

Field Engineering Library

PERSONAL COMPUTER

POCKET SERVICE GUIDE
Volume 1
6th Edition

Code - 2718320W - 00

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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.

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Table of Contents

| | |
|---|-----------|
| M24, M21, M24 SP..... | 1 |
| M240 | 2 |
| M28 | 3 |
| M280 | 4 |
| M290 | 5 |
| M250 - M250 E..... | 6 |
| M380 - M380 C - M380 C NEW | 7 |
| M380T -M380/XP1 - M380/XP3 - M380/XP5 | 8 |
| M380/XP4 - M380/XP7 - M380/XP9 | 9 |
| M300 | 10 |
| P500..... | 11 |
| P800..... | 12 |
| CP486 | 13 |
| M386/25 | 14 |
| P750..... | 15 |
| M486 SCSI..... | 16 |
| M486 ESDI..... | 17 |
| M300-05 | 18 |
| M300-10 | 19 |
| M300-01 | 20 |
| M380-40 | 21 |
| M290-30 | 22 |
| M300-25 | 23 |
| M480-30 | 24 |
| M400-10 | 25 |
| M400-40 | 26 |

| | |
|--------------------------------|-----------|
| M400-60 | 27 |
| M300-08 | 28 |
| M300-15 | 29 |
| M480-40 | 30 |
| M480-60 | 31 |
| M290-25 | 32 |
| M300-04 | 33 |
| M480-10 / M480-20 | 34 |
| M300-28 / PCS44 | 35 |
| M300-30 / M300-30/P | 36 |
| M6-420 / 440 / 450 / 460 | 37 |
| M4-34 | 38 |
| PCS 30 / PCS 40 | 39 |
| M300-02 / M300-02F | 40 |

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 | Bios 1.43/MSDOS 3.20/3.27 |
| Keyboard Adapter | MI293 | 491230 Z | 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

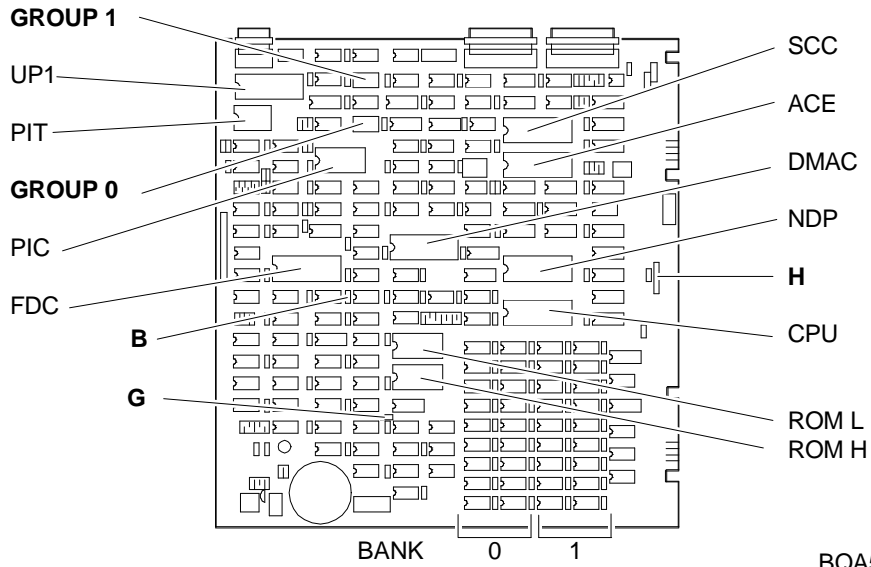
| | |
|--|---|
| PBFY (M24) (CDM 1.60.60.1/525) PBFZ (M24 SP) | Solves timing problems of the 8250 serial interface controller and (bit 05) keyboard controller |
| PL52 (M24) (BIT 160.69.5/24) | To install APB card |
| PL74 (M24) (BIT 160.60.5/24) | Possibility of selecting between 8250 and 8530 by switch |
| 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 |

COMPATIBILITY NOTES

| | |
|--|--|
| Management of M24 SP for 5.25 1.2 MB MFDU settings to be made: | |
| <ul style="list-style-type: none"> - Disable floppy disk controller of system board - Make modifications described in COM 505 M24 - Insert new MFD adapter in the bus converter GO703 | |
| Needed for installation of following options: (See CDM520) | |
| - EGC 2413 board (GO329): | ROM BIOS 1.36 System board PAL 90 System board PAL 73 Video Controller GO317 |
| - 8087 Coprocessor: | ROM BIOS 1.36 PAL 90 |
| - Serial interface: | ROM BIOS 1.36 PAL 90 |
| - Mouse GRD 2469: | Keyboard Firmware PDBN (BIT G15) |
| - APB 2481 (CPU Z8001) | PAL PL52 (BIT 24) |

1

I/O ADDRESS MAP

| ADDRESS | FUNCTION |
|---------|-------------------------------|
| 000-00F | DMA controller |
| 020-021 | Interrupt controller |
| 040-043 | Timer |
| 050-053 | Serial controller (8530) |
| 060-063 | Parallel controller (8255) |
| 064 | Keyboard |
| 066-067 | System configuration |
| 070-07F | Date and time |
| 0F0-0FF | PROM address |
| 210-217 | Expansion box |
| 2F8-2FF | Serial port 2 |
| 320-32F | Hard disk controller |
| 378-37F | Parallel port 1 |
| 380-38F | SDLC communication |
| 3C0-3CF | Reserved |
| 3D0-3DF | Video adapter |
| 3F0-3F7 | Floppy disk controller |
| 3F8-3FF | Serial port 1 (8250) |

