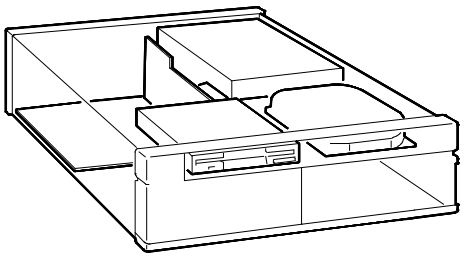
M4-4x / M4-6x / PCS4xx

This chapter describes the following Personal Computer models:

PERSONAL COMPUTER	MOTHER-BOARD	PROCESSOR	CLOCK	COPROCESSOR / OVERDRIVE	CASE
M4-40	T. 1	i486SX @ 25 MHz Soldered	25 MHz	i487SX @ 25 MHz i486DX2 @ 50 MHz	MicroTower
M4-46	T. 1	i486DX2 @ 50 MHz On-socket	25 MHz	NO	MicroTower
M4-60	T. 1	i486SX @ 25 MHz Soldered	25 MHz	i487SX @ 25 MHz i486DX2 @ 50 MHz	M305 BOX
	T. 1.5	i486SX @ 25 MHz Soldered	25 MHz	i487SX @ 25 MHz i486DX2 @ 50 MHz P24 T	
M4-62	T. 1	i486SX @ 33 MHz On-socket (*)	33 MHz	i487SX @ 33 MHz i486DX2 @ 66 MHz	M305 BOX
	T. 1.5	i486SX @ 33 MHz On-socket (*)	33 MHz	i487SX @ 33 MHz i486DX2 @ 66 MHz P24 T	
M4-64	T. 1	i486DX @ 33 MHz On-socket (*)	33 MHz	i486DX2 @ 66 MHz	M305 BOX
	T. 1.5	i486DX @ 33 MHz On-socket (*)	33 MHz	i486DX2 @ 66 MHz P24 T	
M4-65	T. 1	i486DX2 @ 50 MHz On-socket	25 MHz	NO	M305 BOX
	T. 1.5	i486DX2 @ 50 MHz On-socket (*)	25 MHz	P24 T	
M4-66	T. 1	i486DX2 @ 66 MHz On-socket	33 MHz	NO	M305 BOX
	T. 1.5	i486DX2 @ 66 MHz On-socket (*)	33 MHz	P24 T	
PCS 44/C	T. 1	i486SX @ 25 MHz Soldered	25 MHz	i487SX @ 25 MHz i486DX2 @ 50 MHz	MicroTower
PCS 46/C	T. 1	i486DX2 @ 50 MHz On-socket	25 MHz	NO	MicroTower

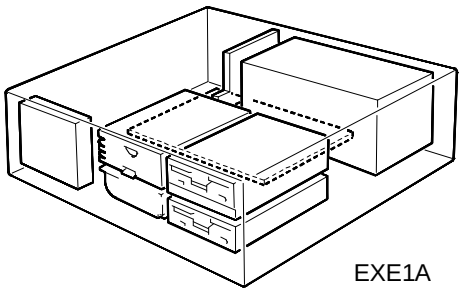
(*) The coprocessor or OverDrive can only be installed by replacing the system's original processor.

MICROTOWER CASE



AYD9A

305 BOX CASE



EXE1A

CHARACTERISTICS

Architecture	AT
Memory	On-board, from 4 MB to 36 MB **Bank 0**: 4 MB soldered **Bank 1**: for one of the following SIMMs: **EXM 28-004** - 4 MB, One 1MB x 36 SIMM **EXM 28-008** - 8 MB, One 2 MB x 36 SIMM **EXM 28-016** - 16 MB, One 4 MB x 36 SIMM **EXM 29-032** - 32 MB, One 8 MB x 36 SIMM
Memory access	70 ns
Video memory	512 KB + 512 KB of DRAM HM514260
Floppy Disks	The **Microtower case** can host: Drive A: 3.5", 1.44 MB diskette drive Drive B: 5.25", 1.2 MB floppy drive The **305 BOX case** can host: Drive A: 3.5", 1.44 MB diskette drive Drive B: 5.25"1.2 MB or 3.5"1.44 MB 1.2 MB, 5.25" Panasonic JU475-3/4/5 1.2 MB, 5.25" Toshiba ND 08 DE 1.44 MB, 3.5" Panasonic JU 257 A 1.44 MB, 3.5" Sony MP-F17 W 1.44 MB, 3.5" Mitsubishi MF 355 1.44 MB, 3.5" EPSON SMD 1040-418 1.44 MB, 3.5" Y-E DATA YD-702B / 702D 1.44 MB, 3.5" MITSUMI D359C / D359T3
Hard Disks	CONNER CP30084E 85 MB WD. Caviar 280 85 MB Quantum ELS 85 AT 85 MB CONNER CP30174E / CFA170A 170 MB Quantum ELS 170 AT 170 MB W.D. AC1170 170 MB Quantum LPS170 AT (local BUS) 170 MB W.D. AC1220 210 MB CONNER CFS210A-E (local BUS) 210 MB SEAGATE ST3250A (local BUS) 210 MB Quantum LPS210 AT 210 MB CONNER CP30254 240 MB QUANTUM LPS240 AT 240 MB W.D. AC2250-14F 240 MB CONNER CP3304 / CP3364 340 MB W.D.AC2340 340 MB CONNER CFA340A 340 MB Quantum LPS340 AT (local BUS) 340 MB SEAGATE ST3391A 340 MB CONNER CP3544 510 MB CONNER CP30544 540 MB SEAGATE ST3655A 540 MB CONNER CFA540A (local BUS) 540 MB SEAGATE ST5660 (local BUS) 540 MB
Streaming Tapes	**Irwin 31250A** 80/120 MB floppy interface **Wangtek 5159ES** 150 MB SCSI interface **Wangtek 5525ES - 5525ES-ACA** 320 MB SCSI interface. Requires the ASC-2 board. **Continues ----->**

BIOS

BA2032 - BA2034 - BA2039
Last level: Rev. 2.06

BA2033 - BA2036
Last level:
Rev. 2.06/S

BA2050 - BA2076 - BA2077 - BA2063 - BA2078 - BA2064 - BA2079 - BA2068 - BA2184- BA2183 BA2187
Last level: Rev. 2.06

EXPANSION BUS

Microtower case:
IN 139
Last level: Nasc.

305 BOX case
IN2003
Last level: 01
IN2016
Last level: Nasc.

POWER SUPPLY

Microtower case
MINEBA NMBSPE 1095
LA/11 BNMB 110 V
LA/16 BNMB 220 V

305 BOX case
PS11 R 220 V - 115 V
PS11 AR 220 V - 115 V

CONSOLE BOARD

For microtower case only
IF2010
Level 01

Slots	**Microtower case** Two 16-bit connectors on the expansion bus **305 BOX** case Four 16-bit connectors on the expansion bus
Video controller	Integrated CL-GD5428 Enhanced VGA
HDU and FDU controller	Integrated - Floppy disk controller: 87310 HDU interface: MSI buffer and logic ports
Mouse	PS/2- and AT-compatible
Keyboard	101/102-key ANK 27-101/N, ANK 27-102/N

MOTHERBOARD

MOTHERBOARD	DESCRIPTION	DESTINATION MODEL
BA2034	Base Assembly T.1 (BA2054) - 25 MHz i486SX CPU - Two serial ports Manufactured in Scarmagno.	M4-40; M4-60
BA2032	Base Assembly T.1 (BA2054) - Without CPU Two serial ports Manufactured in Singapore.	M4-46; M4-62; M4-64; M4-65; M4-66
BA2039	Base Assembly T.1 (BA2054) - Without CPU Two serial ports Manufactured in Scarmagno.	
BA2033	Base Assembly T.1 (BA2044) - 25 MHz i486SX CPU - One serial port and one game port. Manufactured in Scarmagno.	PCS 44/C - PCS 46/C
BA2036	Base Assembly T.1 (BA2044) - Without CPU One serial port and one game port Manufactured in Scarmagno.	
BA2050 BA2076	Base Assembly T.1.5 (BA2067) for BA2050 Base Assembly T.1.5 (BA2070) for BA2076 Without CPU - Two serial ports Manufactured in Scarmagno.	M4-64; M4-65; M4-66
BA2051 BA2077	Base Assembly T.1.5 (BA2067) for BA2051 Base Assembly T.1.5 (BA2070) for BA2077 Without CPU - Two serial ports Manufactured in Singapore.	
BA2063 BA2078	Base Assembly T.1.5 (BA2067) for BA2063 Base Assembly T.1.5 (BA2070) for BA2078 25 MHz i486SX CPU - Two serial ports Manufactured in Scarmagno.	M4-60
BA2064 BA2079	Base Assembly T.1.5 (BA2067) for BA2064 Base Assembly T.1.5 (BA2070) for BA2079 25 MHz i486SX CPU - Two serial ports Manufactured in Singapore.	
BA2068	Base Assembly T.1.5 (BA2067) 33 MHz i486SX CPU - Two serial ports Manufactured in Scarmagno.	M4-62
BA2183 BA2184	BA2183 Base Assembly T.1 (BA2054) Singapore BA2184 Base Assembly T.1.5 (BA 2070) Scarmagno - **Boards manufactured exclusively for Oliservice -** NO CPU - With modifications for KINGSTON LAN	
BA2083	Will not be documented as since it is only present on the Singapore market.	

