NET INTERFACE BOARD 200 series 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C505 DECNET PCSA adapter IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter MICOM NP1000 adapter NOVELL NE1000 adapter NOVELL NE2000 adapter
<b>DISPLAY UNITS</b>	
IBM enhanced graphics monitor 5151 IBM color graphics monitor 5153 IBM PS/2 Monochrome display 8503 IBM PS/2 color display 8512 IBM PS/2 color display 8513 IBM PS/2 color display 8514 NEC MULTISYNC II	NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D PHILIPS 7BM749 PHILIPS 9CM082



## SYSTEM BOARD COMPONENTS



<b>JUMPER J1</b>	Position <b>1-2</b> Position <b>2-3</b>	BUILT IN SETUP not carried out BUILT IN SETUP carried out **
<b>JUMPER J6 &amp; J8</b>	Position <b>1-2</b> Position <b>2-3</b>	Serial port disabled Serial port enabled **
<b>JUMPER J9</b>	Position <b>IN</b>	RING Indicator signal (RS232 threshold voltage) FAIL-SAFE disabled
<b>JUMPER J7</b>	Position <b>IN</b>	Input signals (RS232 threshold voltage) FAIL-SAFE disabled
<b>JUMPER J16</b>	Position <b>1-2</b> Position <b>2-3</b>	Floppy disk write operations disabled Floppy disk write operations enabled **
<b>JUMPER J23</b>	Position <b>IN</b> Position <b>OUT</b>	One hard disk only installed ** Two hard disks installed
<b>JUMPER J13</b>	Position <b>1-2</b> Position <b>2-3</b>	Mouse interrupt 12 disabled Mouse interrupt 12 enabled **

**NOTE:** If installing expansion boards that use interrupt 12 on the AT BUS, jumper J13 should be set in position 1-2. In this case it is no longer possible to use the PS/2 mouse.

IN:

OUT:

\*\* indicates the default setting.

**INTERRUPT LEVELS**

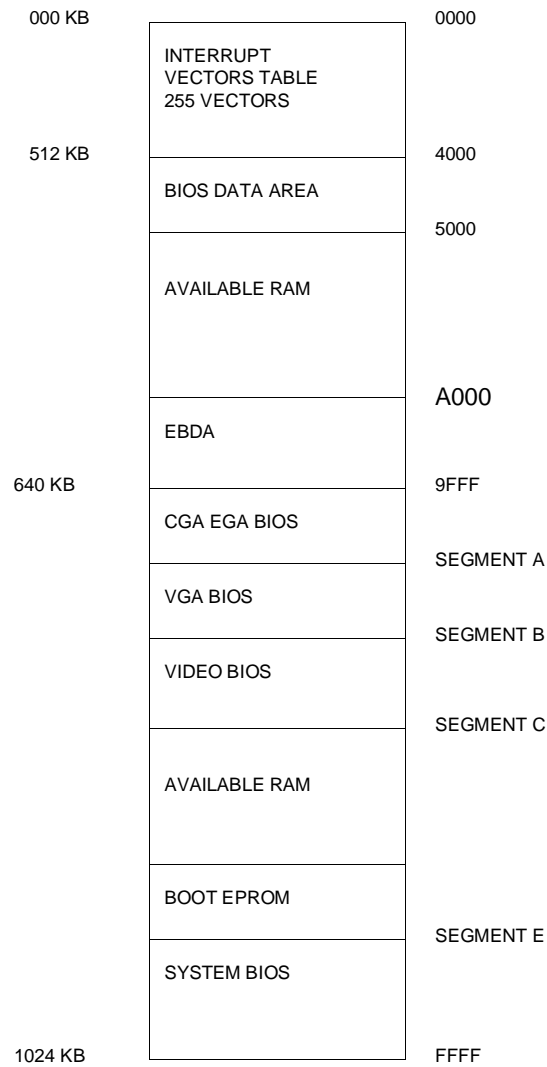
LEVEL	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 - 10	IRQ2	1	Interrupt to Controller 1 from Controller 2
3	IRQ8	2	Real time clock
4	IRQ9	2	Available
5	IRQ10	2	Available
6	IRQ11	2	Available
7	IRQ12	2	Available
8	IRQ13	2	Coprocessor
9	IRQ14	2	Hard Disk controller
10	IRQ15	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

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**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller (channels 0 - 3)	27C - 2F7 h	
020-021F h	Interrupt controller 1	2F8-2FF h	Serial port COM2 (alternative)
022 h	82C283 Address registers	300 - 377 h	
023 h		378-37B h	Parallel port 1 (default)
024 h	82C283 Data registers	37C - 3B3 h	
040-043 h	Timer	3B4-3B5 h	Video controller
044 - 05F h		3B6 - 3B9 h	
60 h	Keyboard data controller	3BA h	Video controller
61 h	System control port B	3BB - 3BF h	
062 - 063 h		3C0-3CF h	Video controller
64 h	Keyboards commands controller	3D0 - 3D3 h	
065 - 06F h		3D4-3D5 h	Video controller
070 - 071 h	Real time clock, NMI, CMOS RAM	3D6 - 3D9 h	
072 - 080 h		3DA h	Video controller
081-08F h	DMA page registers	3DB - 3EF h	
090 - 09F h		3F0-3F7 h	Floppy disk controller
0A0-0A1 h	Interrupt controller 2	3F8-3FF h	Serial Port COM1 (default)
0A2 - 0BF h		400 - 46E7 h	
0C0-0DF h	DMA channels 4-7	46E8 h	VGA control registers
1E0 - 1EF h		46E9 - FFFF	
1F0-1F8 h	Hard disk drive	8000F0-8000FF	i387 SX coprocessor
1F9 - 277 h			
278-27B h	Parallel port 2 (alternative)		

**SYSTEM MEMORY MAP**



# M300-15

## CHARACTERISTICS

Microprocessor	INTEL 386SX
Clock	25 MHz
Architecture	16-bit XT/AT
Memory	From 4 MB to 16 MB on motherboard Bank 0 2 MB soldered 1MB x 4 bit chips Bank 1 2 MB obtained using 2 1MB x 9 SIMM modules Bank 2 Two sockets in which to install the following SIMMs: 1 M x 9 <b>EXM 27-820</b> (2 MB) 4 M x 9 <b>EXM 27-821</b> (8 MB) Bank 3 Same as bank 1 6 MB and 12 MB configurations are not possible. When installing 16 MB the soldered 2 MB are lost.
Video memory	512 KB - 70 ns
Memory access	80 ns - 70 ns
Coprocessor	25 MHz i387SX
Floppy Disk	1.2 MB 5,25" Panasonic JU 475-3-4-5 1.2 MB 5.25" Toshiba ND 08 DE 1.44 MB 3.5" Panasonic J-257 1.44 MB 3.5" Sony MP-F17 1.44 MB Mitsubishi MF355C 1.44 MB YE DATA YD-702B
Hard Disk	40 MB Quantum LPS 52 AT 40 MB W.D. AC 140 40 MB QUANTUM Pioneer ELS42 AT 85 MB W.D. Caviar 280 85 MB CONNER CP30084 85 MB QUANTUM Pioneer ELS85 AT 120 MB CONNER CP30126 120 MB W.D. AC 2120 120 MB QUANTUM Pioneer ELS127 AT 170 MB CONNER CP30174E 210 MB QUANTUM LPS 240 AT 210 MB CONNER CP30204 210 MB CONNER CP30204 / CP30256 240 MB CONNER CP30254
Streaming Tape	80/120 MB IRWIN 287 with floppy interface 80/120 MB IRWIN 3125 with floppy interface
Slots	Four 16-bit connectors on the BUS expansion board
Video controller	VGA-compatible OAK OTI067 integrated on the motherboard
Integrated HDU and FDU controllers	Integrated on the motherboard Floppy disk controller: National 87310 Hard disk interface: MSI Buffer and logic gates
Mouse	AT- and PS/2-compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

### MOTHERBOARD

BA 320 4 MB

2 MB soldered +  
2 SIMMs

### BIOS

Rev. 1.07

### EXPANSION BUS

IN133

### POWER SUPPLY

PS11 R 220 V

PS11 R 115 V

PS11 AR 220 V

PS11 AR 110 V

**MOTHERBOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
<b>BA320</b>	Nasc.		Rev. 1.04 PZCS	Motherboard with 2 MB soldered
	Lev. 01		Rev. 1.06 PD7Y	New BIOS. See the BIOS section of this chapter for the differences between the two releases.
	Lev. 02		Rev. 1.07 PD5B	<ul style="list-style-type: none"> <li>- Cuts and trimmings have been made to solve the parity error problem that occurred when boards operating in master mode are installed on the bus.</li> <li>- New BIOS</li> </ul>
	Lev. 03		Rev. 1.07	For improved EMI margins, the four 100 pF LC filters on the keyboard mouse interface have been replaced with 470 pF filters.
	Lev. 04		Rev. 1.07	<ul style="list-style-type: none"> <li>- The keyboard and mouse connectors have been replaced with shielded connectors.</li> <li>- The ACER 87310 I/O controller is introduced as an alternative to the National 87310 I/O controller</li> </ul>
	Lev. 05		Rev. 1.07	Wiring made to correct the problem of too high of a current (600 nA) absorbed by the CMOS. This high absorption discharges the batteries.

**MOTHERBOARD INTEGRATED CONTROLLERS**

MOTHERBOARD	INTEGRATED CONTROLLERS
BA320	<b>386SX CPU</b> 25 MHz microprocessor Socket for <b>i387SX</b> numeric coprocessor <b>8042</b> Keyboard and mouse controller <b>OAK OTI067</b> V.G.A. video controller <b>82C206</b> 128 byte Non-Volatile RAM with battery back-up Real Time Clock DMA controller Interrupt controller Timer <b>87310</b> Serial and parallel port controller <b>ACER</b> Floppy disk controller <b>MSI buffer</b> Intelligent hard disk interface <b>27C010</b> BIOS Eprom <b>OPTI 82C283</b> Memory controller AT BUS controller Data BUS controller <b>EYE</b> For execution of tests on the video subsystem

**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU system board	BA 320	553059A	2 MB
220 V power supply	PS11 R	553028T	
110 V power supply	PS11 R	553027J	
BUS Adapter board	IN133	978844C	

**USER DISKETTE**

LEVEL	COMPATIBILITY
Rel. 1.00	This release needs BIOS REI. 1.06 or later to work properly. The video drivers for the 72 Hz OS/2 mode of operation are in directory OS2DRV. The video drivers for the Windows 72 Hz mode of operation are in directory WIN_30.

**SYSTEM TEST**

LEVEL	COMPATIBILITY
Rev. 1.00	This release is compatible with MS-DOS rel. 5.00 ver. 2.00. This release needs BIOS Rel. 1.06 or later to work properly.

**POWER SUPPLY UNITS**

<b>POWER SUPPLY</b>	<b>LEVEL</b>	<b>DESCRIPTION</b>
PS11 R 110 V	Nasc.	Manufactured by ASTEC - Due to production problems, this power supply was never manufactured at NASC level.
PS11 R 220 V	Nasc.	Manufactured by ASTEC
	Lev. 01	A capacitor has been added and a resistor has been removed to improve the manufacturing cycle.
	Lev. 02	<ul style="list-style-type: none"> <li>- Inductor L5 has been added to the mains input area to improve the EMI radio interference margins.</li> <li>- New printed circuit to solve the problem with random voltage drops.</li> </ul>
PS11 R 110 V	Nasc.	Manufactured by HANTAREX
PS11 R 220 V	Nasc.	Manufactured by HANTAREX
PS11 AR 220 V	Lev. 01	Manufactured by ASTEC - Due to production problems, this power supply was never available at NASC level.
	Lev. 02	Jumper J103 has been replaced by a 10 Ohm resistance to solve the problem of the ripple not reflecting the specified values during minimum load conditions on the +5 V line.
PS11 AR 110 V	Nasc.	Manufactured by MAGNETEK
PS11 AR 220 V	Nasc.	Manufactured by MAGNETEK

**COMPATIBILITY NOTES**

<b>BOARD OR HW/SW DEVICE</b>	<b>DESCRIPTION</b>
OS/2 video drivers	The video drivers for the 72 Hz OS/2 mode of operation are in the directory OS2DRV on the user diskette
80386 SX processor	The AMD 80386SX-25 CPU is introduced as an alternative to the INTEL 80386SX CPU. The level of the boards does not change.
EOD 400 USER DISKETTE Rel. 1.03	Release 1.03 is replaced by release 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.
85 MB and 170 MB CONNER and 85 MB Western Digital hard disks	The 85 MB and 170 MB CONNER hard disks are not compatible with the 85 MB Western Digital drives.

**SOFTWARE DRIVERS**

DRIVER	NOTES
EVD Rel. 1.00 for WINDOWS 3.0	These drivers must be installed using the Windows SET UP utility. The resolutions available are: - 640 x 480 256 colours (mode 53h) - 1024 x 768 16 colours (mode 56h)
EVD Rel. 1.00 upd 1 for WINDOWS 3.0	Improves the features of the previous release
EVD Rel. 2.00	Improves the high resolution mode (1024x768x16 and 640x480x256)

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**BIOS**

LEVEL	NOTES
Rev. 1.06	This BIOS release is the same as that for the M300-08 with the following differences: - The AT bus clock, programmable through OPI82c283, has a 8.33 MHz clock on the M300-15 against the 10MHz clock of the M300-08 - Machine identifiers different on the two systems
Rev. 1.07	During the POD, the DOC clock in the BIOS DATA AREA is initialized before control is relinquishedp to any ROM option installed in the system.

**HARD DISK SELF-ACKNOWLEDGE**

The M300-15 has the the hard disk self-acknowledge feature.  
Through the BUILT IN SETUP or the SET UP utility of the System Test or Customer Test, the type of hard disk installed in the system can be defined.

For information on this feature, see the previous chapter on the M300-08.

**SHADOW MEMORY FEATURE AND MEMORY REMAPPING**

These are utilities that can be selected from the Customer Test or the System Test.

**Shadow memory feature:**

For faster access to the system BIOS. The ROM BIOS code is copied into the system RAM (Shadow RAM) at the same logic addresses.

**Remapping feature**

Used to regain 256 KB of system memory that would otherwise be lost.

For information on these features, see the previous chapter on the M300-08.



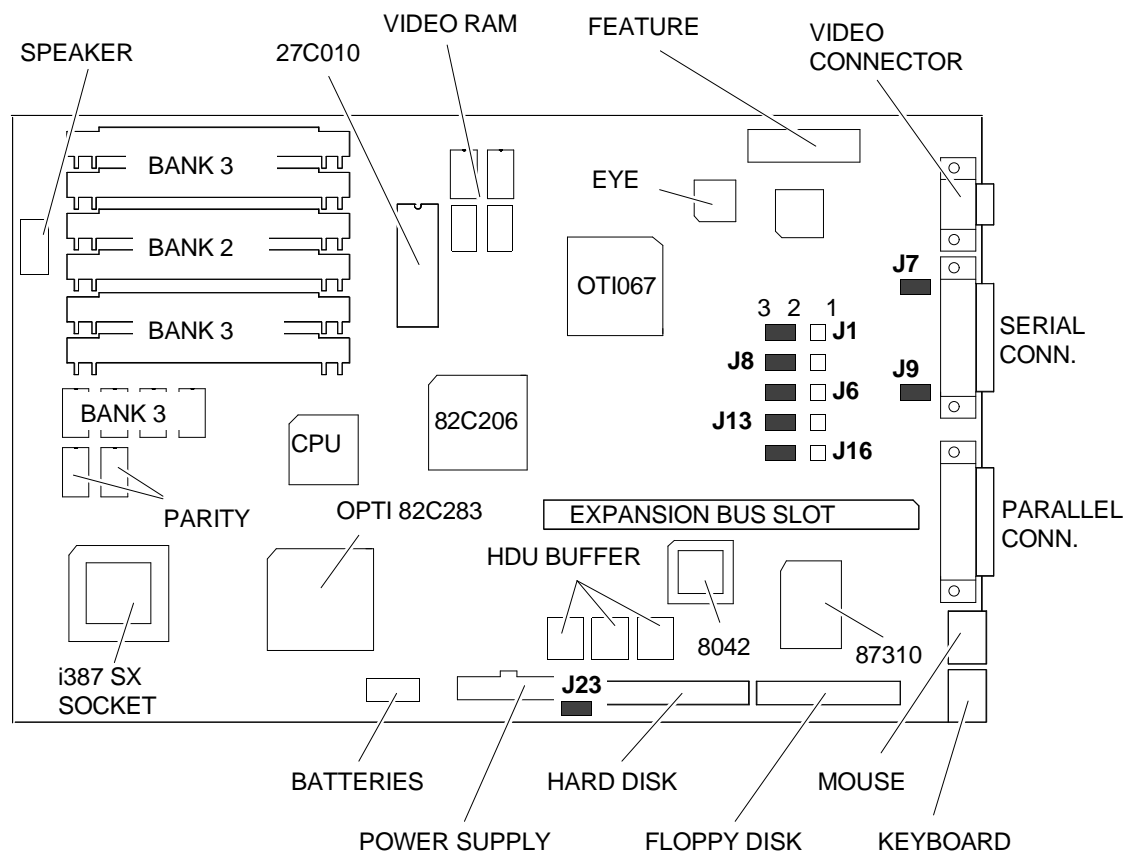
**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01	A formatted DSDD diskette is required during installation on hard disk PS/2 mouse not acknowledged
IBM Operating System/2, Ver. 1.10 and 1.20	
IBM Operating System/2 Extended Edition, Ver. 1.10 and 1.20	PS/2 mouse not acknowledged
INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	
<b>WINDOWS</b>	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smart modem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 GEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
<b>MULTIPOINT</b>	<b>MOUSE</b>
CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) IBM PS/2 Mouse Serial Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
<b>GRAPHIC PRODUCTS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
AST VGA plus FASTWRITE 1024i FASTWRITE VGA HERCULES GRAPHICS CARD IBM VGA Adapter MATROX PG - 1281 MAXON MVGA-16 Adapter ORCHID PRODESIGNER VGA PLUS HERCULES INCOLOR CARD (GB222) PARADISE VGA PRO CARD	10 NET INTERFACE BOARD 200 series 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C505 DECNET PCSA adapter IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter MICOM NP1000 adapter NOVELL NE1000 adapter NOVELL NE2000 adapter
<b>DISPLAY UNITS</b>	
IBM enhanced graphics monitor 5151 IBM color graphics monitor 5153 IBM PS/2 Monochrome display 8503 IBM PS/2 color display 8512 IBM PS/2 color display 8513 IBM PS/2 color display 8514 NEC MULTISYNC II	NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D PHILIPS 7BM749 PHILIPS 9CM082

## MOTHERBOARD COMPONENTS



<b>JUMPER J1</b>	Position 1-2 Position 2-3	The BUILT IN SETUP is not performed The BUILT IN SETUP is performed **
<b>JUMPER J6 &amp; J8</b>	Position 1-2 Position 2-3	Serial port disabled Serial port enabled **
<b>JUMPER J9</b>	Position IN	RING Indicator signal (RS232 threshold voltage)FAIL-SAFE disabled
<b>JUMPER J7</b>	Position IN	Input signals (RS232 threshold voltage) FAIL-SAFE disabled
<b>JUMPER J16</b>	Position 1-2 Position 2-3	Write operations on floppy disk disabled Write operations on floppy disk enabled **
<b>JUMPER J23</b>	Position IN Position OUT	One hard disk only installed ** Two hard disks installed
<b>JUMPER J13</b>	Position 1-2 Position 2-3	Mouse interrupt 12 disabled Mouse interrupt 12 enabled **

**NOTE:** When installing expansion boards that require interrupt 12 on the AT BUS, jumper J13 should be set in position 1-2. In this way, it is no longer possible to use the PS/2 mouse.

IN: Jumper installed

OUT: Jumper not installed

\*\* indicates the default position.

**INTERRUPT LEVELS**

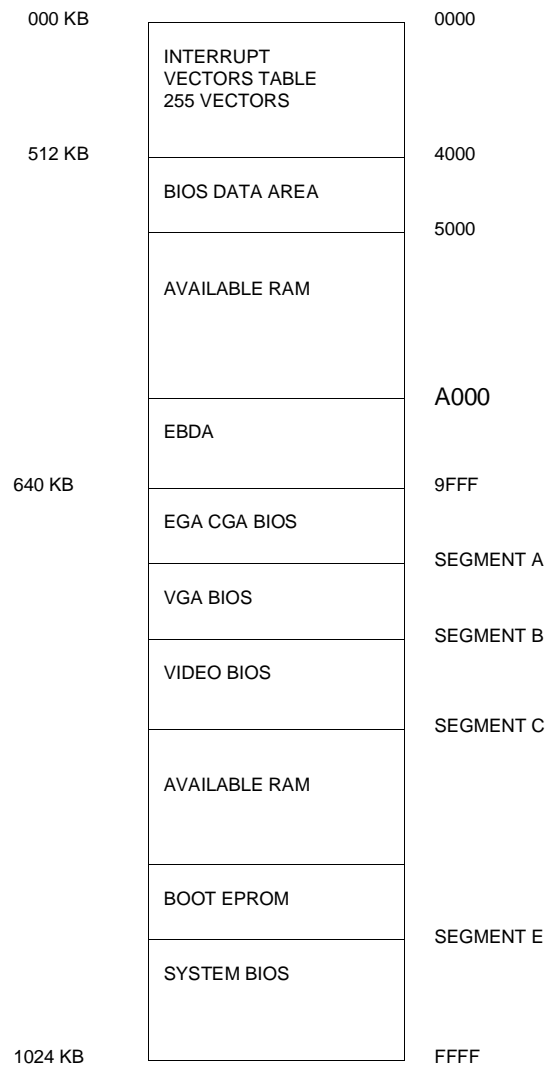
LEVEL	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Timer channel 0 OUT
2	IRQ1	1	Keyboard
3 - 10	IRQ2	1	Interrupt to Controller 1 from Controller 2
3	IRQ8	2	Real time clock
4	IRQ9	2	Available
5	IRQ10	2	Available
6	IRQ11	2	Available
7	IRQ12	2	Available
8	IRQ13	2	Coprocessor
9	IRQ14	2	Hard Disk controller
10	IRQ15	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

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**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller (channels 0 - 3)	27C - 2F7 h	
020-021F h	Interrupt controller 1	2F8-2FF h	Serial port COM2 (alternative)
022 h	82C283 Address registers	300 - 377 h	
023 h		378-37B h	Parallel port 1 (default)
024 h	82C283 Data registers	37C - 3B3 h	
040-043 h	Timer	3B4-3B5 h	Video adapter
044 - 05F h		3B6 - 3B9 h	
60 h	Keyboard data controller	3BA h	Video adapter
61 h	System control port B	3BB - 3BF h	
062 - 063 h		3C0-3CF h	Video adapter
64 h	Keyboard commands controller	3D0 - 3D3 h	
065 - 06F h		3D4-3D5 h	Video adapter
070 - 071 h	Real time clock, NMI, CMOS RAM	3D6 - 3D9 h	
072 - 080 h		3DA h	Video adapter
081-08F h	DMA page registers	3DB - 3EF h	
090 - 09F h		3F0-3F7 h	Floppy disk controller
0A0-0A1 h	Interrupt controller 2	3F8-3FF h	Serial port COM1 (default)
0A2 - 0BF h		400 - 46E7 h	
0C0-0DF h	DMA channels 4-7	46E8 h	VGA control registers
1E0 - 1EF h		46E9 - FFFF	
1F0-1F8 h	Hard disk drive	8000F0-8000FF	i387 SX coprocessor
1F9 - 277 h			
278-27B h	Parallel port 2 (alternative)		

### SYSTEM MEMORY MAP



# M480-40

## CHARACTERISTICS

Microprocessor	INTEL 486 DX	<b>MOTHERBOARD</b> BA307  <b>CPU BOARD</b> UC 117 inserted in a dedicated slot on system board  <b>BIOS</b> 1 <sup>st</sup> part of EPROM code on system board Rev. 2 <sup>nd</sup> part of code in first HDU of the system (IML) Rev.  <b>POWER SUPPLY</b> PS40 of 400 W  <b>CONSOLE</b> Hardware module comprising 2 boards: IF496 Interface circuits with system board IF497 Display for messages  <b>NETWORK BOARDS</b> <b>NCU 9164</b> GO528 Token Ring 4 Mbit/s <b>NCU 9174</b> GO553 Token Ring 4-16 Mbit/s <b>LCU 3474</b> WAN line controller <b>LCU 9216</b> GO516 Intelligent WAN line controller
Clock	33 MHz	
Architecture	MICROCHANNEL	
Memory	From 8 to 64 MB on motherboard. 8 sockets available for SIMM modules. The SIMM modules are to be installed in pairs in the following order: 1 <sup>st</sup> pair connectors A1 and B1 (already mounted) 2 <sup>nd</sup> pair connectors A2 and B2 3 <sup>rd</sup> pair connectors A3 and B3 4 <sup>th</sup> pair connectors A4 and B4 See the figure on page 31-9 for the position of the connectors. The SIMM modules that can be installed are: <b>EXM 27-004</b> - 4 MB - 2 512 Kb x 36 SIMMs <b>EXM 27-998</b> - 8 MB - 2 1 Mb x 36 SIMMs <b>EXM 27-016</b> - 16 MB - 2 2 Mb x 36 SIMMs	
Memory access	70 ns	
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-4/5 1.44 MB 3.5" Panasonic JU-257 A - 103P 1.44 MB 3.5" Sony MP-F17 - 85/MITSUMI D359T3 1.44 MB Mitsubishi MF-355C-58ML 1.44 MB 3.5" Y-E Data YD-702B / 702D 2.88 MB Sony MB-F40W-17	
Hard Disk	210 MB CONNER CP3200 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 May be single (HDS) or double (HDP Disk Pack)	
Streaming Tape	80/120 MB IRWIN 287 with floppy interface 320/525 MB WANGTEK 5525 ES SCSI 150/250 MB WANGTEK 5150 ES SCSI 1.3/2 GB HP 35470A DAT 1300 SCSI	
Slots	Eight 32-bit connectors on system board Six available	
Video Controller	<b>XGA board GO589</b> VGA resolution only <b>XGA-2 board GO2002</b> These must be installed in an MCA slot on the system board	
FDU controller	Integrated on system board	
SCSI HDU controller	SCSI controller GO582 or GO610 to be installed in an MCA slot	
Mouse	PS/2- and AT-compatible	
Keyboard	101/102-key ANK 26-101/N, ANK 26-102/N	

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### FRONT BAYS FOR MAGNETIC AND OPTICAL PERIPHERALS

The M480-40 mechanical structure has 10 half-height, 5.25" bays. These base are subject to the following limitations of use:

- Bay 10 (highest) is always used for a 3.5" floppy disk
- Bay 1 (lowest) is always used for the first hard disk of the system
- Bays 9 to 5 can accomodate removable magnetic peripherals. The number of removable SCSI peripherals is confined to 2.
- Bays 7 to 5 can also accomodate SCSI hard disks
- Bays 4 to 1 must only accomodate SCSI hard disks.

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

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

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

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

### SCSI CHANNEL CONFIGURATION

The general rule in configuring the SCSI channel is that all the devices connected (at most 8, SCSI controller included) have a different SCSI ID and that the BUS is terminated at one end only.

- The SCSI ID as well as assigning a different address to each peripheral also sets the priority. SCSI ID 7 is the highest priority and SCSI ID 0 the lowest.
- In the M480-40, the first hard disk installed 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.
- A 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, then first hard disk, which must have a part of the BIOS, must be connected with the SCSI controller installed in MCA slot 1 and have an SCSI ID of 6.
- The SCSI ID on each peripheral is configured through jumpers on the board.
- The SCSI ID of the SCSI controller is configured through the software using the User Diskette or System Test.

### Termination rules

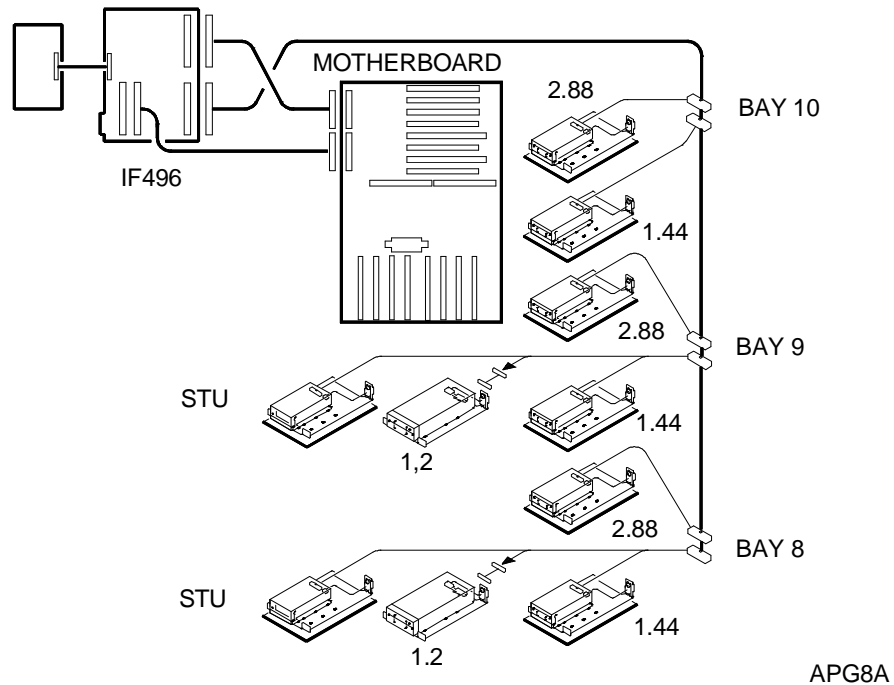
If there are no external SCSI devices, the hard disk or primary disk pack in bay 1 and the SCSI controller must always be terminated. If there are SCSI peripherals connected outside of the system module, the terminator must be removed from the SCSI controller and the last external peripheral connected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

### WIRING OF PERIPHERALS

The following figures illustrate wiring of the floppy interface peripherals and of the SCSI interface peripherals.

#### Wiring of floppy disk interface peripherals

To manage the different interface signals between the floppy disks, the floppy disk cable has two connectors for each of the peripherals that it is possible to install. The bottom connector of each pair must be used when installing a 1.44 MB, 1.2 MB floppy disk or streaming tape. The upper connector must be used when installing a 2.88 MB floppy disk.



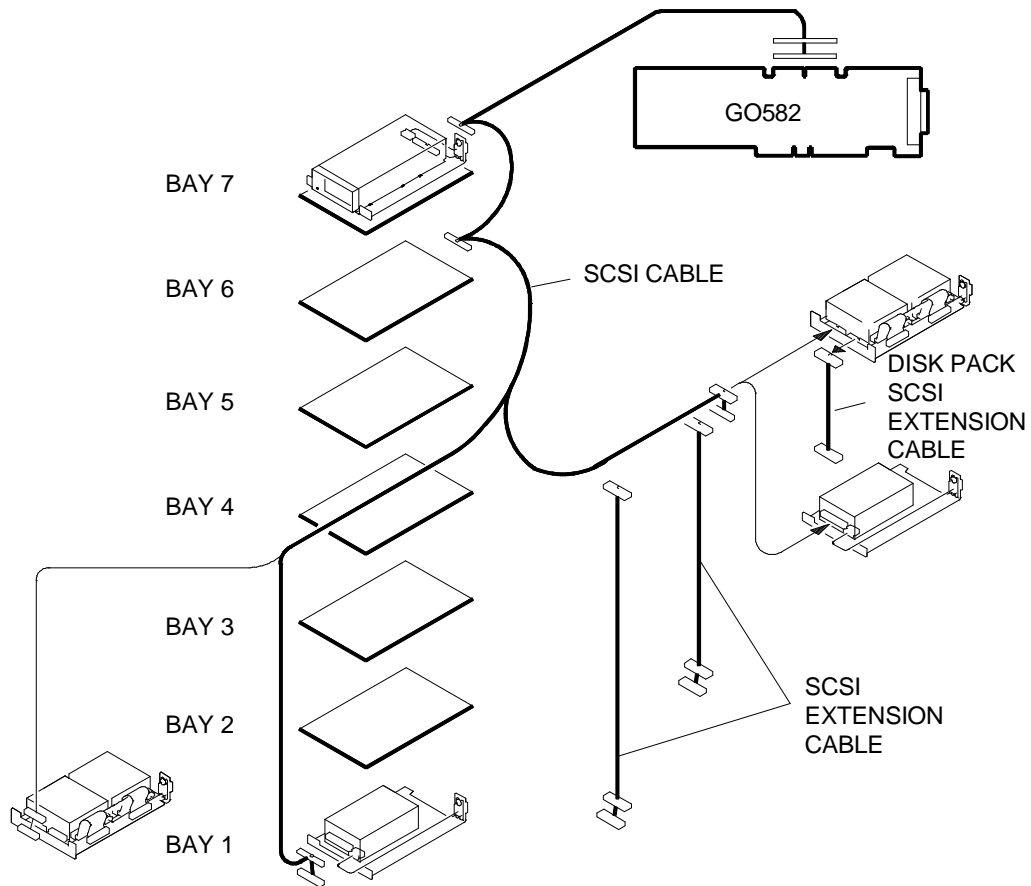


### Wiring of SCSI interface peripherals

The SCSI cable is a straight cable connecting at one end to the SCSI hard disk controller and with 3 connectors at the other end for connection of the peripherals. The last connector must be used to connect the first hard disk of the system, whereas the other two must be used to connect SCSI removable type peripherals.

To add a hard disk, you must:

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



APG7A

**MOTHERBOARD**

	LEVEL	D.R.S. CODE	NOTES
BA307	Nasc.	553035 J	System motherboard integrating: <ul style="list-style-type: none"> <li>- Connector for insertion of CPU board</li> <li>- Connectors for MCA expansion</li> <li>- Sockets for SIMM modules</li> <li>- CMOS RAM and Real Time Clock</li> <li>- Keyboard and mouse interface</li> <li>- Floppy interface</li> <li>- Serial interface</li> <li>- Parallel interface</li> </ul>

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**CPU BOARD**

	LEVEL	D.R.S. CODE	BIOS	NOTES
UC117	Nasc.	553036 K	The EPROM on the CPU board contains only the first part of the BIOS code. The rest is on the first HDU of the system	System CPU board integrating: <ul style="list-style-type: none"> <li>- i486 DX processor</li> <li>- 128 KB of ROM BIOS</li> <li>- Memory Controller</li> <li>- DMA controller</li> </ul>

**XGA VIDEO ADAPTER BOARD**

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

**SCSI HARD DISK CONTROLLER**

BOARD	D.R.S. CODE	LEVEL	DESCRIPTION
GO582	553004 U	Nasc.	SCSI hard disk controller
		Lev. 01	New board layout
GO610	557933 P	Nasc.	Replaces GO582 These two boards have the following differences: <ul style="list-style-type: none"> <li>- The termination resistances are incorporated on board GO610 therefore this board does not require an external terminator on the cable as GO582 does.</li> <li>- Different printed circuit board</li> <li>- New BIOS</li> </ul>

**CONSOLE**

	LEVEL	D.R.S. CODE	NOTES
IF496	Nasc.	553312 U	This board integrates the circuits for interface with the system board, power supply and the floppy disk interface adapter circuit
	Nasc.	553313 V	This board integrates the display and LEDs of the console

**POWER SUPPLY DISTRIBUTION BOARD**

	LEVEL	D.R.S. CODE	NOTES
IF484	Nasc.	932957 P	System power distribution board.
	Lev. 01		Component NDP506A is replaced by component NDP606B or IFR234, while component C363 is replaced by component C710. This ensures that power is supplied to bays 3 and 4 when a 340 MB or 525 MB SEAGATE hard disk is installed.
	Lev. 02		Two interruptions are carried out and two 47 Ohm resistors are mounted to ensure that power is supplied to bays 3 and 4 when a 340 MB or 525 MB SEAGATE hard disk is installed.
IF495/R	Nasc.	932986 D	Replaces IF484/R to recover the printed circuit board's cuts and trimmings.
	Lev. 01		To cut production costs, jumpers are not mounted at locations A17LM, A16AM and A083.