INTERRUPT LEVELS

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

DMA CHANNELS

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

M240

CHARACTERISTICS

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

2

BOARDS

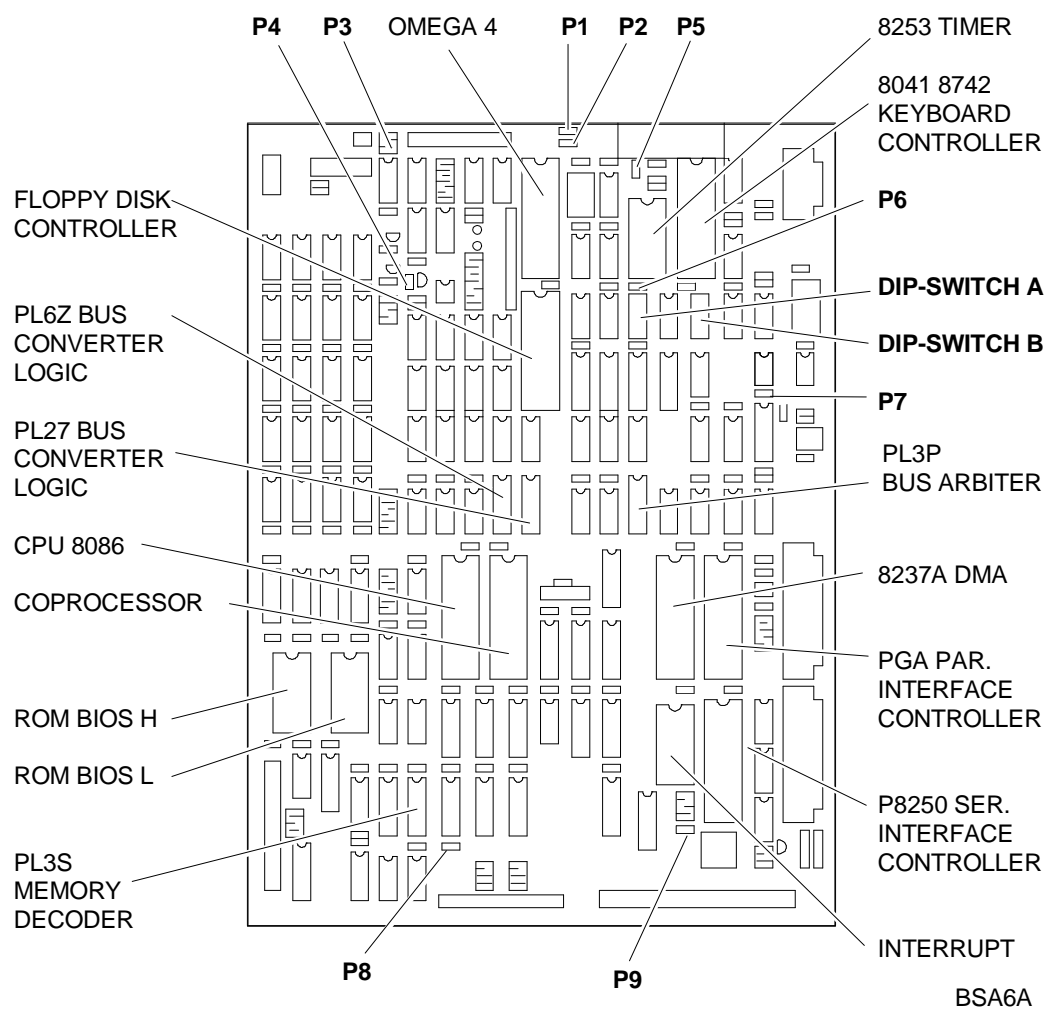
| FUNCTION | DESCRIPTION | D.R.S. CODE | CHARACTERISTICS |
|-------------------------------|-------------------|-------------|--------------------------------------|
| CPU System Board | BA200 | 411658 H | |
| CPU System Board | BA208 | 411730 V | |
| Console Controller | CO124 | 411659 A | |
| Bus Adapter 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"> - "Format Failure" message during hard disk formatting under MS DOS - WANGTEK 40 MB streaming tape unit management - I/O errors in floppy disk after an ON/OFF sequence - Clock problems after using "GOSLOW" - Possibility of testing system from a remote work station - Possibility of programming in RTCC |
| 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 |