MOTHERBOARD EVOLUTION

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2032	Nasc.	588091 P	Lev. 1.03	Motherboard for the following PCs: M4-46; M4-62; M4-64; M4-65; M4-66 Features - Type T. 1 (BA2054) - No CPU (Depending on the PC model) - Two serial ports
	Lev. 01		Lev. 1.05	New BIOS (see the specific table) Modifications to the printed circuit and addition of new components to render the board compatible with EMI standards.
	Lev. 02		Lev. 1.05	Renewed printed circuit, thus causing the name of the Base Assembly to change from T. 1 (BA2054) to T 1.5 (BA2067). As a result the names of the boards also change.
	Lev. 03		Lev. 1.05	Addition of four 47 pF capacitors between pins 3, 6, 8 and 11 of the component at location U71 and ground, to solve the PARITY ERRORS caused by the incorrect timing of the CAS generation circuit.
	Lev. 04		Lev. 1.07 PD3L	New BIOS (see the specific table)
	Lev. 05		Lev. 2.0	New BIOS (see the specific table) Cuts and wirings made, with the addition of jumper J45 to disable the video controller. All this solves the problem with the OS/2 operating system rel 1.3 Ver. 2.02 upd. 6
	Lev. 06		Lev. 2.0	New printed circuit (C.S. 01) to embody the Parity Error modifications (see Lev. 03). **WARNING:** Does not recuperate the wirings of the previous level (OS/2 problem).
	Due to production purposes, not all the boards manufactured have the new BIOS 2.0 and the cuts and wirings to solve the problems with OS/2 (see Lev. 05). From here on all board levels will be dealt with differently, depending on whether they incorporate the modifications to solve OS/2 problems or not. **BA2032 *** Indicates the board on which the modification was carried out. **BA2032 **** Indicates the board on which the modification was not carried out.			
BA2032 *		588091 P		* = Motherboard with modification for OS/2 Ver 1.13 In other words: BIOS 2.0, cuts and wirings
	Lev. 07		Lev. 2.0	Fictitious level in order to correctly document (without skipping levels) the BIOS used on the M4-XX and PCS models. BIOS 2.0/S is used on the PCS models.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2032 *		588091 P		* = Motherboard with changes for OS/2 Ver 1.13 In other words: BIOS 2.0, cuts and wirings
	Lev. 08		Lev. 2.0	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor in location C412
	Lev. 09		Lev. 2.03 PD2C	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 10		Lev. 2.03	Replaced resistors and capacitors to solve the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 11		Lev. 2.04 PD2R	Intel has modified the CPU identifier by using the one for the SL Enhanced family, not recognized by the previous BIOS 2.03. This BIOS level only recognizes the SL Enhanced CPU.
			Lev. 2.04	Introduction of the SL Enhanced 33 MHz i486SX CPU, only used by the M4-62 Personal Computer. Since this is an alternative CPU, board level does not change.
	Lev. 12		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. 13		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 14		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes the system to malfunction with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 15 MI		Lev. 2.06	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs.
	Lev. 15 SI			The modification made at board level 13 (COGENT / WANG boards) is removed. To solve this problem, **a new motherboard BA2187 is developed exclusively for Oliservice.**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2032 **		588091 P		** = Motherboard does not incorporate the modifications for OS/2.
	Lev. 05 (See BA2032)		Lev. 1.07 PD3L	Fictitious level since BIOS 2.0 is not used. However, the printed curcuit has been modified, whose level cahnges to 01.
	Lev. 06		Lev. 1.07	Ficticious level in order to correctly document (without skipping levels) the BIOS used on the M4-XX and PCS models. BIOS 2.0/S is used on the PCS models.
	Lev. 07/A		Lev. 1.07	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor in location C412
	Lev. 08/A		Lev. 1.10 PD2A	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 09/A		Lev. 1.10	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical line).
	Lev. 10/A		Lev. 1.10	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 11/A		Lev. 1.13 PDK9	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. 12/A		Lev. 1.13	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes the system to malfunction with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 13/A		Lev. 1.13	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2034	Nasc.	588092 Q	Lev. 1.03	Motherboard for the following PC models: M4-40; M4-60 Features - Type T. 1 (BA2054) - 25 MHz i486SX CPU - Two serial ports
	Lev. 01		Lev. 1.05	New BIOS (see the specific table) Modifications to the printed circuit and addition of new components to render the board compatible with EMI standards.
	Lev. 02		Lev. 1.05	Renewed printed circuit, thus causing the name of the Base Assembly to change from T. 1 (BA2054) to T 1.5 (BA2067). As a result the names of the boards also change.
	Lev. 03		Lev. 1.05	Addition of four 47 pF capacitors between pins 3, 6, 8 and 11 of the component at location U71 and ground, to solve the PARITY ERRORS caused by the incorrect timing of the CAS generation circuit.
	Lev. 04		Lev. 1.05	Keyboard controller rel. 10.01 has been replaced with rel. 10.02
	Lev. 05		Lev. 1.07 PD3L	New BIOS (see the specific table).
	Lev. 06		Lev. 2.0	New BIOS (see the specific table) Cuts and wirings made, with the addition of jumper J45 to disable the video controller. All this corrects the problem with the OS/2 operating system rel 1.3 Ver. 2.02 upd. 6
	Lev. 07		Lev. 2.0	New printed circuit (C.S. 01) which incorporates the Parity Error modifications (see Lev. 03). **WARNING:** Does not recuperate the wirings of the previous level (OS/2 problem).
	Due to production purposes, not all the boards manufactured have the new BIOS 2.0 and the cuts and wirings to solve the problems with OS/2 (see Lev. 06). From here on all board levels will be dealt with differently, depending on whether they incorporate the modifications to solve OS/2 problems or not. **BA2034 *** Indicates the board on which the modification was carried out. **BA2034** ** Indicates the board on which the modification was not carried out.			
BA2034 *		588092 Q		* = Motherboard with modification for OS/2 Ver 1.13 In other words: BIOS 2.0, cuts and wirings
	Lev. 08		Lev. 2.0	Ficticious level in order to correctly document (without skipping levels) the BIOS used on the M4-XX and PCS models. BIOS 2.0/S is used on the PCS models.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2034 *		588092 Q		* = Motherboard with changes for OS/2 Ver 1.13 In other words: BIOS 2.0, cuts and wirings
	Lev. 09		Lev. 2.0	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor in location C412.
	Lev. 1.10		Lev. 2.03 PD2C	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 11		Lev. 2.03	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 12		Lev. 2.04 PD2R	Intel has modified the CPU identifier by using the one for the SL Enhanced family, not recognized by the previous BIOS 2.03. This BIOS level does not allow the use of the SL Enhanced CPU.
	Lev. 13		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by. - Use of the SL Enhanced 25 MHz i486SX CPU
	Lev. 14		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 15		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes the system to malfunction with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 16 MI		Lev. 2.06	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs.
	Lev. 16 SI			The modification made at board level 13 (COGENT / WANG boards) is removed. To correct this problem, **a new motherboard BA2187 is developed exclusively for Oliservice.**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2034 **		588092 Q		** = Motherboard does not incorporate the modifications for OS/2.
	Lev. 06 (See BA2034)		Lev. 1.07 PD3L	Fictitious level since BIOS 2.0 is not used. However, the printed curcuit has been modified, whose level cahnges to 01.
	Lev. 07		Lev. 1.07	Ficticious level in order to correctly document (without skipping levels) the BIOS used on the M4-XX and PCS models. BIOS 2.0/S is used on the PCS models.
	Lev. 08/A		Lev. 1.07	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor in location C412
	Lev. 09/A		Lev. 1.10 PD2A	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 10/A		Lev. 1.10	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical line).
	Lev. 11/A		Lev. 1.10	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 12/A		Lev. 1.13 PDK9	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by. - Use of an SI Enhanced 25 MHz i486SX CPU.
	Lev. 13MD/A		Lev. 1.13	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes the system to malfunction with certain types of Quantum hard disk drives (170 MB and 340 MB).
	12MI/A		Lev. 1.13	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2039	Nasc.	588091 P	Lev. 1.03	Motherboard for the following Personal Computer models: M4-46; M4-62; M4-64; M4-65; M4-66 Features: - Type T. 1 (BA2054) - No CPU (depending on the Personal Computer model) - Two serial ports
	Lev. 01		Lev. 1.05	New BIOS (see the specific table) Modifications to the printed circuit and addition of new components to render the board compatible with EMI standards.
	Lev. 02		Lev. 1.05	Renewed printed circuit, thus causing the name of the Base Assembly to change from T. 1 (BA2054) to T 1.5 (BA2067). As a result the names of the boards also change.
	Lev. 03		Lev. 1.05	Addition of four 47 pF capacitors between pins 3, 6, 8 and 11 of the component at location U71 and ground, to solve the PARITY ERRORS caused by the incorrect timing of the CAS generation circuit.
	Lev. 04		Lev. 1.05	Keyboard controller rel. 10.01 has been replaced by rel. 10.02
	Lev. 05		Lev. 1.07 PD3L	New BIOS (see the specific table).
	Lev. 06		Lev. 2.0	New BIOS (see the specific table) Cuts and wirings made, with the addition of jumper J45 to disable the video controller. All this corrects the problem with the OS/2 operating system rel 1.3 Ver. 2.02 upd. 6.
	Lev. 07		Lev. 2.0	New printed circuit (C.S. 01) which incorporates the Parity Error modifications (see Lev. 03). **WARNING:** Does not recuperate the wirings of the previous level (OS/2 problem).
	Due to production purposes, not all the boards manufactured have the new BIOS 2.0 and the cuts and wirings to solve the problems with OS/2 (see Lev. 06). From here on all board levels will be dealt with differently, depending on whether they incorporate the modifications to solve OS/2 problems or not. **BA2039 *** Indicates the board on which the modification was carried out. **BA2039 **** Indicates the board on which the modification was not carried out.			
BA2039 *		588091 P		* = Motherboard with modification for OS/2 Ver 1.13 In other words: BIOS 2.0, cuts and wirings
	Lev. 08		Lev. 2.0	Ficticious level in order to correctly document (without skipping levels) the BIOS used on the M4-XX and PCS models. BIOS 2.0/S is used on the PCS models.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2039 *		588091 P		* = Motherboard with changes for OS/2 Ver 1.13 In other words: BIOS 2.0, cuts and wirings
	Lev. 09		Lev. 2.0	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor in location C412
	Lev. 10		Lev. 2.03 PD2C	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 11		Lev. 2.03	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical line).
	Lev. 12		Lev. 2.04 PD2R	Intel has modified the CPU identifier by using the one for the SL Enhanced family, not recognized by the previous BIOS 2.03. This BIOS level only recognizes the SL Enhanced CPU.
			Lev. 2.04	Introduction of the SL Enhanced 33 MHz i486SX CPU, only used by the M4-62 Personal Computer. Since this is an alternative CPU, board level does not change.
	Lev. 13		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. 14		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 15		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes the system to malfunction with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 16 MI		Lev. 2.06	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs.
	Lev. 16 SI			The modification made at board level 13 (COGENT / WANG boards) is removed. To correct this problem, **a new motherboard BA2187 is developed exclusively for Oliservice.**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2039 **		588091 P		** = Motherboard does not incorporate the modifications for OS/2.
	Lev. 06 (See BA2039)		Lev. 1.07 PD3L	Fictitious level since BIOS 2.0 is not used. However, the printed curcuit has been modified, whose level changes to 01.
	Lev. 07		Lev. 1.07	Ficticious level in order to correctly document (without skipping levels) the BIOS used on the M4-XX and PCS models. BIOS 2.0/S is used on the PCS models.
	Lev. 08/A		Lev. 1.07	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor in location C412.
	Lev. 09/A		Lev. 1.10 PD2A	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 10/A		Lev. 1.10	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical line).
	Lev. 11/A		Lev. 1.10	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 12/A		Lev. 1.13 PDK9	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. Lev. 13MD/A		Lev. 1.13	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes the system to malfunction with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 12 MI/A		Lev. 1.13	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2033	Nasc.	588055 S	Lev. 1.03	Motherboard for the PCS 44/C Personal Computer. Features - Type T. 1 (BA2044) - 25 MHz i486SX CPU - One serial porti - One game porti
	Lev. 01		Lev. 1.05	New BIOS (see the specific table) Modifications to the printed circuit and addition of new components to render the board compatible with EMI standards.
	Lev. 02		Lev. 1.05	Renewed printed circuit, thus causing the name of the Base Assembly to change from T. 1 (BA2044) to T 1.5 (BA2067). As a result the names of the boards also change.
	Lev. 03		Lev. 1.05	Addition of four 47 pF capacitors between pins 3, 6, 8 and 11 of the component at location U71 and ground, to correct the PARITY ERRORS caused by the incorrect timing of the CAS generation circuit.
	Lev. 04			Inexistent level to align the documentation of the boards used on the PCS systems.
	Lev. 05		Lev. 1.07 PD3L	New BIOS (see the specific table).
	Lev. 06		Lev. 2.0	New BIOS (see the specific table) Cuts and wirings made, with the addition of jumper J45 to disable the video controller. All this corrects the problem with the OS/2 operating system rel 1.3 Ver. 2.02 upd. 6
	Due to production purposes, not all the boards manufactured have the new BIOS 2.0 and the cuts and wirings to solve the problems with OS/2 (see Lev. 06). From here on all board levels will be dealt with differently, depending on whether they incorporate the modifications to solve OS/2 problems or not. **BA2033 *** Indicates the board on which the level 06 modification was carried out **BA2033 **** Indicates the board on which the level 06 modification was not carried out			
BA2033 *		588055 S		* = Motherboard with modification for OS/2 Ver 1.13 In other words: BIOS 2.0, cuts and wirings
	Lev. 07		Lev. 2.0	New printed circuit (C.S. 01) which incorporates the Parity Error modifications (see Lev. 03). **WARNING:** Does not recuperate the wirings of the previous level (OS/2 problem).