**USER DISKETTE**

LEVEL	COMPATIBILITY
Rev. 1.10 Rev. 1.10 B	With this version the Irwin Streaming tape drive with floppy interface is correctly recognized by the system even when it is installed between two floppy disk drives.
Rev. 1.30 Rev. 1.02	This version allows the management of the XGA-2 board, 2.88 MB floppy disk drive and 1 GB hard disk drive.
Rev. 1.03.1	Eliminates the conflict between the streaming tape drive and the second floppy.

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**SYSTEM TEST**

LEVEL	COMPATIBILITY

**POWER SUPPLY UNIT**

POWER SUPPLY	D.R.S CODE	LEVEL	DESCRIPTION
PS40A 220 V PS40A 110 V Magnetek	553087 P 553088 Y	Nasc. Lev. 01	400 W power supply New printed circuit board to recover trimmings.

**COMPATIBILITY NOTES**

BOARD OR HW/SW DEVICE	DESCRIPTION
SCSI hard disk terminators	A SCSI plug is used to terminate both hard disks and disk packs. This plug replaces the internal terminators of the hard disks. This plug will be introduced at the same time as the new GO610 SCSI controller.
XGA-2 board GO2002	The latest User Disk version must be used with this board.

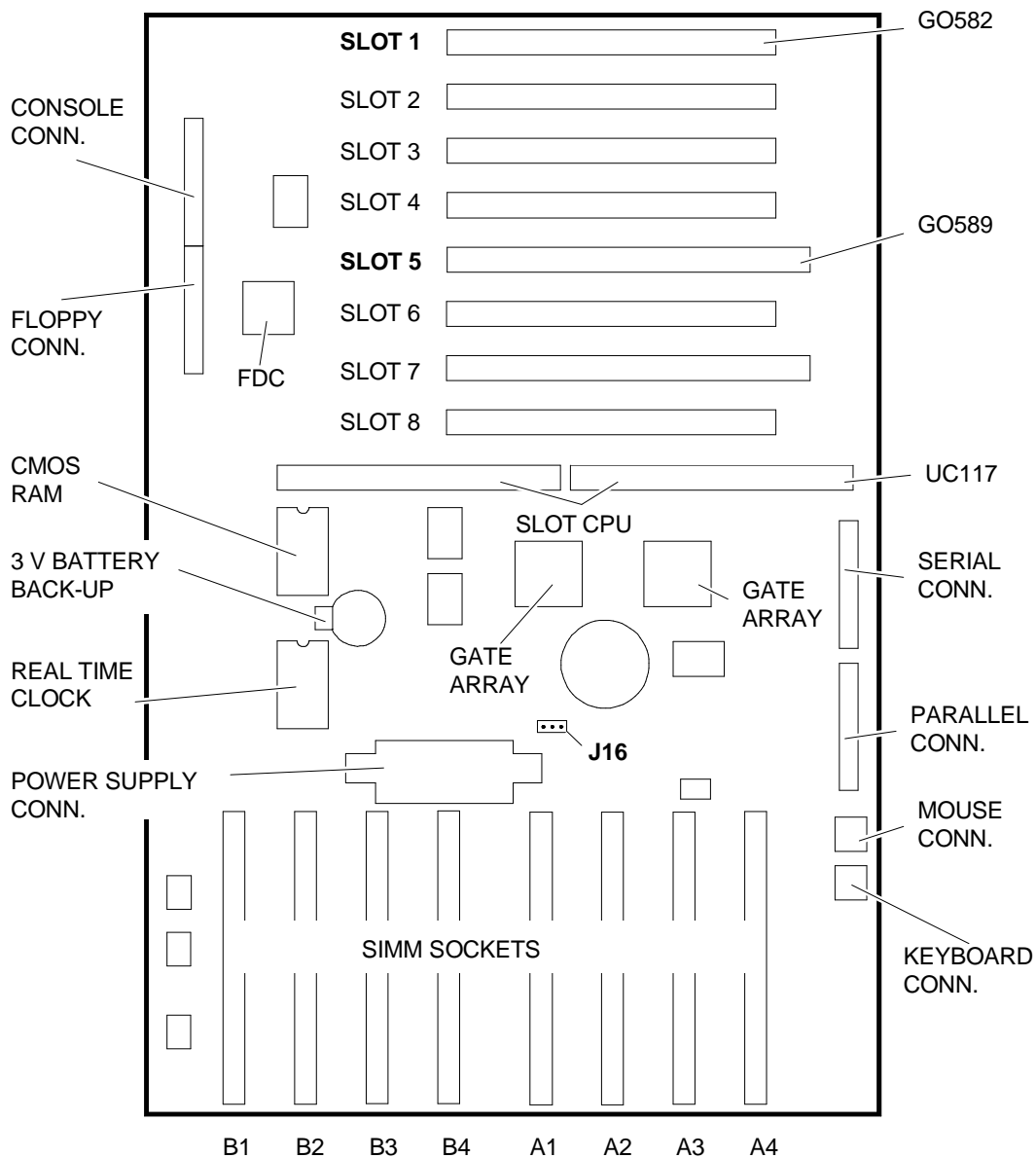
**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, DOS 3.3X, 4.XX, 5.XX and later.  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 IBM Operating System/2 Extended Edition, Ver. 1.1, 1.3 and later OS/2 Presentation Manager Standard and extended edition 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 IBM PC LAN Program	It will only be possible to handle up to seven SCSI HDUs from release 5.xx onwards.

**HARDWARE COMPATIBILITY**

<b>MODEMS</b> Hayes Smartmodem 1200P Hayes Smartmodem 2400P IBM PS/2 300/1200 Internal Modem/A (6450349)	<b>I/O INTERFACE PRODUCTS</b> FUTURE DOMAIN HOST ADAPTER (MCS-350) IBM PS/2 Dual Async Adapter/A (6450347)
<b>EXPANSION MEMORIES</b> 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	<b>MOUSE</b> IBM PS/2 Mouse (6450350) Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti New Advanced Mouse (GRD 25-025)
<b>DISPLAY UNITS</b> IBM PS/2 Monochrome Display 8503 IBM PS/2 Color Display 8512 IBM PS/2 Color Display 8513 IBM PS/2 Color Display 8514	<b>NETWORKING &amp; LAN PRODUCTS</b> IBM PC Network IBM PC Network (Baseband Adapter) IBM Token Ring Network Novell Advanced netware Ver.2.12 3COM Network (Ethernet) 10NET Network
<b>GRAPHICS PRODUCTS</b> IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller	<b>OTHER PRODUCTS</b> SOFTWARE SECURITY Parallel Port Block

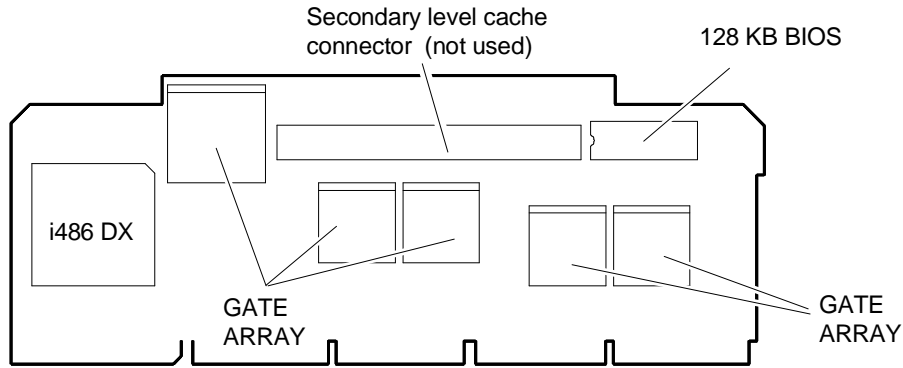
**MOTHERBOARD COMPONENTS AND JUMPERS**



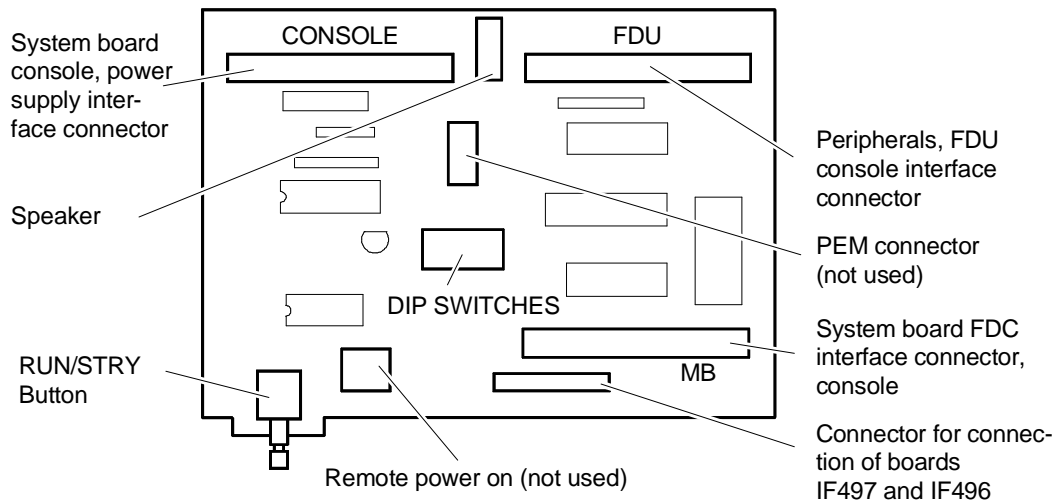
**JUMPER J16** Password erase

To erase the password, position of jumper J16 must be changed. When the password has been erased, the jumper need not be put back in its initial position.

**CPU BOARD COMPONENTS**



**COMPONENTS AND JUMPERS ON CONSOLE BOARD IF496**

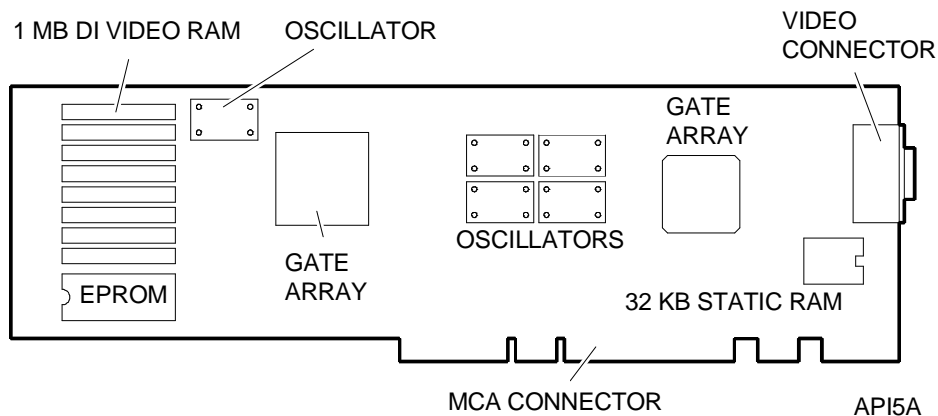


**DIP-SWITCHES** Configuration of floppy disk interface peripherals

BAY	FDU/STU	CONNEC-TOR	DIP-SWITCH							
			1	3	4	5	6	7	8	
FIRST FLOPPY DISK INTERFACE PERIPHERAL (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	OFF OFF
SECOND FLOPPY DISK INTERFACE PERIPHERAL										
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	OFF OFF OFF OFF
THIRD FLOPPY DISK INTERFACE PERIPHERAL										
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	OFF OFF OFF OFF

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

**XGA VIDEO CONTROLLER COMPONENTS**



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**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**

<b>ADDRESS</b>	<b>FUNCTION</b>	<b>ADDRESS</b>	<b>FUNCTION</b>
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	Registro Adapter Enable / 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 8 (DMA mode)

**SYSTEM MEMORY MAP**

<b>ADDRESS</b>	<b>SIZE</b>	<b>FUNCTION</b>
00000000 - 0007FFFF	512 KB	System DRAM
00080000 - 0009FFFF	128 KB	I/O RAM
000A0000 - 000BFFFF	128 KB	Video adapter RAM
000C0000 - 000DFFFF	128 KB	I/O ROM
000E0000 - 000FFFFFF	128 KB	BIOS
00100000 - 007FFFFFF		System RAM
00800000 - 00FFFFFF		System RAM
01000000 - BFFFFFF		System RAM
C0000000 - C1FFFFFF		Coprocessor
C2000000 - DFFFFFF		System RAM
E0000000 - FFFDFFFF		System RAM
FFFE0000 - FFFFFFF	128 KB	System ROM BIOS



# 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: 1 <sup>st</sup> pair connectors A1 and A2 (mounted) 2 <sup>nd</sup> pair connectors A2 and B2 3 <sup>rd</sup> pair connectors A3 and B3 4 <sup>th</sup> pair connectors A4 and B4 See the figure on page 32-8. The SIMM chips that can be installed are: <b>EXM 29-008</b> 8 MB: Two 4 MB 1 Mb x 40 <b>EXM 29-016</b> 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	<b>XGA board GO2002</b> Installed in an MCA slot on the motherboard
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

1<sup>st</sup> part of the EPROM code on the system board

2<sup>nd</sup> 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

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

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### Termination rules

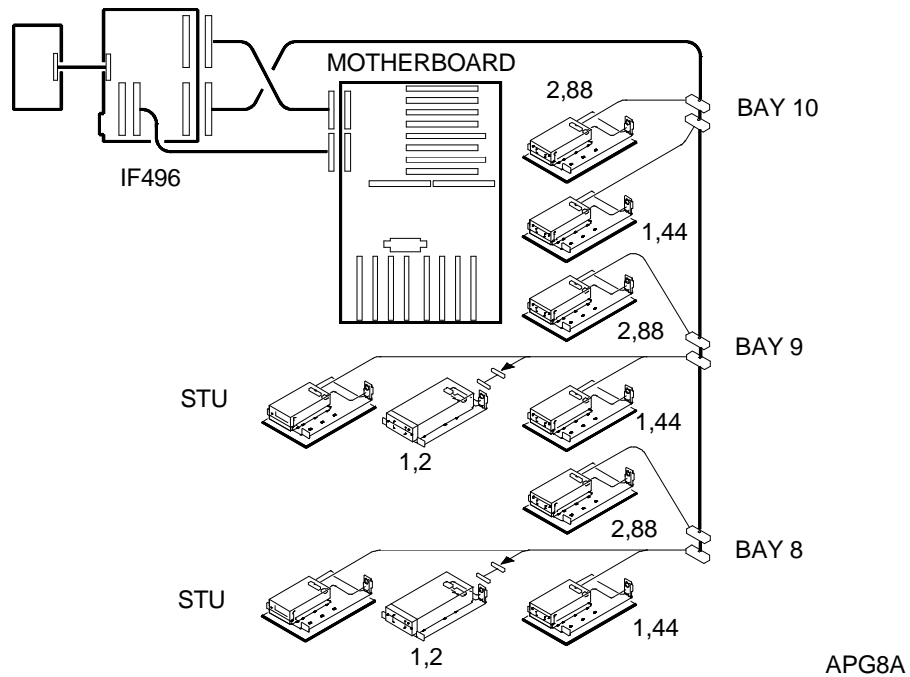
If there are no external SCSI peripherals, the hard disk or primary disk pack in bay 1 and the SCSI controller must always be terminated. If there are external SCSI peripherals connected to the basic module, the terminator must be removed from the SCSI controller and the last external peripheral connected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

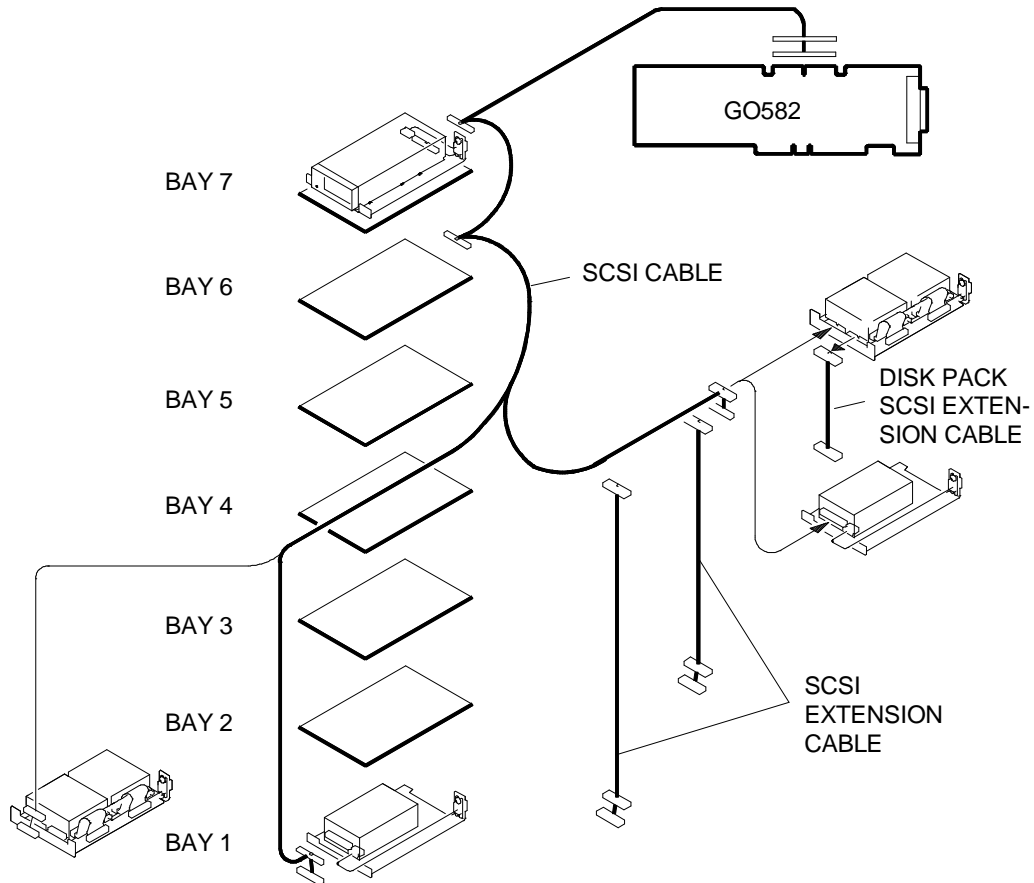


### Wiring of peripherals with SCSI interface

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

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**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**

<b>OPERATING SYSTEM</b>	<b>NOTES</b>
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.

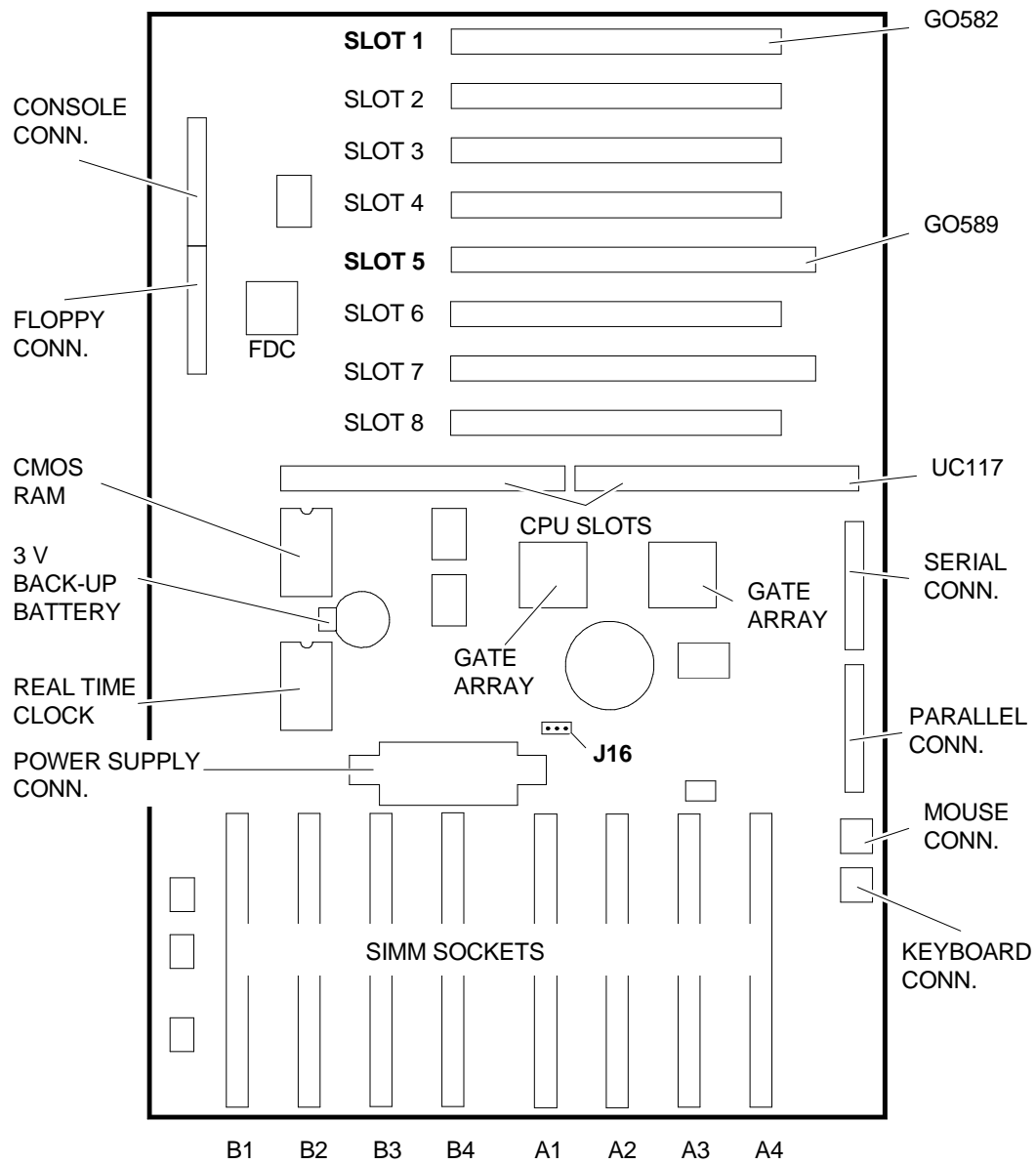
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**HARDWARE COMPATIBILITY**

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



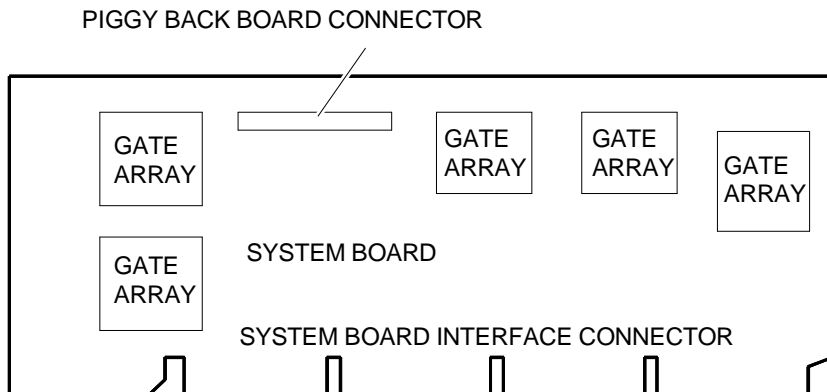
**MOTHERBOARD COMPONENTS AND JUMPERS**



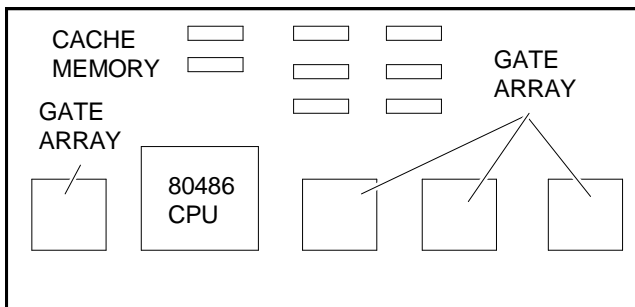
**JUMPER J16** Password erase

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

### CPU BOARD COMPONENTS



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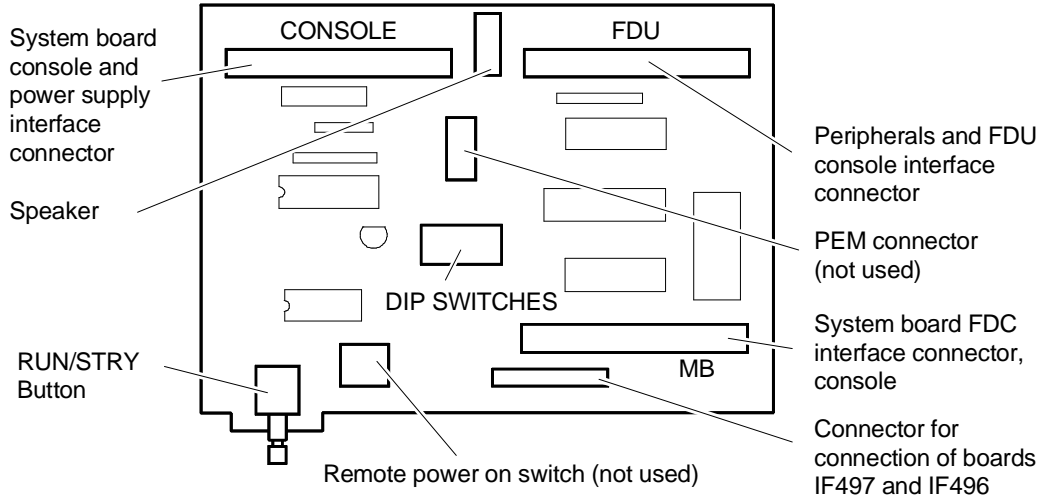


PIGGY BACK BOARD

API9A

There are no jumpers on this board.

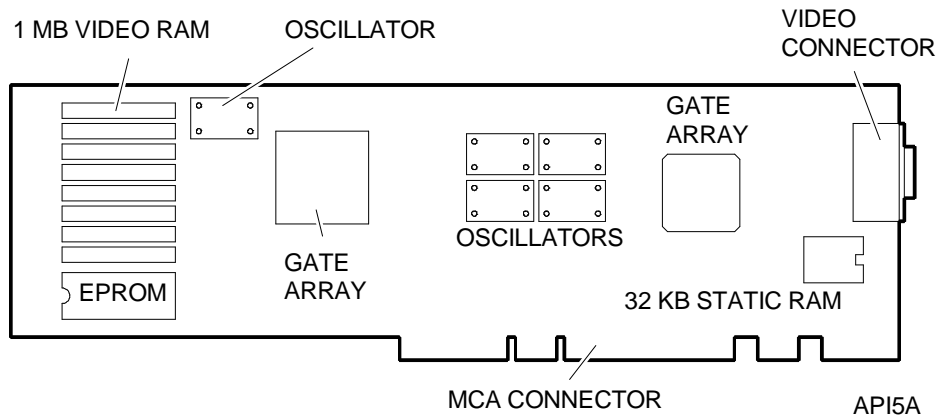
**CONSOLE BOARD IF496 COMPONENTS AND JUMPERS**



**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	Lower	<b>ON</b>	OFF	OFF	OFF	OFF	OFF	OFF	OFF
	2.88 MB FDU	Upper	<b>OFF</b>	OFF	OFF	OFF	OFF	OFF	OFF	OFF
SECOND PERIPHERAL WITH FLOPPY DISK INTERFACE										
9	1.44 MB FDU	Lower	#	<b>ON</b>	<b>ON</b>	OFF	OFF	OFF	OFF	OFF
	2.88 MB FDU	Upper	#	<b>OFF</b>	<b>ON</b>	OFF	OFF	OFF	OFF	OFF
	1.2 MB FDU (with cable )	Lower	#	<b>ON</b>	<b>OFF</b>	OFF	OFF	OFF	OFF	OFF
	80/120 MB STU	Lower	#	<b>OFF</b>	<b>OFF</b>	OFF	OFF	OFF	OFF	OFF
THIRD PERIPHERAL WITH FLOPPY DISK INTERFACE										
8	1.44 MB FDU	Lower	#	#	#	<b>ON</b>	<b>ON</b>	OFF	OFF	OFF
	2.88 MB FDU	Upper	#	#	#	<b>OFF</b>	<b>ON</b>	OFF	OFF	OFF
	1.2 MB FDU (with cable )	Lower	#	#	#	<b>ON</b>	<b>OFF</b>	OFF	OFF	OFF
	80/120 MB STU	Lower	#	#	#	<b>OFF</b>	<b>OFF</b>	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 - 000FFFFFF	128 KB	BIOS
00100000 - 007FFFFFF		System RAM
00800000 - 00FFFFFF		System RAM
01000000 - BFFFFFF		System RAM
C0000000 - C1FFFFFF		Coprocessor
C2000000 - DFFFFFF		System RAM
E0000000 - FFFDFFFF		System RAM
FFFE0000 - FFFFFFF	128 KB	System BIOS ROM



## M290-25

### CHARACTERISTICS

Microprocessor	INTEL 80286
Clock	20 MHz
Architecture	XT/AT with 32-bit addressing
Memory	From 1 MB to 17 MB on the motherboard Banks 0 & 1 1 MB, two 256 KB x 18 bit memory chips soldered Bank 2 On memory expansion board. 2 sockets in which SIMM modules can be installed: 1 M x 9 <b>EXM 25-532</b> (2 MB) 4 M x 9 <b>EXM 26-809</b> (8 MB) Bank 3 Same as bank 2
Memory access	80 ns
Coprocessor	20 MHz 80287
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 C20 1.2 MB 5,25" Panasonic JU 475-4 C20 1.44 MB 3,5" Panasonic JU257 A 293 1.44 MB 3,5" Panasonic JU257 A 294 1.44 MB 3,5" Sony MP-F17W - 86 1.44 MB 3,5" YE DATA YD-702B-6049B
Hard Disk	40 MB QUANTUM LPS 52 AT 40 MB W.D. AC 140 40 MB CONNER CP3044 40 MB CONNER CP3046F 40 MB QUANTUM Pioneer ELS42 AT 85 MB W.D. Caviar 280 85 MB CONNER CP30084E 85 MB QUANTUM Pioneer ELS85 AT 120 MB CONNER CP30126 120 MB W.D. AC 2120 120 MB QUANTUM Pioneer ELS 127 AT
Streaming Tape	120 MB <b>STU 38-120</b> with floppy interface
Slots	Three 16-bit connectors on the expansion BUS board
Video adapter	VGA-compatible integrated on motherboard
HDU and FDU controller	Integrated on motherboard Floppy disk controller: National Hard disk interface: MSI buffers and logic gates
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

<b>MOTHERBOARD</b> BA 08 1 MB
<b>BIOS</b> Latest level: Rev. 2.01
<b>EXPANSION BUS</b> -
<b>POWER SUPPLY</b> 220 V
<b>MOUSE AND KEYBOARD BOARD</b> -
<b>MEMORY EXPANSION BOARD</b> -
<b>HDU LED BOARD</b> M203

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**MOTHERBOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
<b>BA-08</b>	Nasc.	612558T	Rev. 1.04	Motherboard with 1 MB memory.
	Lev. 01		Rev. 2.00	New topcat chip set (82C320A - 82C331A). This implies the addition of a 2 KOhm 1/4 W pull-up resistor R301 at location U 27, between CPU pins 5 and 62.
	Lev. 02		Rev. 2.01	<ul style="list-style-type: none"> <li>- New BIOS to solve the following problems:</li> <li>- Random system crashes</li> <li>- No system bootstrapping</li> <li>- Incorrect management of the S-RAM board and of the A20 GATE signal</li> <li>- New hard disk table</li> <li>- Video controller WD90C11 has been replaced by the equivalent controller WD90C11A-LR.</li> </ul>
	Lev. 03		Rev. 2.01	The new WD90C11-LR video controller replaces the WD90C11.
	Lev. 04		Rev. 2.01	The new ICS90C61 VGA clock generator replaces the WD90C61.

**KEYBOARD AND MOUSE INTERFACE BOARD**

	LEVEL	D.R.S. CODE	NOTES
	Nasc.	731143V	Integrating: Lithium batteries Interface connectors for keyboard and mouse CMOS RAM

**LED HARD DISK BOARD**

	LEVEL	D.R.S. CODE	NOTES
<b>M203</b>	Nasc.	059135X	
	Lev. 02		The DIODE has been replaced

**MOTHERBOARD INTEGRATED CONTROLLERS**

MOTHERBOARD	INTEGRATED CONTROLLERS
BA-08	<b>80286 CPU</b> 20 MHz microprocessor Soket for <b>i387SX</b> numeric coprocessor <b>8042</b> Keyboard and mouse controller <b>WD90C11</b> V.G.A. video controller <b>87C310</b> Serial and parallel port controller <b>NATIONAL</b> Floppy disk controller <b>MSI buffer</b> Intelligent hard disk interface <b>27C010</b> BIOS Eprom <b>TOPCAT</b> System controller <b>82C320</b> BUS controller <b>82C331</b>

**BOARDS**

**32**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU sytem board	BA-08	413251T	1 MB
220 V Power supply		413079S	
BUS Adapter board		029231Z	
Memory expansion board		059189E	
Keyboard and mouse board		030055Z	
Hard disk LED board		059135X	

**USER DISKETTE**

LEVEL	COMPATIBILITY
Rel. 1.89	-

**SYSTEM TEST**

LEVEL	COMPATIBILITY
Rev. 2.06	-

**POWER SUPPLY UNIT**

POWER SUPPLY	LEVEL	DESCRIPTION
220 V	Nasc.	
	Lev. 03	With this level the power supply was made to comply with Danish norms.

**COMPATIBILITY NOTES**

BOARD OR HW/SW DEVICE	DESCRIPTION
-	-

**SOFTWARE DRIVERS**

DRIVER	NOTES
EMS/LIM Ver. 4.0	For extended and expanded memory management.