3

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 |

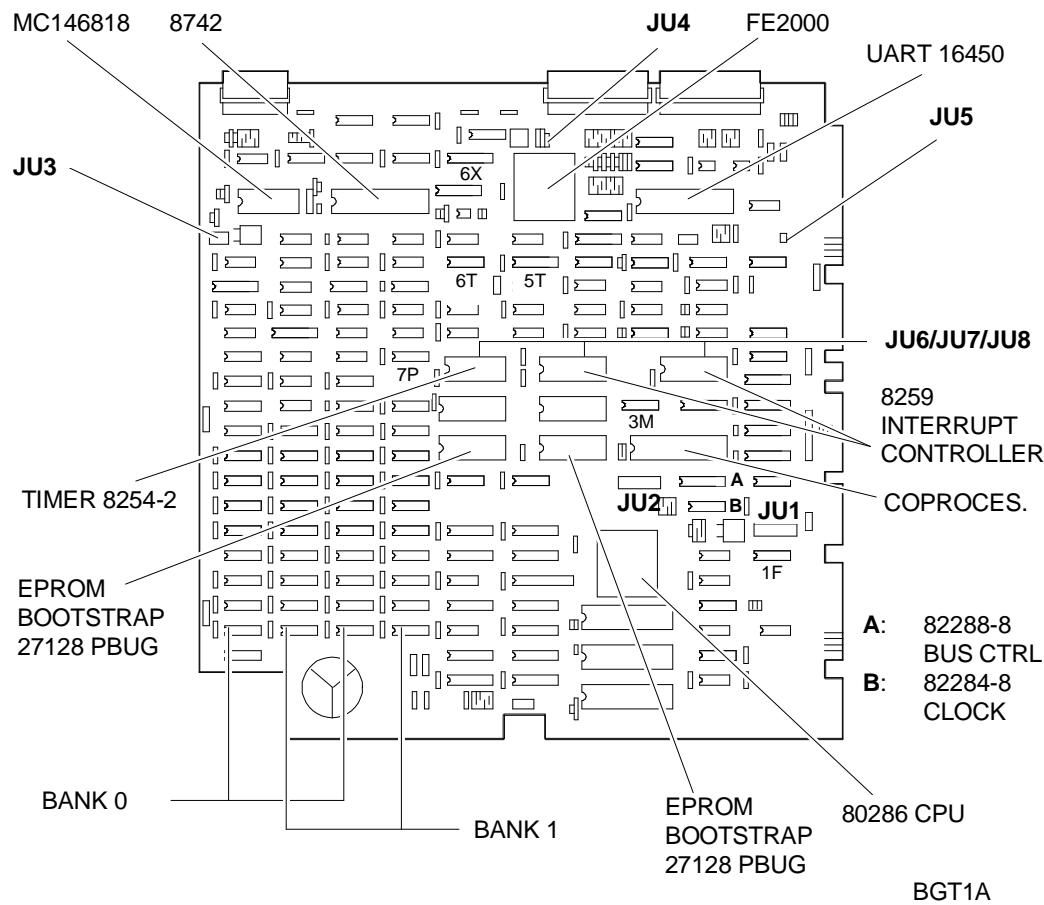
ROM BIOS/PAL/EPROM LEVEL

| 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 |

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

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

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

| | | | | |
|--------------------|----------|----------|----------|-----------------|
| JU6-JU7-JU8 | | | | |
| AREA | 6 | 7 | 8 | FUNCTION |
| 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 |

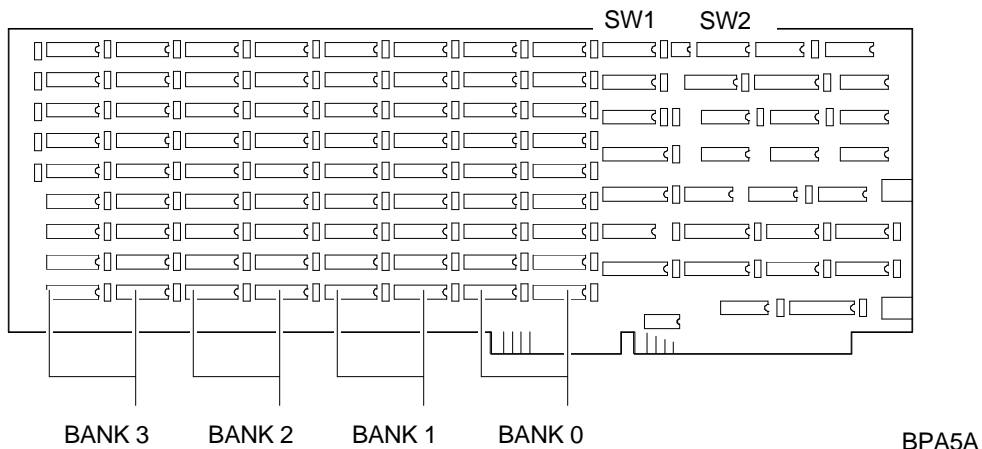
INTERRUPT LEVELS

| 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 | |

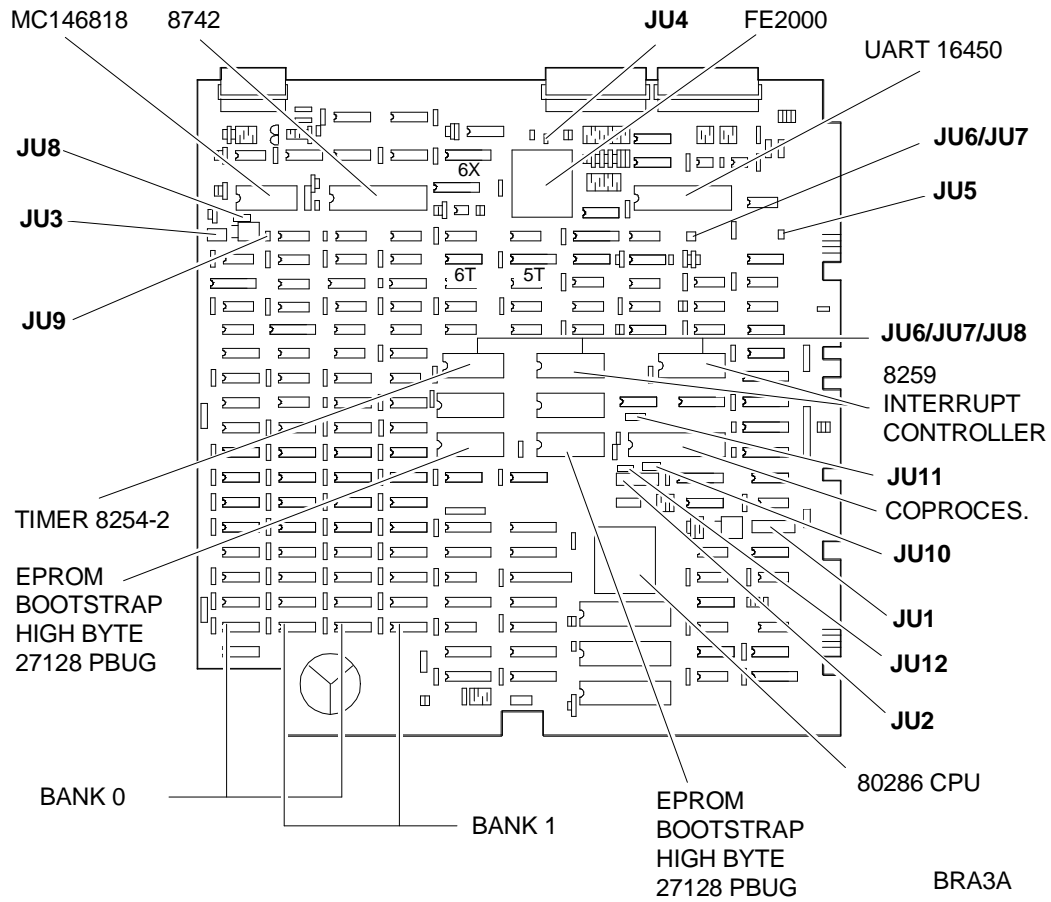
ROM BIOS/PAL/EPROM LEVEL

| 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"> - Enlarges the HDU table and adds a 62 MB RLL hard disk - Solves problems with 1.44 MB uFD - Supports OEC 2 board in CGA mode - Solves format B problem: (CDM 501 M280) - Manages correctly hard disk even if it is not formatted with the system BIOS level |
| 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) |