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2033 *		588055 S		* = Motherboard with changes for OS/2 Ver 1.13 In other words: BIOS 2.0, cuts and wirings.
	Lev. 08		Lev. 2.0/S	New BIOS (see the specific table) for the game port. This BIOS is only present on PCS models. For alignment of the different levels, a fictitious level upgrade from 07 to 08 was made for the BA2034/39 of M4-XX systems. For the BA2032, the fictitious level upgrade was made from 06 to 07 to correctly document (without skipping levels) the distribution of the BIOS among the PCS and M4-XX models).
	Lev. 09		Lev. 2.0/S	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor in location C412.
	Lev. 10		Lev. 2.03/S	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 11		Lev. 2.03/S	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 12		Lev. 2.04/S PD2S	Intel has modified the CPU identifier by using the one for the SL Enhanced family, not recognized by the previous BIOS 2.03. This BIOS level does not allow the use of the SL Enhanced CPU.
	Lev. 13		Lev. 2.06/S PDK1	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by. - Use of the SL Enhanced 25 MHz i486SX CPU
	Lev. 14		Lev. 2.06/S	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 15		Lev. 2.06/S	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2033 *	Lev. 16 MI Lev. 16 SI	588055 S	Lev. 2.06/S	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs. The modification made at board level 13 (COGENT / WANG boards) is removed. To correct this problem, **a new motherboard BA2187 is developed exclusively for Oliservice.**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2033 **		588055 S		** = Motherboard does not incorporate the modifications for OS/2.
	Lev. 06 (See BA2033)		Lev. 1.07	Fictitious level as BIOS 2.0 is not used. The update to the printed circuit has been made to incorporate Parity Error modifications (see Lev. 03). The printed circuit remains at level 01. **WARNING:** Does not incorporate the wirings of the previous level (problem with OS/2).
	Lev. 07		Lev. 1.07/S PD3Y	New BIOS (see the specific table) for the game port. This BIOS is only present on PCS models. For alignment of the different levels, a fictitious level upgrade from 07 to 08 was made for the BA2034/39 of M4-XX systems. For the BA2032, the fictitious level upgrade was made from 06 to 07 to correctly document (without skipping levels) the distribution of the BIOS among the PCS and M4-XX models).
	Lev. 08/A		Lev. 1.07/S	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor at location C412.
	Lev. 09/A		Lev. 1.10/S PD2B	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 10/A		Lev. 1.10/S	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 11/A		Lev. 1.10/S	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 12/A		Lev. 1.13/S PDKA	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by. - Use of the SL Enhanced 25 MHz i486SX CPU
	Lev. 13 MD/A		Lev. 1.13	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2033 **	Lev. 12MI/A	588055 S	Lev. 1.13	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2036	Nasc.	588056 T	Lev. 1.03	Motherboard used on the PCS 44/C Personal Computers Features - Type T. 1 (BA2044) - No CPU (uses the i486 DX2) - One serial port - One game port
	Lev. 01		Lev. 1.05	New BIOS (see the specific table) Modifications to the printed circuit and addition of new components to render the board compatible with EMI standards.
	Lev. 02		Lev. 1.05	Renewed printed circuit, thus causing the name of the Base Assembly to change from T. 1 (BA2054) to T 1.5 (BA2067). As a result the names of the boards also change.
	Lev. 03		Lev. 1.05	Addition of four 47 pF capacitors between pins 3, 6, 8 and 11 of the component at location U71 and ground, to solve the PARITY ERRORS caused by the incorrect timing of the CAS generation circuit.
	Lev. 04		Lev. 1.05	Keyboard controller rel. 10.01 has been replaced by rel. 10.02
	Lev. 05		Lev. 1.07 PD3L	New BIOS (see the specific table).
	Lev. 06		Lev. 2.0	New BIOS (see the specific table) Cuts and wirings made, with the addition of jumper J45 to disable the video controller. All this corrects the problem with the OS/2 operating system rel 1.3 Ver. 2.02 upd. 6.
	Due to production purposes, not all the boards manufactured have the new BIOS 2.0 and the cuts and wirings to solve the problems with OS/2 (see Lev. 05). From here on all board levels will be dealt with differently, depending on whether they incorportate the modifications to solve OS/2 problems or not. **BA2036 *** Indicates the board on which the level 06 modification was carried out. **BA2036 **** Indicates the board on which the level 06 modification was not carried out.			