**BIOS**

LEVEL	NOTES
Rev. 2.00	-
Rev. 2.01	This release solves the following: <ul style="list-style-type: none"> <li>- Random system crashes</li> <li>- No system bootstrapping</li> <li>- Incorrect management of the S-ROM board and of the A 20 GATE signal.</li> <li>- New hard disk table</li> </ul>

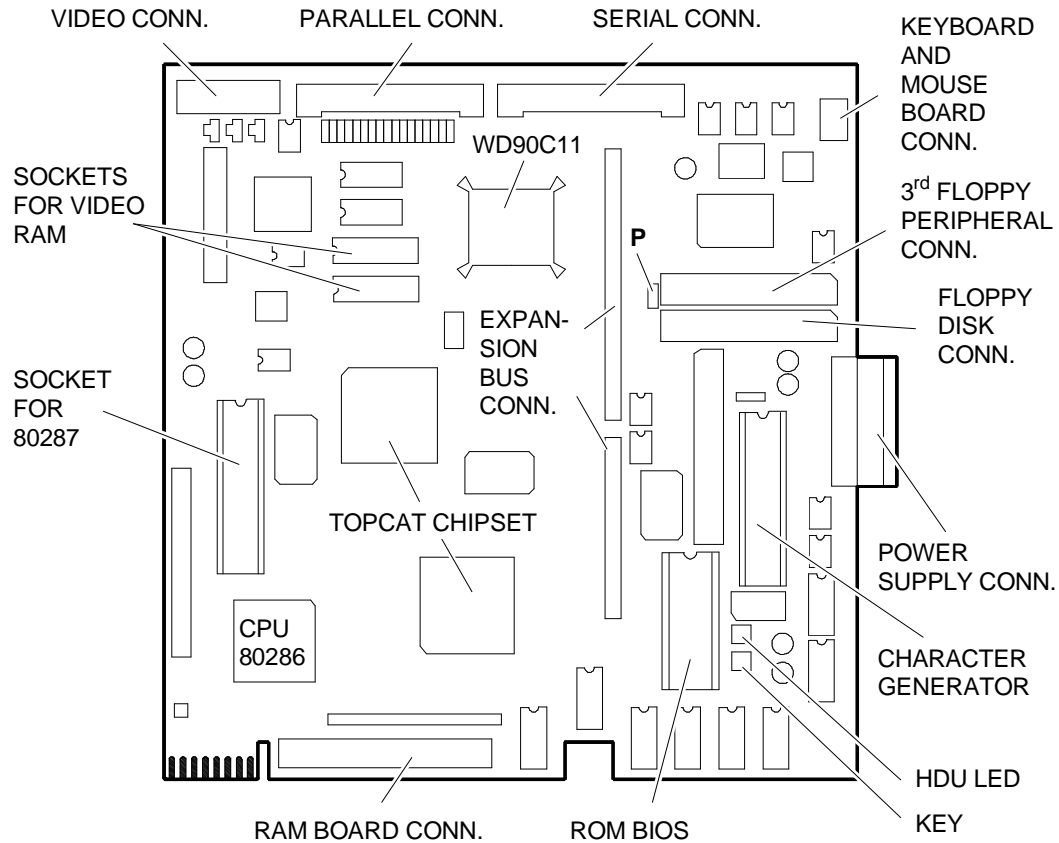
**SOFTWARE COMPATIBILITY**

OPERATING SYSTEMS	NOTES
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20  IBM Operating System/2 Extended Edition, Ver. 1.10 and 1.20 INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	 A formatted DSDD diskette is required during installation on hard disk The PS/2 mouse is not acknowledged The PS/2 mouse is not acknowledged
<b>WINDOWS</b>	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/P INTERFACE PRODUCTS</b>
Hayes Smart modem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 GEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
<b>MULTIPOINT</b>	<b>MOUSE</b>
CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) IBM PS/2 Mouse Serial Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
<b>GRAPHIC PRODUCTS</b>	<b>NETWORK &amp; LAN PRODUCTS</b>
AST VGA plus FASTWRITE 1024i FASTWRITE VGA HERCULES GRAPHICS CARD IBM VGA Adapter MATROX PG - 1281 MAXON MVGA-16 Adapter ORCHID PRODESIGNER VGA PLUS HERCULES INCOLOR CARD (GB222) PARADISE VGA PRO CARD	10 NET INTERFACE BOARD 200 series 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C505 DECNET PCSA adapter IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter MICOM NP1000 adapter NOVELL NE1000 adapter NOVELL NE2000 adapter
<b>DISPLAY UNITS</b>	
IBM enhanced graphics monitor 5151 IBM color graphics monitor 5153 IBM PS/2 Monochrome display 8503 IBM PS/2 color display 8512 IBM PS/2 color display 8513 IBM PS/2 color display 8514 NEC MULTISYNC II	NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D PHILIPS 7BM749 PHILIPS 9CM082

**COMPONENTS AND JUMPERS ON THE SYSTEM BOARD**



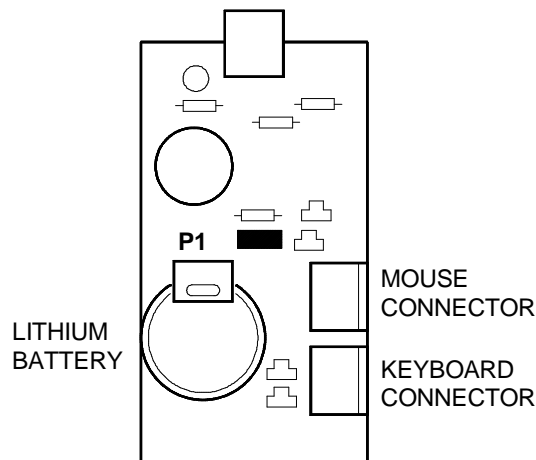
AMD3A

**JUMPER P**

Position 1-2  
Position 2-3

Normal operation  
Erases the password

**COMPONENTS AND JUMPERS OF THE KEYBOARD AND MOUSE BOARD**



ANG1A

**P1** inserted:

Battery enabled, data present in CMOS RAM

**P1** not inserted:

Battery disabled, no data in the CMOS RAM

## BUILT IN SETUP and EXTENDED SETUP Utilities

### BUILT IN SETUP

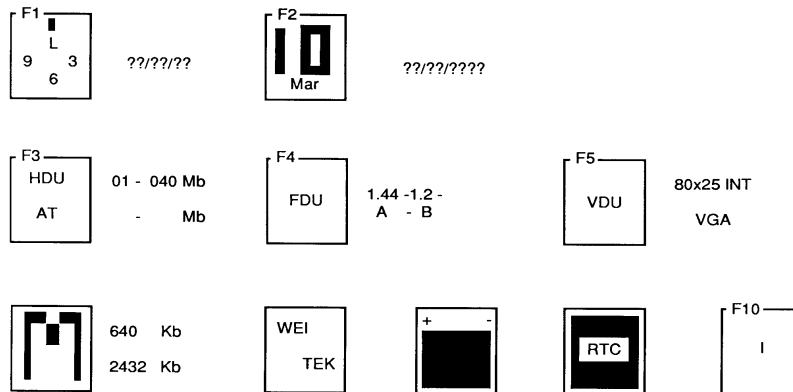
This program, resident in ROM BIOS, allows users to change some of the Personal Computer configuration parameters.

There are two possibilities:

First case: If the information in the CMOS RAM is no longer valid or if the power battery is not charging, the screen will display the BUILT IN SETUP. Users can select the national language version they wish to work in from a choice of 6 languages.

Second case: If the system configuration has been modified, only the icon of the device to be added or changed in the CMOS RAM will be displayed. For instance, after installing a second floppy disk the floppy disk icon will be displayed.

In both cases, this BUILT IN SETUP screen will be displayed automatically, without any operator action.



**F1** To modify hour, minutes and seconds.

**F2** To modify day, month and year.

**F3** Press this key to select hard disk type and capacity. Press the space bar until the correct value is displayed. The following table lists the hard disks that can be installed in this system.

TYPE	MODEL	CAPACITY	CYL	T	SECTORS PER TRACK
01	W.D. AC 140	40 MB	980	5	17
02 *	QUANTUM LPS 52 AT CONNER CP 3044 CONNER CP 3046F QUANTUM ELS42 AT				
02	W.D. CAVIAR AC 280	85 MB	977	10	17
04 *	CONNER CP 30084E QUANTUM ELS85 AT				
03	W.D. AC-2120	120 MB	762	8	39
06*	CONNER CP 30126 QUANTUM ELS127 AT				

**Where:** T: No. of heads  
 CYL: No. of cylinders  
 (\*) With BIOS 2.01

**F4** Press this key to select capacity of the floppy disk. Three fields will be displayed beside the icon, according to the number of drives (1, 2 or 3) in the system; enter the capacity of the floppy disk installed in the corresponding field.

The line underneath shows the letters A (for one drive only), A - B (for two drives) or A - B - X (for three drives). These are the logic names of the drives.

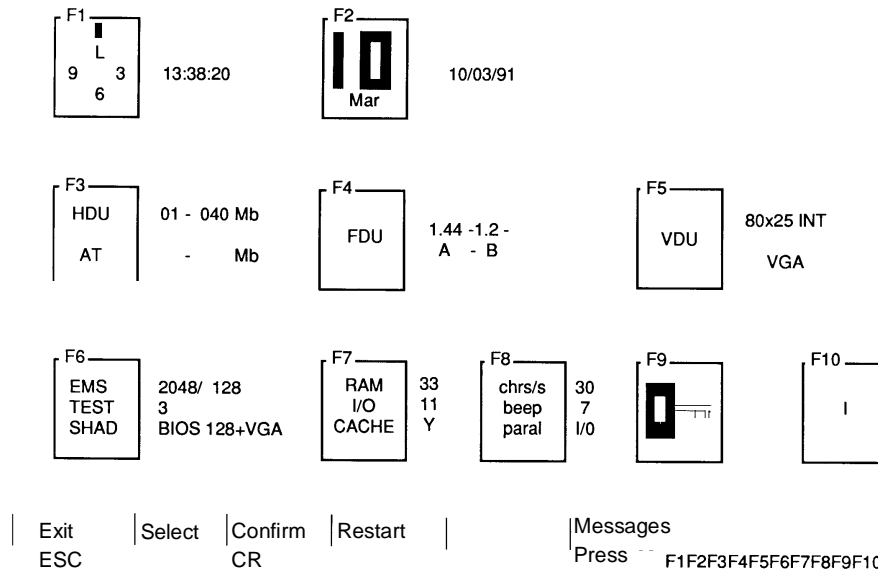
**NOTE:** To install a floppy interface streaming tape, the data field corresponding to this unit must not contain any value and the drive must have logic name B associated with it.

**F5** Press this key to select video format when the system is switched on.

<b>Memory</b>	The information in this field cannot be changed since its only purpose is to inform the user of system memory capacity. The System or Customer Test diskette will be needed if you wish to change system memory size.
<b>Numeric coprocessor</b>	This icon is displayed only when the WEITEK coprocessor is installed and is for the information of the user only.
<b>Batteries</b>	This icon is displayed only when the system is switched on for the first time or when the system batteries are not charging.
<b>Real time clock</b>	This icon blinks when there is a failure of the system's <i>Real Time Clock</i> .
<b>Language</b>	It is possible to select the language in which to have the messages of the BUILT IN SETUP displayed. There are six languages to choose from.

### EXTENDED BUILT IN SETUP

In addition to the BUILT IN SETUP utility, there is another utility called EXTENDED BUILT IN SETUP with which other parameters of the system can be configured. This utility can be called by the operator by pressing the keys SHIFT, CTRL, ALT and DEL at the same time.



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This menu includes all icons of the BUILT IN SETUP and allows the system to be configured as described previously.

The following other configuration parameters have been added:

- F6** EMS Used to modify capacity of the extended memory and memory expansion.
- TEST Used to reduce the number of tests made on the system memory during the power-on diagnostics.
- SHAD Used to assign a quantity of shadow memory to the BIOS and specific areas of memory.
- F7** RAM Used to modify system speed from the default value of (33 MHz) to 14 MH.,
- I/O Used to modify the system BUS speed from the default value of 11 MHz to the AT standard speed of 8 MHz.
- F8** CHR/S Used to modify character repeat speed when the associated keys are pressed. This key repeat value is expressed as a number of characters per second.
- BEEP Used to increase or decrease speaker volume.
- PARAL Used to change direction of the parallel port.
- F9** The system allows the user to enter a **PASSWORD**.

**INTERRUPT LEVELS**

LEVEL	NAME	CONTROLLER	FUNCTION
1	NMI		Parity error
2	IRQ0	1	Channel 0 timer OUT
3	IRQ1	1	Keyboard
4	RQ8	2	Real time clock
5	IRQ9	2	Software redirected to INT 0AH (IRQ2)
6	IRQ10	2	Available
7	IRQ11	2	Available
8	IRQ12	2	Mouse
9	IRQ13	2	Available
10	IRQ14	2	Hard Disk controller
11	IRQ15	2	Available
12	IRQ3	2	Serial port 2
13	IRQ4	1	Serial port 1
14	IRQ5	1	Parallel port 2
15	IRQ6	1	Floppy Disk controller
16	IRQ7	1	Parallel port 1

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-00F	DMA controller 1	2B0-2DF h	Video control registers
020-02F h	Interrupt controller 1	2E1 h	Reserved
040-05F h	Timer	2E2 h & 2E3 h	Reserved
060 h	Keyboard data controller	3F8-2FF h	COM2 serial port
061	System control port B	300-31F h	Reserved
064 h	Keyboard commands controller	360-363 h	Part low of the address
070 - 07F	Real time clock, NMI, CMOS RAM	364-367 h	Reserved
080-09F h	DMA page registers	368-36B h	Part high of the address
0A0-0AF h	Interrupt controller 2	36C-36F h	Reserved
0E8-0EF h	I/O control registers	378-37F h	Parallel port 1 (LPT1)
0F0 h	Cancel math coprocessor operation	380-38F h	SDLC (Synchronous Data Link Control )
0F1	Resets the math coprocessor	3A0-3AF h	SDLC (Synchronous Data Link Control)
0A8-0FF h	Math coprocessor	3B0-3BF h	Video control registers
1F0-1FF h	Hard disk drive	3C0-3CF h	Video control registers
200-20F	Game port	3D0-3DF h	Video control registers
21F h	Audio communications adapter	3F0-3F7	Hard disk controller
278-27F h	Parallel port 2 (LPT2)	3F8-3FF	Serial port 1 (COM1)

**SYSTEM MEMORY MAP**

<b>ADDRESS</b>	<b>FUNCTION</b>
000000 - 0003FF h	Interrupt vectors
000400 - 005FF h	ROM BIOS data area
000700 - 09FFFF h	Portion of the resident MS-DOS operating system and program area
0A0000 - 0BFFFF h	Video buffer
0C0000 - 0DFFFF h	Available for optional ROM
0E0000 - 0EFFFF h	Video BIOS
0F0000 - 0FFFFFF h	System BIOS



## M300-04

### CHARACTERISTICS

Microprocessor	INTEL 386SX
Clock	20 MHz
Architecture	XT/AT with 32-bit addressing
Memory	From 3 MB to 17 MB on motherboard Banks 0 & 1 1 MB, two 256 KB x 18 bit memory chips soldered Bank 2 2 sockets on which to install SIMM modules: 1 M x 9 <b>EXM 25-532</b> (2 MB) 4 M x 9 <b>EXM 26-809</b> (8 MB) Bank 3 Same as bank 2
Memory access	80 ns
Coprocessor	20 MHz i387SX
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 C20 1.2 MB 5.25" Panasonic JU 475-4 C20 1.44 MB 3.5" Panasonic JU257 A 293 1.44 MB 3.5" Panasonic JU257 A 294 1.44 MB 3.5" Sony MP-F17W - 86 1.44 MB 3.5" YE DATA YD-702B-6049B
Hard Disk	40 MB QUANTUM LPS 52 AT 40 MB W.D. AC 140 40 MB CONNER CP3044 40 MB CONNER CP3046F 40 MB QUANTUM Pioneer ELS42 AT 85 MB W.D. Caviar 280 85 MB CONNER CP30084E 85 MB QUANTUM Pioneer ELS85 AT 120 MB CONNER CP30126 120 MB W.D. AC 2120 120 MB QUANTUM Pioneer ELS127 AT
Streaming Tape	120 MB <b>STU 38-120</b> with floppy interface
Slots	Three 16-bit connectors on the BUS expansion board
Video adapter	VGA-compatible integrated on motherboard WD90C11
HDU and FDU controller	Integrated on motherboard Floppy disk controller: National 87C311 Hard disk interface: MSI buffers and logic gates
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

#### MOTHERBOARD

3 MB

#### BIOS

1.04

#### EXPANSION BUS

-

#### POWER SUPPLY

M203 220 V

M203 115 V

#### KEYBOARD AND MOUSE BOARD

-

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**MOTHERBOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
	Nasc.	413407 R	Rev. 1.04	Motherboard with 3 MB of RAM
	Lev. 01		Rev. 1.04	The WD90C11 video controller has been replaced with the equivalent WD90C11A-LR controller.

**KEYBOARD AND MOUSE INTERFACE BOARD**

	LEVEL	D.R.S. CODE	NOTES
	Nasc.	030066 U	Integrating: Lithium batteries Interface connectors for keyboard and mouse CMOS RAM

**MOTHERBOARD INTEGRATED CONTROLLERS**

MOTHERBOARD	INTEGRATED CONTROLLERS
	<b>386SX CPU</b> 20 MHz microprocessor Socket for <b>i387SX</b> numeric coprocessor <b>8042</b> Keyboard and mouse controller <b>WD90C11</b> V.G.A. video controller <b>87C310</b> Serial and parallel port controller <b>NATIONAL</b> Floppy disk controller <b>Buffer MSI</b> Intelligent hard disk interface <b>27C010</b> BIOS EPROM <b>TOPCAT</b> System controller <b>82C320</b> BUS controller <b>82C331</b>

**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU system board		413407R	3 MB
Power supply 220 V	M203	413079S	
Power supply 110 V	M203	413416H	
BUS Adapter board		029231Z	
Keyboard mouse board		030066U	

**USER DISKETTE**

LEVEL	COMPATIBILITY
Rel. 1.88	–

**SYSTEM TEST**

LEVEL	COMPATIBILITY
Rev. 2.08	–

**POWER SUPPLY UNIT**

POWER SUPPLY	LEVEL	DESCRIPTION
M203 110 V	Lev. Nasc.	With this level the power supply is made to comply with Danish norms.
M203 220 V	Lev. Nasc.	
	Lev. 03	

**COMPATIBILITY NOTES**

BOARD OR HW/SW DEVICE	DESCRIPTION
-	-

**SOFTWARE DRIVERS****33**

DRIVER	NOTES
LIM EMM386	For the management of expanded and extended memory.

**BIOS**

LEVEL	NOTES
Rev. 1.04	-

**SOFTWARE COMPATIBILITY**

OPERATING SYSTEMS	NOTES
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01 IBM Operating System/2, Ver. 1.10 and 1.20 IBM Operating System/2 Extended Edition, Ver. 1.10 and 1.20 INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	A formatted DSDD diskette is required during installation on hard disk The PS/2 mouse is not acknowledged The PS/2 mouse is not acknowledged
WINDOWS	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<b>MODEM</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smart modem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 CEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
<b>MULTIPOINT</b>	<b>MOUSE</b>
CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) IBM PS/2 Mouse Serial Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
<b>GRAPHICS PRODUCTS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
AST VGA plus FASTWRITE 1024i FASTWRITE VGA HERCULES GRAPHICS CARD IBM VGA Adapter MATROX PG - 1281 MAXON MVGA-16 Adapter ORCHID PRODESIGNER VGA PLUS HERCULES INCOLOR CARD (GB222) PARADISE VGA PRO CARD	10 NET INTERFACE BOARD 200 series 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C505 DECNET PCSA adapter IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter MICOM NP1000 adapter NOVELL NE1000 adapter NOVELL NE2000 adapter
<b>DISPLAY UNITS</b>	
IBM enhanced graphics monitor 5151 IBM color graphics monitor 5153 IBM PS/2 Monochrome display 8503 IBM PS/2 color display 8512 IBM PS/2 color display 8513 IBM PS/2 color display 8514 NEC MULTISYNC II	NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D PHILIPS 7BM749 PHILIPS 9CM082



## BUILT IN SETUP and EXTENDED SETUP Utilities

### BUILT IN SETUP

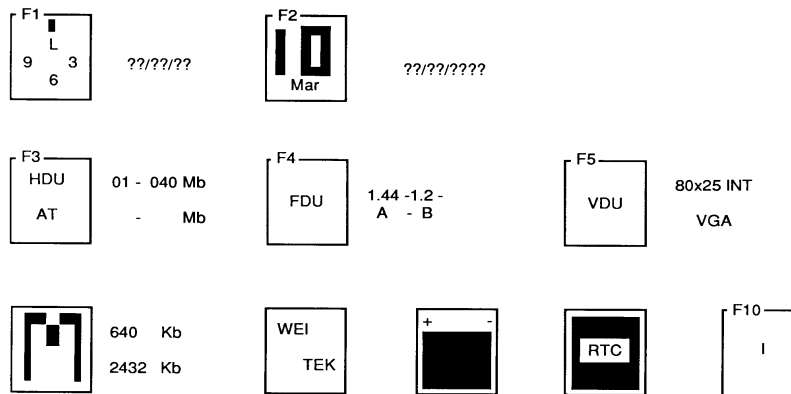
This program, resident in ROM BIOS, allows users to change some of the Personal Computer configuration parameters.

There are two possibilities:

First case: If the information in the CMOS RAM is no longer valid or if the power battery is not charging, the screen will display the BUILT IN SETUP. Users can select the national language version they wish to work in from a choice of 6 languages.

Second case: If the system configuration has been modified, only the icon of the device to be added or changed in the CMOS RAM will be displayed. For instance, after installing a second floppy disk the floppy disk icon will be displayed.

In both cases, this BUILT IN SETUP screen will be displayed automatically, without any operator action.



**F1** To modify the system hour, minutes and seconds.

**F2** To modify the system day, month and year.

**F3** Press this key to select hard disk type and capacity. Press the space bar until the correct value is displayed. The following table lists the hard disks that can be installed in the system.

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
01	W.D. AC-140 3.5" 19 ms Quantum LPS 52 AT CONNER CP3044 CONNER CP3046F QUANTUM ELS42 AT	40 MB	980	5	-1	980	17
02	W.D. Caviar AC-280 CONNER CP30084E QUANTUM ELS85 AT	85 MB	977	10	-1	977	17
03	W.D. AC-2120 CONNER CP30126 QUANTUM ELS127 AT	120	762	8	-1	762	39

**Where:** CYL: No. of disk cylinders

WPC: Precompensation cylinder number

T: No. of disk heads

LZ: Head parking cylinder number

SET: No. of disk sectors

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**F4** Press this key to select capacity of the floppy disk. Three fields will be displayed beside the icon, in function of the number of drives (1, 2 or 3) in the system; enter the capacity of the floppy disk installed in the corresponding field.

The line underneath shows the letters A (for one drive only), A - B (for two drives) or A - B - X (for three drives). These are the logic names of the drives.

**NOTE:** To install a floppy interface streaming tape, the data field corresponding to this unit must not have any value and the drive must have logic name B associated with it.

**F5** Press this key to select the video format when the system is switched on.

**Numeric coprocessor** This icon is displayed only when the WEITEK coprocessor is installed and is for the information of the user only.

**Batteries** This icon is displayed only when the system is switched on for the first time or when the system batteries are not charging.

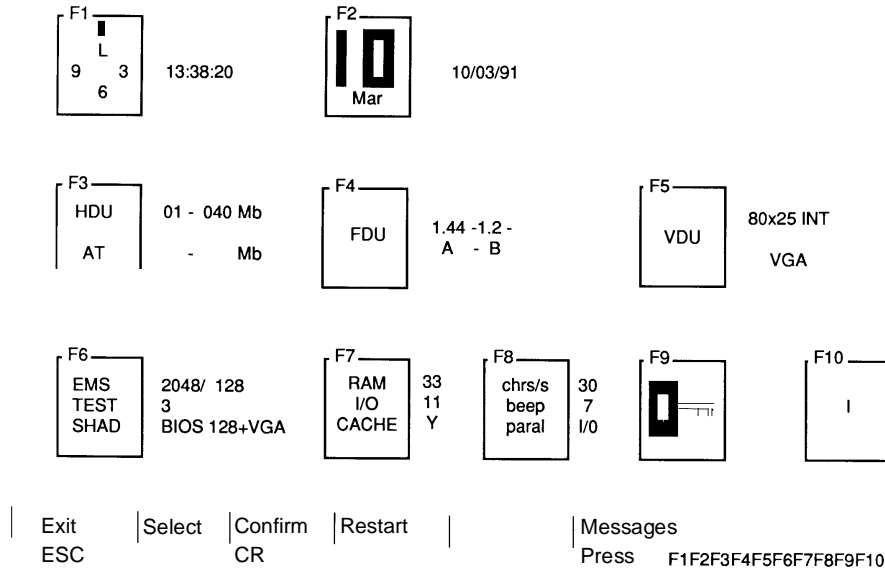
**Real time clock** This icon blinks when there is a failure of the system's *Real Time Clock*.

**Language** It is possible to select the language in which to have the messages of the BUILT IN SETUP displayed. Six languages are available.

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## EXTENDED SETUP

In addition to the BUILT IN SETUP utility, there is another utility called EXTENDED SETUP with which other system parameters can be configured. This utility can be called by the operator by pressing the SHIFT, CTRL, ALT and DEL keys simultaneously.



This menu includes all icons of the BUILT IN SETUP and allows the system to be configured as described previously.

The following other configuration parameters have been added:

- F6** EMS Used to modify capacity of the extended memory and memory expansion.
- TEST Used to reduce the number of tests made on the system memory during power-on diagnostics.
- SHAD Used to assign a quantity of shadow memory to the BIOS and to defines specific areas of memory.
- F7** RAM Used to modify system speed from the default value (33 MHz) to 14 MH.
- I/O Used to modify the system BUS speed from the default value of 11 MHz to the AT standard speed of 8 MHz.
- F8** CHR/S Used to modify character repeat speed when the associated keys are pressed. This key repeat value is expressed as a number of characters per second.
- BEEP Used to increase or decrease speaker volume.
- PARAL Used to change direction of the parallel port.
- F9** The system allows the user to enter a **PASSWORD**



**INTERRUPT LEVELS**

LEVEL	NAME	CONTROLLER	FUNCTION
1	NMI		Parity error
2	IRQ0	1	Channel 0 timer OUT
3	IRQ1	1	Keyboard
4	IRQ8	2	Real time clock
5	IRQ9	2	Software redirected to INT 0AH (IRQ2)
6	IRQ10	2	Available
7	IRQ11	2	Available
8	IRQ12	2	Mouse
9	IRQ13	2	Available
10	IRQ14	2	Hard Disk controller
11	IRQ15	2	Available
12	IRQ3	2	Serial port 2
13	IRQ4	1	Serial port 1
14	IRQ5	1	Parallel port 2
15	IRQ6	1	Floppy Disk controller
16	IRQ7	1	Parallel port 1

**33****I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller (channels 0 - 3)	0F8-0FF h	Math coprocessor
020-03F h	Interrupt controller 1	1F0-1F7 h	Hard disk drive (HCS0 selection)
040-043 h	Timer	278-27F h	Parallel port 2
060 h	Keyboard data controller	2F8-2FF h	Serial port COM2 (alternative)
061- 06F h	System control port B	378-37F h	Parallel port 1 (default)
064 h	Keyboard commands controller	3C0 - 3DF h	Video adapter
070 - 071 h	Real time clock, NMI, CMOS RAM	3F2 h	Floppy disk controller
080-08F h	DMA page registers	3F3 h	Super I/O configuration register
092 h	System control port A	3F4- 3F5 h	Floppy disk controller
0A0-0BF h	Interrupt controller 2	3F6-3F7 h	Hard disk drive (HCS1 selection)
0C0-0DE h	DMA channels 4-7	3F7 h	Floppy disk controller
1E0 - 1EF h	TOPCAT registers	3F8-3FF h	Serial port COM 1
0F0 h	Cancels math coprocessor operations	46E8 h	VGA register
0F1 h	Resets the coprocessor		

**SYSTEM MEMORY MAP**

<b>ADDRESS</b>	<b>MEMORY</b>	<b>FUNCTION</b>
00000 - 7FFFF h	512 KB	Conventional memory (0 KB - 512 KB)
80000 - 9FFFF h	128 KB	Basic memory (512 KB - 640 KB)
A0000 - BFFFF h	128 KB	Video adapter RAM
C0000 - DFFFF h	128 KB	Available
E0000 - FFFFF h	128 KB	BIOS/Shadow BIOS
100000 - FFFFFFF h	15 MB	Memory expansion (to the physical addressable limit of the 80386SX CPU)
1000000 - 1FFFFFFF h	1 MB	Memory expansion (to the physical addressable limit of the system)



## M480-10 / M480-20

### CHARACTERISTICS

Microprocessor	i486SX for M480-10, i486 for M480-20
Clock	20 MHz for M480-10, 33 MHz for M480-20
Architecture	XT/AT with 32-bit addressing
Memory	From 4 to 36 MB on the motherboard Bank 0 Eight 514402 chips soldered for a total of 4 MB Bank 1 Four SIMM sockets : 1 MB x 9 <b>EXM 486-04</b> (for 4 MB) or four 4 MB x 9 SIMMs <b>EXM 486-16</b> (for 16 MB) Bank 2 On an expansion board connected to the motherboard through a connector. This bank is identical to bank 1
Memory access	60 ns static column
Coprocessor	WEITEK WTL 4167 at 25 MHz M480-10 i487SX at 25 MHz M480-10 WEITEK WTL 4167 at 33 MHz M480-20
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-3 C20R 1.2 MB 5.25" Panasonic JU 475-4/5 C20R 1.44 MB 3.5" Panasonic JU-257 A - 293 / 294 1.44 MB 3.5" Sony MP-F17 - 86 1.44 MB 3.5" Y-E DATA YD-702B - 6039 B
Hard Disk	120 MB CONNER CP30126 AT 120 MB W.D. AC2120 AT 210 MB CONNER CP3206 / CP30256 AT 210 MB QUANTUM LPS240 AT 240 MB CONNER CP30254 340 MB CONNER CP3304 AT 510 MB CONNER CP3504 AT 510 MB CONNER CP3544 AT 510 MB CONNER CP30544 AT 210 MB CONNER CP3200F SCSI 210 MB CONNER CP30200 SCSI 510 MB CONNER CP3500 SCSI 510 MB CONNER CP3540 SCSI 525 MB CONNER CP30540 SCSI
Streaming Tape	120 MB STU 38-120 with floppy interface 150 MB WANGTEK with SCSI Interface 320 MB WANGTEK with SCSI Interface
Slots	Six 16-bit connectors
Video adapter	VGA-compatible 82C453 integrated on the motherboard
Integrated FDU controller AT HDU controller	Floppy disk controller: National 87310 Hard disk interface: MSI buffers and logic gates
SCSI HDU controller	Board to be installed on ASC-1 BUS
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

#### MOTHERBOARD

Earlier models:  
 M480-10: 486 SX 4 MB  
 M480-20: 486 SX 4 MB

New models:  
 M480-10: BA372  
 M480-20: BA371

#### BIOS

Earlier models:  
 1.03 for M480-10  
 1.06 for M480-20

New models:  
 2.07 for M480-10  
 2.08 for M480-20

#### EXPANSION BUS

#### POWER SUPPLY

OS - 020  
 Earlier models  
 OS - 020A  
 New models

These personal computers are available in two versions:

- 1 - With AT IDE hard disk interface
- 2 - With SCSI hard disk interface

The following table shows the main differences between the different versions and models of the M480-10 and M480-20 Personal Computers.

PERSONAL COMPUTER	VERSION	MODEL	CHARACTERISTICS
M480-10	IDE AT	PREVIOUS MODEL Can be recognized as it uses BIOS rel. 1.XX	Processor 20 MHz i486 SX Coprocessor WEITEK and i487 SX Built in setup Available Security feature Not available BIOS Rev. 1.XX System Test M300-04, M290-25, M480-10/20 HDU controller On system board Possibility of installing two 1.44 MB floppy disk drives
		NEW MODEL Can be recognized as it uses BIOS rel. 2.XX and has an ID plate on its rear panel	Processor i486 SX Clock 20 MHz Coprocessore WEITEK and i487 SX Built in setup Not available Security feature Available BIOS Rev. 2.XX System Test M480-10, M480-20 Rel.3.XX HDU controller On system board Two 1.44 MB floppy disk drives cannot be installed
	SCSI	-	Processor 20 MHz i486 SX Coprocessor WEITEK and i487 SX Built in setup Not available Security feature Available BIOS Rev. 2.XX System Test M480-10, M480-20 Rel 3.XX HDU controller ASC-1/A board Two 1.44 MB floppy disk drives cannot be installed
M480-20	IDE AT	PREVIOUS MODEL Can be recognized as it uses BIOS rel. 1.XX	Processor 33 MHz i486 Coprocessor WEITEK Built in setup Available Security feature Not available BIOS Rev. 1.XX System Test M300-04, M290-25, M480-10/20 HDU controller On system board Possibility of installing two 1.44 MB floppy disk drives
		NEW MODEL Can be recognized as it uses BIOS rel. 2.XX and has an ID plate on its rear panel	Processor 33 MHz i486 SX Coprocessor WEITEK Built in setup Not available Security feature Available BIOS Rev. 2.XX System Test M480-10, M480-20 Rel.3.XX HDU controller On system board Two 1.44 MB floppy disk drives cannot be installed
	SCSI	-	Processor 33 MHz i486 SX Coprocessor WEITEK Built in setup Not available Security feature Available BIOS Rev. 2.XX System Test M480-10, M480-20 Rel 3.XX HDU controller ASC-1/A board Two 1.44 MB floppy disk drives cannot be installed

**MOTHERBOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
486 SX	Nasc.	612543 X	Rev. 1.01	System board of the previous M480-10 model with 4 MB of soldered memory
	Lev. 01		Rev. 1.02	New BIOS so that new hard disks can be added
	Lev. 02		Rev. 1.03	New BIOS to solve the problems with Windows 3.1.
BA372	Nasc.	553101 S	Rev. 2.06	System board of the new M480-10 model with 4 MB of soldered memory. This board is introduced with the new User Diskette and the new System Test Rev. 3.00.
	Lev. 02			Introduction of the new ACER I/O controller 87310 as an alternative to the National Super I/O controller
	Lev. 02		Rev. 2.07	New BIOS to solve the problems with Windows 3.1.
	Lev. 02		Rev. 2.08	New BIOS to correct the problems with the printers. This new BIOS does not change board level.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
486/33	Nasc.	612544 Y	Rev. 1.01	System board of the previous M480-20 model with 4 MB of soldered memory.
	Lev. 01		Rev. 1.05	New BIOS to solve the parity error that occurs when more than 4 MB of DRAM are installed.
	Lev. 02		Rev. 1.06	New BIOS to solve the problems with Windows 3.1.
BA371	Nasc.	553102 T	Rev. 2.07	System board of the new M480-20 model with 4 MB of soldered memory. This board is introduced with the new User Diskette and the new System Test Rev. 3.01.
	Lev. 02			Introduction of the new ACER I/O controller 87310 as an alternative to the National Super I/O controller
	Lev. 02		Rev. 2.08	New BIOS to solve the problems with Windows 3.1. This new BIOS does not change board level.
	Lev. 03 SI		Rev. 2.08	To correct the loss of synchronism with the DVA 4000 board, the two 2200 pF capacitors at location F26 and F27 have been replaced by two 100 pF EMI filters. <b>This modification is only valid at field level, therefore board level changes from 03 to 03SI.</b>
	Lev. 04 SI		Rev. 2.08	Component 74ALS32 at location U14 is replaced by NATIONAL's component 74ALS32. This modification corrects problem with the monitor not working correctly when expansion boards are installed on the bus. This problem only occurred in SCSI configuration systems.
Lev. 04 SI	Rev. 2.09	New BIOS to correct the problems with the printers. This new BIOS does not change board level.		
BA2046	Nasc.	588054 Z	Rev. 2.08	New board replacing board BA371. The board has been re-designed to host fast page mode RAM and SIMMs. The previous board used static column RAM and SIMMs. Boards BA371 and BA2046 are interchangeable <u>as long as memory expansions are made using Fast Page Mode SIMMs.</u>

**MOTHRBOARD INTEGRATED CONTROLLERS**

MOTHERBOARD	INTEGRATED CONTROLLERS
<p>The boards do not differ significantly as far as the main components are concerned.</p>	<ul style="list-style-type: none"> <li>- 20 MHz <b>i486 SX</b> CPU on the M480-10</li> <li>33 MHz <b>i486</b> CPU on the M480-20</li> <li>- Socket for the 25 MHz <b>WEITEK WTL 4167</b> on the M480-10</li> <li>Socket for the 33 MHz <b>WEITEK WTL 4167</b> on the M480-20</li> <li>- Clock generators:14.318 MHz - 16 MHz - 50 MHz for the M480-10</li> <li>Clock generators:14.318 MHz - 16 MHz - 66 MHz for the M480-20</li> <li>- Keyboard controller and mouse interface <b>8742 OTP</b></li> <li>- VGA video adapter <b>82C453</b></li> <li>- 1 MB video memory</li> <li>- Component <b>BT476</b> - Video DAC - Color palette</li> <li>- <b>ACER 87310</b> Serial port interface</li> <li>Parallel port interface</li> <li>Floppy disk peripherals controller</li> <li>Interface for intelligent AT hard disks</li> <li>- 128 KB ROM BIOS (2 <b>27512</b> chips)</li> <li>- <b>TOPCAT</b> chip set consisting of 3 chips and integrating:                         <ul style="list-style-type: none"> <li>- VL82C330 System controller</li> <li>- VL82C331 AT BUS controller</li> <li>- VL82C332 Data buffer.</li> </ul> </li> </ul>

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**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
486 SX	Motherboard of previous M480-10 model	413271 X	4 MB of soldered memory
BA372	System board of new M480-10 model		4 MB of soldered memory
486/33	Motherboard of previous M480-20 model	413266 S	4 MB of soldered memory
BA371	System board of new M480-20 model		4 MB of soldered memory
OS-020	220 V power supply	413178 S	The power supply has a jumper with which to change the operating voltage
OS-020	110 V power supply	413178 S	
OS-020A	220 V power supply		
OS-020A	110 V power supply		
Bus adapter board		030072 S	
Memory expansion board		030069 F	
SCSI HDU controller	ASC-1/A		For the version with SCSI system hard disks.