5

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 | |

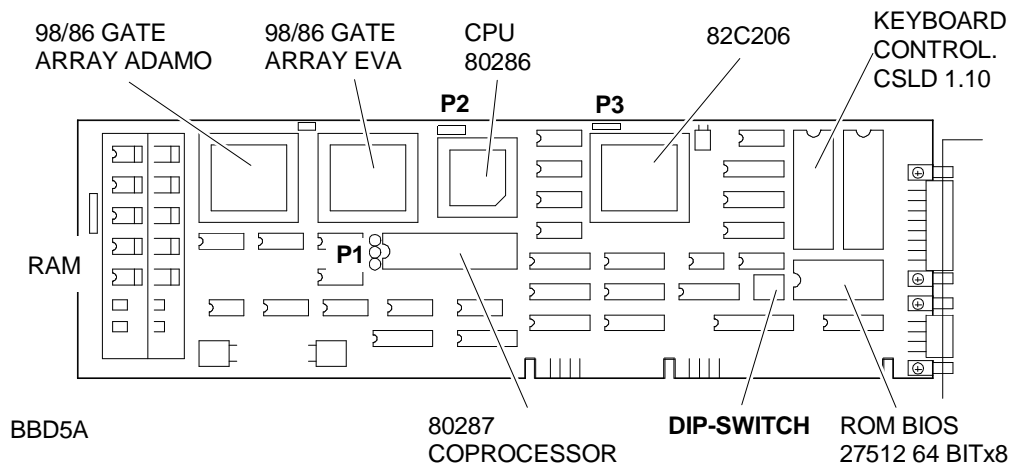
ROM BIOS/PAL/EPROM LEVEL

| 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

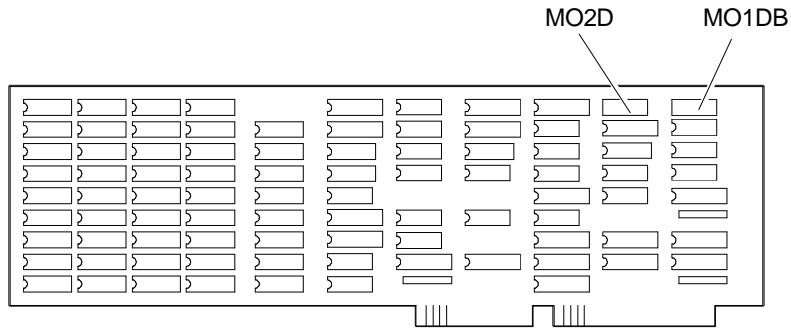
| POSITION | FUNCTION |
|----------|-----------------------|
| 1-2 | 256-512 KB RAM Module |
| 2-3 | 1 MB RAM Module |

JUMPERS P2 and P3

ON OF NORMAL OPERATION

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

MEM 25-292 MEMORY BOARD SETTINGS



5

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

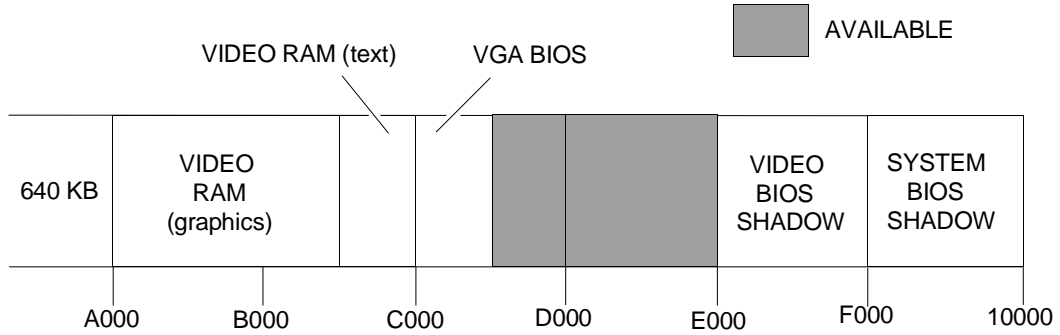
| DIGIT No. | SWITCH No. | | | | VALUE |
|-----------|------------|-----|-----|------|-------|
| 3 | 6 | | 7 | | |
| | ON | | ON | | 000H |
| | OFF | | ON | | 100H |
| | ON | | OFF | | 200H |
| | OFF | | OFF | | 300H |
| 2 | 2 | 3 | 4 | 5 | |
| | ON | ON | ON | ON | 000H |
| | OFF | ON | ON | ON | 010H |
| | 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>MODEM</p> <p>HAYES SMARTMODEM (1200B) QUADRAM QUADMODEM II (QM2024) TELENETICS EXPRESSDATA 24i (24i-12i) VEN-TEL PC MODEM HALF-CARD (PCM XT) AT&T 2200 SERIES MODEM (2224-CD0) HAYES SMARTMODEM 1200</p> | <p>MEMORY EXPANSIONS</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>DISPLAY UNITS</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>MOUSE</p> <p>AT&T BUS MOUSE (459420) LOGITECH BUS MOUSE (P7-3F) MICROSOFT BUS MOUSE, REV. C MICROSOFT SERIAL MOUSE MOUSE SYSTEMS PC MOUSE (M1)</p> |
| <p>NETWORKS & LAN PRODUCTS</p> <p>AT&T STARLAN NETWORK IBM PC NETWORK IBM TOKEN RING NETWORK NOVELL NETWORK 3COM NETWORK</p> | <p>I/O INTERFACE PRODUCTS</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>GRAPHICS PRODUCTS</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 |