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2036 *		588056 T		* = Motherboard with changes for OS/2 Ver 1.13 In other words: BIOS 2.0, cuts and wirings.
	Lev. 07		Lev. 2.0	New printed circuit (C.S. 01) that incorporates the Parity Error modifications (see Lev. 03). **WARNING:** Does not incorporate the wirings of the previous level (problem with OS/2).
	Lev. 08		Lev. 2.0/S	New BIOS (see the specific table) for the game port. This BIOS is only present on PCS models. For alignment of the different levels, a fictitious level upgrade from 07 to 08 was made for the BA2034/39 of M4-XX systems. For the BA2032, the fictitious level upgrade was made from 06 to 07 to correctly document (without skipping levels) the distribution of the BIOS among the PCS and M4-XX models).
	Lev. 09		Lev. 2.0/S	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor in location C412.
	Lev. 10		Lev. 2.03/S	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 11		Lev. 2.03/S	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 12		Lev. 2.04/S PD2S	Intel has modified the CPU identifier by using the one for the SL Enhanced family, not recognized by the previous BIOS 2.03. This BIOS level does not allow the use of the SL Enhanced CPU.
	Lev. 13		Lev. 2.06/S PDK1	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. 14		Lev. 2.06/S	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 15		Lev. 2.06/S	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2036 *	Lev. 16 MI Lev. 16 SI	588056 T	Lev. 2.06/S	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs. The modification made at board level 13 (COGENT / WANG boards) is removed. To correct this problem, **a new motherboard BA2187 is developed exclusively for Oliservice.**

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2036 **		588056 T		** = Motherboard does not incorporate the modifications for OS/2.
	Lev. 06 (See BA2036)		Lev. 1.07	Fictitious level as BIOS 2.0 is not used. The update to the printed circuit has been made to incorporate Parity Error modifications (see Lev. 03). The printed circuit remains at level 01. **WARNING:** Does not incorporate the wirings of the previous level (problem with OS/2).
	Lev. 07		Lev. 1.07/S PD3Y	New BIOS (see the specific table) for the game port. This BIOS is only present on PCS models. For alignment of the different levels, a fictitious level upgrade from 07 to 08 was made for the BA2034/39 of M4-XX systems. For the BA2032, the fictitious level upgrade was made from 06 to 07 to correctly document (without skipping levels) the distribution of the BIOS among the PCS and M4-XX models).
	Lev. 08/A		Lev. 1.07/S	New printed circuit (C.S. 02) which incorporates the wirings and has a 68 pF capacitor at location C412.
	Lev. 09/A		Lev. 1.10/S PD2B	New BIOS (see the specific table). New 74LS245 and GD75232 components that replace the 74ALS245 and SN75C185, respectively.
	Lev. 10/A		Lev. 1.10/S	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 11/A		Lev. 1.10/S	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 12/A		Lev. 1.13/S PDKA	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. 13MD/A		Lev. 1.13/S	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 12MI/A		Lev. 1.13/S	Replaced the 1 Ohm resistors at locations R148 and R149 with 0 Ohm resistors. This corrects the screen's background instability in Windows and OS/2 when accessing HDUs and FDUs.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2050	Nasc.	589581 Q	Lev. 2.0	Motherboard used on the following PC models: M4-64; M4-65; M4-66 (Made in Scarmagno) Features - Type T. 1.5 (BA2067) - No CPU (Depends on the Personal Computer model) - Two serial ports
	Lev. 01		Lev. 2.0	
	Lev. 02 Field level		Lev. 2.03 PD2C	- New BIOS (see the specific table). Since this board is no longer manufactured, it is replaced by BA2070. Board level change is only made at field level. - Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 03 Field level		Lev. 2.03	Cuts and wirings to correct WAN (LPU) board failures.
	Lev. 04 Field level		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. 05 Field level		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 06 Field level		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2076	Nasc.		Lev. 2.0	Motherboard used on the following PC models: M4-64; M4-65; M4-66 (Made in Scarmagno) Features: - Type T. 1.5 (BA2070) - No CPU (Depends on the Personal Computer model) - Two serial ports
	Lev. 01		Lev. 2.03 PD2C	New BIOS (see the specific table).
	Lev. 02		Lev. 2.03	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 03		Lev. 2.04 PD2R	Intel has modified the CPU identifier by using the one for the SL Enhanced family, not recognized by the previous BIOS 2.03. This BIOS level does not allow the use of the SL Enhanced CPU.
	Lev. 04		Lev. 2.04	Cuts and wirings to correct WAN board (LPU) failures.
	Lev. 05		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. 06		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 07		Lev. 2.06	New printed circuit (level 02) that incorporates the wirings that corrected the problems that occurred when using WAN boards - See level 04.
	Lev. 08		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 09		Lev. 2.06	New printed circuit incorporating all previous modifications: WAN boards COGENT / WANG boards Increased VBATT value

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2051	Nasc.	589581 Q	Lev. 2.0	Motherboard used on the following PC models: M4-64; M4-65; M4-66 (Made in Singapore) Features - Type T. 1.5 (BA2067) - No CPU (Depends on the Personal Computer model) - Two serial ports
	Lev. 01		Lev. 2.0	
	Lev. 02 Field level		Lev. 2.03 PD2C	- New BIOS (see the specific table). Since this board is no longer manufactured, it is replaced by BA2077. Board level change is only made at field level. - Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 03 Field level		Lev. 2.03	Cuts and wirings to correct WAN (LPU) board failures.
	Lev. 04 Field level		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. 05 Field level		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 06 Field level		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2077	Lev. Nasc.		Lev. 2.0	Motherboard used on the following PC models: M4-64; M4-65; M4-66 (Made in Singapore) Features: - Type T. 1.5 (BA2070) - No CPU (Depends on the Personal Computer model) - Two serial ports
	Lev. 01		Lev. 2.03 PD2C	New BIOS (see the specific table).
	Lev. 02		Lev. 2.03	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 03		Lev. 2.04 PD2R	Intel has modified the CPU identifier by using the one for the SL Enhanced family, not recognized by the previous BIOS 2.03. This BIOS level does not allow the use of the SL Enhanced CPU.
	Lev. 04		Lev. 2.04	Cuts and wirings to correct WAN board (LPU) failures.
	Lev. 05		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by.
	Lev. 06		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 07		Lev. 2.06	New printed circuit (level 02) that incorporates the wirings that corrected the problems that occurred when using WAN boards (LPU) - See level 04.
	Lev. 08		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 09		Lev. 2.06	New printed circuit incorporating all previous modifications: WAN boards COGENT / WANG boards Increased VBATT value

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2063	Nasc.	589580 T	Lev. 2.0	Motherboard used on the M4-60 Personal Computer: (Made in Scarmagno) Features: - Type T. 1.5 (BA2067) - 25 MHz i486SX CPU - Two serial ports
	Lev. 01		Lev. 2.0	
	Lev. 02 Field level		Lev. 2.03 PD2C	- New BIOS (see the specific table). Since this board is no longer manufactured, it is replaced by BA2078. Board level change is only made at field level. - Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 03 Field level		Lev. 2.03	Cuts and wirings to correct WAN (LPU) board failures.
	Lev. 04 Field level		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by - SL Enhanced 25 MHz i486SX CPU used.
	Lev. 05 Field level		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 06 Field level		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2078	Nasc.	589580 T	Lev. 2.0	Motherboard used on the M4-60 Personal Computer (Made in Scarmagno). Features: - Type T. 1.5 (BA2070) - 25 MHz i486SXCPU - Two serial ports
	Lev. 01		Lev. 2.03 PD2C	New BIOS (see the specific table).
	Lev. 02		Lev. 2.03	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 03		Lev. 2.04 PD2R	Intel has modified the CPU identifier by using the one for the SL Enhanced family, not recognized by the previous BIOS 2.03. This BIOS level does not allow the use of the SL Enhanced CPU.
	Lev. 04		Lev. 2.04	Cuts and wirings to correct WAN board (LPU) failures.
	Lev. 05		Lev. 2.06 PDK0	- New BIOS (see specific table) - SL Enhanced 25 MHz i486SX CPU is used - Increase in CMOS VBATT margins during stand by.
	Lev. 06		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 07		Lev. 2.06	New printed circuit (level 02) that incorporates the wirings that corrected the problems that occurred when using WAN boards - See level 04.
	Lev. 08		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 09		Lev. 2.06	New printed circuit incorporating all previous modifications: WAN boards COGENT / WANG boards Increased VBATT value

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2064	Nasc.	589580 T	Lev. 2.0	Motherboard used on the M4-60 Personal Computer (Made in Singapore). Features: - Type T. 1.5 (BA2067) - 25 MHz i486SX CPU - Two serial ports
	Lev. 01		Lev. 2.0	
	Lev. 02 Field level		Lev. 2.03 PD2C	- New BIOS (see the specific table). Since this board is no longer manufactured, it is replaced by BA2079. Board level change is only made at field level.
			Lev. 2.03	- Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 03 Field level		Lev. 2.03	Cuts and wirings to correct WAN (LPU) board failures.
	Lev. 04 Field level		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by. - SL Enhanced 25 MHz i486SX CPU
	Lev. 05 Field level		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 06 Field level		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2079	Nasc.	589580 T	Lev. 2.0	Motherboard used on the M4-60 Personal Computer (Made in Singapore). Features: - Type T. 1.5 (BA2070) - 25 MHz i486SXCPU - Two serial ports
	Lev. 01		Lev. 2.03 PD2C	New BIOS (see the specific table).
	Lev. 02		Lev. 2.03	Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 03		Lev. 2.04 PD2R	Intel has modified the CPU identifier by using the one for the SL Enhanced family, not recognized by the previous BIOS 2.03. This BIOS level does not allow the use of the SL Enhanced CPU.
	Lev. 04		Lev. 2.04	Cuts and wirings to correct WAN board (LPU) failures.
	Lev. 05		Lev. 2.06 PDK0	- New BIOS (see specific table) - SL Enhanced 25 MHz i486SX CPU is used - Increase in CMOS VBATT margins during stand by.
	Lev. 06		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 07		Lev. 2.06	New printed circuit (level 02) that incorporates the wirings that corrected the problems that occurred when using WAN boards - See level 04.
	Lev. 08		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).
	Lev. 09		Lev. 2.06	New printed circuit incorporating all previous modifications: WAN boards COGENT / WANG boards Increased VBATT value

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2068	Nasc.		Lev. 2.0	Motherboard used on the M4-60 Personal Computer (Made in Singapore). Features: - Type T. 1.5 (BA2067) - 25 MHz i486SX CPU - Two serial ports
	Lev. 01		Lev. 2.0	
	Lev. 02 Field level		Lev. 2.03 PD2C	- New BIOS (see the specific table). Since this board is no longer manufactured, it is replaced by BA2079. Board level change is only made at field level.
			Lev. 2.03	- Replaced resistors and capacitors to correct the following video problems: - Comet effect visible at a resolution of 1024x768 with a 72 Hz vertical sync. - Incorrect compensation between the modulation of a line and the modulation of a dot (the horizontal line is brighter than the vertical one).
	Lev. 03 Field level		Lev. 2.03	Cuts and wirings to correct WAN (LPU) board failures.
	Lev. 04 Field level		Lev. 2.06 PDK0	- New BIOS (see specific table) - Increase in CMOS VBATT margins during stand by. - SL Enhanced 33 MHz i486SX CPU
	Lev. 05 Field level		Lev. 2.06	Cuts, wirings and the addition of a resistor to correct system failures when COGENT / WANG boards are used.
	Lev. 06 Field level		Lev. 2.06	1000 pF capacitor installed at location CA1 to eliminate the noise on IRQ14 which causes system failures with certain types of Quantum hard disk drives (170 MB and 340 MB).
BA2184	Nasc.		Lev. 2.06	Motherboard manufactured in Scarmagno **exclusively for Oliservice**. Features: - Type T. 1.5 (BA2070) - No CPU New motherboard implementing the modifications for operation with the KINGSTON network.