**ASC-1 SCSI HARD DISK CONTROLLER**

LEVEL	NOTES
Nasc.	-

**USER DISKETTE**

LEVEL	COMPATIBILITY
Rev. 3.0	-
Rev. 3.01	Disables memory between 512 KB and 640 KB. Handles Security features.

**SYSTEM TEST**

LEVEL	COMPATIBILITY
Rev. 2.06	-
Rev. 3.0	For the new personal computers with BIOS rel. 2.XX
Rev. 3.01	Disables memory between 512 KB and 640 KB. Handles Security features.

**POWER SUPPLY UNIT**

POWER SUPPLY	LEVEL	DESCRIPTION
OS - 020 110 V OS - 020 220 V	Nasc.	The power supply has a jumper used to change the operating voltage.
OS - 020A 110 V OS - 020A 220 V	Nasc.	Replaces power supply OS - 020 that had the following problems: <ul style="list-style-type: none"> <li>- Excessive distribution of radio interference upon load variation</li> <li>- Does not comply with Danish norms.</li> </ul>

**COMPATIBILITY NOTES**

BOARD/DEVICE	COMPATIBILITY
Customer Test diskette provided in the Streaming Tape kit STS 26-150/321	The Customer Test diskettes provided in Streaming Tape kit STS 26-150/321 Lev. 01, were formatted with MS-DOS 4.01 and cannot bootstrap on systems with more than two hard disks since MS-DOS 4.01 does not support these configurations. The diskettes provided with starter kit Lev. 02 were formatted with MS-DOS 5.0 thus solving this problem.
1.2 MB, 5.25" Panasonic JU-475-4 floppy disk drive	Modifications were made to the mechanics of this drive. The new drives have the letter "R" printed on their external label while the earlier drives have the letter "K".



**SOFTWARE DRIVERS**

DRIVER	NOTES
LIM/EMS 4.0	Management of extended and expanded memory.
EVD driver rev. 2.01	
EVD driver rev. 2.02	
SCSI hard disk driver Rev. 1.0	

**BIOS OF THE EARLIER M480-10 MODELS**

LEVEL	NOTES
Lev. 1.01	–
Lev. 1.02	Solves the problem regarding the management of some monitors Addition of some AT hard disk parameters
Lev. 1.03	Solves the problems with Windows 3.1.

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**BIOS OF THE EARLIER M480-20 MODELS**

LEVEL	NOTES
Lev. 1.01	–
Lev. 1.02	Solves the problem regarding the management of some monitors Addition of some AT hard disk parameters
Lev. 1.05	Solves the parity error that occurs when more than 4 MB of DRAM are installed
Lev. 1.06	Solves the problems with Windows 3.1.

**BIOS OF THE NEW M480-10 MODELS**

LEVEL	NOTES
Rev. 2.06	This new BIOS revision controls the features offered by the new models: <ul style="list-style-type: none"> <li>- The Built-in Setup has been removed so the system is configured via User Disk</li> <li>- The Shadow is addressed at 0C000.</li> <li>- Three drives with floppy disk interface are no longer handled.</li> <li>- The 1.44 MB diskette drive can no longer be installed.</li> <li>- No longer possible to assign drive identifier A or B to any one of the two diskette drives.</li> <li>- The Olivetti standard fonts have been added, the Office fonts removed.</li> <li>- Only the Olivetti high resolution monitors can be used.</li> <li>- The Security utilities are handled. This requires User Disk or System Test version 3.01.</li> </ul>
Rev. 2.07	Solves the problems with Windows 3.1.

**BIOS OF THE NEW M480-20 MODELS**

<b>LEVEL</b>	<b>NOTES</b>
Rev. 2.07	<p>This new BIOS revision controls the features offered by the new models:</p> <ul style="list-style-type: none"> <li>- The Built-in Setup has been removed so the system is configured via User Disk</li> <li>- The Shadow is addressed at 0C000.</li> <li>- Three drives with floppy disk interface are no longer handled.</li> <li>- The 1.44 MB diskette drive can no longer be installed.</li> <li>- No longer possible to assign drive identifier A or B to any one of the two diskette drives.</li> <li>- The Olivetti standard fonts have been added, the Office fonts removed.</li> <li>- Only the Olivetti high resolution monitors can be used.</li> <li>- The Security utilities are handled. This requires User Disk or System Test version 3.01.</li> </ul>
Rev. 2.08	Solves the problems with Windows 3.1.

**SOFTWARE COMPATIBILITY**

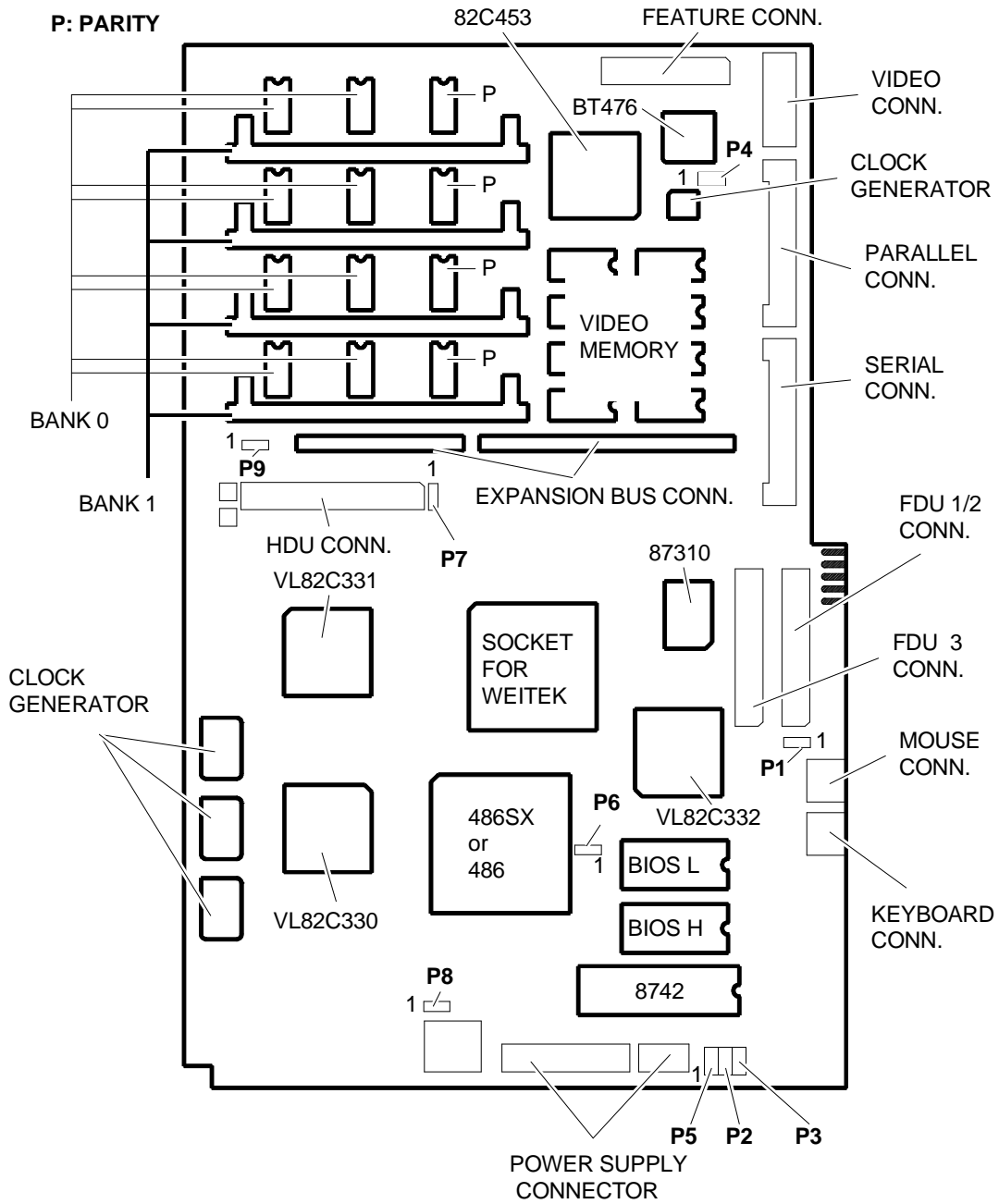
<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01 MS-DOS Ver. 5.0	A formatted DSDD diskette is required during installation on hard disk
IBM Operating System/2, Ver. 1.10 and 1.20 IBM Operating System/2 Extended Edition, Ver. 1.10 and 1.20 INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	The PS/2 mouse is not acknowledged The PS/2 mouse is not acknowledged
<b>WINDOWS</b>	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smart modem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 GEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
<b>MULTIPOINT</b>	<b>MOUSE</b>
CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) IBM PS/2 Mouse Serial Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
<b>GRAPHICS PRODUCTS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
AST VGA plus FASTWRITE 1024i FASTWRITE VGA HERCULES GRAPHICS CARD IBM VGA Adapter MATROX PG - 1281 MAXON MVGA-16 Adapter ORCHID PRODESIGNER VGA PLUS HERCULES INCOLOR CARD (GB222) PARADISE VGA PRO CARD	10 NET INTERFACE BOARD 200 series 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C505 DECNET PCSA adapter IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter MICOM NP1000 adapter NOVELL NE1000 adapter NOVELL NE2000 adapter
<b>DISPLAY UNITS</b>	
IBM enhanced graphics monitor 5151 IBM color graphics monitor 5153 IBM PS/2 Monochrome display 8503 IBM PS/2 color display 8512 IBM PS/2 color display 8513 IBM PS/2 color display 8514 NEC MULTISYNC II	NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D PHILIPS 7BM749 PHILIPS 9CM082

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### MOTHERBOARD COMPONENTS



ATE2A

**Jumper P1 - Third floppy disk interface peripheral**

Position 1 - 2 Third floppy disk interface peripheral enabled (default)

Position 2 - 3 Third floppy disk interface peripheral disabled.

**Jumper P2 - Password**

Position 1 - 2 Password disabled

Position 2 - 3 Password enabled (default).

**Jumper P3 - Parallel port**

Position 1 - 2 Parallel port disabled during inputs (default)

Position 2 - 3 Bidirectional parallel port.

**Jumper P4 - Interlaced video**

Position 1 - 2 Disabled

Position 2 - 3 Enabled (default).

**Jumper P5 - Board current control**

Position 1 - 2 Maximum current (default)

Position 2 - 3 Minimum current.

**Jumper P6 - Type of microprocessor on system board**

This jumper is not mounted on the M480-20 Personal Computer

Position 1 - 2 i487 SX processor

Position 2 - 3 i486 SX processor on the M480-10.

**Jumper P7 - Wait states on the hard disk**

Position 1 - 2 One additional wait state (default)

Position 2 - 3 No additional wait state.

**Jumper P8 - Battery**

Position 1 - 2 Battery disconnected

Position 2 - 3 Battery connected (default).

**Jumper P9 - Parity check on memory**

Position 1 - 2 Parity check enabled (default)

Position 2 - 3 Parity check disabled.

## BUILT IN SETUP and EXTENDED SETUP Utilities

The M480-10 and M480-20 personal computers with BIOS release 2.xx no longer use the BUILT IN SETUP utility, and can be configured using the User Diskette or System Test.

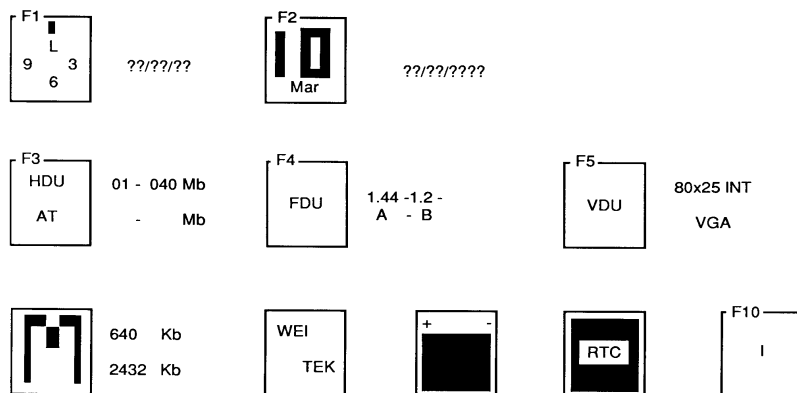
### BUILT IN SETUP

This program, resident in the ROM BIOS, allows users to change some of the Personal Computer configuration parameters.

There are two possibilities:

First case: If the information in the CMOS RAM is no longer valid or if the power battery is not charging, the screen will display the BUILT IN SETUP. Users can select the national language version they wish to work in from a choice of 6 languages.

Second case: If the system configuration has been modified, only the icon of the device to be added or changed in the CMOS RAM will be displayed. For instance, after installing a second floppy disk the floppy disk icon will be displayed. In both cases, this BUILT IN SETUP screen will be displayed automatically, without any operator action.



**F1** To modify the system hour, minutes and seconds.

**F2** To modify the system day, month and year.

**F3** Press this key to select hard disk type and capacity. Press the space bar until the correct value is displayed. The following table lists the hard disks that can be installed in the system.

TYPE	MODEL	CAPACITY	CYL	T	SECTORS PER TRACK
01	W.D. Caviar 280	85 MB	977	10	17
02	CONNER CP30126	120 MB	762	8	39
	W.D. AC-2120	120 MB	763	8	39
CP	CONNER CP3206	210 MB	683	16	38
	CONNER CP3204F	210 MB	683	16	38
WD	W.D. AC 4200	210 MB	987	12	35
05	CONNER CP3304	340 MB	726	15	61
06	CONNER CP3504	510 MB	989	26	63

**Where:** T: No. of disk heads  
 CYL: No. of disk cylinders

**F4** Press this key to select capacity of the floppy disk. Three fields will be displayed beside the icon, according to the number of drives (1, 2 or 3) in the system; enter the capacity of the floppy disk drive installed in the corresponding field.

The line underneath shows the letters A (for one drive only), A - B (for two drives) or A - B - X (for three drives). These are the logic names of the drives.

**NOTE:** To install a streaming tape drive with floppy interface, the data field corresponding to this unit must not contain any value and the drive must have logic name B associated with it.

**F5** Press this key to select the video format when the system is switched on.

**Numeric coprocessor** This icon is displayed only when the WEITEK coprocessor is installed and is intended to inform the user of this installation.

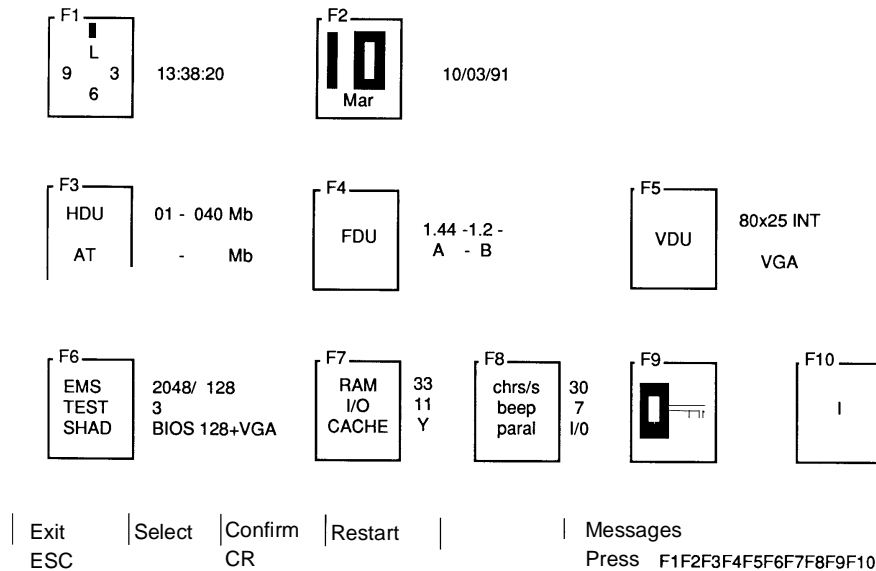
**Batteries** This icon is displayed only when the system is switched on for the first time or when the system batteries are not charging.

**Real time clock** This icon blinks when there is a failure of the system's *Real Time Clock*.

**Language** It is possible to select the language in which to have the messages of the BUILT IN SETUP displayed. One of six languages can be chosen.

**EXTENDED SETUP**

In addition to the BUILT IN SETUP utility, there is another utility called EXTENDED SETUP with which other parameters of the system can be configured. This utility can be called by the operator by pressing the SHIFT, CTRL, ALT and DEL keys simultaneously.



This menu includes all icons of the BUILT IN SETUP and allows the system to be configured as described previously.

The following other configuration parameters have been added:

- F6** EMS Used to modify capacity of the extended memory and memory expansion.
- TEST Used to reduce the number of tests made on the system memory during the power-on diagnostics.
- SHAD Used to assign a quantity of shadow memory to the BIOS and specific areas of memory.

- F7**    **RAM**            Used to modify system speed from the default value of (33 MHz) to 14 MHz,
- I/O**              Used to modify the system BUS speed from the default value of 11 MHz to the AT standard speed of 8 MHz.
- CACHE**        Used to enable (Y) or disable (N) cache memory.
- F8**    **CHR/S**            Used to modify character repeat speed when the associated keys are pressed. This key repeat value is expressed as a number of characters per second.
- BEEP**            Used to increase or decrease speaker volume.
- PARAL**         Used to change direction of the parallel port.
- F9**                    The system allows the user to enter a **PASSWORD**

**HARD DISK SELF-ACKNOWLEDGE FEATURE**

The hard disk self-acknowledge feature is available on systems with BIOS revision 2.xx . 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 Full
10	42 MB	820	6	17	-1	819	Seagate ST251, Half
11	45 MB	872	6	17	-1	871	RODIME RO3055 40 ms
12	21 MB	612	4	17	128	663	MINISCRIBE M8425 3.5"
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).

#### INTERRUPT LEVELS

LEVEL	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 - 10	IRQ2	1	Interrupt to Controller 1 from Controller 2
3	IRQ8	2	Real time clock
4	IRQ9	2	Available
5	IRQ10	2	Available
6	IRQ11	2	Available
7	IRQ12	2	Mouse
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

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#### I/O ADDRESS MAP

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller (channels 0 - 3)	2F8-2FF h	Serial port COM2 (secondary)
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		

### SYSTEM MEMORY MAP

INTERRUPT VECTOR TABLE 255 VECTORS	0000.0000 h 0000.03FF h
BIOS DATA AREA	0000.0400 h 0000.05FF h
AVAILABLE RAM	0000.0600 h 0000.06FF h
AVAILABLE RAM	0000.0700 h 0009.FFFF h
VIDEO DATA BUFFER	000A.0000 h 000B.FFFF h
OPTIONAL ROM	000C.0000 h 000D.FFFF h
VGA BIOS	000E.0000 h 000E.FFFF h
SYSTEM BIOS	000F.0000 h 000F.FFFF h
EXTENDED MEMORY	0010.0000 h  0240.0000 h



## M300-28 / PCS44

### CHARACTERISTICS

Microprocessor	INTEL 486 SX
Clock	25 MHz
Architecture	32-bit XT/AT
Memory	From 4 MB to 20 MB on the motherboard Bank 0 4 MB of soldered RAM Bank 1 Sockets for SIMM chips. Installable SIMMs are: <b>EXM 28-004</b> 4 MB (1MB x36) SIMMs <b>EXM 28-008</b> 8 MB (2MB x 36) SIMMs <b>EXM 28-016</b> 16 MB (4MB x 36) SIMMs
Memory access	70 ns
Coprocessor	- 25 MHz i487 SX - 25/50 MHz Overdrive Coprocessor
Floppy Disk	5.25", 1.2 MB Panasonic JU 475-4 C20R 5.25", 1.2 MB Panasonic JU 475-5 C20R 3.5", 1.44 MB EPSON SMD 1040-418
Hard Disk	40 MB CONNER CP3046F 40 MB QUANTUM Pioneer ELS42 AT 85 MB W.D. Caviar 280 85 MB CONNER CP30084E 85 MB QUANTUM Pioneer ELS85 AT 120 MB QUANTUM Pioneer ELS127 AT 120 MB CONNER CP30126 170 MB CONNER CP30174E 170 MB QUANTUM Pioneer ELS170 AT 170 MB W.D. AC1170 210 MB CONNER CP30256 240 MB CONNER CP30254 240 MB W.D. AC2250-14F 240 MB QUANTUM LPS240 AT
Streaming Tape	120 MB <b>STU 38-120</b> with floppy interface SCSI Wangtek 5150ES
Slots	Two 16-bit connectors on the bus expansion board
Video controller	OAK OTI-077, integrated on the motherboard Super V.G.A.
HDU and FDU controller	Integrated on motherboard Floppy disk and hard disk controller: National 87C311
Mouse	AT- and PS/2- compatible
Keyboard	101/102-key ANK 26-101, ANK 26-102

#### MOTHERBOARD

BA362 4 MB

#### BIOS

Latest release:  
V032004K.25

#### POWER SUPPLY

Mineba NMB SPE 1095  
ALI-LA/11B 110 V  
ALI-LA/16B 220 V

Latest level: 01

#### BUS EXPANSION BOARD

Original

#### CONSOLE BOARD

Original

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**MOTHERBOARD**

	LEVEL	D.R.S. CODE	BIOS ROM	NOTES
<b>BA362</b>	Nasc.	553096Q	The BIOS ROM is a FLASH EPROM. The BIOS code is stored on diskettes and has to be copied into Flash EPROM	4 MB soldered on the motherboard.
	Lev. 01			Cuts and wirings to solve parity errors when using 8 MB SIMMs. These kind of parity errors occur only in systems using GOLDSTAR memory chips.

**BUS EXPANSION BOARD**

	LEVEL	D.R.S. CODE	NOTES
	Nasc.	030099W	The Bus expansion board has: <ul style="list-style-type: none"> <li>- Two connectors for expansion boards</li> <li>- The CMOS RAM battery</li> </ul>
	Lev. 01		-
	Lev. 02		New printed circuit which improves contact between the bus expansion board and system structure.

**CONSOLE BOARD**

	LEVEL	D.R.S. CODE	NOTES
	Nasc.	030787U	The console board has: <ul style="list-style-type: none"> <li>- The speaker</li> <li>- Hard disk LED.</li> </ul>

**MOTHERBOARD INTEGRATED CONTROLLERS**

MOTHERBOARD	INTEGRATED CONTROLLERS
BA362	<p><b>i486SX CPU</b> 25 MHz microprocessor                      Socket for the <b>i487SX</b> math coprocessor or for the <b>Overdrive Coprocessor.</b></p> <p><b>8042</b> Keyboard and mouse controller  <b>OAK OTI-077</b> VGA video controller  <b>87C311</b> - Serial and parallel port controller                      Floppy disk controller                      - Intelligent hard disk interface</p> <p><b>VL-82C486</b> - DMA controller                      - Interrupt controller                      - Timer                      - System memory controller                      - System bus controller                      - Clock generator</p> <p><b>82C113A</b> - Real Time Clock                      - 128 byte CMOS RAM powered by a lithium battery                      - Address latch</p> <p><b>IMI SC407BXB</b> System clock generator  <b>1 MB Flash EPROM</b></p>

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**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
CPU board	BA362	553096Q	4 MB
220 V power supply	ALI-LA/11B	150542B	
110 V power supply	ALI-LA/16B	150543C	
Bus adapter board		030099W	
Console board		030787U	

**USER DISKETTE**

LEVEL	COMPATIBILITY
Rel. 1.02	-
Rel 1.03	User diskette in five languages. All problems regarding the CPU and mouse tests have been solved.

**SYSTEM TEST**

LEVEL	COMPATIBILITY
Rel. 1.0	System test for the PCS44
Rel. 1.03	System test for the M300-28

**POWER SUPPLY**

POWER SUPPLY	LEVEL	DESCRIPTION
ALI-LA/11B 110 V	Nasc.	
	Lev. 01	Modifications to the metal cover.
ALI-LA/16B 220 V	Nasc.	
	Lev. 01	Modifications to the metal cover.

**NOTES ON COMPATIBILITY**

BOARD OR HW/SW DEVICE	DESCRIPTION
-	-

**SOFTWARE DRIVER**

DRIVER	NOTES
EVD driver Rev. 1.02	Driver for the OAK OTI 077 video controller

**BIOS**

LEVEL	NOTES
V032004 <b>b</b> 25	
V032004 <b>e</b> 25	
V032004 <b>g</b> .25	This BIOS version solves the problem concerning the incorrect compilation of the BIOS data area as far as the addresses of any serial or parallel board installed on the AT bus are concerned.
V032004 <b>k</b> 25	This BIOS version solves the problem of the Security utilities not accepting numeric characters.

**SOFTWARE COMPATIBILITY**

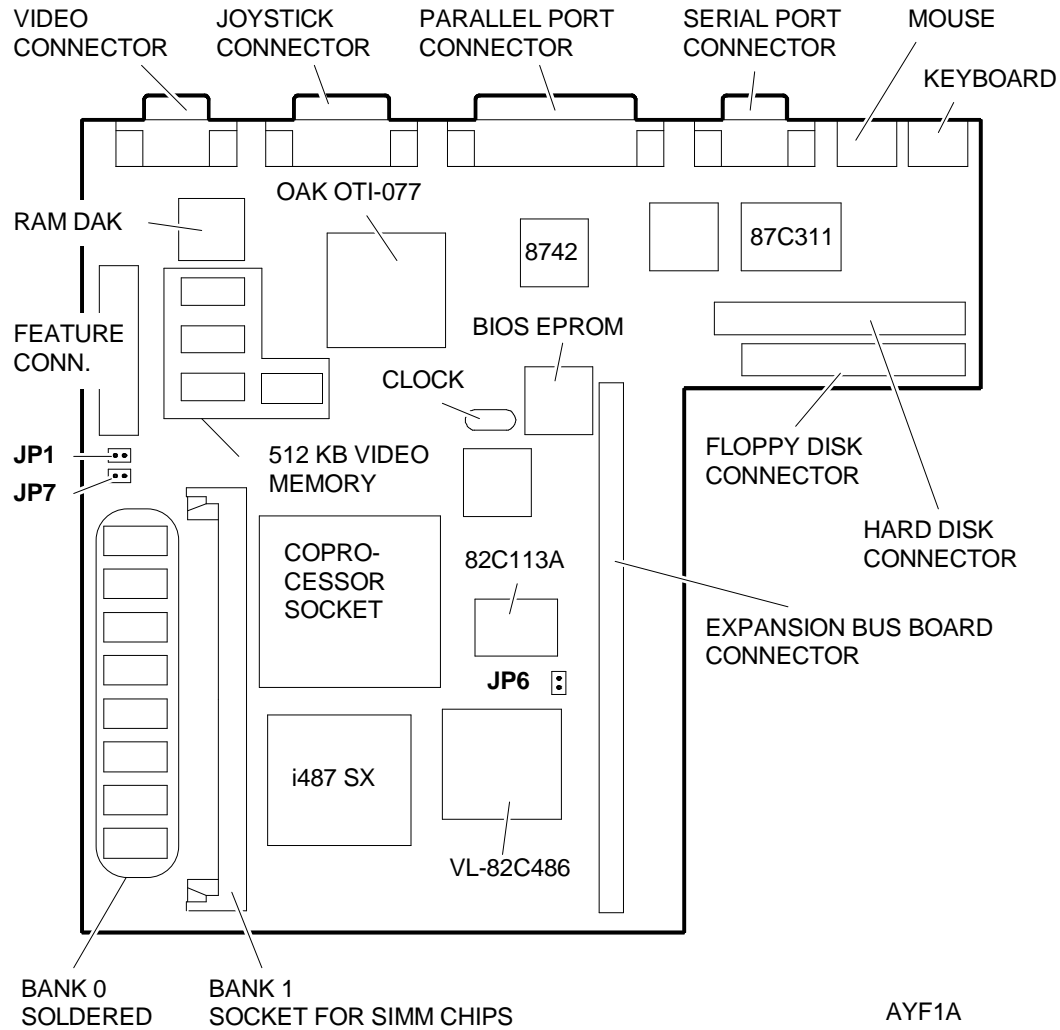
OPERATING SYSTEMS	NOTES
MS-DOS Release 5.0 OS/2 Release 2.0 OS/2 Release 1.3 SE SCO UNIX System V Version 3.2.4 WINDOWS Ver. 3.1	

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smart modem 2400 Hayes Smart modem 2400B Hayes Smart modem 9600 B Motorolla UDS Ext. Modem Internal Modem 2400B	Serial/parallel adapter Printer adapter
<b>MULTIPOINT</b>	<b>MOUSE</b>
Multipoint I/O Card Digi Board com/8 Megaport 8CS Intelliport II	IBM PS/2 Mouse IBM PS/2 Serial Mouse Serial Mouse BUS Mouse
<b>GRAPHICS PRODUCTS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
Graphics Adapter ISA BUS Graphics Station Adapter Graphics Adapter VGA1024 Graphics Adapter 1024/i VGA BUS EGA autoswitch	NOVELL NE2000 adapter ARCNET PC600 adapter ISA 16/4 Token Ring Adapter
<b>MONITORS</b>	
IBM 8503 Monitor IBM 8514 Monitor NEC 3D Monitor	Multisync 3D monitor

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## MOTHERBOARD COMPONENTS AND JUMPERS



### JUMPER JP1

Not installed i486 SX processor soldered. Default setting.

Installed i486 DX or i486 DX2 coprocessor soldered (not available on the M300-28/PCS44).

**NOTE:** If the i487SX or the Overdrive Coprocessor is installed in the coprocessor socket, there is no need to set this jumper since the system will automatically detect that one of these coprocessors are present.

### JUMPER JP6

Not installed Normal operation. This is the default setting.

Installed The contents of the CMOS are cancelled and therefore system SETUP is lost.

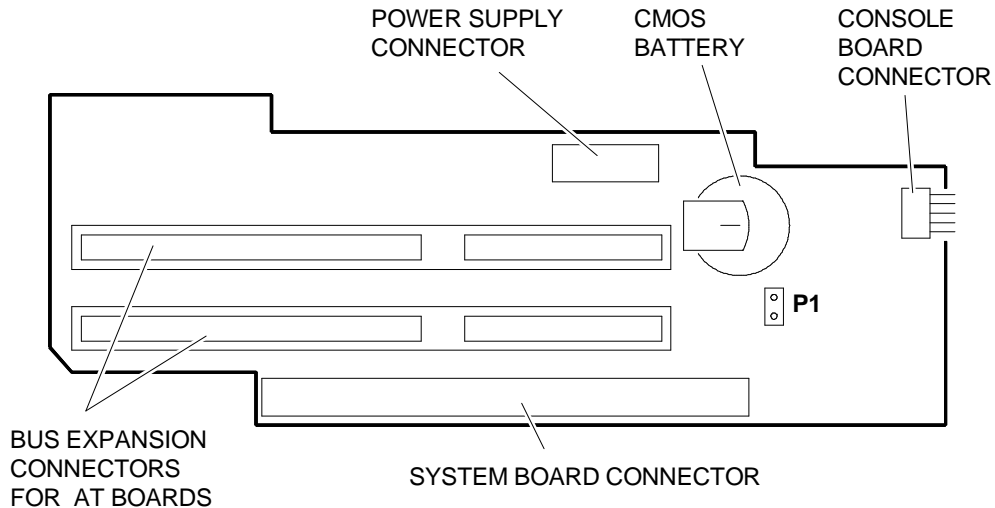
### JUMPER JP7

Not installed Normal operation. This is the default setting.

Installed The password is cancelled.



**BUS EXPANSION BOARD COMPONENTS AND JUMPERS**

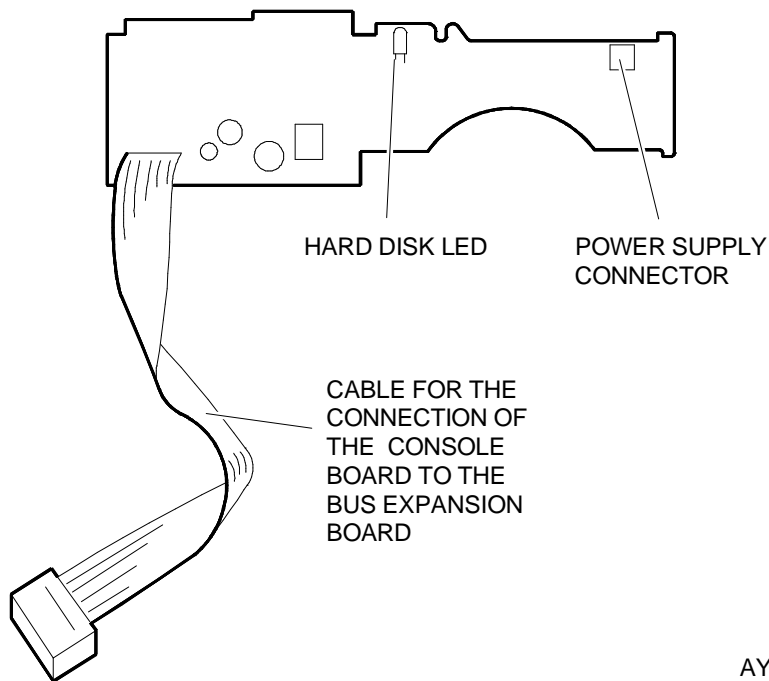


AYD3A

**JUMPER P1 (CMOS battery)**

This jumper must be installed when the system is powered on.

**CONSOLE BOARD CONNECTORS**



AYD4A

## BUILT IN SETUP

During the Power On Diagnostics, the following message is displayed after checkpoint 2ch:

**“PRESS CTRL-ALT- ESC for SETUP”**

From now until the moment the BIOS begins the system bootstrapping sequence, you will have the possibility of accessing the system SETUP facility. When SETUP is requested, the software reads the contents of CMOS RAM. If the CMOS is altered, default values will be used.

If, when exiting SETUP, you decide to save the modifications made, the program will copy the new configuration into CMOS and calculate the new checksum.

The SETUP utility consists of four screens that directly interface the system BIOS, and is displayed in English only.

The first screen is only informative. The information collected during the first part of the POD is displayed on the left-hand side of this screen, while **the different icons that give access to the other screens are displayed on the right-hand side.**

The SETUP utility has usual interface with pop-up menus. The following function keys can be used: **arrow** keys, the **<ENTER>** key, the **F2** key to switch from between a color and monochrome interface, the **F10** or **<ESC>** key to move upwards from one screen to another until reaching the very first menu screen with the EXIT icon.