5

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 | EXM 25-531 - 2 SIMM 512 KB 80 ns (1 MB to 2 MB memory expansion on system board) EXM 25-332 - 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 IN 113 for the M250 IN 118 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 EXM 25-852 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 |

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

6

SYSTEM BOARD

| | LEVEL | D.R.S. CODE | BIOS ROM | NOTES | |
|--------------|--------------|--------------------|---|--|--|
| BA227 | Nasc. | 412436 M | See following table Lev. 1.03 | 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. 02 | | Lev. 1.03 | Solves the parity error, CMOS and timer problems. | |
| BA233 | Nasc | | See following table Lev. 1.03 Lev. 1.03 | M250 motherboard. Multilayer & SMD Corrects parity error, CMOS and timer problems | |
| | Lev. 01 | | | | |
| | Lev. 02 | | Lev. 1.04 | New BIOS | |
| | Lev. 03 | | Lev. 1.06 | Replaces BIOS 1.04 with 1.06. Corrects serial port problems. | |
| BA239 | 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. |
| BA240 | 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 |
|--------------|---------|-------------|---------------------|---|
| BA241 | 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. |

6

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

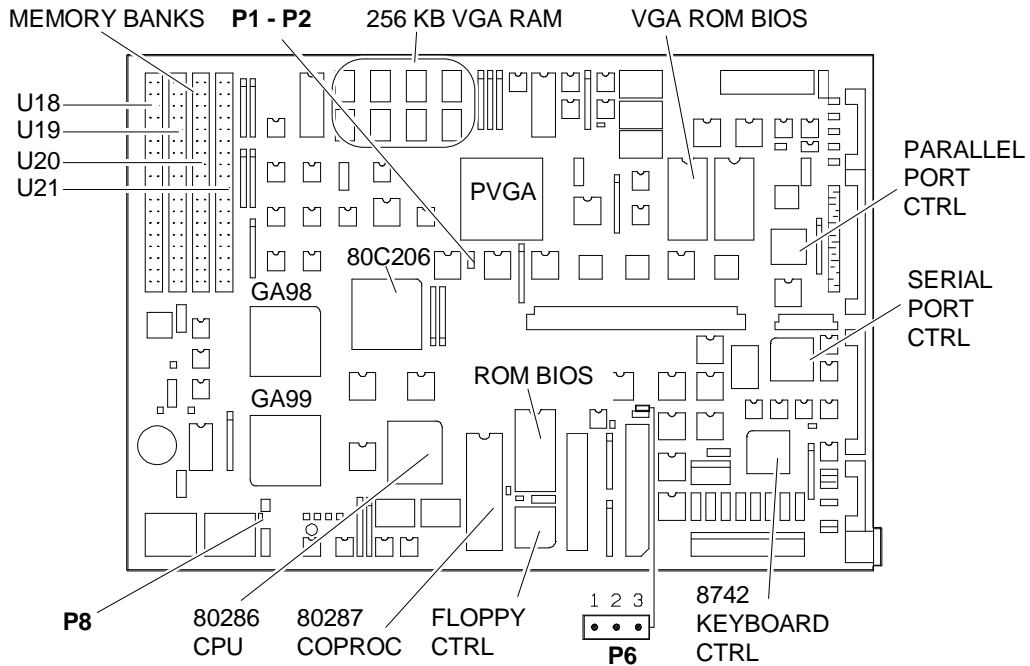
SETUP OPERATIONS

| | |
|----|--------------------------|
| 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



6

BSA7A

JUMPERS

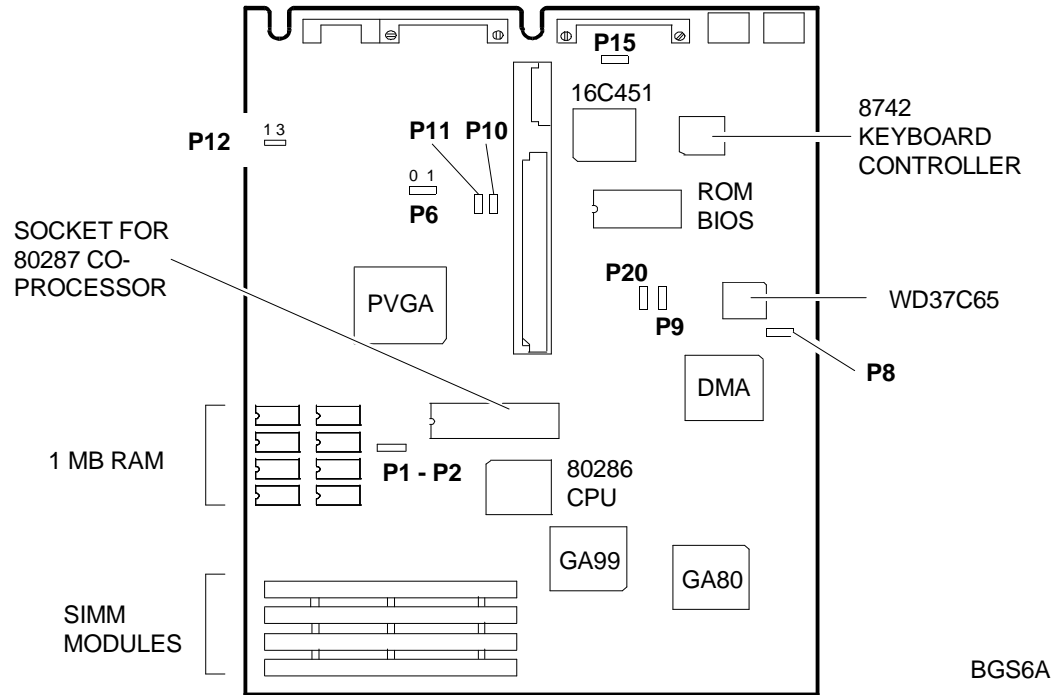
| P1 | P2 | BANK 0 | BANK 1 | No. SIMM | SIMM TYPE |
|-----|-----|------------------------|------------|----------|--------------------|
| IN | OUT | ACTIVE | NOT ACTIVE | 2 | 256 x 9 512 x 9 |
| OUT | OUT | ACTIVE | ACTIVE | 4 | 256 x 9 512 x 9 |
| IN | IN | ACTIVE | NOT ACTIVE | 2 | 1 M x 9 |
| OUT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