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA2183	Nasc. Lev. 01		Lev. 2.06	Motherboard manufactured in Singapore **exclusively for Oliservice**. Features: - Type T. 1.5 (BA2054) - No CPU New motherboard implementing the modifications for operation with the KINGSTON network. The level 13 modification (COGENT/WANG boards) has been eremoved. To correct this problem, **new motherboard BA2187 is manufactured exclusively for Oliservice.**
BA2187	Nasc		Lev. 2.06	Motherboard **for Oliservice only.** Features: - Type T. 1.5 (BA2054) - No CPU New board implementing the modifications for operation with the COGENT / WANG boards.

MOTHERBOARD INTEGRATED CONTROLLERS

MOTHER-BOARD	INTEGRATED CONTROLLERS
T.1 (BA2054) BA2032 BA2034 BA2039 BA2183 BA2187 T.1 (BA2044) BA2033 BA2036	**CPU:** i486SX @ 25 MHz (soldered QFP) **OverDrive II Performance Upgrade Socket:** This socket can host the following processors: i486SX @ 33 MHz i486DX @ 33 MHz i487SX @ 25 MHz or 33 MHz i486DX2 @ 50 MHz or 66 MHz **ET6000** This component integrates the following functions: - Geneation of system Reset and synchronization signals - System bus and CPU control - Control of the operations and arbitration between device masters, DMA and memory refresh - Control port B and NMI logic registers - Port 92 logic control - Memory controller - Concurrent memory refresh and normal PC refresh control - BIOS shadowing control - Management of the interface between the system's three buses - CPU local data bus (16-bit) - Memory data bus (32-bit) - I/O peripherals data bus (16-bit) - Parity checking - Math coprocessor interface - Clock generation **BIOS EPROM** Socket installed 128 Kb x 8 27c010-120 **83C206Q** System peripheral controller. This component integrates the following functions: - CMOS RAM - 114 bytes of non-volatile RAM backed up by a lithium battery to maintain the data while the system is powered off. - Real Time Clock (system date and time) - DMA control - Interrupt control **PC87310** Super I/O. This component integrates the following functions: - Floppy disk control - Interface for the two serial ports - Interface for the parallel port - Interface for the intelligent hard disks **8042** Keyboard and mouse controller **ICD2023** Programmable system clock generator - Timer - Local address bus interface **CL-GD5428** Enhanced VGA video controller
T.1.5 (BA2067) BA2050 BA2051 BA2063 BA2064 BA2068	The difference with respect to the previous board is that this new board is available with a Pentium OverDrive Ready Socket so that the Pentium-based P24T processor can be installed.
T.1.5 (BA2070) BA2076 BA2077 BA2078 BA2079 BA2184	Replace the BA2050 - BA2051 - BA2063 - BA2064 - BA2068 boards.

BOARDS

FUNCTION	DESCRIPTION	D.R.S. CODE	FEATURES
Motherboard	T.1 (2054)	See the BA tables	Base Assembly for M4-XX
	T.1 (2044)		Base Assembly for PCS XX
Motherboard	T.1.5 (2067)		Base Assembly for M4-6X
	T.1.5 (2070)		Base Assembly for M4-6X
PS11 A power supply	220 V		Power supply used on
PS11 A power supply	115 V		systems equipped with a
PS11 AR power supply	220 V	588062 Z	305 BOX case
PS11 AR power supply	115 V	589579 D	
LA/11 BNMB power supply	110 V	558184 S	Power supply used on
LA/16 BNMB power supply	220 V	558185 T	systems equipped with a microtower case
BUS Adapter board		030099 W	For microtower systems
BUS Adapter board	IN2003	588416 R	For 305 BOX systems
	IN 2016	588304 H	For 305 BOX systems
Console board	IF2010	588196 M	For microtower systems

USER PROGRAM

This program is stored in the hard disk's System Regions.

M4-40, M4-46	
LEVEL	**NOTES**
Lev. 1.02	
Lev. 1.04 upd 1	This version has the following corrective updates: - The mouse test has been optimized. - The memory test has been optimized. - New messages have been added. - The video configuration utility now allows new monitors to be added. - The cache subtest of the CPU test has been modified. - The hard disk test has been modified. - This version allows the configuration of high-capacity hard disks. - The Setup Utility now correctly displays shadow memory capacity. - The system's logotype has been added. Requires BIOS level 2.06.
Lev. 1.05	This version has the following corrective updates: - The Setup Utility has been modified. - The new HDU Fast Access Utility has been added allowing multi-sector Read/Write operations. - The keyboard test has been modified. - Floppy disk tests have been added. - Video tests have been added. Requires BIOS level 2.06.

M4-60, M4-62, M4-64, M4-65, M4-66	
LEVEL	**NOTES**
Lev. 1.01	This version includes the following corrective updates: - New messages have been added - The Video Configuration Utility now allows the addition of new monitors. - The cache subtest of the CPU test has been modified. - The hard disk test has been modified. - This version allows the configuration of high-capacity hard disks. - The Setup Utility now correctly displays shadow memory capacity. - The system's logotype has been added. Requires BIOS level 2.0.
Lev. 1.02	This version includes the following corrective updates: - New messages have been added - The Video Configuration Utility now allows the addition of new monitors. - The cache subtest of the CPU test has been modified. - The hard disk test has been modified. - High-capacity hard disks can now be configured. Requires BIOS level 2.0.
Lev. 1.03	This version includes the following corrective updates: - The Setup Utility has been modified. - The new HDU Fast Access Utility has been added allowing multi-sector Read/Write operations. - The keyboard test has been modified. - Floppy disk tests have been added. - Video tests have been added. Requires BIOS level 2.06.
Lev. 1.04 upd 1	This version includes the following corrective updates: - The mouse test has been optimized. - The memory test has been optimized. - New messages have been added. - The Video Configuration Utility now allows new monitors to be added. - The cache subtest of the CPU test has been modified. - The hard disk test has been modified. - High-capacity hard disks can now be configured. - The Setup Utility now correctly displays shadow memory capacity. - The system's logotype has been added. Requires BIOS level 2.06.
Lev. 1.05	This version includes the following corrective updates: - The Setup Utility has been modified. - The new HDU Fast Access Utility has been added allowing multi-sector Read/Write operations. - The keyboard test has been modified. - Floppy disk tests have been added. - Video tests have been added. Requires BIOS level 2.06.

PCS 44/C, PCS 46/C	
LEVEL	**NOTES**
Lev. 1.00	
Lev. 1.01	This version includes the following corrective updates: - A test on dedicated memory has been added. - The floppy disk test can now check 1.2 MB drives. - The keyboard test has been modified. - The CPU test has been modified. - The logotype has been changed for the new Personal Computer models. - The video test has been modified.
Lev. 1.03 upd 1	This version includes the following corrective updates: - The mouse test has been optimized. - The memory test has been optimized. - New messages have been added. - The Video Configuration Utility now allows new monitors to be added. - The cache subtest of the CPU test has been modified. - The hard disk test has been modified. - High-capacity hard disks can now be configured. - The Setup Utility now correctly displays shadow memory capacity. - The system's logotype has been added. Requires BIOS level 2.0/S
Lev. 1.04 upd 1	This version includes the following corrective updates: - The Setup Utility has been modified. - The new HDU Fast Access Utility has been added allowing multi-sector Read/Write operations. - The keyboard test has been modified. - Floppy disk tests have been added. - Video tests have been added. Requires BIOS level 2.06/S

SYSTEM TEST

M4-40, M4-46, M4-60, M4-62, M4-64, M4-65, M4-66	
LEVEL	**NOTES**
Lev. 1.02	
Lev. 1.03	This version includes the following corrective updates: - A test on dedicated memory has been added. - The floppy disk test can now check 1.2 MB drives. - The keyboard test has been modified. - The CPU test has been modified. - The logotype has been changed for the new Personal Computer models. - The video test has been modified.
Lev. 1.05	This version includes the following corrective updates: - The mouse test has been optimized. - The memory test has been optimized. - New messages have been added. - The Video Configuration Utility now allows new monitors to be added. - The cache subtest of the CPU test has been modified. - The hard disk test has been modified. - High-capacity hard disks can now be configured. - The Setup Utility now correctly displays shadow memory capacity. - The system's logotype has been added. Requires BIOS level 2.0.
Lev. 1.06	This version includes the following corrective updates: - The Setup Utility has been modified. - The new HDU Fast Access Utility has been added allowing multi-sector Read/Write operations. - The keyboard test has been modified. - Floppy disk tests have been added. - Video tests have been added. Requires BIOS level 2.06.
Lev. 1.07	This version includes the following corrective updates: - The memory test has been modified. - Floppy disk tests have been added. Requires BIOS level 2.06.