### SYSTEM CONFIGURATION

This is the first screen of the SETUP utility; the values that appear in the individual fields are specific for each machine configuration. The icons that give access to the different screens are displayed on the right-hand side of the screen:

Setup Version Number:	1.01	<---Setup program version
BIOS Version Number:	v3.20.03	<--- BIOS version
BIOS Date Stamp:	09/08/92	<--- Latest BIOS update*
Processor:	486SX	<--- Type of processor installed
Processor Speed:	25MHz	<--- System clock
System Base Memory:	640	<--- Basic memory
System Extended Memory:	3072	<--- Extended memory

\* This update could have been the last time a BIOS EPROM Flash was performed or when the configuration was last changed.

### 1<sup>st</sup> MENU - SYSTEM SETUP

This is the first menu of the SETUP utility. A help window is displayed on the right-hand side of the screen. Each time you select a SETUP parameter, this window will display the meaning of this parameter and how to use it.

**System Date:** Allows you to enter or change the system date according to the following format: mm/dd/yy.

**System Time:** Allows you to enter or change the system time.

**Floppy diskette 1:**

**Floppy diskette 2:** Allows you to define the type of floppy disk drive installed in the system. Drive 1 is the default drive. The following drives can be defined: NONE, 360K, 1.2M, 720K, 1.4M.

**Disk:** Indicates the hard disk drive installed. The BIOS supports two hard disks, but the installation of a second hard disk is **not** expected.

**Video:** Allows you to select the type of monitor connected to the system. The following can be defined: Mono, EGA/VGA, Color 40, Color 80.

**Mouse Port:** Allows you to enable or disable the mouse port. If Enabled is defined but the mouse port is not detected, this parameter will automatically change to Disabled.

**Processor Speed:** Allows you to set the processor speed so that the system becomes compatible with the previous generation of slower microprocessors. The values that can be defined are Fast and Slow.

**Video VDU Refresh Rate:** Allows you to select the video refresh rate. The following values can be defined: 60 Hz and 72 Hz.

### Hard Disk Table

The hard disk table is an area of the BIOS that stores operating characteristics of a representative group of hard disk drives. The information does not refer to a specific manufacturer but to the characteristics of the standard drives available.

Each table entry is identified by a specific type, and there are 47 predefined types of drives listed. The last two types, 48 and 49, can provide the values obtained by the self-acknowledge feature of the first or second (not expected) hard disk drive installed in the system.

**WARNING:** Since the BIOS supports the hard disk self-acknowledge feature, the Disk parameter is usually configured automatically. This is because the intelligent hard disk drive (IDE interface) provides its own configuration parameters (Capacity, Cylinders, Heads, Sectors, Precompensation and Head Landing Zone) to the BIOS. The self-configured disk is identified as Type 48.

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DISK	TYPE	CYLS	HDS	SEC	PRE	ZONE
10M	1	306	4	17	128	305
20M	2	615	4	17	300	615
30M	3	615	6	17	300	615
62M	4	940	8	17	512	940
46M	5	940	6	17	512	940
20M	6	615	4	17	NONE	615
30M	7	462	8	17	256	511
30M	8	733	5	17	NONE	733
112M	9	900	15	17	NONE	901
20M	10	820	3	17	NONE	820
35M	11	855	5	17	NONE	855
49M	12	855	7	17	NONE	855
20M	13	306	8	17	128	319
42M	14	733	7	17	NONE	733
	15	RESERVED				
20M	16	612	4	17	0	663
40M	17	977	5	17	300	977
56M	18	977	7	17	NONE	977
59M	19	1024	7	17	512	1023
30M	20	733	5	17	300	732

<b>DISK</b>	<b>TYPE</b>	<b>CYLS</b>	<b>HDS</b>	<b>SEC</b>	<b>PRE</b>	<b>ZONE</b>
42M	21	733	7	17	300	732
30M	22	733	5	17	300	733
10M	23	306	4	17	0	336
40M	24	977	5	17	NONE	976
76M	25	1024	9	17	NONE	1023
71M	26	1224	7	17	NONE	1223
111M	27	1224	11	17	NONE	1223
152M	28	1224	15	17	NONE	1223
68M	29	1024	8	17	NONE	1023
93M	30	1024	11	17	NONE	1023
83M	31	918	11	17	NONE	1023
69M	32	925	9	17	NONE	926
85M	33	1024	10	17	NONE	1023
102M	34	1024	12	17	NONE	1023
110M	35	1024	13	17	NONE	1023
119M	36	1024	14	17	NONE	1023
17M	37	1024	2	17	NONE	1023
136M	38	1024	16	17	NONE	1023
114M	39	918	15	17	NONE	1023
40M	40	820	6	17	NONE	820
42M	41	1024	5	17	NONE	1023
65M	42	1024	5	26	NONE	1023
40M	43	809	6	17	NONE	852
61M	44	809	6	26	NONE	852
100M	45	776	8	33	NONE	775
203M	46	684	16	38	NONE	685
30M	47	615	6	17	NONE	615
	48	MANUAL OR SELF-ACKNOWLEDGED DEFINITION				
	49	MANUAL OR SELF-ACKNOWLEDGED DEFINITION				

### Autoconfiguration during the system bootstrap phase

If the data in CMOS regarding the configuration of the hard disk are lost, or if a new hard disk is installed in the system, the following question will be displayed at the end of the POD, at the bottom of the screen:

#### Auto Config IDE Controller (Y/N)?

If you answer Y, the hard disk will pass its own parameters over to the BIOS. The following message is displayed at the end of the autoconfiguration phase:

**IDE Drive successfully configured, press any key...**

### Autoconfiguration from BUILT IN SETUP

Select the Disk field from the System SETUP menu, and then select the **AUTO** option. After confirming this option, the messages indicated in the previous section will be displayed.

### 2<sup>nd</sup> MENU - EXTENDED SETUP

This is the second SETUP menu. It allows you configure the system at an advanced level. An explanation of the parameter selected is displayed on the right-hand side of the screen.

**Primary Cache Controller:** Allows you to copy the BIOS code into system RAM. The two values that can be defined are Enable/Disable.

**Shadow RAM:** Allows you to store the video and system BIOS in Shadow RAM.. The following values can be defined: Disable, System, Video, System & Video. System & Video is the default configuration.

**BIOS Cacheability:** Allows you to store the video and system BIOS in cache memory. The values that can be defined are the same as those for Shadow RAM..

**Flash BIOS Eprom Enable:** Enables the setting of the Flash BIOS procedures. Disabled is the default configuration.

**WARNING:** In order to change the value in this field, switch the system off and then on again. A software reset (CTRL+ALT+DEL) is not enough.

**Speaker Volume:** Allows you to set the speaker volume. The allowed values are: OFF, 1/7, 2/7, 3/7, 4/7, 5/7, 6/7, FULL.

**Power On Keyboard Test:** Allows you to enable/disable the keyboard. The allowed values are: ON, OFF.

**Base Memory Size:** Allows you to select the size of basic memory. The allowed values are: 640K, 512K.

**C800 Segment Shadow**

**D000 Segment Shadow**

**D800 Segment Shadow**

**E000 Segment Shadow**

**E800 Segment Shadow:** Allow you shadow, shadow & cache, or disable certain 32K memory segments. If an optional board with its own ROM is installed in the system and this board's address is known, you can shadow & cache this ROM at one of the addresses enabled by this parameter.

**INT 15 Memory Report:** Used to ensure compatibility with certain operating systems. The allowed values are ALL and 16 MB. ALL indicates that int 15 h shows all the system RAM installed, even if greater than 16 MB. 16 MB indicates that int 15 h shows a maximum 16 MB configuration.

**ISA Memory Caching:** Allows you to disable memory cache at 1 MB intervals. The allowed values are All Enable, 16M Disable, 15-16M Disable, 14-16M Disable, 13-16M Disable.

### 3<sup>rd</sup> MENU - SYSTEM SECURITY

This is the third SETUP menu. It allows you to set the system's security features.

- System Security:** Allows you to set the different security levels. The allowed values are:
- Disable:** No security is enabled.
  - Boot:** A password is requested the moment the system is bootstrapped.
  - Quicklock:** Allows you to disable/enable the keyboard through a CTRL-ALT-x sequence, where x is a user-selected secret letter.
  - Quicklock & Boot:** Enables the Quicklock feature and requests a password the moment the system is bootstrapped.
- System Security Password:** Allows you to define a system security password at the security level defined in the previous parameter. If the System Security parameter is set to Disabled, the password defined in this field is automatically erased.
- Quick Lock Key:** Allows you to define the letter to associate with the CTRL-ALT sequence to enable the keyboard protection feature. This field can only be modified if the System Security field is correctly set (Quicklock or Quicklock & Boot).
- Setup Security:** Allows you to protect the BUILT IN SETUP. The allowed values are: Enable/Disable.
- Setup Password:** Allows you to define the BUILT IN SETUP password.

### 4<sup>th</sup> MENU - EXIT

Select this icon to exit BUILT IN SETUP. You will be asked to confirm this choice and to save any modification made to the system's **basic configuration**.

**I/O ADDRESS MAP**

<b>ADDRESS</b>	<b>FUNCTION</b>	<b>ADDRESS</b>	<b>FUNCTION</b>
0-0F	DMA controller #1	FB	Chipset configuration register enable
20-21	Interrupt controller #1	0C0-0DF	DMA controller #2
40-43	Timer counter	1F0-1F7	IDE hard disk register
60, 64	Keyboard controller	201	Game port
61	Port B	278-27F	Alternative LPT2 parallel port
70	RTC index/NMI enable register	2B0-2BF	EGA video
71	RTC data register	2C0-2CF	EGA video
80-8F	DMA page registers	2D0-2DF	EGA video
90	Custom I/O port #1	2E8-2EF	Alternative COM4 allocation for serial port B
91	Custom I/O port #2	2F8-2FF	Primary COM2 allocation for serial port B
92	PS/2-compatible FAST GATE_A20 and FAST RESET	378-37F	Primary LPT1 parallel port
94	System setup register OTI-077	398-399	National PC82311 configuration ports
102	System setup register OTI-077	3B0-3BB	MDA video
A0-A1	Interrupt controller#2	3B4/3D4	VGA video
EC-ED	82C486 chipset configuration ports	3B5/3D5	VGA video
EE	FAST A20 (alternative)	3BA/3DA	VGA video
EF	FAST CPU reset port (alternative)	3C0-3CF	EGA/VGA video
F0	Coprocessor busy register	3D0-3DF	CGA video
F1	Coprocessor reset register	3F0-3F7	Floppy disk drive allocation
F4	Slow CPU register	3E8-3EF	Alternative COM3 allocation for serial port A
F5	Fast CPU register	3F8-3FF	Primary COM1 allocation for serial port A
F9	Chipset configuration register disable		

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**INTERRUPT LEVELS**

<b>INTERRUPT</b>	<b>FUNCTION</b>
IRQ1	Counter timer
IRQ2	Second interrupt controller cascade input
IRQ3	COM2 interrupt
IRQ4	COM1 interrupt
IRQ5	LPT1
IRQ6	Floppy disk drive
IRQ7	LPT2
IRQ8	Real Time Clock
IRQ9	Not used
IRQ10	Not used
IRQ11	Not used
IRQ12	Mouse
IRQ13	Numeric coprocessor
IRQ14	IDE drive controller
IRQ15	Not used

**DMA CHANNELS**

<b>CHANNEL</b>	<b>FUNCTION</b>
Channel 0	Not used
Channel 1	Not used
Channel 2	Floppy disk drive
Channel 3	Not used
Channel 4	Cascade
Channel 5	Not used
Channel 6	Not used
Channel 7	Not used

**MEMORY MAP**

<b>ADDRESS</b>	<b>FUNCTION</b>
00000-7FFFF	512K of system memory
80000-9FFFF	128K of system memory/optional ISA mapping
A0000-BFFF	Graphics and text memory (on system board)
C0000-CFFFF	Video BIOS
D0000-DFFFF	Extended ROM BIOS/expansion for I/O channels
E0000-EFFFF	Video BIOS
F0000-FFFFFF	System BIOS
100000-3FFFFFF	4 MB of system DRAM
400000-13FFFFFF	20 MB expansion SIMMs
1400000-FFFEFFFF	Local bus (not used on system board)
FFFF0000-FFFFFFFF	System BIOS Shadow

The entire DRAM area can be cached.



## Pre-installed software on the PCS44

The PCS44 personal computer is configured at the factory with a basic software platform and an application. The following table shows how this platform is composed and indicates the function of each software.

SFTWARE	FUNCTION
<b>Welcome</b>	<p>This program is used to customize the system. It must be launched after the POD when the system is powered-on for the <b>very first time</b>.</p> <p><b>WARNING:</b> This program can be launched only once. You can, however, make a back-up copy of the program once it has been installed.</p> <p>With this program, you can:</p> <ul style="list-style-type: none"> <li>- Define the type of keyboard used and the national language version</li> <li>- Choose, install and configure the software platform</li> <li>- Install the <b>MS-DOS 5.0</b> operating system. Make a back-up copy of this operating system</li> <li>- Install <b>Windows 3.1</b></li> <li>- Install <b>Antivirus Norton</b></li> <li>- Install <b>DoubleDisk</b></li> <li>- Run the <b>Tutorial</b></li> <li>- Install the <b>Enhanced Video Drivers</b></li> </ul>
<b>MS-DOS 5.0</b>	Operating system
<b>Windows 3.1</b>	Graphics environment
<b>Norton Antivirus</b>	Antivirus utility.
<b>DoubleDisk</b>	Hard disk data compression utility. Virtually extends the capacity of the hard disk.
<b>Tutorial</b>	Gives technical information on the system, hardware modules and software.

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After installing the software platform, a file system as the one shown in the following table should be present on the hard disk.

C:\	AUTOEXEC.BAT, CONFIG.SYS, COMMAND.COM
C:\DOS	National version of the MS-DOS operating system
C:\WINDOWS	National version of Windows
C:\DOSHELP	National version of Doshelp
C:\NAV	National version of Norton's Antivirus program
C:\DUBLDISK	DoubleDisk data compression program
C:\MANUALS	USER-MAN, files from the User's Guide NAV-MAN, files from the Norton Antivirus manual DD-MAN, files from the DoubleDisk manual
C:\TUTORIAL	Tutorial program files
C:\CUSTOMER	Diagnostic test and mouse driver files

## M6-420 / 440 / 450 / 460

### CHARACTERISTICS

Microprocessor	M6-420 33 MHz i486 SX M6-440 33 MHz i486 DX M6-450 25/50 MHz i486 DX2 M6-460 33/66 MHz i486 DX2
Clock	25 MHz or 33 MHz
Architecture	AT
Memory	From 4 MB to 100 MB on the motherboard <b>Bank 0:</b> 4 MB soldered <b>Banks 1, 2 and 3:</b> Three SIMM sockets: <b>EXM 28-004</b> - 4 MB, one 1MB x 36 SIMM <b>EXM 28-008</b> - 8 MB, one 2 MB x 36 SIMM <b>EXM 28-016</b> - 16 MB, one 4 MB x 36 SIMM <b>EXM 29-032</b> - 32 MB, one 8 MB x 36 SIMM - Mixed configurations are allowed. - The banks must be filled in sequence without leaving empty spaces.
Memory access	70 ns
Video memory	1 MB - 4 chip VRAM 256 K x 8 - 80 ns
Coprocessor	- 25 or 33 MHz i487 SX - 25/50 MHz or 33/66 MHz i486 DX2 - P24T OverDrive Coprocessor
Floppy Disk	1.2 MB 5.25" Panasonic JU475-3 - JU475-4 1.2 MB 5.25" Toshiba ND 08 DE 2.88 MB Sony MP-F40W
Hard Disk	85 MB CONNER CP30084E 85 MB WD. Caviar 280 85 MB Quantum ELS 85 AT 170 MB CONNER CP30174E / CFA170A 170 MB Quantum ELS 170 AT 170 MB W.D. AC1170 170 MB Quantum LPS170 AT (local BUS) 340 MB CONNER CFA340A 340 MB Quantum LPS340 AT (local BUS) 210 MB CONNER CP30256 210 MB W.D. AC1220 210 MB CONNER CFS210A (local BUS) 240 MB CONNER CP30254 240 MB Quantum LPS 240 AT 240 MB W.D. AC2250-14F 510 MB CONNER CP3544 540 MB CONNER CP30544 540 MB SEAGATE ST3655A
Streaming Tape	80/120 MB <b>Irwin 31250A</b> with floppy inter. 150 MB SCSI <b>Wangtek 5159ES</b> 320 MB SCSI <b>Wangtek 5525ES - 5525ES-ACA</b> . Requires the ASC-2 controller
Slots	Four 16-bit connectors on the expansion bus <b>Continued</b>

### MOTHERBOARD

BA2000 M6-420  
BA2001 M6-440  
BA2002 M6-460

BA2003 - BA2004  
Boards without a CPU.  
A specific CPU is installed according to the personal computer model.

### BIOS

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

Latest level: Rev. 1.20

### EXPANSION BUS

IN 2006

### POWER SUPPLY

PS11 A 220 V - 115 V  
PS11 AR 220 V - 115 V

### AUDIO BOARD

MI 2002  
MI 2017

Video controller	Integrated Super VGA ATI 68000-3 OV 68000-6
HDU and FDU controller	Integrated floppy disk controller: 87312 HDU interface: MSI buffer and logic gates
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 27-101/N, ANK 27-102/N

**MOTHERBOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2000	Nasc.		The ROM BIOS is a FLASH EPROM. The BIOS code is therefore supplied on diskettes and must be copied into Flash EPROM.	<p>M6-420 motherboard. Uses the 33 MHz i486 SX CPU.</p> <p>This board has been replaced by boards BA2003 and BA2004. These do not have a CPU. A specific CPU is installed depending on the personal computer model.</p> <p><b>The modifications made to this board are carried out on the field only and are the same as those made to boards BA2003 and BA2004.</b></p>
BA2001	Nasc.			<p>M6-440 motherboard. Uses the 33 MHz i486 DX CPU</p> <p>This board has been replaced by boards BA2003 and BA2004. These do not have a CPU. A specific CPU is installed depending on the personal computer model</p> <p><b>The modifications made to this board are carried out on the field only and are the same as those made to boards BA2003 and BA2004.</b></p>
BA2002	Nasc.			<p>M6-460 motherboard. Uses the 66 MHz i486 DX2 CPU</p> <p>This board has been replaced by boards BA2003 and BA2004. These do not have a CPU. A specific CPU is installed depending on the Personal Computer model</p> <p><b>The modifications made to this board are carried out on the field only and are the same as those made to boards BA2003 and BA2004.</b></p>

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2003	Nasc.	557980 T		Motherboard without CPU and with 4 MB of soldered memory.
	Lev. 01 MI			<ul style="list-style-type: none"> <li>- New printed circuit wirings.</li> <li>- 100 Ohm resistances R521, R522 have been changed to 200 Ohm. This modification solves the problem with background colors when using Windows 3.1.</li> </ul> <p><b>NOTE:</b> Only the value of resistance R522 must be modified in field (which actually solves the problem), and not the value of R521 (which improves the functional margins only).</p>
	Lev. 02 MI			<p>Modified the value of the following resistances:                      R527, R528 from 100 Ohm to 470 Ohm                      R426 from 180 Ohm to 100 Ohm</p> <p>These modifications were made to solve random video memory errors. This problem occurs only on boards using a certain type of buffer:                      Motorola F244 xxAE9302 and Texas F244.</p>
	Lev. 03 MI			<ul style="list-style-type: none"> <li>- New keyboard controller Rev. 10.02 to replace Rev. 10.01.                              This new controller is available in two versions: OPT (function name CSKM) or ROM (function name CSKL). The modification solves the problems with the mouse and relative driver being too slow for the speed of the 66 MHz i886 DX2.</li> <li>- The following components are mounted on the board:                              Transistor 2N3904                              Resistances R478 and R477                              This solves the problem of the system crashing when the 386MAX software is used.</li> </ul> <p><b>NOTE:</b> This problem can also be solved via software using the A20ARCH driver made available by QUALITAS BBS. This driver is suggested as it improves system performance.</p>
	Lev. 04 MI			<ul style="list-style-type: none"> <li>- To solve the parity errors during a DMA cycle when using two Adaptec SCSI boards and one communication board installed in the last slot of the expansion bus, a 100pF capacitor is installed between pin 1 and GND of component U19.</li> <li>- To cut costs, some capacitors have been replaced.</li> </ul>
Lev. 05 MI				<p>A new ATI 68800-6 video controller replaces the ATI 68800. This also implies the following modifications:</p> <ol style="list-style-type: none"> <li>1) Resistance R522 and capacitor C280 no longer need to be mounted</li> <li>2) R407 switches from 33 Ohm to 0 Ohm</li> <li>3) New BIOS Rev. 1.10</li> </ol>

	LEVEL	D.R.S CODE	ROM BIOS	NOTES
BA2003	Lev. 06	557980 T	Rev. 1.14	<ul style="list-style-type: none"> <li>- The values of some capacitors have been changed in order to solve the problems with the DM 124, DM 324 and DM 624 printers.</li> <li>- Some resistances have been replaced in order to solve noise problems at the audio output.</li> <li>- New BIOS 1.13 for True Color video mode management. The following new diagnostic releases have to be used: System Test 1.08 and System region Setup 1.08.</li> </ul>
	Lev. 07		Rev. 1.16	To correct the problem that the CPU reset is not included in the P24T OverDrive specifications, the PAL at location U138 is changed. The new PAL has function name GKHB.
	Lev. 08		Rev. 1.18	<ul style="list-style-type: none"> <li>- The AMP 50x2 ISA BACKPLAIN connector is replaced by the FOX CONN 50x2 ISA BACKPLAIN connector. (This modification is not necessary on board BA2004.)</li> <li>- Introduction of revision A of the CS4021 chipset which consists of 2 gate arrays:                             <ul style="list-style-type: none"> <li>- 84021A (corrects the faults)</li> <li>- 84025A (production improvements)</li> </ul>                             Since only gate array 84021A corrects the faults, the 84021 Rev. A can be mounted together with the earlier 84025.                         </li> </ul> It is mandatory that BIOS Rev. 1.18 be used. Resistor R426 changes from a 100 Ohm component to a 0 Ohm component.
	Lev. 08		Rev. 1.18	A socket with data bus terminations is used to correct the problems with Windows 3.1. This socket is called MI2037. <ul style="list-style-type: none"> <li>- In production this socket is inserted at system level, so the board does not change level.</li> <li>- In field this socket must be installed between SK9 and the processor.</li> </ul> The following problem was encountered with Windows: after the bootstrap phase, messages were displayed indicating that certain Windows groups were damaged. These groups can no longer be used.
	Lev. 09		Rev. 1.18	The following modifications are made to correct the malfunctions of the DVA4000 board: <ul style="list-style-type: none"> <li>- Signal PCLK was cut from the feature connector</li> <li>- A 33 Ohm resistor was added to the same pin from which the signal was cut.</li> </ul>

	LEVEL	D.R.S CODE	ROM BIOS	NOTES
BA2003	Lev. 09	557980 T	Rev. 1.19	486DX2-50 SI and 486DX2-66 SL processors are used as alternatives to the 486DX2-50 and 486DX2-66 processors. Board level does not change.  100 MHz DAC BT481 controller is used as alternative to the 80 MHz DAC BT481. Board level does not change.
	Nasc.	557980 T		System board without CPU and with 4 MB of memory.
BA2004	Lev. 01 MI			Modified the value of resistances R521, R522 from 100 Ohm to 220 Ohm. Solves the problem of the altering of background colors when using Windows 3.1. <b>NOTE:</b> At field level, only the value of R522 has to be changed (which solves the problem) and not that of R521 (which only improves functional margins). The field board are upgraded from level 00 (Nasc.) to level 00/A.
	Lev. 02 MI			Modified the value of resistances R527, R528 from 100 Ohm to 470 Ohm, R426 from 180 Ohm to 100 Ohm. These modifications were made to solve random video memory errors. This problem occurred only on boards using a certain type of buffer: Motorola F244 xxAE9302 and Texas F244.
	Lev. 03 MI			<ul style="list-style-type: none"> <li>- New keyboard controller Rev. 10.02 to replace Rev. 10.01. This new controller is available in two versions: OPT (function name CSKM) or ROM (function name CSKL). This modification solves the problems with the mouse and relative driver being too slow for the speed of the 66 MHz i486 DX2.</li> <li>- The following components are mounted on the board: Transistor 2N3904 Resistances R478 and R477 This solves the problem with the system crashing when the 386MAX software is used.</li> </ul> <b>NOTE:</b> This problem can also be solved via software using the A20ARCH driver made available by QUALITAS BBS. This driver is suggested as it improves system performance.

	LEVEL	D.R.S CODE	ROM BIOS	NOTES
BA2004	Lev. 04 MI	557980 T		New printed circuit board that optimizes EMI margins and changes the shape of some components
	Lev. 05 MI			<ul style="list-style-type: none"> <li>- To solve the parity errors during a DMA cycle when using two Adaptec SCSI boards and one communication board installed in the last slot of the expansion bus, a 100pF capacitor is installed between pin 1 and GND of component U19.</li> </ul>
	Lev. 06 MI		Rev. 1.10	<p>A new ATI 68800-6 video controller replaces the ATI 68800. This also implies the following:</p> <ol style="list-style-type: none"> <li>1) Resistance R522 and capacitor C280 no longer need to be mounted</li> <li>2) R407 switches from 33 Ohm to 0 Ohm</li> <li>3) New BIOS Rev. 1.10</li> </ol>
	Lev. 07 MI		Rev. 1.14	<ul style="list-style-type: none"> <li>- The values of some capacitors have been changed in order to solve the problems with the DM 124, DM 324 and DM 624 printers.</li> <li>- Some resistances have been replaced in order to solve noise problems at the audio output.</li> <li>- New BIOS 1.13 for True Color video mode management. The following new diagnostic releases have to be used: System Test 1.08 System region Setup 1.08.</li> </ul>
	Lev. 08 MI		Rev. 1.16	To correct the problem that the CPU reset is not included in the P24T OverDrive specifications, the PAL at location U138 is changed. The new PAL has function name GKHB.
	Lev. 09 MI		Rev. 1.18	<p>Introduction of revision A of the CS4021 chipset which consists of 2 gate arrays:</p> <ul style="list-style-type: none"> <li>- 84021A (corrects the faults)</li> <li>- 84025A (production improvements)</li> </ul> <p>Since only gate array 84021A corrects the faults, the 84021 Rev. A can be mounted together with the earlier 84025.</p> <p>It is mandatory that BIOS Rev. 1.18 be used.</p> <p>Resistor R426 changes from a 100 Ohm component to a 0 Ohm component.</p>

	LEVEL	D.R.S CODE	ROM BIOS	NOTES
<b>BA2004</b>	<u>Lev. 09</u>	557980 T	Rev. 1.19	<p>A socket with data bus terminations is used to correct the problems with Windows 3.1. This socket is called MI2037.</p> <ul style="list-style-type: none"> <li>- In production this socket is inserted at system level, so the board does not change level.</li> <li>- In field this socket must be installed between SK9 and the processor.</li> </ul> <p>The following problem was encountered with Windows: after the bootstrap phase, messages were displayed indicating that certain Windows groups were damaged. These groups can no longer be used.</p>
	<u>Lev. 10</u>		Rev. 1.19	<p>The following modifications are made to correct the malfunctions of the DVA4000 board:</p> <ul style="list-style-type: none"> <li>- Signal PCLK was cut from the feature connector</li> <li>- A 33 Ohm resistor was added to the same pin from which the signal was cut.</li> </ul>
	<u>Lev. 10</u>		Rev. 1.19	<p>486DX2-50 SI and 486DX2-66 SL processors are used as alternatives to the 486DX2-50 and 486DX2-66 processors. Board level does not change.</p>
	<u>Lev. 10</u>		Rev. 1.19	<p>100 MHz DAC BT481 controller is used as alternative to the 80 MHz DAC BT481. Board level does not change.</p>



**MOTHERBOARD INTEGRATED CONTROLLERS**

MOTHERBOARD	INTEGRATED CONTROLLERS
BA2003 BA2004 BA2000 BA2001 BA2002	<p><b>CPU:</b> These systems can host the following CPUs: i486 SX - i486 DX - 486 DX2</p> <p><b>Overdrive II Performance Upgrade Socket:</b> This socket can host the following processors: i487 SX - i486 DX2 - P24T OverDrive Processor</p> <p><b>82C4021</b> Integrates the following functions:</p> <ul style="list-style-type: none"> <li>- DMA controller - memory controller - interrupt controller</li> <li>- Timer</li> <li>- Secondary level cache controller</li> <li>- Clock generator</li> <li>- System reset and sync signals generator</li> <li>- System bus controller</li> <li>- Local data bus interface</li> <li>- Local address bus interface</li> <li>- Real Time Clock (system date and time)</li> <li>- CMOS RAM - 128 KB of non-volatile RAM powered by a Lithium battery that stores data when the system is powered off</li> </ul> <p><b>82C4025</b> Integrates the following functions:</p> <ul style="list-style-type: none"> <li>- Local data bus interface</li> <li>- Control unit for signal decoding</li> <li>- System data bus interface</li> <li>- Data buffer</li> </ul> <p><b>Socket for the secondary level cache implementation module</b></p> <p><b>8042</b> Keyboard and mouse controller</p> <p><b>87312</b> Integrates the following functions:</p> <ul style="list-style-type: none"> <li>- Floppy disk controller</li> <li>- Interface for two serial ports</li> <li>- Parallel interface</li> <li>- Intelligent hard disk drive interface</li> </ul> <p><b>ATI 68800LX</b> Super VGA video controller</p> <p><b>ICD2027</b> Programmable system clock generator</p> <p><b>ATI-18811</b> Programmable video clock generator</p> <p><b>BT481</b> RAMDAC video analog/digital converter</p> <p><b>BIOS Flash EPROM</b></p> <p><b>EYE</b> Runs tests on the video subsystem</p>

**AUDIO BOARD**

BOARD	LEVEL	NOTES
MI2002	Nasc.	
MI2017	Nasc	New printed circuit board incorporating the following changes: <ul style="list-style-type: none"> <li>- New 47 pF capacitor between the IORD* and GND signal</li> <li>- New space on side B.</li> </ul>
	Lev. 01	New Codec AD 1884 Sound Port Stereo K mask to replace the old mask J. This offers the following changes: Capacitors C11, C12 go from 1000 pF to 1 uF Capacitor C37 goes from 1 uF to 2.2 uF.

**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
Motherboard	2000		33 MHz i486 CPU
Motherboard	2001		33 MHz i486 CPU
Motherboard	2002		66 MHz i486 DX2 CPU
Motherboard	BA2003	557980 T	No CPU, with 4 MB of RAM
Motherboard	BA2004		No CPU, with 4 MB of RAM
PS11 A power supply	220 V	612184 Q	
PS11 A power supply	115 V	612183 P	
PS11 AR power supply			
BUS Adapter board	IN 2006	558074 E	
Audio board	MI 2002	557952 S	
Audio board	MI 2017		

**USER PROGRAM**

This program is found in the hard disk system regions.