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

| | | |
|-----------|------|--|
| P6 | 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) |
| P8 | 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



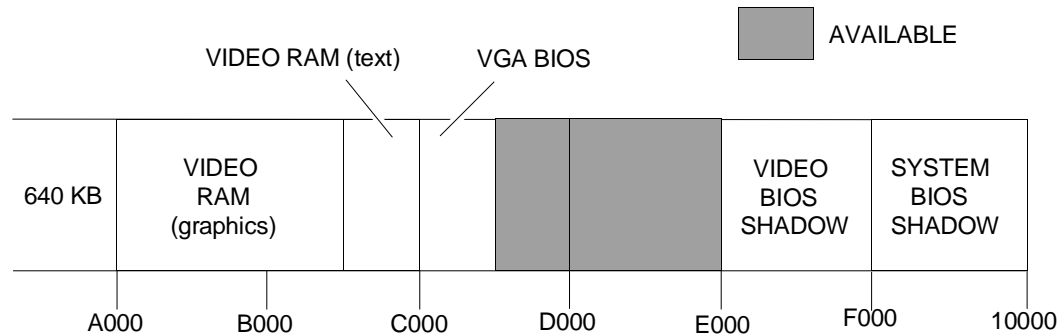
MEM 2852 (ME903) MEMORY EXPANSION BOARD SETTINGS FOR M250

(See M28 page 3-5).

AMB 2678 MEMORY EXPANSION BOARD SETTINGS FOR M250 E

(See M300 page 10-7).

M250 MEMORY MAP



6

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 |

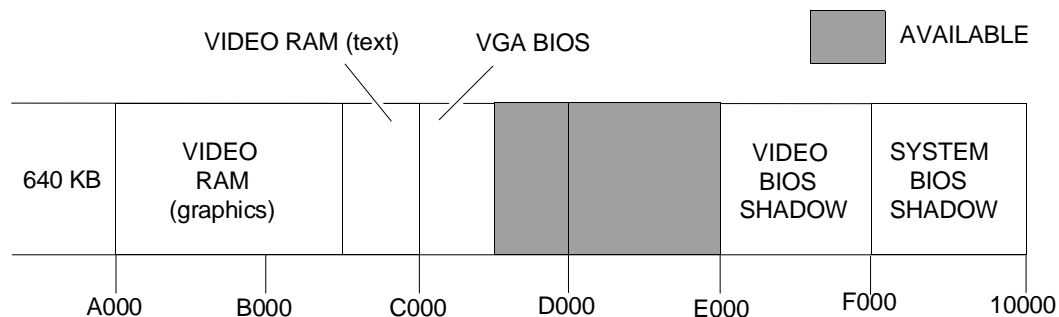
M250 E INTERRUPT LEVELS

| 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

| OPERATING SYSTEMS | NOTES |
|---|--|
| 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 |

6

HARDWARE COMPATIBILITY

| MODEMS | NETWORKING & LAN PRODUCTS |
|---|--|
| 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 |
| MOUSE | MEMORY EXPANSION PRODUCTS |
| 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) |
| INTERFACE & I/O PORT PRODUCTS | DISPLAY UNITS |
| 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) |
| GRAPHICS PRODUCTS | |
| 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 I |

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>M380, M380 C GO717 (WD1003-WAH) - ST506-MFM 3:1 (Hard disk controller) GO720 (WD1005-WAH) - ESDI 3:1 (Hard disk controller)</p> <p>M380 C NEW GO723 (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 | |

7

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

| | | POS. | EVOLUTION | | | |
|--------------------------|----------|----------------|------------------------|------------------------|------------------------|------------------------|
| 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 |

7

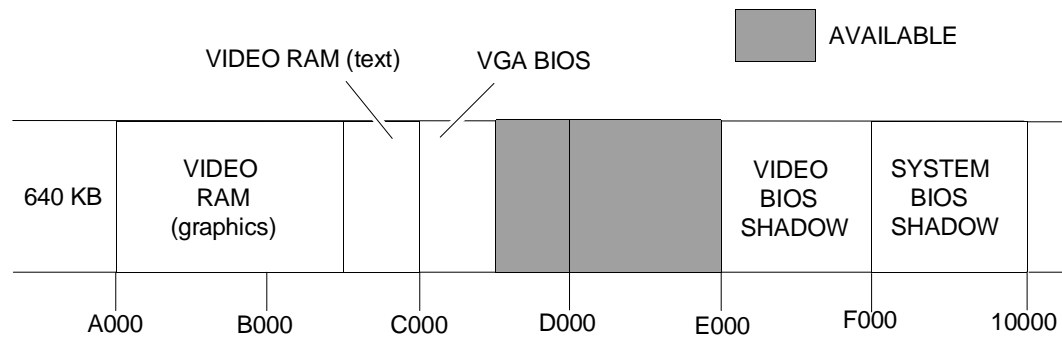
PAL LEVEL ON MEMORY EXPANSION BOARDS

| 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 |

7

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 | M380 T GO728 (WD1007A) or GO565 (WD1009-SE2) ESDI 1:1 GO723 (WD1003-RA2) ST506-RLL 2:1 (Hard disk/floppy disk controller) GO720 (WD1005 WAH) ESDI 3:1 M380/XP1 GO728 (WD1007A) or GO565 (WD1009-SE2) ESDI 1:1 M380/XP3 GO728 (WD1007A) or GO565 (WD1009-SE2) ESDI 1:1 M380/XP5 GO728 (WD1007A) or GO565 (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 |