PCS 44/C, PCS 46/C	
LEVEL	**NOTES**
Lev. 1.01	
Lev. 1.02	This version includes the following corrective updates: - A test on dedicated memory has been added. - The floppy disk test can now check 1.2 MB drives. - The keyboard test has been modified. - The CPU test has been modified. - The logotype has been changed for the new Personal Computer models. - The video test has been modified. - The Setup Utility has been optimized.
Lev. 1.04	This version includes the following corrective updates: - The mouse test has been optimized. - The memory test has been optimized. - New messages have been added. - The Video Configuration Utility now allows new monitors to be added. - The cache subtest of the CPU test has been modified. - The hard disk test has been modified. - High-capacity hard disks can now be configured. - The Setup Utility now correctly displays shadow memory capacity. - The system's logotype has been added. Requires BIOS level 2.0/S.
Lev. 1.05	This version includes the following corrective updates: - The Setup Utility has been modified. - The new HDU Fast Access Utility has been added allowing multi-sector Read/Write operations. - The keyboard test has been modified. - Floppy disk tests have been added. - Video tests have been added. Requires BIOS level 2.06/S.
Lev. 1.06	This version includes the following corrective updates: - The memory test has been modified. - Floppy disk tests have been added. Requires BIOS level 2.06/S.

SYSTEM REGION SETUP

M4-40, M4-46	
LEVEL	**NOTES**
Lev. 1.04	
Lev. 1.06	Allows User Disk Lev. 1.04, Upd. 1, to be automatically installed on the hard disk. Requires BIOS level 2.0.
Lev. 1.07	Allows User Disk Lev. 1.05 to be automatically installed on the hard disk. Requires BIOS level 2.06.
M4-60, M4-62, M4-64, M4-65, M4-66	
LEVEL	**NOTES**
Lev. 1.00	
Lev. 1.01	Allows User Disk Lev. 1.01 to be automatically installed on the hard disk. Requires BIOS level 2.0.
Lev. 1.02	Allows User Disk Lev. 1.02 to be automatically installed on the hard disk. Requires BIOS level 2.0.
Lev. 1.03	Allows User Disk Lev. 1.03 to be automatically installed on the hard disk. Requires BIOS level 2.06.
Lev. 1.06	Allows User Disk Lev. 1.04, Upd. 1, to be automatically installed on the hard disk. Requires BIOS level 2.06.
Lev. 1.07	Allows User Disk Lev. 1.05 to be automatically installed on the hard disk. Requires BIOS level 2.06.
PCS 44/C, PCS 46/C	
LEVEL	**NOTES**
Lev. 1.00	Allows User Disk Lev. 1.00 to be automatically installed on the hard disk.
Lev. 1.01	Allows User Disk Lev. 1.01 to be automatically installed on the hard disk.
Lev. 1.03	Allows User Disk Lev. 1.03, Upd. 1, to be automatically installed on the hard disk.
Lev. 1.04 upd 1	Allows User Disk Lev. 1.04, Upd. 1, to be automatically installed on the hard disk.

POWER SUPPLY

POWER SUPPLY	LEVEL	DESCRIPTION
PS11 A - 220 V PS11 A - 115 V PS11 AR - 220 V PS11 AR - 115 V LA/11 BNMB LA/16 BNMB		

BUS EXPANSION BOARD

NAME	LEVEL	DESCRIPTION
IN 139	Nasc.	Bus expansion board for Microtower case systems.
IN2003	Nasc. Lev. 01	Bus expansion board for 305 BOX case systems. Modified printed circuit.
IN2016	Nasc.	Bus expansion board for 305 BOX case systems.

SOFTWARE DRIVERS

DRIVER	NOTES
EVD Rel 1.00	Video drivers for: Windows 3.1 (Beta release only) OS/2 v. 2.0 Lotus 123 v. 3.x Ventura v. 2 & V. 3 AutoDESK
EVD Rel. 1.02	- Final driver version for Windows 3.1 - Modifications for Autodesk and OS/2
EVD Rel. 1.03	New drivers for OS/2 v. 2.1 and Windows 3.1
EVD Rel. 1.03 Rev. 1.0	OS/2 drivers reorganized to correct installation problems.
EVD Rel. 1.04	- Corrects the CTRL ALT DEL problem with Windows 3.1 - Corrects the problems with Autocad 12 - Corrects the problems with the documentation
EVD Rel. 1.05	- Windows 3.1 drivers have been modified to improve this program's performance. - A new video driver specific for Windows NT Ver. 3.1 is used.
EVD Rel. 1.06	- Corrects the problem of the 1024x768, 256 col. 60/72 Hz drivers which can only work with 16 colors in Windows NT. - Incorrect CLOCK accessory management; problems in displaying the fonts selected within CLOCK. - DOS window (ALT-ENTER) contains contaminated lines. - Keyboard codepage 437 generates a few incorrect codes.
EVD Rel. 1.07	- Updates the Windows 3.1 video drivers based on the Cirrus ver. 1.43 component. - Corrects the Windows 3.1 CTRL ALT DEL problem. - Updates the documentation.

BIOS

LEVEL	NOTES
Lev. 1.02	

Lev. 1.03	- New shadow RAM management:
	  - System and video shadow BIOS enabled - This option does not change.
	  - System shadow BIOS enabled, video shadow BIOS disabled - This option is only available if the video ROM BIOS is not the one on the motherboard.
	  - System and video BIOS disabled - This option is no longer available.
	- New ways to configure the parallel and serial ports.
	- Problem with the joystick corrected.
	- Video problems corrected.

Lev. 1.05	This release corrects the following problems: - With a Computone board installed at address 8000:0, the system would crash when the CTRL ALT DEL key sequence was pressed during the POD. - Incorrect memory size display. - Inability to install the drivers for Autocad Rev. 1.00. - The new BIOS version allows the management of the 56 Hz and interlaced 87 Hz video frequencies.
Lev. 1.07	This version corrects the following problems: - In version 1.05, the True Colors modes could have been set even if only 512 KB of video memory was installed, thus causing malfunctions. 1 MB of video RAM is required for True Colors operation. - INT 10h - func. 12h - subfunc. 80h (inquire Cirrus VGA Controller Type) is a non-standard video BIOS function that has been integrated to make the Cirrus video drivers for AutoCAD work. In BIOS version 1.05, this function only recognized the Cirrus GD5428 video driver as GD5426 since the video drivers were not yet developed to work with the GD5428. Version 1.02 of these video drivers also recognized the GD5428 video controller and therefore the Inquire Cirrus VGA Controller Type function was re-enabled in BIOS version 1.06 (which never went out of production). As a result of these problems, the compatibility between the BIOS and video drivers for AutoCAD is the following: **BIOS** **VIDEO DRIVER** **OPERATION** 1.05 1.00 YES 1.05 1.02 YES 1.07 1.00 NO 1.07 1.02 YES - The DSM27-028 and DSM27-039 monitors were incorrectly handled in version 1.05.
Lev. 2.0	This version corrected the problem concerning the installation of the OS/2 rel. 1.3, ver. 2.02, upd. 6 operating system. The inconvenience was caused by the fact that the on-board VGA video controller was responding at address 3C3h while a video controller installed on the expansion bus would respond at address 46E8h. This BIOS version ensures that both controllers respond at address 46E8h.

LEVEL	NOTES
Lev. 2.03	This version includes the following corrective updates: - Memory segment E is made available so that it could used as the address range for all the tools that use this memory area in paged mode (for example EMM386). - A HERCULES board installed on the AT bus can now drive an MDA monitor. - Windows NT can now be used with EVD drivers in high resolution modes. - The new 26-141PS monitor is now supported, which can only be selected using the new System Test, System Regions and User Diskette versions. - Problems with the video drive frequency are corrected. - Problems given when accessing video memory in 132-column video modes are corrected.
Lev. 2.04 This BIOS level never reached wide-scale production	This version includes the following corrective updates: - The new CPUs supplied by Intel have a different identifier than the one known to date. Since this identifier is used to display the banner during the POD, when these CPUs were installed the message displayed by the banner no longer provided an indication on the type of CPU nor its clock. The CPU recognition procedure was rewritten to correct this problem. - The video BIOS failure was corrected: in the 132x43 video mode, the font is displayed incorrectly, leaving a line of undriven pixels between one row and the next.
Lev. 2.06	Revisions 2.06 and 2.06/S replace Rev. 2.05 and 2.05/S, respectively, on which a multiblock read/write on HDU access setting option management failure was detected during the SWQA phase. Revisions 2.05 and 2.05/S were not yet in production. This version includes the following corrective updates: - The Personal Computer no longer crashes at the end of the Solitaire game provided with Windows 3.1. - Oversanning in the 72 Hz 640x480 video mode was corrected. This problem came about during video diagnostics, when the lower side of the frame was not displayed on the screen. - Correction of the video controller's fifo code programming values in the different video modes for video refresh function. - This BIOS version now optionally handles the multisector RD/WR function during hard disk accesses (user-selectable by means of the Setup Utility included in the hard disk's system regions).

For production purposes, not all the boards manufactured use BIOS 2.0 and have the cuts and wirings needed to solve the problems that occur when using OS/2 (see Lev. 06).
From here on all board levels will be dealt with differently, depending on whether they incorporate the modifications to correct the problems with OS/2 or not.
Another BIOS release **1.XX** is therefore introduced.

LEVEL	**NOTES**
	This BIOS release is only available for the motherboards that do not integrate the modifications needed to correct the problems related to the use of OS/2.
Lev. 1.10	Corresponds to the standard level 2.0 BIOS.
Lev. 1.13	Corresponds to the standard level 2.06 BIOS

Due to a failure during the self-acknowledgement of the number of serial ports integrated on the motherboard, a new BIOS release called X.YY/S was developed that will be installed on all the products equipped with a single on-board serial port. These products are: PCS 44/C - PCS 46/C.