LEVEL	NOTES
Rel. 1.00	This version required BIOS release 1.05 or later.
Rel. 1.02	<p>This release incorporates the following changes:</p> <ul style="list-style-type: none"> <li>- The Setup utility has been changed as far as the way it managed memory above 100 MB is concerned. Help files have also been added..</li> <li>- The hard disk tests have been changed so high capacity hard disks can be used. A configuration utility for these hard disks has also been added.</li> <li>- The On-Line Documentation manual has been changed.</li> <li>- The Settex utility has been modified.</li> <li>- The Sound utility has been modified for the 66 MHz i486 DX2 CPU.</li> <li>- The serial port test has been optimized.</li> <li>- The passwords have been modified so that they can be handled as ASCII codes</li> <li>- The CPU test recognizes the i486 DX2 processor.</li> </ul> <p>This release requires BIOS release 1.08 or later.</p>
Rev. 1.03	<p>This release incorporates the following changes:</p> <ul style="list-style-type: none"> <li>- The memory test has been changed.</li> <li>- The floppy disk test has been changed.</li> </ul>
Rev. 1.04	<p>The following changes have been made to this release:</p> <ul style="list-style-type: none"> <li>- The Setup utility has been changed so as to manage the parallel port on the system board and to be able to enable or disable the second serial port on the system board..</li> <li>- Possibility of managing memory above 100 MB.</li> <li>- The firmware revision utility has been changed.</li> <li>- The way in which 1.2 drives are managed has been changed.</li> </ul> <p>This release requires BIOS release 1.10 or later.</p>
Rev. 1.07	<p>This release incorporates the following changes:</p> <ul style="list-style-type: none"> <li>- The hard disk test also recognizes SEAGATE hard disks.</li> <li>- A test is run on Dedicated Memory Calculation.</li> <li>- The test on the 1.2 MB floppy disk drive has been changed.</li> <li>- The keyboard test is capable of recognizing between PS/2 and AT keyboards.</li> <li>- The M6-450 logotype has been added.</li> <li>- The video test for the graphics accelerator has been added.</li> </ul> <p>This release requires BIOS 1.12 or later.</p>

LEVEL	NOTES
Lev. 1.08	<p>This version requires BIOS release 1.16 or later.</p> <p>This release includes the following modifications with respect to the previous versions:</p> <ul style="list-style-type: none"> <li>- The hard disk test has been modified so that 1 GB hard disks can be tested.</li> <li>- The floppy disk test has been modified to optimize its code.</li> <li>- The keyboard test has been modified. The interrupt subtest has been added.</li> </ul>

**SYSTEM TEST**

LEVEL	NOTES
Rel. 1.02	<p>This version requires BIOS 1.08 or later.</p> <p>It has the following restrictions:</p> <ul style="list-style-type: none"> <li>- Memory test - the Cache Memory subtest is not supported.</li> <li>- VGA test - The DMA Transfer and Truecolor subtest are not supported.</li> </ul>
Rel. 1.04	<p>This version requires BIOS 1.08 or later.</p> <p>The following modifications have been incorporated:</p> <ul style="list-style-type: none"> <li>- The Setup utility has been updated as far as the management of memory above 100 MB is concerned.</li> <li>- Possibility of configuring high capacity hard disk drives</li> <li>- The sound utility has been modified for the 66 MHz i486 DX2 CPU.</li> <li>- The floppy disk test has been added.</li> </ul>
Rel. 1.05	<p>This version requires BIOS 1.10 or later.</p> <p>The following modifications have been incorporated:</p> <ul style="list-style-type: none"> <li>- Updated memory test.</li> <li>- The Setup utility has been changed so as to manage the parallel port on the system board and to be able to enable or disable the second serial port on the system board..</li> <li>- The firmware revision utility has been changed.</li> <li>- Updated floppy disk test.</li> </ul>
Rev. 1.06	<p>This version requires BIOS 1.10 or later.</p> <p>The following modifications have been incorporated:</p> <ul style="list-style-type: none"> <li>- The hard disk test also recognizes SEAGATE hard disks.</li> <li>- A test is run on Dedicated Memory Calculation.</li> <li>- The test on the 1.2 MB floppy disk drive has been changed.</li> <li>- The keyboard test is capable of recognizing between PS/2 and AT keyboards.</li> <li>- The M6-450 logotype has been added.</li> <li>- The video test for the graphics accelerator has been added.</li> </ul>
Rev. 1.07	<p>This version requires BIOS 1.10 or later.</p> <p>The following modifications have been incorporated:</p> <ul style="list-style-type: none"> <li>- The hard disk test has been introduced.</li> <li>- The keyboard test is capable of recognizing between PS/2 and AT keyboards.</li> <li>- The mouse test has been optimized.</li> <li>- Updated CPU cache test.</li> </ul>
Rev. 1.08	<p>This version requires BIOS release 1.13 or later.</p> <p>True Color video management has been implemented in this release.</p>

**SYSTEM REGION SET UP**

LEVEL	NOTES
Rel. 1.01	<p>This System Region Setup version allows User Disk Rel. 1.00 to be installed automatically in the system region of the hard disk drives.</p> <p>This version requires BIOS 1.05 or later, and has the following restrictions:</p> <ul style="list-style-type: none"> <li>- The Parking Heads utility is not present.</li> <li>- The system regions can only be installed if only one hard disk is present. They cannot be used if the personal computer has two hard disks.</li> </ul>
Rel. 1.02	<p>This System Region Setup version allows User Disk Rel. 1.00 to be installed automatically in the system region of the hard disk drives.</p> <p>It has the same restrictions as the previous version.</p>
Rel. 1.03	<p>This System Region Setup version allows User Disk Rel. 1.02 to be installed automatically in the system region of the hard disk drives. This release incorporates the following changes with respect to the releases used on earlier systems:</p> <ul style="list-style-type: none"> <li>- The Setup utility has been changed as far as the way it managed memory above 100 MB is concerned. Help files have also been added.</li> <li>- The hard disk tests have been changed so high capacity hard disks can be used. A configuration utility for these hard disks has also been added.</li> <li>- The On-Line Documentation manual has been changed.</li> <li>- The Settex utility has been modified.</li> <li>- The Sound utility has been modified for the 66 MHz i486 DX2 CPU.</li> <li>- The serial port test has been optimized.</li> <li>- The passwords have been modified so that they can be handled as ASCII codes.</li> <li>- The CPU test recognizes the i486 DX2 processor.</li> </ul> <p>This release requires BIOS 1.08 or later.</p>
Rel. 1.04	<p>This System Region Setup version allows User Disk Rel. 1.03 to be installed automatically in the system region of the hard disk drives. This release incorporates the following changes with respect to earlier releases</p> <ul style="list-style-type: none"> <li>- Updated memory test.</li> <li>- Updated floppy disk test.</li> </ul> <p>This release requires BIOS 1.08 or later.</p>
Rel. 1.05	<p>This System Region Setup version allows User Disk Rel. 1.04 to be installed automatically in the system region of the hard disk drives. This release incorporates the following changes with respect to earlier releases:</p> <ul style="list-style-type: none"> <li>- The Setup utility has been changed so as to manage the parallel port on the system board and to be able to enable or disable the second serial port on the system board.</li> <li>- Possibility of managing memory above 100 MB.</li> <li>- The firmware revision utility has been changed.</li> <li>- The way in which 1.2 drives are managed has been changed.</li> </ul> <p>This release requires BIOS release 1.10 or later</p>
Rel. 1.08	<p>This System Region Setup version allows User Disk Rel. 1.05 to be installed automatically in the system region of the hard disk drives. This release incorporates the following changes with respect to earlier releases:</p> <ul style="list-style-type: none"> <li>- The hard disk test also recognizes SEAGATE hard disks.</li> <li>- A test is run on Dedicated Memory Calculation.</li> <li>- The test on the 1.2 MB floppy disk drive has been changed.</li> <li>- The keyboard test is capable of recognizing between PS/2 and AT keyboards.</li> <li>- The M6-450 logotype has been added.</li> <li>- The video test for the graphics accelerator has been added.</li> </ul> <p>This release requires BIOS 1.10 or later</p>

LEVEL	NOTES
Rel. 1.09	<p>This System Region Setup version allows User Disk Rel. 1.08 to be installed automatically in the system regions of the hard disk drives.</p> <p>This version requires BIOS release 1.16 or later.</p> <p>This release includes the following modifications with respect to the previous versions:</p> <ul style="list-style-type: none"> <li>- The hard disk test has been modified so that 1 GB hard disks can be recognized.</li> <li>- The floppy disk test has been modified to optimize its code.</li> <li>- The keyboard test has been modified. The interrupt subtest has been added.</li> </ul>

**POWER SUPPLY**

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

**VIDEO CONTROLLER**

MOTHERBOARD	LEVEL	VIDEO CONTROLLER COMPONENT	NOTES
BA2000	Nasc.	68000-3	Boards no longer in production; replaced by the following.
BA2001	Nasc.	68000-3	
BA2002	Nasc.	68000-3	
BA2003	Nasc.	68000-3	
	Lev. 01		
	Lev. 02		
	Lev. 03		
	Lev. 04		
BA2004	Nasc.	68000-3	
	Lev. 01		
	Lev. 02		
	Lev. 03		
	Lev. 04		
	Lev. 05		
Lev. 06	68000-6		

**SOFTWARE DRIVERS**

<b>DRIVER</b>	<b>NOTES</b>
Enhanced video driver EVD Rel. 1.00	The Readme file is in English only.
Enhanced video driver EVD Rel. 1.00 upd 1.0	The Readme file is in five languages.
Enhanced video driver EVD Rel. 1.00 upd 1.0	
Enhanced video driver EVD Rel 1.02	This version improves the features offered by the previous version as far as the following fields are concerned: <ul style="list-style-type: none"><li>- MS-DOS and Windows (VESA Display Power Management)</li><li>- Allows the operation of OS/2 Ver. 2.1 drivers</li><li>- Allows True Color mode operation at 640x480 resolution with Windows 3.1.</li></ul>

**BIOS**

<b>LEVEL</b>	<b>NOTES</b>
Rev. 1.02	This is the first BIOS version used on these systems.
Rev. 1.03	Solves the following problems of release 1.02: <ul style="list-style-type: none"> <li>- Self-recognition of a pair of 8 MB SIMMs. In the previous release these SIMM pairs were not recognized.</li> <li>- Audio board management.</li> <li>- Faster test routine on the secondary level cache when RAM between 512 KB and 640 KB is disabled.</li> <li>- Correction of the problems concerning the recognition of the size of secondary level cache following a reset by the Setup program.</li> <li>- Management of the i486 DX2 50 MHz and 66 MHz clock.</li> <li>- Management of the ROMCS signal in the Chips &amp; Technology 4021 chip set.</li> </ul>
Rev. 1.04	Solves the following problems of release 1.03: <ul style="list-style-type: none"> <li>- CPU recognition with an invalid CMOS RAM.</li> <li>- Management of the memory gap between 12 MB and 16 MB after a hardware reset.</li> <li>- Video refresh rate adjustments.</li> <li>- Management of the system and video BIOS in the ROM BIOS.</li> <li>- Management of the EYE component when a VGA board is installed on the bus.</li> <li>- Memory test with a 33 MHz i486 DX2 CPU (66 MHz internal clock).</li> </ul>
Rev. 1.05	Solves the following problems of release 1.04: <ul style="list-style-type: none"> <li>- Running of fast memory tests when the addresses within 512 KB and 640 KB are disabled, and when the Large Tests option for memory tests has been selected from Setup.</li> <li>- Memory filling above 16 MB in case a gap forms between 12 MB and 16 MB.</li> <li>- Management of the Computone board installed between 512 KB and 640 KB after a jump at f000:fff0 (reset simulation)</li> <li>- Management of the COM2 serial port on the bus.</li> </ul>
Rev. 1.06	Solves the following problems of release 1.05: <ul style="list-style-type: none"> <li>- Adjustment of the video timing values that cause the picture to be slightly shifted with respect to the center of the screen.</li> <li>- Management of the I/Os of the Super I/O II via jumper settings to solve conflicts between the Sound Blaster Plus board I/O addresses and those of the Super I/O II.</li> <li>- Management of the hidden partitions on high capacity hard disk drives (above 510 MB). This feature must, however, be used with the appropriate program that automatically installs hidden partitions.</li> </ul>
Rev. 1.07	Replaces release 1.06 since this release, in certain conditions, crashes when testing linear memory.

LEVEL	NOTES
Rev. 1.08	<p>Solves the following problems of release 1.07:</p> <ul style="list-style-type: none"> <li>- No "Large" memory test during the Power On Diagnostics.</li> <li>- Testing of high capacity hard disks during the System Test (or Customer Test) As far as user memory above 64 MB and high capacity hard disk drives are concerned, this BIOS release must be associated to the following releases: System Region Rev.1.02 User Diskette Rev. 1.01 System Test Rev. 1.02</li> <li>- Management of disk A disable security feature during a bootstrap routine in the system region environment. This problem occurred whenever the bootstrap routine was launched from the system region where the system Setup program is stored, and the bootstrap for disk A security feature is selected. In this case the message "No system disk" was displayed and you were asked to press a key which would have launched the bootstrap routine from the system region. This modification ensures that bootstrapping is performed automatically.</li> </ul>
Rev. 1.10	<p>Solves the following problems of release 1.09:</p> <ul style="list-style-type: none"> <li>- Possibility of disabling the second serial port through Setup.</li> <li>- Possibility of configuring the I/O address of the primary parallel port through Setup.</li> <li>- Cache controller enable before the the bootstrap interrupt to solve the problems with boards using the optional ROM. When installed on the bus, these boards would replace the system BIOS bootstrap interrupt with one of their own, thus degrading their own performance</li> <li>- Management of the TI 68800-AX-6 video controller.</li> </ul>
Rev. 1.11	Introduces a 50 MHz clock. Can also handle the Norway keyboard.
Rev. 1.13	This revision allows True Color video mode management. This BIOS revision was never produced.
Rev. 1.14	Corrects the problem with some videos which automatically switch to black and white mode after a software reset.
Rev. 1.16	<p>This BIOS release solves the following problems:</p> <ul style="list-style-type: none"> <li>- Distinguishes the 486 CPU from the 486SX2 CPU during system bootstrap</li> <li>- Correctly handles the ETHERLINK 16 3C507 line board</li> <li>- Handles the Siemens SIMMs</li> <li>- Handles the second level of Chips and Technology's 4021 chipset</li> <li>- Handles hard disks with timing problems, in particular CONNER 85 MB and 170 MB drives.</li> </ul>
Rev. 1.18	<p>This revision allows the management of memory between 512 KB and 1 MB with the second level of chipset CS4021.</p> <p>It also corrects the ATI 68800 (Setp 6) video controller fault which consisted of reducing video subsystem performance.</p> <p>This BIOS reveision was never produced, but is used to correct problems at field level.</p>
Rev. 1.19	This revision corrects problems concerning the factory testing of the audio subsystem.
Rev. 1.20	Corrects the problems with the ATI video controller.



**BUS EXPANSION BOARD**

<b>NAME</b>	<b>LEVEL</b>	<b>NOTES</b>
IN2006	Nasc.  Lev. 01	If the interrupt used by the audio board (the available interrupts are 7-9-10-11) is changed in the Windows environment, a message is displayed when exiting the Windows session indicating that the interrupt selected is already used and that interrupt 7 will be remapped. To correct this problem, remove all KRC3 terminators present on side B of the bus expansion board.

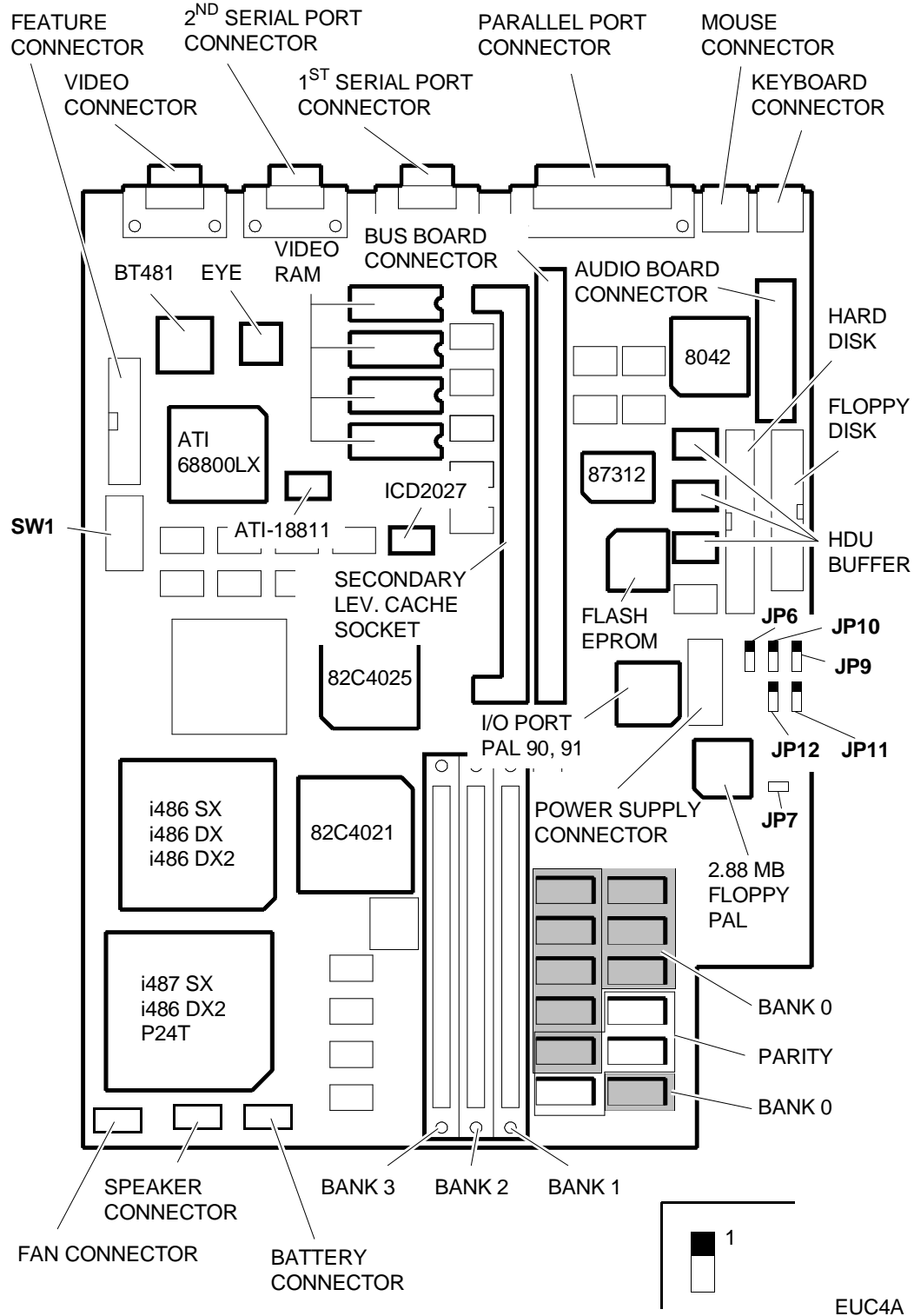
**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01  MS-DOS Release 5.0 OS/2 Release 2.0 OS/2 Release 1.3 SE	Requests for 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	
<b>WINDOWS</b>	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

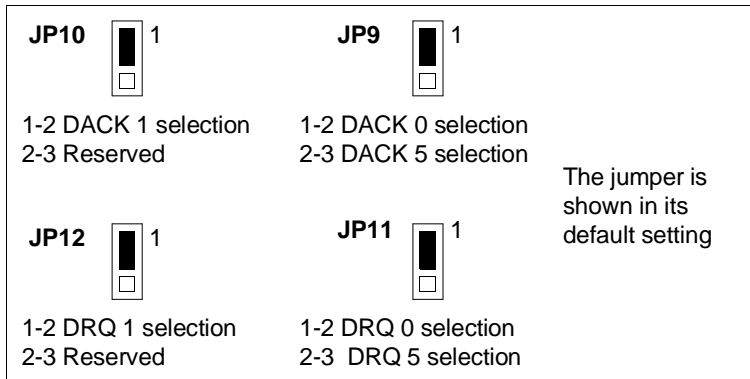
**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smart modem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 GEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
<b>MULTIPOINT</b>	<b>MOUSE</b>
CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) IBM PS/2 Mouse Serial Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
<b>GRAPHICS PRODUCTS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
AST VGA plus FASTWRITE 1024i FASTWRITE VGA HERCULES GRAPHICS CARD IBM VGA Adapter MATROX PG - 1281 MAXON MVGA-16 Adapter ORCHID PRODESIGNER VGA PLUS HERCULES INCOLOR CARD (GB222) PARADISE VGA PRO CARD	10 NET INTERFACE BOARD 200 series 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C505 DECNET PCSA adapter IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter MICOM NP1000 adapter NOVELL NE1000 adapter NOVELL NE2000 adapter
<b>DISPLAY UNITS</b>	
IBM enhanced graphics monitor 5151 IBM color graphics monitor 5153 IBM PS/2 Monochrome display 8503 IBM PS/2 color display 8512 IBM PS/2 color display 8513 IBM PS/2 color display 8514 NEC MULTISYNC II	NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D PHILIPS 7BM749 PHILIPS 9CM082

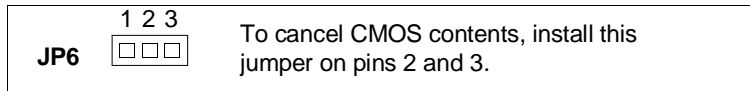
### MOTHERBOARD COMPONENTS AND JUMPERS



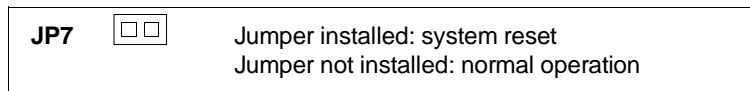
**Jumpers for the audio board DMA channel selection**



**Jumper JP6  
RAM cancellation**



**Jumper JP7  
System reset**



**DIP-Switch SW1**

DIP SWITCH	FUNCTION	POS.	DESCRIPTION
A	87311 or 87312 addressing	ON	Component 87311/12 responds at address 26E - 26F
		OFF *	Component 87311/12 responds at address 398 - 399
B	Disables the setup program	ON	The User program stored in the hidden partitions of the hard disk drive, and that allows the system to be configured, is not launched. When enabled, the following message is displayed at the end of the POD: <i>POD Warning</i> .
		OFF *	If system configuration has changed, the POD will automatically access the User Program so that it can be reconfigured.
C	Disables bootstrapping from the serial port	ON	The system cannot be bootstrapped from the serial port. The POD controls this DIP-Switch and, if it is set to ON, the following message is displayed: <i>Serial Port 0/1 Security Enabled</i> .
		OFF *	The system can be bootstrapped from the serial port.
D	Enables writing to the Flash EPROM	ON	Flash EPROM write enabled. The contents of the system BIOS can be changed via diskette.
		OFF *	Flash EPROM write disabled.
E	Enables writing to the floppy disk drives	ON	Floppy disk drive write disabled.
		OFF *	Floppy disk write enabled.
F	Enables writing to the RAMDAC	ON	RAMDAC write disabled. This setting is used for multimedia boards
		OFF *	RAMDAC write enabled.
G	Disables the video controller	ON	The video controller is disabled.
		OFF	The video controller is enabled.
H	System clock	ON *	33 MHz.
		OFF	25 MHz.

\* Indicates the 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 from Controller 1 from Controller 2
3	IRQ8	2	Real time clock
4	IRQ9	2	Available
5	IRQ10	2	Available
6	IRQ11	2	Available
7	IRQ12	2	Mouse
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 - parallel port 3
14	IRQ6	1	Floppy disk controller
15	IRQ7	1	Parallel port

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

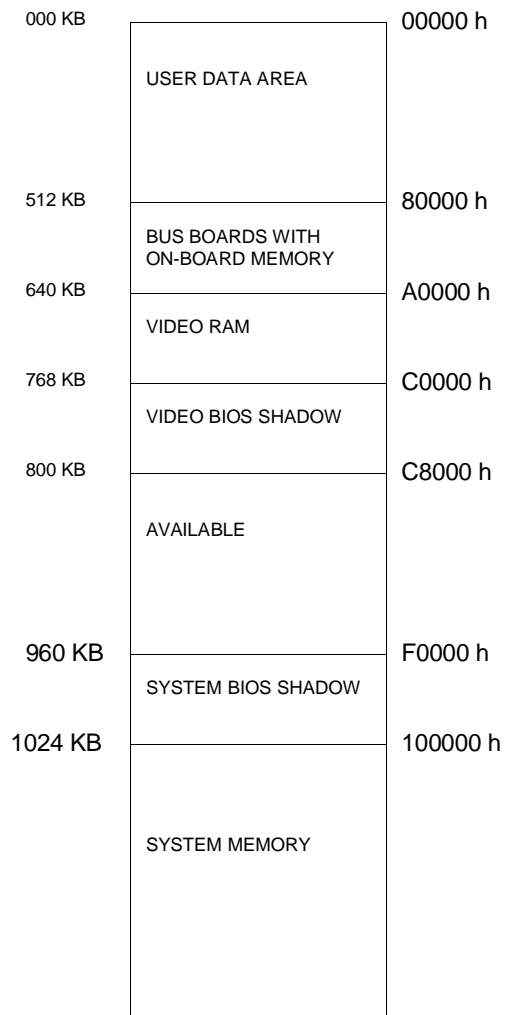
**DMA CHANNELS**

CHANNEL	NO. OF BITS	FUNCTION
0	8	Reserved
1	8	Available
2	8	Floppy disk transfers
3	8	Video
4	16	Used for the cascade connection of DMA 1
5	16	Available
6	16	Available
7	16	Available

**I/O ADDRESS MAP**

<b>ADDRESS</b>	<b>FUNCTION</b>	<b>ADDRESS</b>	<b>FUNCTION</b>
000-01F h	DMA 1, 8237A-5 controller	300-31F h	Reserved
020-03F h	8259A interrupt 1 controller	360-36F h	Reserved
040-05F h	8254 timer	378-37F h	Parallel port 1 (LPT1)
060-06F h	8742 keyboard data controller	380-38F h	Reserved for SDLC communications, Bisynchronous 2
61 h	System Control Port B	3A0-3AF h	Reserved for bisynchronous 1
64 h	8742 keyboard command controller	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	8259 interrupt 2 controller	3E8-3EF h	Serial port 3 (COM3)
0F0 h	Cancels NPX (80487) busy	3F0-3F7 h	Floppy disk controller
0F1 h	Resets NPX, 80487	3F8-3FF h	Serial port (COM1)
0F8-0FF	80487 math coprocessor	533 h	Muting check on the audio subsystem (alternative to 607 h)
1F0-1F8 h	Hard disk drive controller	534-537 h	Audio subsystem (alternative to 608-60B h)
200-207 h	Reserved	607 h	Muting check on the audio subsystem (alternative to 533 h)
278-27F h	Parallel port 2 (LPT 2)	608-60B h	Audio subsystem (alternative to 534-537 h)
2F8-2FF h	Serial port 2 (COM2)		

### SYSTEM MEMORY MAP



## M4-34

### CHARACTERISTICS

Microprocessor	AMD 80386 SX
Clock	40 MHz
Architecture	AT
Memory	2 MB to 16 MB on the motherboard, without parity circuitry <b>Bank 0:</b> 2 MB soldered <b>Banks 1 and 2:</b> Four sockets that can host the following SIMMs: <b>EXM 27-820</b> - 2 MB - Two 1MBx9 SIMMs <b>EXM 27-821</b> - 8 MB - Two 4MBx9 SIMMs When installing the SIMMs, always begin from Bank 1.
Cache memory	16 KB
Memory access	70 ns
Video memory	512 KB expandible to 1 MB Expansion to 1 MB is obtained through kit <b>VGA-MEM/02</b> - One VRAM 256x16 chip
Coprocessor	40 MHz CYRIX 80387 SX
Floppy Disk	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 1.2 MB 5.25" Panasonic JU475-3 - JU475-4 1.2 MB 5.25" Toshiba ND 08 DE 1.2 MB 5.25" Panasonic JU475-5
Hard Disk	85 MB CONNER CP30084E 85 MB W.D. Caviar 280 85 MB Quantum ELS 85 AT 170 MB CONNER CP30174E 170 MB Quantum ELS 170 AT 240 MB CONNER CP30254 240 MB Quantum LPS 240 AT
Streaming Tape	80/120 MB <b>Irwin 31250A</b> with floppy disk interface
Slots	Two 16-bit connectors on the expansion bus
Video controller	Integrated Enhanced VGA CL-GF5422
HDU and FDU controllers	Integrated floppy disk controller: 87310 HDU interface: MSI buffer and logic gates
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 27-101/N, ANK 27-102/N

#### MOTHERBOARD

BA2012 2 MB

#### BIOS

Last Lev. 1.05

#### EXPANSION BUS

#### POWER SUPPLY

MINEBA  
 NMB SPE 1095  
 LA/11 BNMB 110 V  
 LA/16 BNMB 220 V

#### CONSOLE BOARD

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**MOTHERBOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>NOTES</b>
<b>BA2012</b>	Nasc.	5579 75 Z	Rev. 1.01	System board with 2 MB of soldered memory
	Lev. 01		Rev. 1.02	New BIOS to solve resolution problems when using Windows.
	Lev. 01*		Rev. 1.03	BIOS revision 1.03 is used on systems which host video memory with an 80 ns. access time.
	Lev. 02		Rev. 1.04	This BIOS revision solves the problems encountered when different work sessions run simultaneously under Windows.
	Lev. 02*		Rev. 1.05	BIOS revision 1.05 is used on systems which host video memory with an 80 ns access time.

\* = Board versions with an 80 ns video RAM instead of a 70 ns memory access.

**MOTHERBOARD INTEGRATED COMPONENTS**

MOTHERBOARD	INTEGRATED COMPONENTS
	<p><b>CPU</b> 40 MHz AMD 80386 SX  <b>Math coprocessor socket</b> 40 MHz CYRIX 80387 SX  <b>82C390SX</b> Integrates the following functions:</p> <ul style="list-style-type: none"> <li>- RESET signal generator</li> <li>- Clock generator</li> <li>- System and CPU bus controller</li> <li>- Control of the arbitration between Device MAsTers, DMA and memory refresh</li> <li>- Control port B and NMI logic registers</li> <li>- Management of the A20 GATE signal</li> <li>- Cache controller</li> <li>- Memory controller</li> <li>- BIOS shadow control</li> <li>- Memory relocation control</li> <li>- Control of concurrent memory refresh and normal PC refresh</li> <li>- Management of the interface between the three system buses: CPU data bus (16-bit), memory data bus (16-bit), I/O peripheral data bus (16-bit)</li> <li>- Math coprocessor interface</li> <li>- Generation of the system sync signals</li> </ul> <p><b>MCM6264</b> Components implementing 16 KB cache memory  <b>83C206Q</b> Integrates the following functions:</p> <ul style="list-style-type: none"> <li>- 114 bytes of CMOS RAM backed up by a lithium battery to maintain the data stored even after the system is powered off.</li> <li>- Real Time Clock</li> <li>- DMA controller</li> <li>- Interrupt controller</li> </ul> <p><b>27C010</b> 128 Kb x 8 ROM BIOS  <b>87310</b> Integrates the following functions</p> <ul style="list-style-type: none"> <li>- Floppy disk controller</li> <li>- Interface for two serial ports</li> <li>- Interface for the parallel port</li> <li>- Interface for intelligent hard disk drives</li> </ul> <p><b>8042</b> Keyboard and mouse controller  <b>CL-GD5422</b> Super VGA controller  <b>ICD2027</b> System programmable clock generator  <b>74LS293</b> Speaker volume control</p>

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**BOARDS**

FUNCTION	DESCRIPTION	D.R.S. CODE	CHARACTERISTICS
Motherboard	2012	557975 Z	40 MHz i386 SX CPU with
LA/16 BNMB power supply	220 V	151950 D	2 MB of RAM
LA/11 BNMB power supply	110 V	151951 S	
BUS Adapter board		030099 W	
Console board		030787 U	

**USER PROGRAM**

This program is stored in the system regions of the hard disk drive.

LEVEL	NOTES
Rel. 1.00	Requires BIOS release 1.01 or later. This release has the following restrictions: <ul style="list-style-type: none"> <li>- The Hard Disk parking utility is not present.</li> <li>- The "Monitor Utility" includes the "Video Refresh Rate: 75 Hz" and "High Vertical Refresh" options that the BIOS is not yet capable of supporting correctly</li> <li>- The video tests of release 1.01 do not support the "high resolution graphics" video mode</li> </ul>
Rel. 1.01	Requires BIOS release 1.02 or later. The following modifications are made with respect to the previous release: <ul style="list-style-type: none"> <li>- The Setup utility has been modified so as to be able to configure the system board's parallel port and to either enable or disable the second serial port.</li> <li>- The video test has been modified to support the new vertical refresh rates.</li> <li>- The floppy disk test has been modified so that it can work correctly on 1.2 MB drives</li> <li>- The Monitor Utility has been modified to support the new vertical refresh rates.</li> </ul> This release has the following restrictions: <ul style="list-style-type: none"> <li>- The graphics accelerator subtests are not supported by this system's video controller.</li> <li>- The TrueColor subtest does not work correctly if video RAM has a capacity of less than 1 MB.</li> </ul>

**SYSTEM TEST**

LEVEL	NOTES
Rel. 1.01	Requires BIOS release 1.01 or later. This release has the following restrictions: <ul style="list-style-type: none"> <li>- The Hard Disk parking utility is not present.</li> <li>- The "Monitor Utility" includes the "Video Refresh Rate: 75 Hz" and "High Vertical Refresh" options that the BIOS is not yet capable of supporting correctly</li> <li>- The video tests of release 1.01 do not support the "high resolution graphics" video mode</li> </ul>
Rel. 1.02	Requires BIOS release 1.02 or later. The following modifications are made with respect to the previous release: <ul style="list-style-type: none"> <li>- The Setup utility has been modified so as to be able to configure the system board's parallel port and to either enable or disable the second serial port.</li> <li>- The video test has been modified to support the new vertical refresh rates.</li> <li>- The floppy disk test has been modified so that it can work correctly on 1.2 MB drives</li> <li>- The Monitor Utility has been modified to support the new vertical refresh rates.</li> </ul> This release has the following restrictions: <ul style="list-style-type: none"> <li>- The graphics accelerator subtests are not supported by this system's video controller.</li> <li>- The TrueColor subtest does not work correctly if video RAM has a capacity of less than 1 MB.</li> </ul>

**SYSTEM REGION SET UP**

LEVEL	NOTES
Rel. 1.00	<p>This System Region Setup version allows User Disk rel. 1.00 to be automatically installed in the system regions of the hard disk drive.</p> <p>This release requires BIOS release 1.01 or later, and has the following restrictions:</p> <ul style="list-style-type: none"> <li>- The Hard Disk parking utility is not present.</li> <li>- The "Monitor Utility" includes the "Video Refresh Rate: 75 Hz" and "High Vertical Refresh" options that the BIOS is not yet capable of supporting correctly</li> </ul>
Rel. 1.01	<p>This System Region Setup version allows User Disk rel. 1.01 to be automatically installed in the system regions of the hard disk drive</p> <p>This release requires BIOS release 1.02 or later, and incorporates the following modifications with respect to the previous release:</p> <ul style="list-style-type: none"> <li>- The Setup utility has been modified so as to be able to configure the system board's parallel port and to either enable or disable the second serial port.</li> <li>- The video test has been modified to support the new vertical refresh rates.</li> <li>- The floppy disk test has been modified so that it can work correctly on 1.2 MB drives</li> <li>- The Monitor Utility has been modified to support the new vertical refresh rates.</li> </ul> <p>This release has the following restrictions:</p> <ul style="list-style-type: none"> <li>- The graphics accelerator subtests are not supported by this system's video controller.</li> <li>- The TrueColor subtest does not work correctly if video RAM has a capacity of less than 1 MB.</li> </ul>

**POWER SUPPLY**

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POWER SUPPLY	LEVEL	DESCRIPTION
MINEBA NMB SPE 1095 LA/16 BNMB	Nasc.	220 V
MINEBA NMB SPE 1095 LA/11 BNMB	Nasc.	110 V

**COMPATIBILITY NOTES**

BOARD OR HW/SW DEVICE	DESCRIPTION

**SOFTWARE DRIVERS**

DRIVER	NOTES
Enhanced Video Drivers EVD Rel. 1.00	

**BIOS**

LEVEL	NOTES
Rev. 1.01	
Rev. 1.02	<ul style="list-style-type: none"> <li>- This release allows the following video vertical refresh rates to be used: 56, 84, 75, 87 Hz</li> <li>- Solves the problem with Windows in the 800x600 and 256-color 1024x768 video modes.</li> <li>- Introduces the new 16-color 800x600 and 1024x768 video modes.</li> <li>- New ways to configure the parallel and serial ports</li> <li>- Solves the problem of the optional ROM not allowing the correct management of the CPU cache.</li> </ul>
Rev. 1.03	This BIOS release supports 80 ns video RAM chips instead of the 70 ns video RAM chips which are no longer available on the market.