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

8

BOARDS

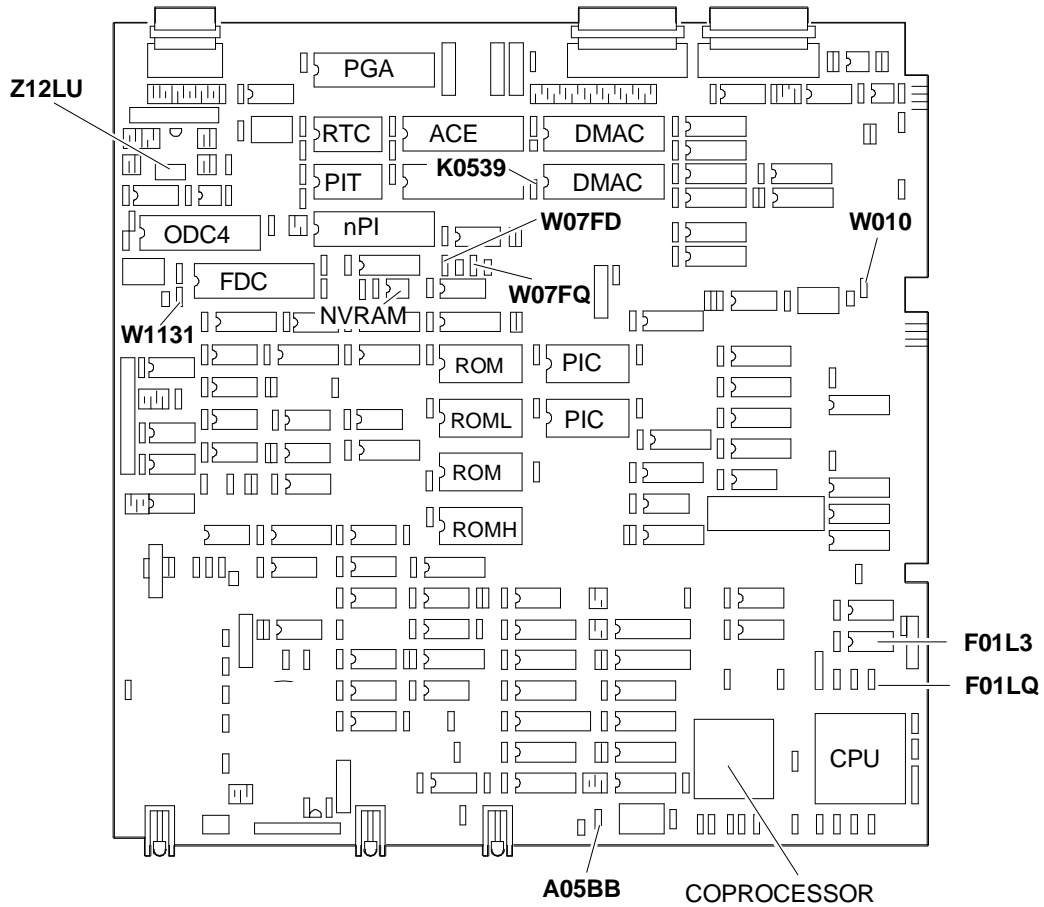
| FUNCTION | DESCRIPTION | D.R.S. CODE | CHARACTERISTICS |
|----------------------|--------------------|-------------|--|
| CPU system board | BA814 | 412142 M | M380T /XP1 /XP3 /XP5 |
| Bus Adapter | IF624 | 412318 V | M380 /XP1/XP3 (7 slots) |
| Bus Adapter | IF615 | 411868 U | M380 /XP1/XP3 (7 slots) |
| 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 | | | |
|---------------------------|----------|-------|-----------|-----------|-----------|----------|
| ROM BIOS | 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



8

| 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

| NAME (on page 9-3) | FUNCTION | |
|---------------------------|-----------------|--------------------------|
| 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

| PAGE 1: C-MOS RAM | PAGE 2: RAM NVRAM |
|--------------------------|--------------------------|
| 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 |