LEVEL	**NOTES**
	This BIOS release is only available for the PCS Personal Computer models. The only variation with respect to the normal BIOS version is that this release takes into consideration that these systems are not equipped with two serial ports but with a single serial port and a game port.
Lev. 1.07/S	Corresponds to the standard BIOS level 1.07.
Lev. 2.0/S Lev. 1.10/S	Corresponds to the standard BIOS level 2.0
Lev. 2.04/S	This BIOS level is used at the factory for a short period of time.
Lev. 2.06/S Lev. 1.13/S	Correspond to the standard BIOS level 2.06.

SOFTWARE COMPATIBILITY

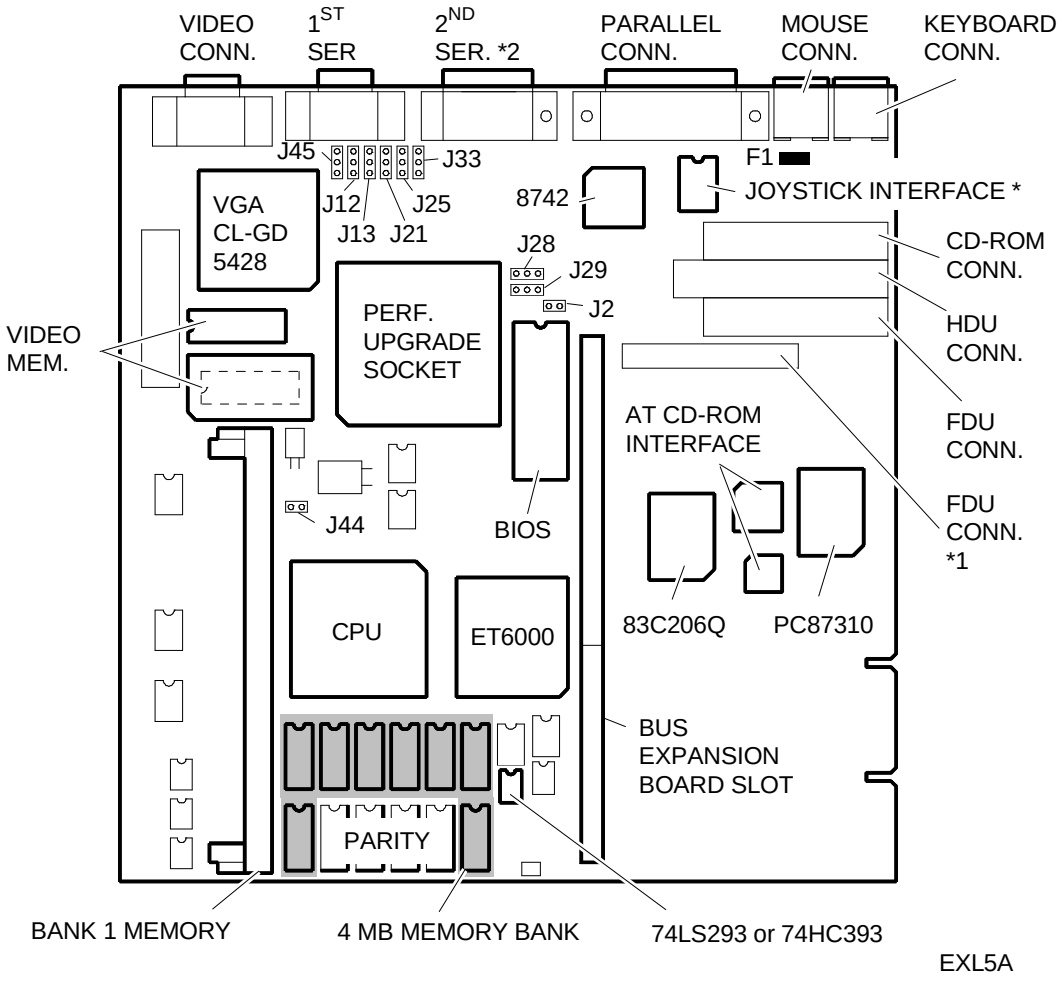
OPERATING SYSTEMS	NOTES
IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01 MS-DOS Release 6.0 OS/2 Release 2.0 OS/2 Release 1.3 SE IBM Operating System/2, Ver. 1.10 e 1.20 IBM Operating System/2 Extended Edition, Ver. 1.10 e 1.20 INTERACTIVE 386/ix, Ver. 2.02 SCO UNIX System V/386, Rev. 3.2.4 SCO XENIX 386, Rev. 2.3	 Requires a formatted DSDD diskette during installation on hard disk. The PS/2 mouse is not recognized. The PS/2 mouse is not recognized.
WINDOWS	
GEM/3 Desktop, IBM-PC Ver. 3.13 MS-WINDOWS /286 Ver. 2.11	MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0
MULTIMEDIA SOFTWARE PRODUCTS	
MS-WINDOWS Ver. 3.0 + MULTIMEDIA Ver. 1.0 MS-WINDOWS Ver. 3.1 MULTIMEDIA Appl. tested) MS-MDK Multimedia Development kit AUTHOWARE STAR Ver. 1.0A	IM-AGE Ver. 2.0 IM-AGE Ver. 3.0 TOOLBOOK Ver. 1.5 MS-MPC SAMPLER

HARDWARE COMPATIBILITY

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

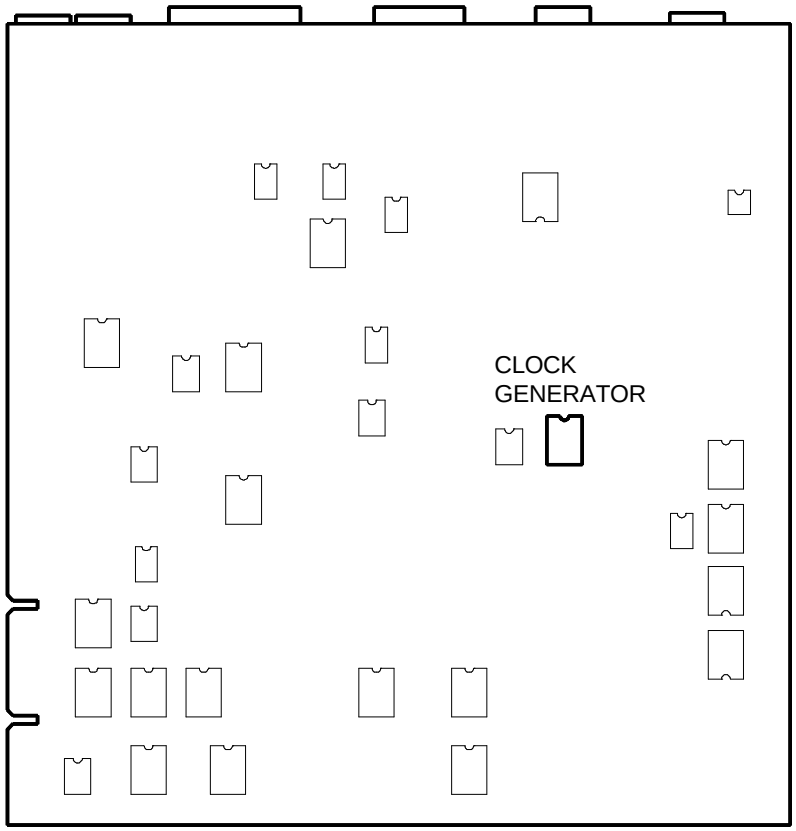
COMPONENTS AND JUMPERS ON THE T.1 MOTHERBOARD (BA2054) (BA2044)

COMPONENTS ON SIDE A



* FOR PCS MODELS ONLY
*1 FOR PERSONAL COMPUTERS WITH MICROTOWER CASE ONLY
*2 THE PCS MODELS HAVE A GAME PORT INSTEAD OF THE 2ND SERIAL PORT

COMPONENTS ON SIDE B



EXL7A

JUMPERS ON THE T.1 MOTHERBOARD (BA2054) (BA2044)

Jumper J21 (Serial Port 1) and J25 (Serial Port2) - Serial port control.
Position 2-3 The system can be bootstrapped from the serial ports. *
Position 1-2 The system cannot be bootstrapped from the serial ports.

Jumper J33 - Floppy disk write protect
Position 1-2 The floppy disk drive is write protected.
Position 2-3 The floppy disk drive is not write protected. *
This feature is also valid for the streaming tape drives with floppy disk interface.

Jumper J12 - Setup control.
Position 1-2 The User Program resident in the System Region of the hard disk drive and which allows the system to be configured, is not executed. If the configuration of the system has changed, the only way to reconfigure the system is by launching the System Test program.
If this security feature is enabled, the following message is displayed at the end of the Power On Diagnostics: *POD Warning*.
Position 2 - 3 If the configuration of the system has changed, the POD will automatically access the User Program which allows the system to be reconfigured. *

Jumper J2 - Number of hard disks connected.
Jumper IN Only one hard disk is installed in the system.
Jumper OUT Two hard disks are installed in the system.
NOTE: Some boards may not have this jumper.

Jumper J13 - Mouse interrupt
Position 1 - 2 Mouse interrupt 12 disabled
Position 2 - 3 Mouse interrupt 12 enabled. *

Jumper J44 - CPU clock selection.
Jumper IN 25 MHz
Jumper OUT 33 MHz

Jumper J45 - Not used.