**SOFTWARE COMPATIBILITY**

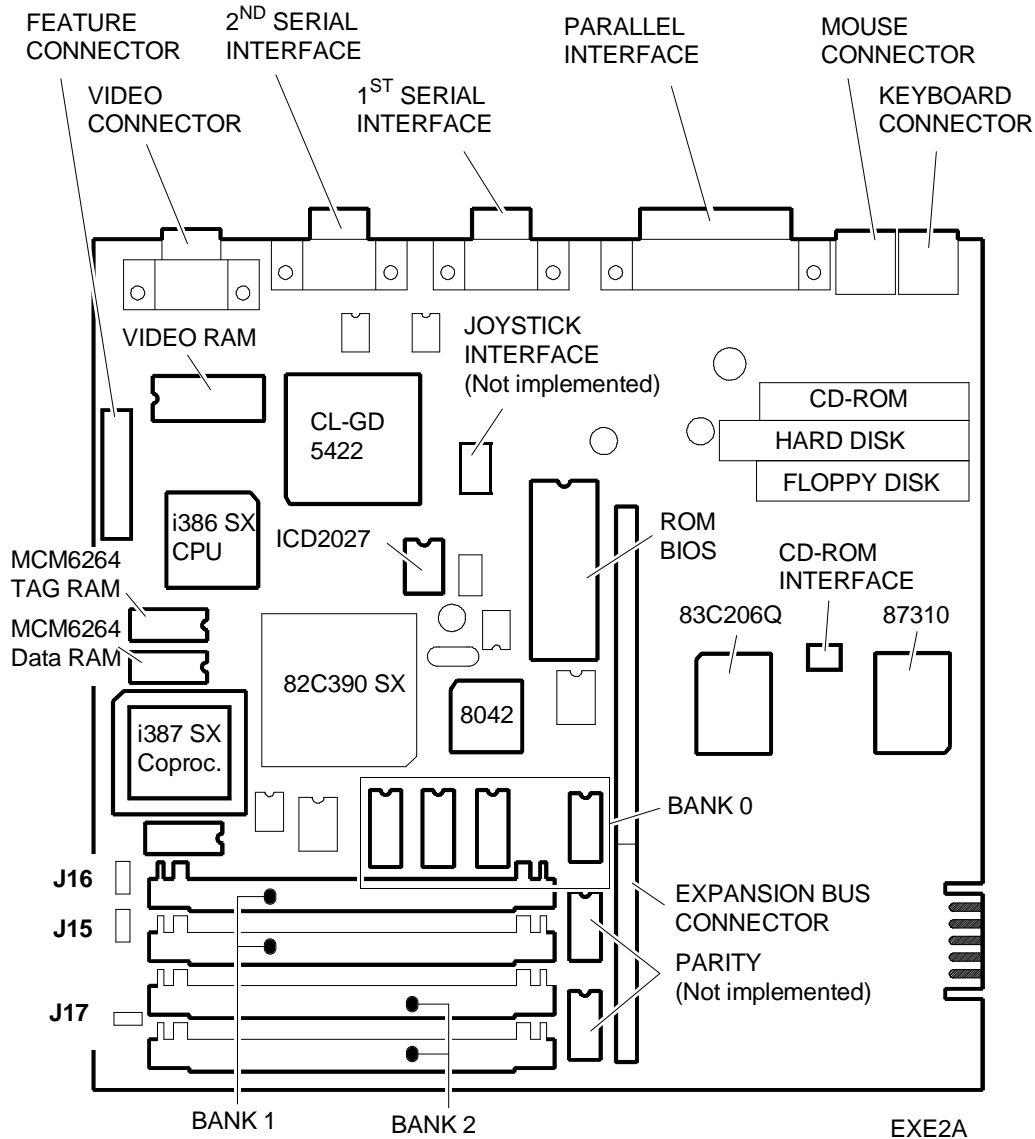
OPERATING SYSTEMS	NOTES
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INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2.4 SCO XENIX 386, Rev. 2.3	
<b>WINDOWS</b>	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<b>MODEM</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smart modem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 GEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
<b>MULTIPOINT</b>	<b>MOUSE</b>
CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) IBM PS/2 Mouse Serial Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
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## MOTHERBOARD COMPONENTS AND JUMPERS

### Components on Side A



#### Jumper J16

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

#### Jumper J17 IN:

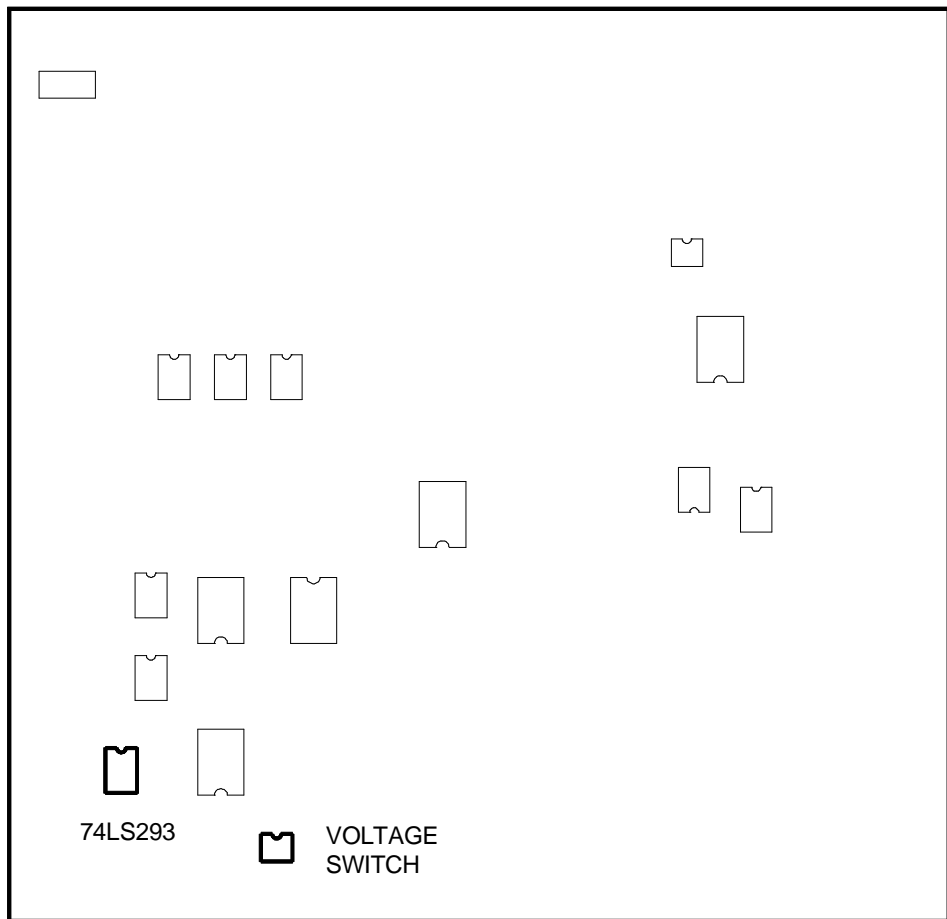
The User Program that allows the system to be configured and which is stored in the system region of the hard disk drive, is not launched. If the configuration of the system has been changed, the only way to reconfigure the system is by using the System Test diskette. If this security feature was enabled, the following message is displayed at the end of the POD: *POD Warning*

OUT: If the configuration of the system has been changed, the POD will automatically access the User Program so that the system can be reconfigured.

#### Jumper J15

Position 1-2: Floppy drive write disabled.  
 Position 2-3: Floppy drive write enabled.

*Components on Side B*



EXE5A



**INTERRUPT LEVELS**

LEVEL	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 to 10 *	IRQ2	1	Interrupt from Controller 1 to Controller 2
3	IRQ8	2	Real time clock
4	IRQ9	2	Available
5	IRQ10	2	Available
6	IRQ11	2	Available
7	IRQ12	2	Mouse
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 - parallel port 3
14	IRQ6	1	Floppy disk controller
15	IRQ7	1	Parallel port 1

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

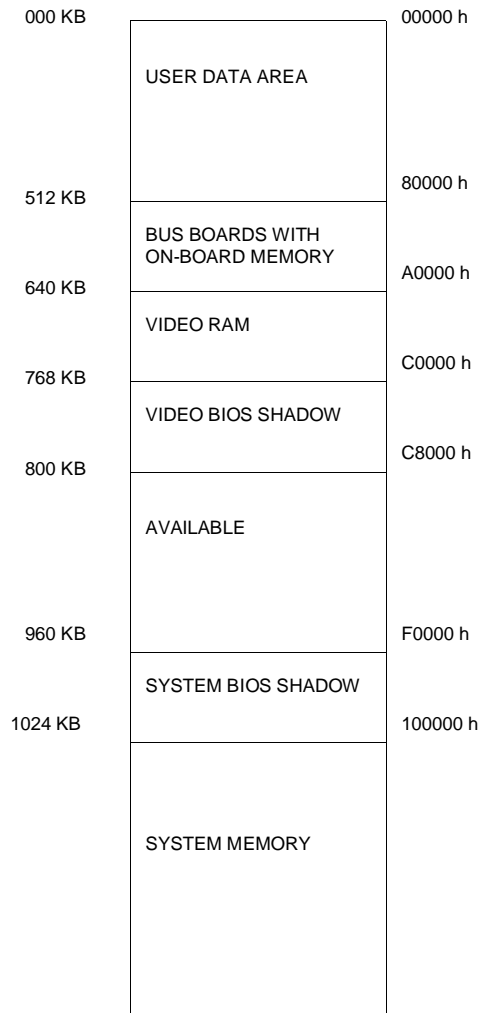
**DMA CHANNELS**

CHANNEL	NO. OF BITS	FUNCTION
0	8	Reserved
1	8	Available
2	8	Floppy disk transfers
3	8	Video
4	16	Used for the cascade connection of DMA 1
5	16	Available
6	16	Available
7	16	Available

**I/O ADDRESS MAP**

<b>ADDRESS</b>	<b>FUNCTION</b>	<b>ADDRESS</b>	<b>FUNCTION</b>
000-01F h	8237A-5 DMA controller 1	2F8-2FF h	Serial port 2 (COM2)
020-03F h	8259A interrupt controller 1	300-31F h	Reserved
040-05F h	8254 timer	340-347 h	AT CD-ROM interface
060-06F h	8742 data keyboard controller	360-36F h	Reserved
61 h	System Control Port B	378-37F h	Parallel port 2 (LPT2)
64 h	8742 commands keyboard controller	380-38F h	Reserved for SDLC connections, bisynchronous 2
070-07F h	Real time clock, NMI Mask, CMOS RAM (write registers)	3A0-3AF h	Reserved for bisynchronous 1
080-09F h	DMA page registers	3B0-3BF h	Reserved
0A0-0BF h	8259 interrupt controller 2	3BC h	Parallel port 1 (LPT1)
0F0 h	Cancel NPX (80487) busy	3C0-3CF h	Reserved
0F1 h	Reset NPX, 80487	3D0-3DF h	Video controller
0F8-0FF	80487 math coprocessor	3E8-3EF h	Serial port 3 (COM3)
1F0-1F8 h	Hard disk controller	3F0-3F7 h	Floppy disk controller
200-207 h	Reserved	3F8-3FF h	Serial port (COM1)
278-27F h	Parallel port 3 (LPT 3)		

### SYSTEM MEMORY MAP



## PCS30 - PCS40

The following personal computers belong to the PCS30-PCS40 system line:

PERSONAL COMPUTER	PROCESSOR	CLOCK	MEMORY	CACHE	SLOTS
PCS30 SX/40 Desktop slim case	80386 SX	40 MHz	2 MB to 16 MB	16 KB	5 AT 3 free
PCS30 DX/40 Desktop slim case	80386 DX	40 MHz	4 MB to 32 MB	128 KB	5 AT 3 free.
PCS40 SX/25 Desktop slim case	80486 SX	25 MHz	4 MB to 32 MB	Internal to the CPU	5 AT 3 free.
PCS40 SX/33 Minitower case	80486 SX	33 MHz	4 MB to 32 MB	Internal to the CPU	8 AT 6 free
PCS40 DX/33 Minitower case	80486 DX	33 MHz	4 MB to 32 MB	Internal to the CPU	8 AT 6 free
PCS40 D2/50 Minitower case	80486 DX2	50 MHz	4 MB to 32 MB	Internal to the CPU+ 128 KB 2 <sup>nd</sup> level	8 AT 6 free
PCS40 D2/66 Minitower case	80486 DX2	66 MHz	4 MB to 32 MB	Internal to the CPU + 128 KB 2 <sup>nd</sup> level	8 AT 6 dispo.

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### NOTE:

Nearly 5,000 systems have been manufactured specifically for the Italian Subsidiary. Following are the major differences between these models and those of the standard production:

- System board: Some systems have been equipped with a system board that can only support the 33 MHz 80386 SX CPU.
- Hard disk: These systems do not come with a hard disk installed at the factory. The first hard disk on these systems must be installed by the field engineer using one of the following kits:
  - **HDU 85/M**, 20 85 MB HDUs
  - **HDU 170/M**, 20 170 MB HDUs
  - **HDU 240/M**, 20 240 MB HDUs
- Streaming tape: These systems use an 80/120 MB streaming tape drive with a floppy interface.
- Monitors: The following monitors can be used - **DSM 25-415**, 14" color
  - **DSM 27-214**, trimode color
- Bus: Due to the problems with the casing of these systems, the joystick and I/O board second serial port connectors must be mounted on a board which is installed in one of the expansion slots. This means that the system loses one expansion slot.
 

Therefore:

  - For systems with slim case, of 5 slots 2 are available.
  - For systems with minitower case, of 8 slots 5 are available.

### SYSTEM BOARD & COPROCESSOR

Different types of board are available depending on the personal computer model.

SYSTEM BOARD NAME	PROCESSOR	COPROCESSOR	PERSONAL COMPUTER
WH 386 SX	40 MHz 386 SX	40 MHz 387 SX *	PCS30 SX/40 slim
4386-VC-HD	40 MHz 386 DX	40 MHz 387 DX *	PCS30 DX/40 slim
486-VC	25 MHz 486 SX	25 MHz 487 SX 50 MHz 486 DX2	PCS40 SX/25 slim
	33 MHz 486 SX	33 MHz 487 SX 66 MHz 486 DX2	PCS40 SX/33 Minitower
	33 MHz 486 DX	66 MHz 486 DX2 replacig the installed 486 DX	PCS40 DX/33 Minitower
	50 MHz 486 DX2	NO	PCS40 D2/50 Minitower
	66 MHz 486 DX2	NO	PCS40 D2/66 Minitower

\* These coprocessors can work on these systems even though Olivetti is not planning to use them.

### SYSTEM BOARD & MEMORY

SYSTEM BOARD	MEMORY																
WH 386 SX	Two memory banks each consisting of two sockets. These banks already host four 1MBx9 SIMMs for a total of 4 MB. Memory can be expanded at 8 MB steps:																
	<table border="1"> <thead> <tr> <th>BANK 0</th> <th>BANK 1</th> <th>TOTAL</th> <th>NOTES</th> </tr> </thead> <tbody> <tr> <td>2 MB Two 1MB x 9 SIMMs</td> <td>2 MB Two 1MB x 9 SIMMs</td> <td>4 MB</td> <td>Standard configuration</td> </tr> <tr> <td>2 MB Two 1MB x 9 SIMMs</td> <td>8 MB Two 4MB x 9 SIMMs</td> <td>10 MB</td> <td>Removing the 1 MB SIMMs from bank 1</td> </tr> <tr> <td>8 MB Two 4MB x 9 SIMMs</td> <td>8 MB Two 4MB x 9 SIMMs</td> <td>16 MB</td> <td>Removing the SIMMs from banks 0 and 1</td> </tr> </tbody> </table>	BANK 0	BANK 1	TOTAL	NOTES	2 MB Two 1MB x 9 SIMMs	2 MB Two 1MB x 9 SIMMs	4 MB	Standard configuration	2 MB Two 1MB x 9 SIMMs	8 MB Two 4MB x 9 SIMMs	10 MB	Removing the 1 MB SIMMs from bank 1	8 MB Two 4MB x 9 SIMMs	8 MB Two 4MB x 9 SIMMs	16 MB	Removing the SIMMs from banks 0 and 1
	BANK 0	BANK 1	TOTAL	NOTES													
	2 MB Two 1MB x 9 SIMMs	2 MB Two 1MB x 9 SIMMs	4 MB	Standard configuration													
	2 MB Two 1MB x 9 SIMMs	8 MB Two 4MB x 9 SIMMs	10 MB	Removing the 1 MB SIMMs from bank 1													
8 MB Two 4MB x 9 SIMMs	8 MB Two 4MB x 9 SIMMs	16 MB	Removing the SIMMs from banks 0 and 1														
4 MB 4 1MB x 9 SIMMs	-	4 MB	Standard configuration														
4 MB 4 1MB x 9 SIMMs	4 MB 4 1MB x 9 SIMMs	8 MB															
16 MB 4 4MB x 9 SIMMs	-	16 MB	Removing 1 MB SIMMs from bank 0														
4 MB 4 1MB x 9 SIMMs	16 MB 4 4MB x 9 SIMMs	20 MB															
16 MB 4 4MB x 9 SIMMs	16 MB 4 4MB x 9 SIMMs	32 MB	Removing 1 MB SIMMs from bank 0														
The SIMMs to be used come in the following kits: <b>EXM-820/D</b> - 4 MB - four 1MB x 9 SIMMs <b>EXM-821/D</b> - 16 MB - four 4MB x 9 SIMMs																	
4386-VC-HD and 486-VC	Two memory banks each consisting of four sockets. Bank 0 already host four 1MBx9 SIMMs for a total of 4 MB. Memory can be expanded at 8 MB steps:																
	4 MB 4 1MB x 9 SIMMs	-	4 MB	Standard configuration													
	4 MB 4 1MB x 9 SIMMs	4 MB 4 1MB x 9 SIMMs	8 MB														
	16 MB 4 4MB x 9 SIMMs	-	16 MB	Removing 1 MB SIMMs from bank 0													
	4 MB 4 1MB x 9 SIMMs	16 MB 4 4MB x 9 SIMMs	20 MB														
	16 MB 4 4MB x 9 SIMMs	16 MB 4 4MB x 9 SIMMs	32 MB	Removing 1 MB SIMMs from bank 0													
	The SIMMs to be used come in the following kits: <b>EXM-820/D</b> - 4 MB - four 1MB x 9 SIMMs <b>EXM-821/D</b> - 16 MB - four 4MB x 9 SIMMs																

**CHARACTERISTICS**

Architecture	AT
Memory access time	70 ns
Floppy Disk	1.44 MB 3.5" MITZUMI D359T3 1.44 MB Y-E DATA YD-702B / 702D 1.2 MB 5.25" Panasonic JU475-3 - JU475-4 1.2 MB 5.25" Toshiba ND 08 DE 1.2 MB 5.25" Panasonic JU475-5
Hard Disk	85 MB CONNER CP30084E 85 MB W.D. Caviar 280 85 MB Quantum ELS 85 AT 120 MB CONNER CP30124 170 MB CONNER CP30174E 170 MB Quantum ELS 170 AT 170 MB CONNER CFA170A 170 MB Quantum LPS170 AT (local BUS) 210 MB W.D. AC1220 210 MB CONNER CFS210A (local BUS) 240 MB Quantum LPS 240 AT 240 MB CONNER CP30254 240 MB W.D. AC2250-14F 340 MB W.D. AC2340 340 MB CONNER CFA340A 340 MB Quantum LPS340 AT (local BUS) 540 MB CONNER CFA540A (local BUS)
Streaming Tape	80/120 MB <b>Ilrwin 31250A</b> with floppy interf.
Video controller	Board to be installed on the bus: 1570 SX Rev. A 512 KB of video memory 1580 Rev.A 1 MB of video memory
HDU and FDU controller	Board to be installed on the bus. This board includes: - Two serial ports - One parallel port - One joystick port - Floppy disk controller - Hard disk interface
Mouse	400 dpi serial 3-button mouse
Keyboard	101/102-key ANK 27-102/N

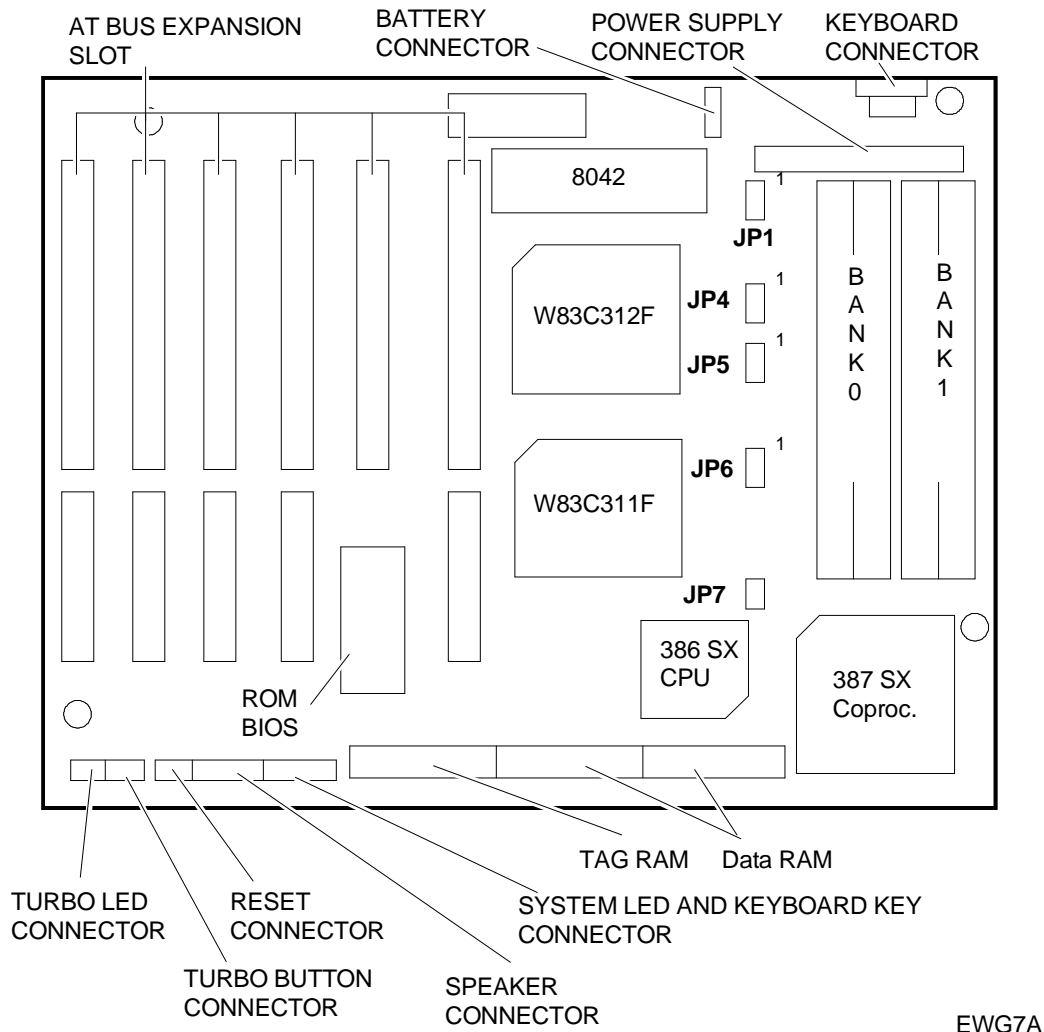
<p><b>BIOS</b></p> <p><b>System Board WH 386 SX</b> BIOS from American Megatrends Inc.</p> <p><b>System Board 4386-VC-HD</b> BIOS from Harward</p> <p><b>System Board 486-VC</b> BIOS from Harward</p>
<p><b>POWER SUPPLY</b></p> <p>MAX POWER MPV-200 90 - 130 V 180 - 260 V</p>

**SYSTEM TEST**

LEVEL	NOTES
Rev. 1.00 Rev. 1.01	<ul style="list-style-type: none"> <li>- Hard disk test has been added</li> <li>- Video test has been optimized</li> <li>- Some CPU tests have been modified</li> </ul>

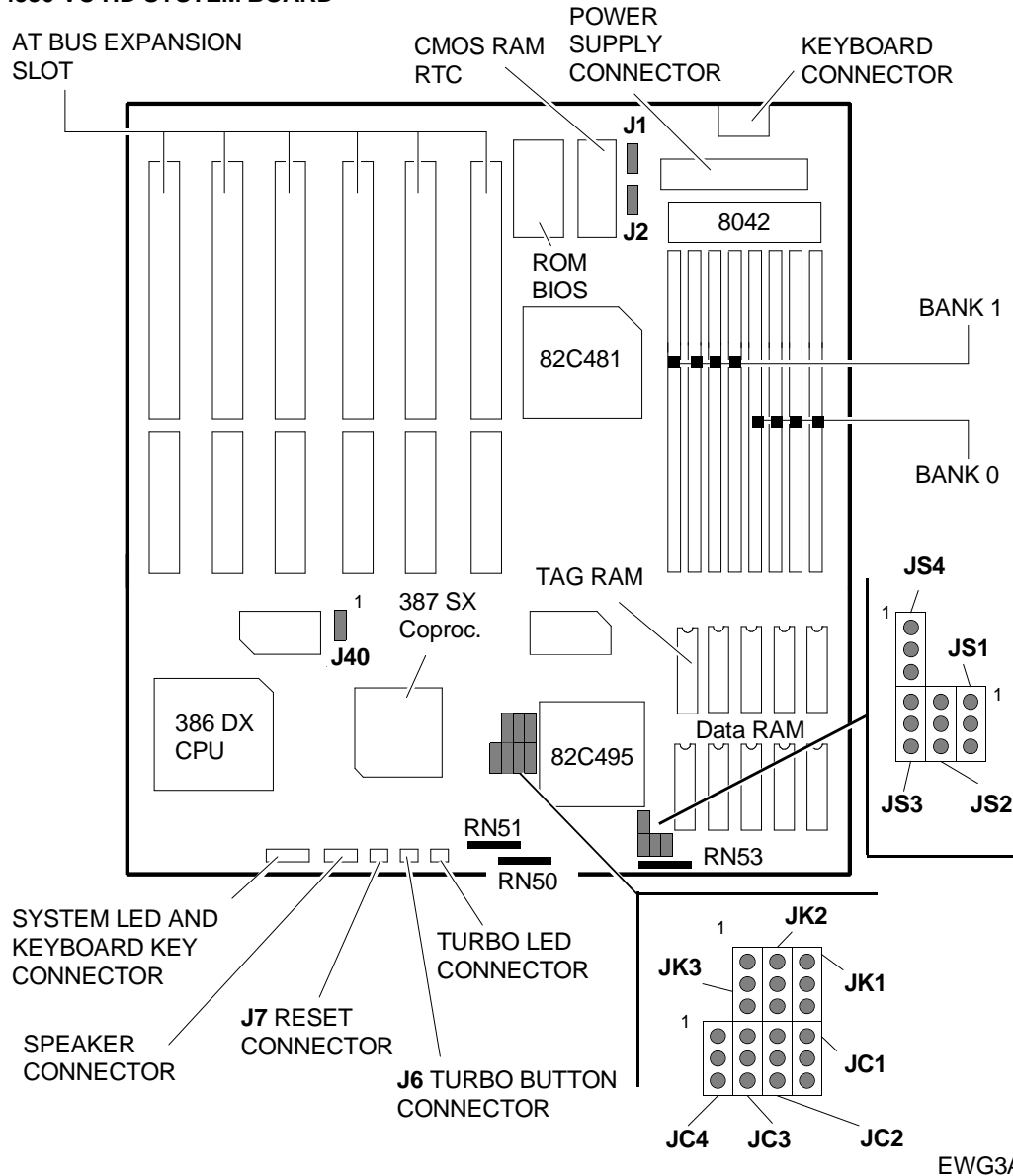
**SYSTEM BOARD COMPONENTS AND JUMPERS**

**WH 386 SX SYSTEM BOARD**



JUMPER	SETTING	FUNCTION
JP1	On 1 - 2 On 2 - 3	Monochrome monitor connected to the system Color monitor connected to the system
JP7	IN OUT	Cache enabled Cache disabled
JP5	On 1 - 2 On 2 - 3	64 KB cache 16 KB cache
JP4 JP6	On 1 - 2	System clock selection: CLK2IN/4
JP4 JP6	On 2 - 3 On 2 - 3	System clock selection: CLK2IN/5
JP4 JP6	On 2 - 3 On 1 - 2	System clock selection: CLK2IN/6
JP4 JP6	On 1 - 2 On 2 - 3	System clock selection: CLK2IN/8

**4386-VC-HD SYSTEM BOARD**



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EWG3A

JUMPER	SETTING	FUNCTION
J1	IN OUT	Reset by the system Real Time Clock Normal operation (default)
J2	IN OUT	Color VGA monitor connected to the system Monochrome EGA or VGA monitor connected to the system
J6 Turbo Switch	IN OUT	System operations in normal mode System operations in turbo mode
J7 Reset Switch	IN OUT	System reset Normal operations
J40	On 1 - 2 On 2 - 3	Synchronous coprocessor clock (default) Asynchronous coprocessor clock



**System Board CPU Selection Jumpers**

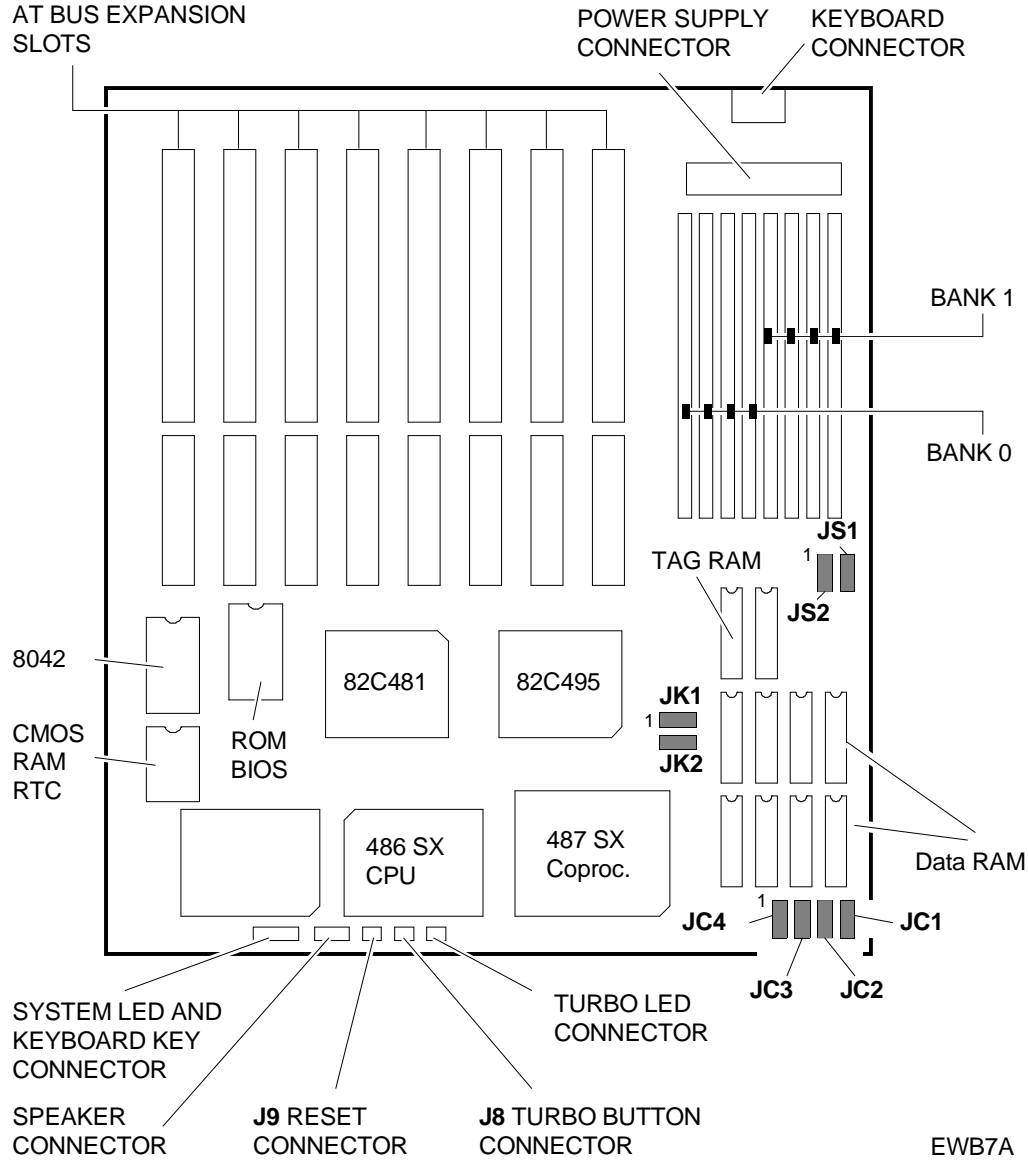
CPU	JUMPERS							1 MHz OSCILL.	0 OHM 10P5R	22 OHM 8P4R
	JK1	JK2	JK3	JK4	JC1	JC2	JC3			
486DX-50	2-3	2-3	2-3	1-2	1-2	1-2	1-2	50.00	RN51	RN10
486DX-33	2-3	2-3	2-3	1-2	1-2	1-2	1-2	33.33	RN51	RN10
486DX-25	1-2	1-2	2-3	1-2	1-2	1-2	1-2	50.00	RN51	RN10
485DX-20	1-2	1-2	2-3	1-2	1-2	1-2	1-2	40.00	RN51	RN10
486DX2-66	2-3	2-3	2-3	1-2	1-2	1-2	1-2	33.33	RN51	RN10
486DX2-50	1-2	1-2	2-3	1-2	1-2	1-2	1-2	50.00	RN51	RN10
487SX-25	1-2	1-2	2-3	1-2	1-2	1-2	2-3	50.00	RN51	RN10
487SX-20	1-2	1-2	2-3	1-2	1-2	1-2	2-3	40.00	RN51	RN10
486SX-33	2-3	2-3	2-3	1-2	2-3	2-3	OUT	33.33	RN51	RN10
486SX-25	1-2	1-2	2-3	1-2	2-3	2-3	OUT	50.00	RN51	RN10
486SX-20	1-2	1-2	2-3	1-2	2-3	2-3	OUT	40.00	RN51	RN10
<b>386DX-40</b>	<b>1-2</b>	<b>1-2</b>	<b>1-2</b>	<b>2-3</b>	<b>1-2</b>	<b>1-2</b>	<b>1-2</b>	<b>80.00</b>	<b>RN50</b>	<b>RN53</b>
386SX-33	1-2	1-2	1-2	2-3	1-2	1-2	1-2	66.66	RN50	RN53

NOTE: These jumper must not be used.

**Cache Memory Configuration and Size**

	CACHE MEMORY SIZE		
	64 KB	128 KB	256 KB
DATA RAM	Eight 8 KB x 8 SRAM chips	Four 32 KB x 8 SRAM chips	Eight 32 KB x 8 SRAM chips
TAG RAM	One 8 KB x 8 SRAM chip	One 8 KB x 8 SRAM chip	One 32 KB x 8 SRAM chip
<b>PONTICELLI</b>			
JS1	On 1 - 2	On 1 - 2	On 2 - 3
JS2	On 1 - 2	On 2 - 3	On 2 - 3
JS3	On 1 - 2	On 2 - 3	On 1 - 2
JS4	On 1 - 2	On 2 - 3	On 1 - 2

**486-VC SYSTEM BOARD WITH 80486 SX**



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JUMPER	SETTING	FUNCTION
J2 (wirings)	IN OUT	Reset from system Real Time Clock Normal operation (default)
J3 (wirings)	IN OUT	color monitor connected to the system EGA, VGA and monochrome monitor connected to the system (default)
J8 Turbo Switch	IN OUT	System operations in normal mode System operations in turbo mode
J9 Reset Switch	IN OUT	System reset Normal operation

**System Board CPU Selection Jumpers**

JUMPER	CPU		
	486 SX (default)	487 SX	486 DX
JC1	On 2 - 3	On 1 - 2	On 1 - 2
JC2	On 2 - 3	On 1 - 2	On 1 - 2
JC3	On 2 - 3	On 2 - 3	On 1 - 2
JC4	OUT	On 2 - 3	On 1 - 2

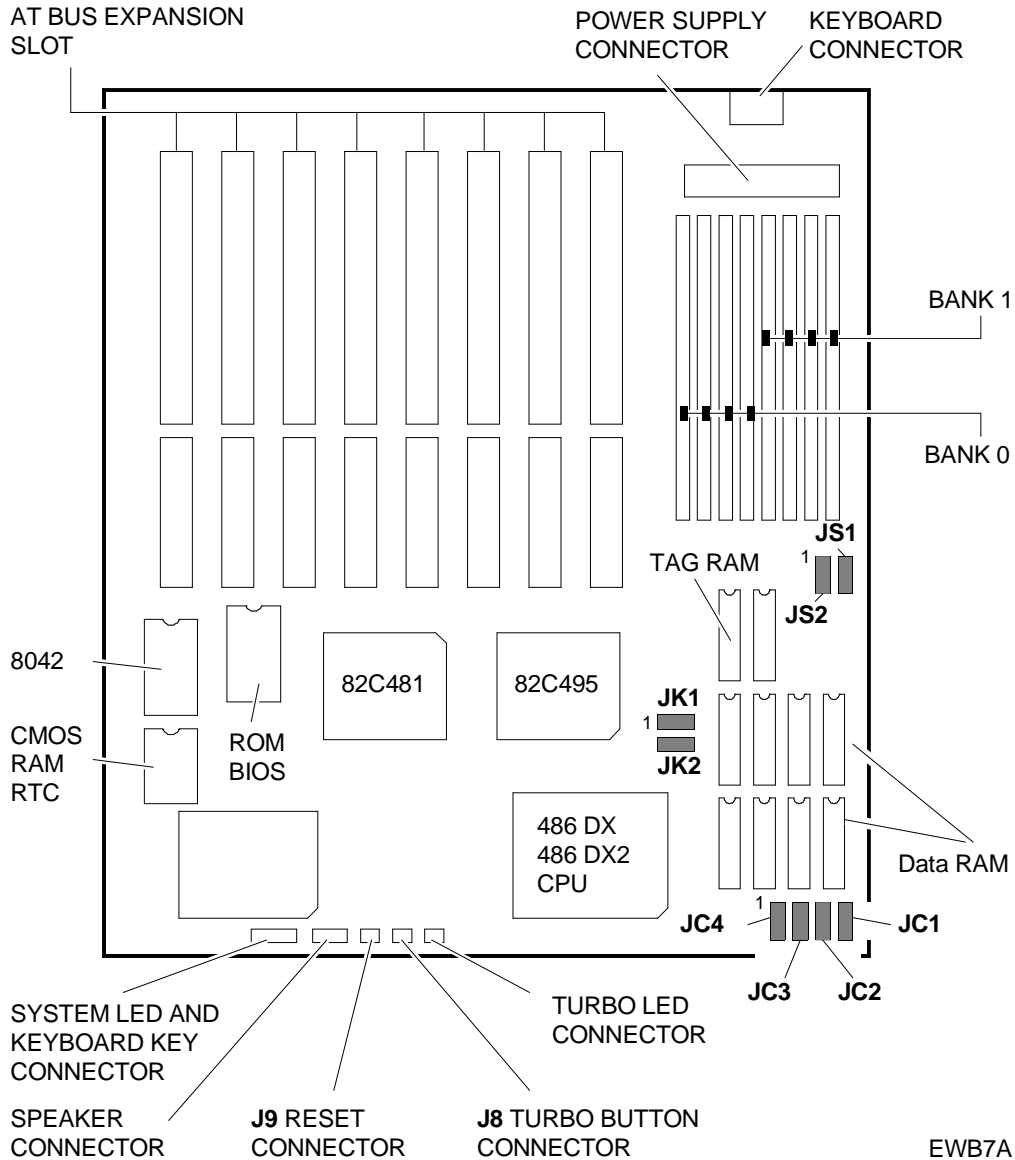
**CPU Clock Selection**

JUMPERS	Clock x 1 (33 MHz Clock)	Clock x 2 (25 MHz Clock)
JK1	On 2 - 3	On 1 - 2
JK2	On 2 - 3	On 1 - 2

**Cache Memory Configuration and Size**

	CACHE MEMORY SIZE		
	64 KB	128 KB	256 KB
DATA RAM	Eight 8 KB x 8 SRAM chips	Four 32 KB x 8 SRAM chips	Eight 32 KB x 8 SRAM chips
TAG RAM	One 8 KB x 8 SRAM chip	One 8 KB x 8 SRAM chip	One 32 KB x 8 SRAM chip
<b>JUMPERS</b>			
JS1	On 1 - 2	On 1 - 2	On 2 - 3
JS2	On 1 - 2	On 2 - 3	On 2 - 3

**486-VC SYSTEM BOARD WITH 80486 DX AND 80486 DX2**

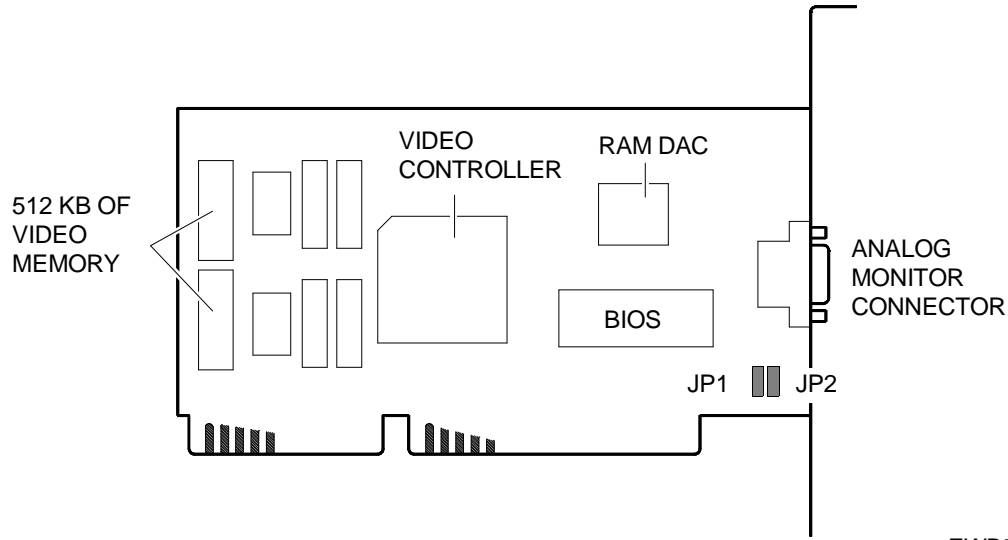


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EWB7A

The jumpers on this board have the same meanings as those on the previous board.

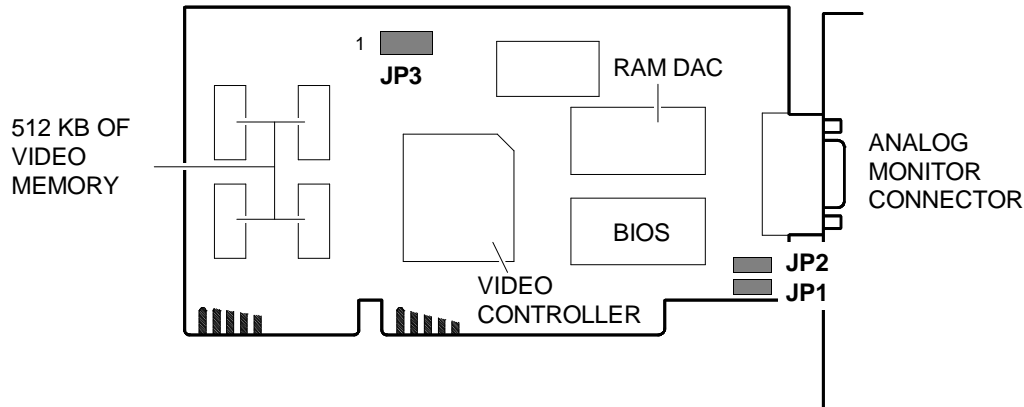
**1570 SX Rev. A VIDEO CONTROLLER**



EWB5A

JUMPERS	SETTING	FUNCTION
JP1	On 1 - 2	Interlaced video (default)
	On 2 - 3	Non-interlaced video
JP2	Riservato (2-3 Default)	

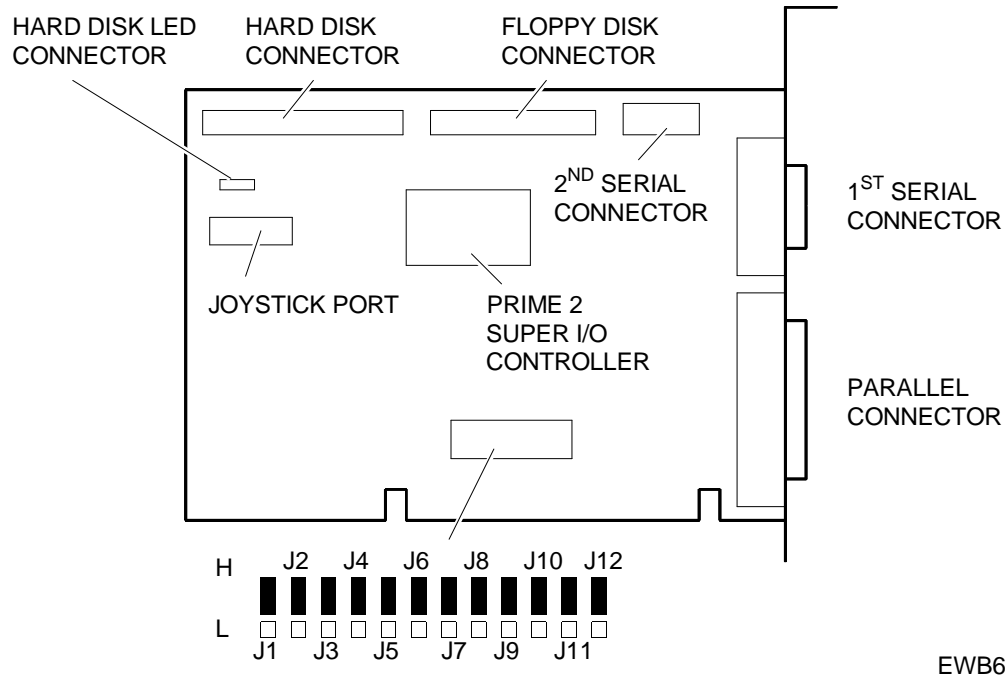
**1580 Rev. A VIDEO CONTROLLER**



EWG2A

JUMPERS	SETTING	FUNCTION
JP1	On 1 - 2	VESA
	On 2 - 3	SVGA (default)
JP2	On 1 - 2	Interlaced video (default)
	On 2 - 3	Non-interlaced video
JP3	On 1 - 2	Normal (default)
	On 2 - 3	Turbo

**SUPER I/O CONTROLLER**



**Jumpers**

DEVICE	JUMPER	SETTING	FUNCTION
Serial port 1	J7	H	Serial port 1 enabled
		L	Serial port 1 disabled
Serial port 1	J8	H	Serial port 1 addressed at 3F8-3FF h & IRQ4 (COM1)
		L	Serial port 1 addressed at 3E8-3EF h & IRQ4 (COM3)
Serial port 2	J9	H	Serial port 2 enabled
		L	Serial port 2 disabled
Serial port 2	J10	H	Serial port 2 addressed at 2F8-2FF h & IRQ3 (COM2)
		L	Serial port 2 addressed at 2E8-2EF h & IRQ4 (COM4)
Parallel port	J11	H	Parallel port enabled
		L	Parallel port disabled
Parallel port	J12	H	Parallel port addressed at 378-37F h & IRQ7 (LPT1)
		L	Parallel port addressed at 278-27F h & IRQ7 (LPT2)
Floppy disk interface	J1	H	Floppy disk interface enabled
		L	Floppy disk interface disabled
Floppy disk interface	J2	H	Floppy disk interface addressed at 3F0-3F7 h
		L	Floppy disk interface addressed at 370-377 h
IDE AT hard disk interface	J3	H	Hard disk interface enabled
		L	Hard disk interface disabled
AT or XT HDU selection	J6	H	IDE AT hard disk
		L	IDE XT hard disk
AT HDU interf. address	J4	H	AT HDU interface addressed at 1F0-1F7 h & 3F6-3F7 h
		L	AT HDU interface addressed at 170-177 h & 376-377 h
XT HDU interf. address	J5	H	XT HDU interface addressed at 320 - 323 h
		L	XT HDU interface addressed at 324 - 327 h

**INTERRUPT LEVELS**

LEVEL	NAME	CONTROLLER	FUNCTION
1	IRQ0	1	Channel 0 timer OUT
2	IRQ1	1	Keyboard
3 to 10 *	IRQ2	1	Interrupt to Controller 1 from Controller 2
3	IRQ8	2	Real time clock
4	IRQ9	2	Available
5	IRQ10	2	Available
6	IRQ11	2	Available
7	IRQ12	2	Mouse
8	IRQ13	2	Coprocessore
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 1
14	IRQ6	1	Floppy disk controller
15	IRQ7	1	Parallel port 2

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

**DMA CHANNELS**

CHANNEL	NO. OF BITS	FUNCTION
0	8	Reserved
1	8	Available
2	8	Floppy disk transfers
3	8	Available
4	16	Used for the cascade connection of DMA 1
5	16	Available
6	16	Available
7	16	Available

**I/O ADDRESS MAPS**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
0-0F h	8237A-5 DMA controller 1	F9 h	Disables chip set configuration registers
020-021 h	Interrupt controller 1	FB h	Enables chip set configuration registers
040-43 h	8254 timer	0C0-0DF h	DMA controller #2
060 h	8742 data keyboard controller	1F0-1F7 h	IDE hard disk registers
61 h	System Control Port B	201 h	Joystick port
64 h	8742 commands keyboard controller	278-27F h	Parallel port 2 (LPT2)
070 - 071 h	Real time clock, NMI Mask, CMOS RAM (write registers)	2B0-2BF h	EGA video
080-08F h	DMA page registers	2C0-2CF h	EGA video
90 h	Custom I/O port #1	2D0 - 2DF h	EGA video
91 h	Custom I/O port #2	2E8-2EF	Serial port 4 (COM4)
92 h	PS/2-compatible Fast Gate A20 and Fast Reset	2F8-2FF h	Serial port 2 (COM2)
94 h	Video controller system Setup register	378-37F h	Parallel port 1 (LPT1)
102 h	Video controller system Setup register	3B0/3BB h	MDA video
0A0-0A1 h	Interrupt controller 2	3B4/3D4	VGA video
EC - ED f	Chip set configuration port	3B5/3D5 h	VGA video
EE h	Alternative Fast A20	3BA/3DA h	VGA video
EF h	Alternative fast CPU reset port	3C0-3CF h	EGA/VGA video
F0 h	Coprocessor busy register	3D0-3DF h	Video controller
F1 h	Coprocessor reset register	3F0-3F7 h	Floppy disk drive location
F4 h	Slow CPU register	3E8-3EF h	Serial port 3 (COM3)
F5 h	Fast CPU register	3F8-3FF h	Serial port (COM1)

**39****SYSTEM MEMORY MAP**

ADDRESS RANGE	FUNCTION
00000 h - 7FFFF h	512 KB of system memory; user data area
80000 h - 9FFFF h	128 KB of memory for optional boards
A0000 h - BFFFF h	Video memory
C0000 h - CFFFF h	Video BIOS
D0000 h - DFFFF h	Extended/expanded ROM BIOS for I/O channels
E0000 h - EFFFF h	Video BIOS
F0000 h - FFFFF h	System BIOS
100000 h - 3FFFFFFh	4 MB of system memory
400000 h - 13FFFFFF h	Memory expansion SIMMs
FFFF0000 h - FFFFFFFF h	System BIOS shadow



**TABLE OF COMPATIBLE HARD DISK DRIVES**

The system's configuration utilities contain fields in which to define the type and operating parameters of the hard disk drive installed in the system.

The BIOS already contains the parameters of the different hard disk drives.

For the hard disks certified by Olivetti, you will need to select hard disk type 47, 48 or 49 and manually define the parameters of the hard disk installed using the → and ← keys.

The following table gives the different parameters of these hard disks.

TYPE	CYL	HEADS	WPCOM	LZONE	SET.	CAP.	MODEL
47-49	980	10	0	980	17	85 MB	W.D. Caviar 280
47-49	903	4	0	903	46	85 MB	CONNER Jaguar CP30084E
47-49	977	10	0	977	17	85 MB	Quantum Pioneer ELS85 AT
47-49	903	8	0	903	46	170 MB	CONNER Jaguar CP30174E
47-49	1011	15	0	1011	22	170 MB	Quantum Pioneer ELS170AT
47-49	1010	6	0	1010	55	170 MB	W.D. AC1170
47-49	895	10	0	895	55	240 MB	CONNER CP30254
47-49	723	13	0	723	51	240 MB	Quantum LPS240AT
47-49	1010	9	0	1010	55	240 MB	W.D. AC225
47-49			0			120 MB	CONNER CP30124
47-49	1010	12	0	1010	55	340 MB	W.D. AC2340

**NOTE:** The system automatically calculates the capacity of the hard disk drive.



## M300-02 / M300-02F

### CHARACTERISTICS

Microprocessor	INTEL 386SX
Clock	16 MHz on the earlier M300-02 models 25 MHz on the new M300-02F models
Architecture	16-bit AT
Memory	2 MB to 10 MB on the motherboard Bank 0 2 MB, consisting of two soldered memory chips Bank 1 Two sockets that can host two SIMMs: 1 M x 9 <b>EXM 25-532</b> (2 MB) 4 M x 9 <b>EXM 26-809</b> (8 MB)
Memory access	80 ns
Coprocessor	16 MHz i387SX on the earlier models 25 MHz i387SX on the new models
Floppy Disk	1.2 MB 5.25" Panasonic JU 475-4 C20R 1.2 MB 5.25" Panasonic JU 475-5 C20R 1.44 MB 3.5" EPSON SMD 1040-418
Hard Disk	40 MB Quantum LPS 52 AT 40 MB W.D. AC 140 40 MB CONNER CP3044 40 MB CONNER CP3046F 40 MB QUANTUM Pioneer ELS42 AT 85 MB W.D. Caviar 280 85 MB CONNER CP30084E 85 MB QUANTUM Pioneer ELS85 AT 120 MB CONNER CP30126 120 MB W.D. AC 2120 120 MB QUANTUM Pioneer ELS127 AT
Streaming Tape	120 MB <b>STU 38-120</b> - with floppy disk interf.
Slots	Two 16-bit connectors on the bus expansion board
Video controller	VGA-compatible WD90C11A integrated on the motherboard
HDU and FDU controller	Integrated on the motherboard Floppy disk controller: National 87C310 Hard disk interface: MSI buffer and logic gates
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 27-101/N, ANK 27-102/N

#### MOTHERBOARD

BA013/16 2 MB  
BA013/25 2 MB

#### BIOS

Last level:  
Lev. 1.03 BA013/16  
Lev. 5.03 BA013/25

#### EXPANSION BUS

Level: 02

#### POWER SUPPLY

LA/11B 220 V  
LA/16B 110 V

#### CONSOLE BOARD

**MOTHERBOARD**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA013/16	Nasc.	612547T	Rev. 1.03	For the 16 MHz clock version, motherboard with 2 MB
	Lev. 04			New printed circuit board that renders the board compatible with the CISPR22/B norms.
BA013/25	Nasc.	612563 T	Rev. 5.01	For the 25 MHz clock version, motherboard with 2 MB
	Lev. 01		Rev. 5.01	<ul style="list-style-type: none"> <li>- To comply with the restrictions imposed by the UL and NEMKO norms, the value of resistance R245 is changed from 100 Ohm to 340 Ohm.</li> <li>- Cuts and trimmings to guarantee a stabile picture on the screen when using a high resolution 1024x768 monitor.</li> </ul>
			Rev. 5.03	New BIOS allowing the management of the following HDUs: Quantum ELS42A 40 MB Quantum ELS85A 85 MB Quantum ELS127A 120 MB CONNER CP30124 120 MB Board level does not change.

**CONSOLE BOARD**

	LEVEL	D.R.S. CODE	NOTES
	Nasc.	030787U	A cable is used to connect the console board to the bus expansion board The hard disk LED is mounted on the console board.

**BUS EXPANSION BOARD**

	LEVEL	D.R.S. CODE	NOTES
	Nasc.	030099W	New printed circuit board to improve contact between the bus expansion board and system structure.
	Lev. 01		
	Lev. 02		

**MOTHERBOARD INTEGRATED COMPONENTS**

<b>MOTHERBOARD</b>	<b>INTEGRATED CONTROLLER</b>
	<b>CPU 386SX</b> 16 or 25 MHz microprocessor Socket for the <b>i387SX</b> math coprocessor <b>8042</b> Keyboard and mouse controller <b>WD90C11C</b> VGA video controller. <b>WD90C64</b> Video controller clock generator <b>ADV BT476</b> DAC <b>87C310</b> Parallel and serial interface controller <b>ACER</b> Floppy disk controller <b>Buffer MSI</b> Intelligent hard disk interface <b>27C010</b> BIOS EPROM <b>TOPCAT</b> <b>VL82C320</b> system controller <b>VL82C331</b> bus controller

**BOARDS**

<b>FUNCTION</b>	<b>DESCRIPTION</b>	<b>D.R.S. CODE</b>	<b>CHARACTERISTICS</b>
CPU board	BA013/16	612547T	2 MB 16 MHz M300-02
CPU board	BA013/25	612563T	2 MB 25 MHz M300-02F
220 V power supply	LA/16B	150543C	
110 V power supply	LA/11B	150542B	
220 V power supply	LA/16B	151950 D	
110 V power supply	LA/11B	151951 S	
BUS Adapter board		030099W	Two expansion slots
Console board		030787U	

**USER DISKETTE**

LEVEL	COMPATIBILITY
Rev. 1.96	
Rev. 1.99	This release contains version 1.06 of the EMMBOX2 file. The modification was made necessary since version 1.05 of the EMMBOX2 file, contained in the previous User Disk version, caused the system to crash when configured with 64 KB + VGA of shadow memory and 128 KB of expanded memory. In fact, part of the E000 segment (area reserved for the BIOS) is incorrectly occupied by expanded memory thus causing the system to crash.

**SYSTEM TEST**

LEVEL	COMPATIBILITY
	-

**POWER SUPPLY**

POWER SUPPLY	LEVEL	DESCRIPTION
LA/16B 220 V	Nasc	
LA/11B 110 V	Nasc	
LA/16B 220 V LA/11B 110 V		Two new power supplies have been introduced to improve EMI margins.

**COMPATIBILITY NOTES**

BOARD OR HW/SW DEVICE	DESCRIPTION
-	-

**SOFTWARE DRIVERS**

DRIVER	NOTES
LIM EMM386	For expanded and extended memory management.

**BIOS**

LEVEL	NOTES
Rev. 1.04	-

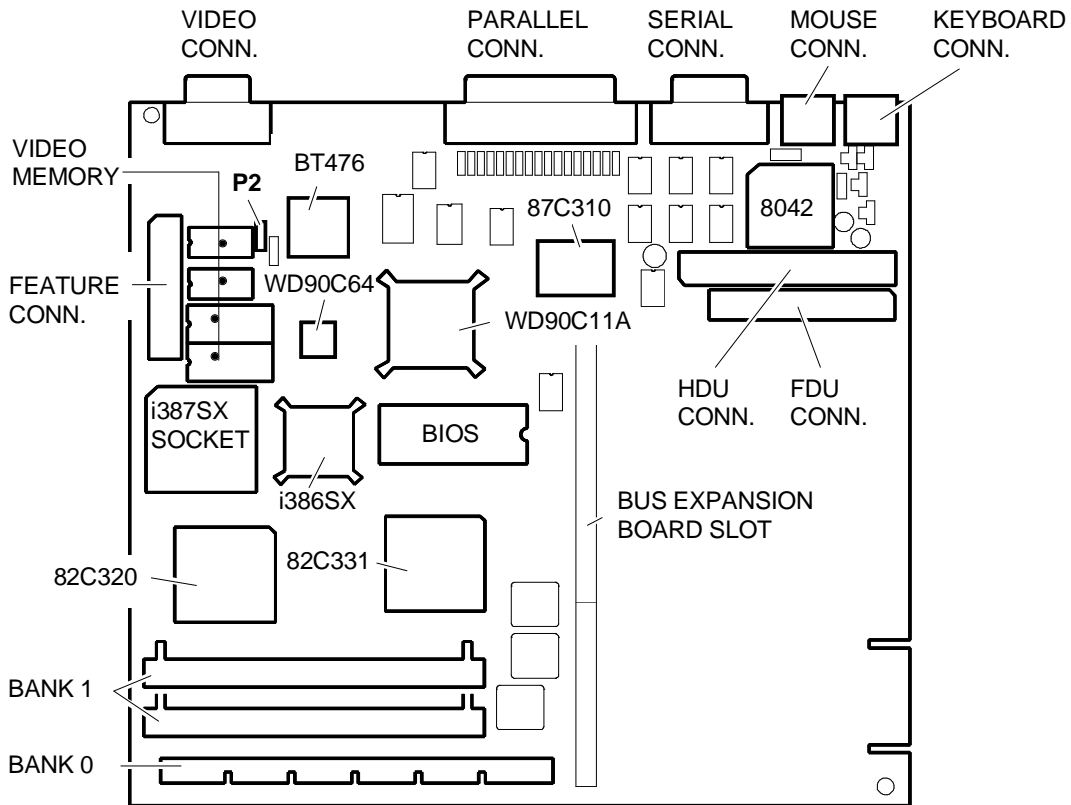
**SOFTWARE COMPATIBILITY**

<b>OPERATING SYSTEMS</b>	<b>NOTES</b>
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01  IBM Operating System/2, Ver. 1.10 and 1.20  IBM Operating System/2 Extended Edition, Ver. 1.10 and 1.20 INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2 SCO XENIX 386, Rev. 2.3	 Requests for a formatted DSDD diskette during installation on hard disk. Does not recognize the PS/2 mouse.  Does not recognize the PS/2 mouse.
<b>WINDOWS</b>	
GEM/3 Desktop, IBM-PC Ver. 3.02 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0

**HARDWARE COMPATIBILITY**

<b>MODEMS</b>	<b>I/O INTERFACE PRODUCTS</b>
Hayes Smart modem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 CEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
<b>MULTIPOINT</b>	<b>MOUSE</b>
CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8	IBM PS/2 Mouse (6450350) IBM PS/2 Mouse Serial Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-MOUSE serial
<b>GRAPHICS PRODUCTS</b>	<b>NETWORKING &amp; LAN PRODUCTS</b>
AST VGA plus FASTWRITE 1024i FASTWRITE VGA HERCULES GRAPHICS CARD IBM VGA Adapter MATROX PG - 1281 MAXON MVGA-16 Adapter ORCHID PRODESIGNER VGA PLUS HERCULES INCOLOR CARD (GB222) PARADISE VGA PRO CARD	10 NET INTERFACE BOARD 200 series 3COM Etherlink adapter 3C501 3COM Etherlink II adapter 3C503 3COM Etherlink plus adapter 3C505 3COM Etherlink plus adapter 3C505 DECNET PCSA adapter IBM PC NETWORK adapter II IBM TOKEN RING 16/4 adapter IBM TOKEN RING adapter II MADGE AT RING NODE adapter MICOM NP1000 adapter NOVELL NE1000 adapter NOVELL NE2000 adapter
<b>DISPLAY UNITS</b>	
IBM enhanced graphics monitor 5151 IBM color graphics monitor 5153 IBM PS/2 Monochrome display 8503 IBM PS/2 color display 8512 IBM PS/2 color display 8513 IBM PS/2 color display 8514 NEC MULTISYNC II	NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D PHILIPS 7BM749 PHILIPS 9CM082

**MOTHERBOARD COMPONENTS AND JUMPERS**

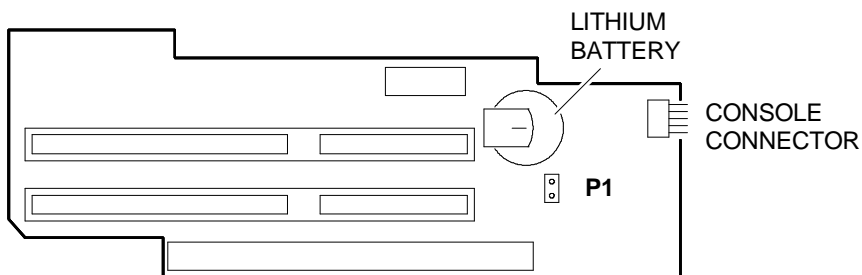


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ASB7A

<b>JUMPER P2</b>	Position 1-2	Password disabled
	Position 2-3	Password enabled

**BUS EXPANSION BOARD COMPONENTS AND JUMPERS**



AYD3A

<b>P1</b> installed:	Battery connected
<b>P1</b> not installed	Battery not connected (Personal Computer not operative)



## BUILT IN SETUP and EXTENDED SETUP Utilities

### BUILT IN SETUP

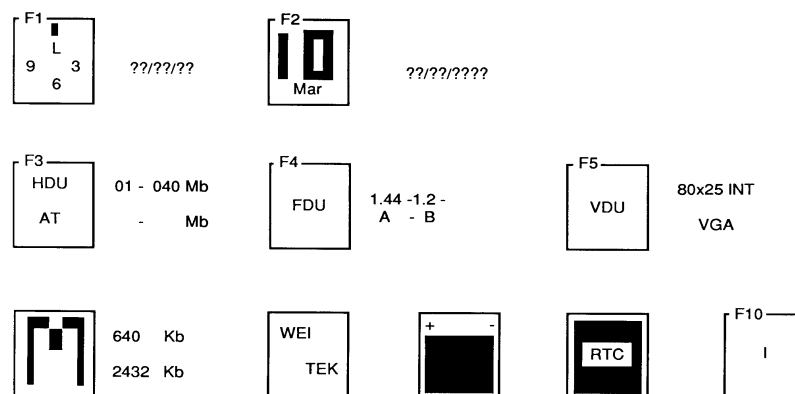
This ROM BIOS-resident program allows you to change some of the Personal Computer's configuration parameters.

Two cases can arise:

First case: If the data stored in the CMOS RAM is no longer valid or the power supply battery is low, the BUILT IN SETUP screen is displayed. You are now give the choice of selecting the language to work in from a total of six languages available.

Second case: If the configuration of the system has been changed, only the icon representing the device that has to be added to, or modified in, CMOS RAM will be displayed. For example, if you install a second floppy disk drive, just the floppy disk icon will be displayed.

In both cases the BUILT IN SETUP screen is automatically displayed without operator intervention.



**F1** Allows you to change the system hour, minutes and seconds.

**F2** Allows you to change the system day, month and year.

**F3** Allows you the type of hard disk installed and its capacity. Press the space bar until the correct value is displayed. The following table lists the hard disks that can be installed in the system.

TYPE	MODEL	CAPACITY	CYL	T	WPC	LZ	SET
01	W.D. AC-140 3,5" 19 ms	40 MB	980	5	-1	980	17
	Quantum LPS 52 AT	40 MB	980	5	-1	980	17
	CONNER CP3044	40 MB	980	5	-1	980	17
	CONNER CP3046F	40 MB	980	5	-1	980	17
	QUANTUM ELS42 AT	40 MB	980	5	-1	980	17
02	W.D. Caviar AC-280	85 MB	977	10	-1	977	17
	CONNER CP30084E	85 MB	977	10	-1	977	17
	QUANTUM ELS85 AT	85 MB	977	10	-1	977	17
03	W.D. AC-2120	120	762	8	-1	762	39
	CONNER CP30126	120	762	8	-1	762	39
	QUANTUM ELS127 AT	120	762	8	-1	762	39

**Where:** CYL: Number of disk cylinders  
 WPC: Write precompensation cylinder number  
 LZ: Head landing zone cylinder number  
 T: Number of disk heads  
 SET: Number of disk sectors.

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**F4** Allows you select the capacity of the floppy disk drive. Depending on the number of drives present (1, 2 or 3), up to three fields can be displayed next to this icon. Define in these fields the capacity of the floppy disk drive installed.

The logic names of the drives are displayed on the row underneath: A (for one drive only), A-B (for two drives), A-B-X (for three drives).

**NOTE:** If a streaming tape drive with floppy disk interface is installed, the data field corresponding to this drive must not contain any value, and this drive must always be indicated as logic drive B.

**F5** Allows you to select the video format when powering on the system.

**Math Coprocessor** This icon appears only when the WEITEK coprocessor is installed. It is intended for informational purposes only.

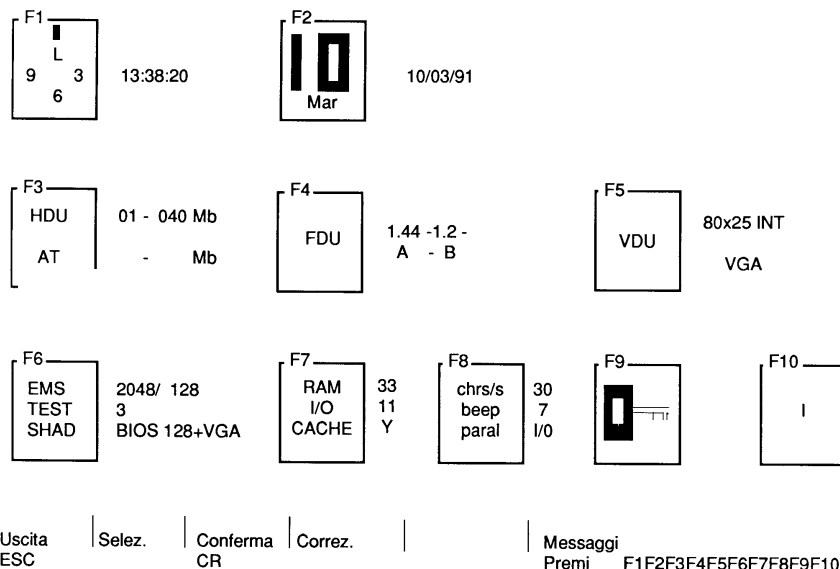
**Batteries** This icon appears only when the system is powered on for the very first time or when the system batteries are low

**Real time clock** This icon flashes when the system *Real Time Clock* is faulty.

**Language** You can select the language in which all the BUILT IN SETUP messages will be displayed. There are six languages available.

### EXTENDED SETUP

Besides using the BUILT IN SETUP utility, you can also use the EXTENDED SETUP utility to configure the system parameters. You can recall this utility at any time by pressing the CTRL, ALT and DEL keys simultaneously.



This menu contains all the icons of the BUILT IN SETUP utility, therefore it allows you to configure the system as previously explained.

However, the EXTENDED SETUP utility has the following additional parameters:

- F6** EMS: Allows you to modify the capacity of extended and expanded memory..
- TEST: Allows you to reduce the number of tests performed on system memory during the Power On Diagnostics.
- SHAD: Allows you to assign shadow memory to the BIOS and specify memory areas.
- F7** RAM: Allows you to change system speed from the default value (33 MHz) to 14 MHz.
- I/O: Allows you to the system bus speed from the default value (11 MHz) to the standard AT speed (8 MHz).
- F8** CHR/S: Allows you to change change the character repeat speed when associated keys are pressed. This value is expressed in number of characters per second.
- BEEP: Allows you to increase or decrease the speaker volume.
- PARAL: Allows you to modify the direction of the parallel port.
- F9**: Allows you to assign a system **PASSWORD**.

**INTERRUPT LEVELS**

LEVEL	NAME	CONTROLLER	FUNCTION
1	NMI		Parity error
2	IRQ0	1	Channel 0 timer OUT
3	IRQ1	1	Keyboard
4	RQ8	2	Real Time Clock
5	IRQ9	2	Software redirection to INT 0AH (IRQ2)
6	IRQ10	2	Available
7	IRQ11	2	Available
8	IRQ12	2	Mouse
9	IRQ13	2	Available
10	IRQ14	2	Hard disk controller
11	IRQ15	2	Available
12	IRQ3	2	Serial port 2
13	IRQ4	1	Serial port 1
14	IRQ5	1	Parallel port 2
15	IRQ6	1	Floppy disk controller
16	IRQ7	1	Parallel port 1

**I/O ADDRESS MAP**

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller (channels 0 - 3)	0F8-0FF h	Math coprocessor
020-03F h	Interrupt controller 1	1F0-1F7 h	Hard disk drive (HCS0 selection)
040-043 h	Timer	278-27F h	Parallel port 2
060 h	Keyboard data controller	2F8-2FF h	COM2 serial port (alternat.)
061- 06F h	System control port A	378-37F h	Parallel port 1 (default)
064 h	Keyboard commands controller	3C0 - 3DF h	Video controller
070 - 071 h	Real time clock, NMI, CMOS RAM	3F2 h	Floppy disk controller
080-08F h	DMA page registers	3F3 h	Super I/O configuration register
092 h	System control port B	3F4- 3F5 h	Floppy disk controller
0A0-0BF h	Interrupt controller 2	3F6-3F7 h	Hard disk drive (HCS1 selection)
0C0-0DE h	DMA channels 4-7	3F7 h	Floppy disk controller
1E0 - 1EF h	TOPCAT registers	3F8-3FF h	COM1 serial port
0F0 h	Cancels the operation of the math coprocessor	46E8 h	VGA register
0F1 h	Resets the coprocessor		

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**SYSTEM MEMORY MAP**

<b>ADDRESS</b>	<b>MEMORY</b>	<b>FUNCTION</b>
00000 - 7FFFF h	512 KB	Conventional memory (0 KB - 512 KB)
80000 - 9FFFF h	128 KB	base memory (512 KB - 640 KB)
A0000 - BFFFF h	128 KB	Video controller RAM
C0000 - DFFFF h	128 KB	Available
E0000 - FFFFF h	128 KB	BIOS/Shadow BIOS
100000 - FFFFFFF h	15 MB	Memory expansion (to the physical addressable limits of the 80386SX CPU)
1000000 - 1FFFFFFF h	1 MB	Memory expansion (to the system's physical addressable limit)