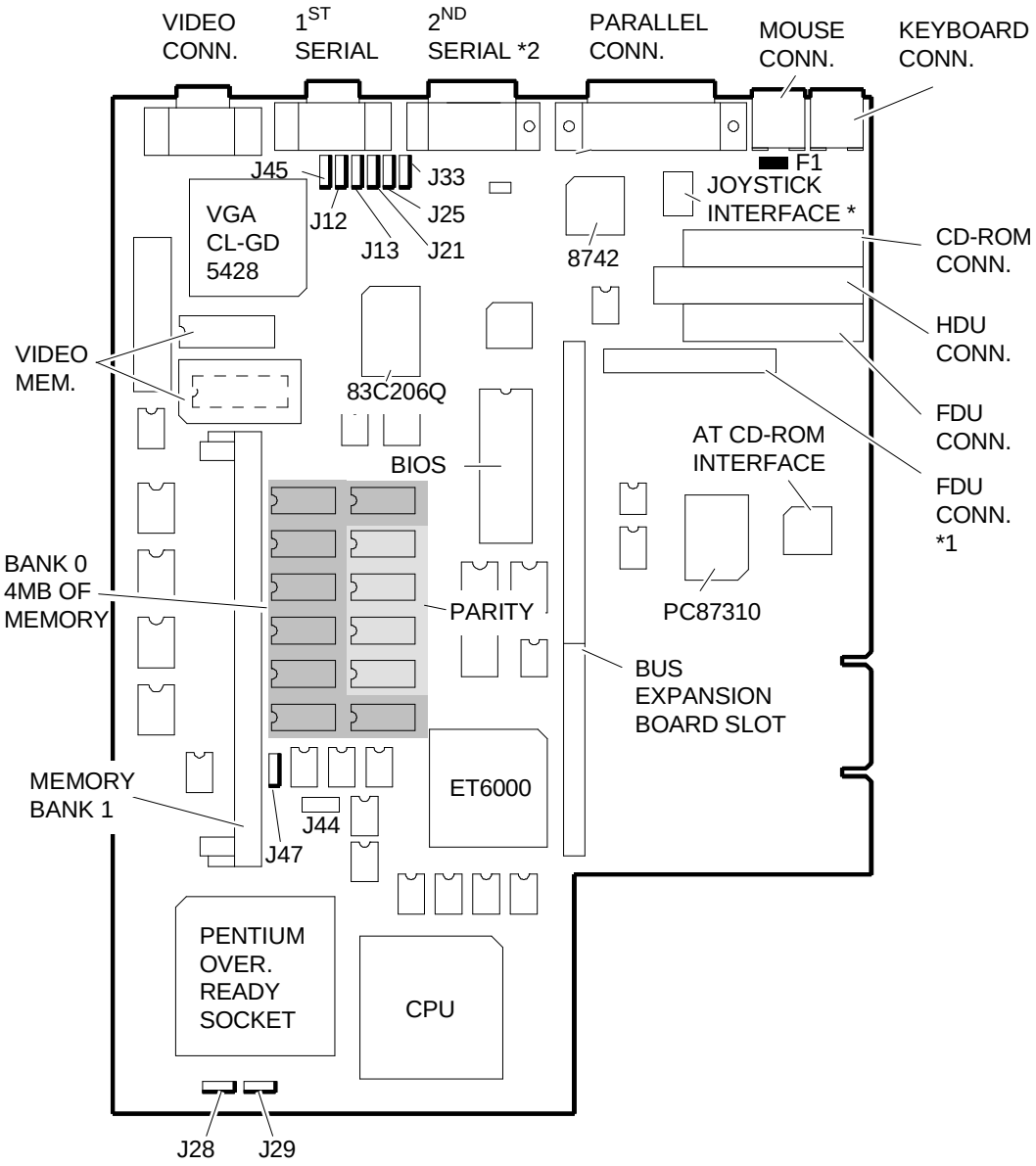
Jumpers J29 - J28 - Type of processor installed

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

* Default setting.

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

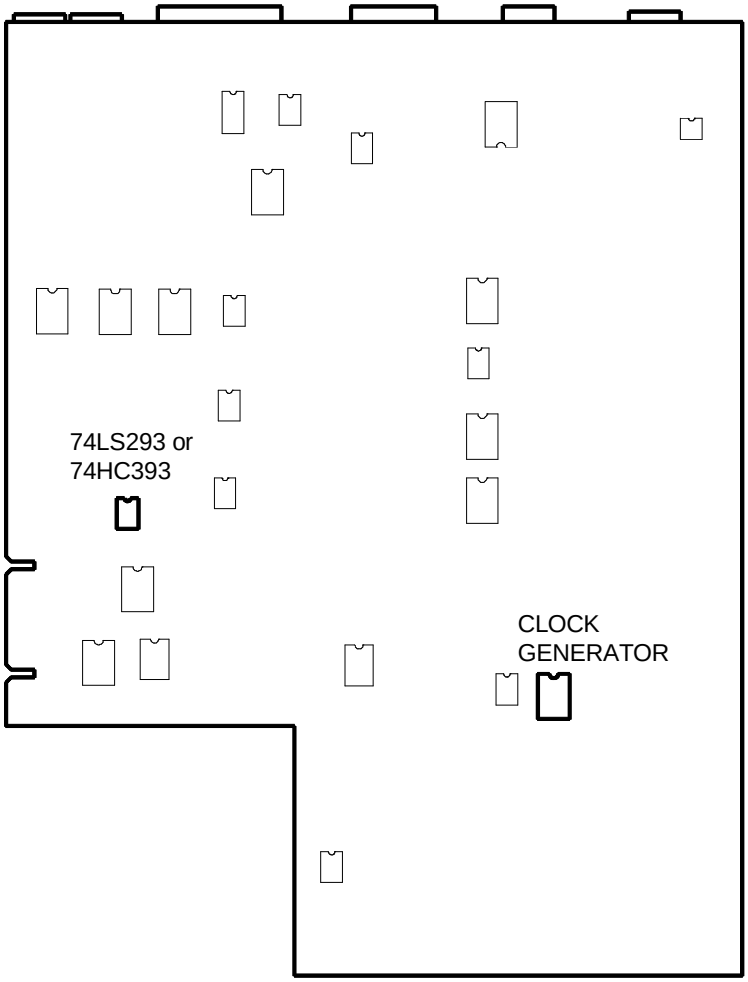
COMPONENTS ON SIDE A



EXM9A

* FOR PCS PERSONAL COMPUTER MODELS ONLY
*1 FOR PERSONAL COMPUTERS WITH MICROTOWER CASE ONLY
*2 INSTEAD OF THE 2ND SERIAL PORT, THE PCS MODELS HAVE A GAME PORT

COMPONENTS ON SIDE B



EXN3A

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

Jumper J21 (Serial Port 1) and J25 (Serial Port2) - Serial port control.
Position 2-3 The system can be bootstrapped from the serial ports. *
Position 1-2 The system cannot be bootstrapped from the serial ports.

Jumper J33 - Floppy disk write protect
Position 1-2 The floppy disk drive is write protected.
Position 2-3 The floppy disk drive is not write protected. *
This feature is also valid for the streaming tape drives with floppy disk interface.

Jumper J12 - Setup control.
Position 1-2 The User Program resident in the System Region of the hard disk drive and which allows the system to be configured, is not executed. If the configuration of the system has changed, the only way to reconfigure the system is by launching the System Test program.
If this security feature is enabled, the following message is displayed at the end of the Power On Diagnostics: *POD Warning*.
Position 2 - 3 If the configuration of the system has changed, the POD will automatically access the User Program which allows the system to be reconfigured. *

Jumper J13 - Mouse interrupt
Position 1 - 2 Mouse interrupt 12 disabled
Position 2 - 3 Mouse interrupt 12 enabled. *

Jumper J44 - CPU clock selection.
Jumper IN 25 MHz
Jumper OUT 33 MHz

Jumper J47 - AT bus status selection
Position 1 - 2 Synchronous
Position 2 - 3 Asynchronous. *

Jumper J45 - VGA video controller setting
Position 1 - 2 On-board VGA controller disabled
Position 2 - 3 On-board VGA controller enabled. *

Jumpers J29 - J28 - Type of processor installed

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

* Default setting.

INTERRUPT LEVELS

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

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

DMA CHANNELS

CHANNEL	NUMBER OF BITS	FUNCTION
0	8	Reserved
1	8	Free
2	8	Floppy disk transfers
3	8	Video
4	16	Used for the cascade connection of DMA1
5	16	Free
6	16	Free
7	16	Free

I/O ADDRESS MAP

ADDRESS	FUNCTION	ADDRESS	FUNCTION
000-01F h	DMA controller 1, 8237A-5	300-31F h	Reserved
020-03F h	Interrupt controller 1, 8259A	360-36F h	Reserved
040-05F h	Timer, 8254	378-37F h	Parallel port 1 (LPT1)
060-06F h	8742 data keyboard controller	380-38F h	Reserved for SDLC communications, Bisync 2
61 h	System Control Port B	3A0-3AF h	Reserved for bisync 1
64 h	8742 commands keyboard 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	Interrupt cpntroller 2, 8259	3E8-3EF h	Serial port 3 (COM3)
0F0 h	Cancels NPX (80487) busy	3F0-3F7 h	Floppy disk controller
0F1 h	Reset NPX, 80487	3F8-3FF h	Serial port (COM1)
0F8-0FF	80487 math coprocessor	533 h	Audio subsystem mute control (in alternative to 607 h)
1F0-1F8 h	Hard disk controller	534-537 h	Audio subsystem (in alternative to 608-60B h)
200-207 h	Reserved	607 h	Audio subsystem mute control (in alternative to 533 h)
278-27F h	Parallel port 2 (LPT 2)	608-60B h	Audio subsystem (in alternative to 534-537 h)
2F8-2FF h	Serial port 2 (COM2)		

SYSTEM MEMORY MAP