8

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. |

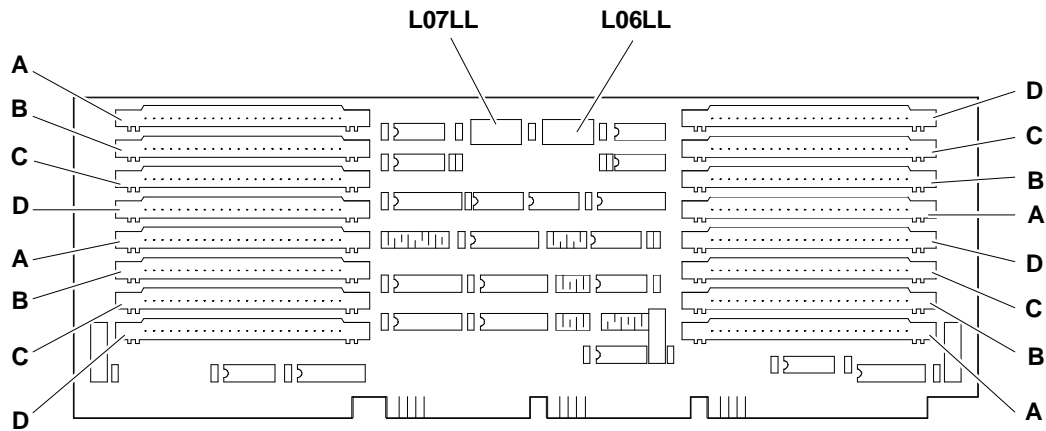
PAL LEVEL ON MEMORY EXPANSION BOARD

| 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

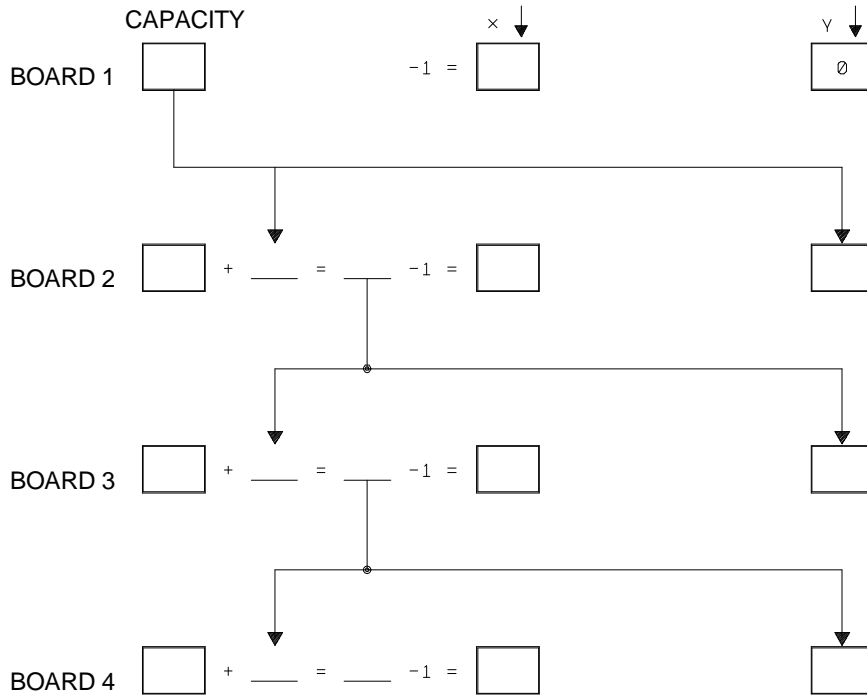


BDP8A

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 |

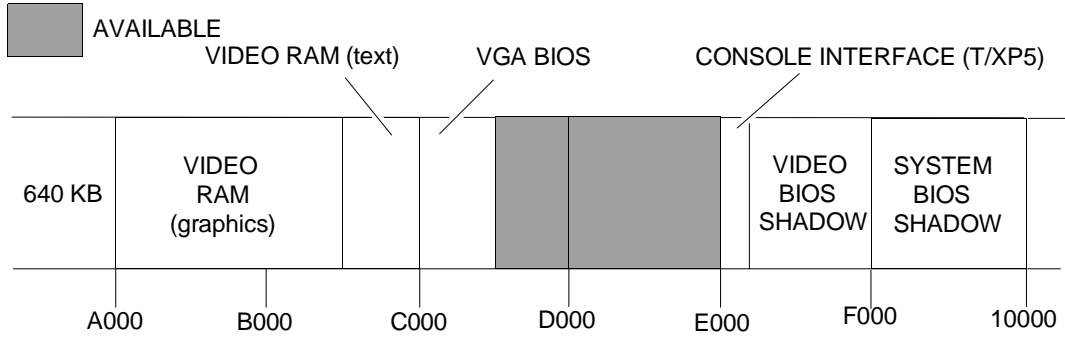
L06LL DIP-SWITCH (SWITCHES 1-4)

| 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

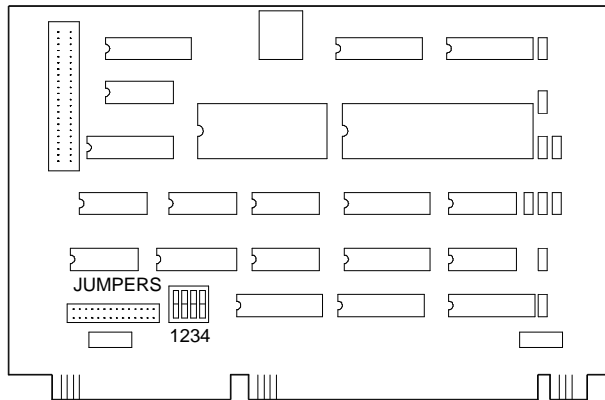
| LEVEL | FUNCTION | LEVEL | FUNCTION |
|-------|---------------------------------------|-------|---------------------------------|
| IRQ0 | Timer | IRQ8 | RTC |
| IRQ1 | Keyboard | IRQ9 | Redirected to IRQ2 via software |
| IRQ2 | Interrupt from interrupt controller 2 | IRQ10 | Available |
| IRQ3 | 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-CFFF |
| 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-DFFF |

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

| GRAPHICS PRODUCTS | EXPANSION MEMORIES |
|--|--|
| 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 |
| MODEM | MOUSE |
| 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) |
| I/O INTERFACE PRODUCTS | NETWORKS & LAN PRODUCTS |
| 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: EXM 25-885 - 4 SIMM 1 Mb x 9 100 ns Memory can be furtherly expanded via memory board MEM 25-886 - 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 | GO470 VGA compatible GO481 VGA compatible HGC 1281 MATROX installation kit |
| Hard Disk Floppy Disk Controller | GO733 (WD1007A-WA2) ESDI 1:1 GO535 (WD1007V-SE2) ESDI 1:1 GO565 (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 NOTE: 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

9

SYSTEM BOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | NOTES |
|--------------|---------|-------------|--|---|
| BA829 | Nasc. | 412589 N | ROM H: PBU5 Rev. 1.05 ROM L: PBU4 Rev. 1.05 | System board M380/XP4 and M380/XP7 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 | | ROM H: PBZ1 Rev. 1.07 ROM L: PBZ0 Rev. 1.07 | Permits use of multiport boards: <ul style="list-style-type: none"> - Mapped between 512 and 640 KB - Liable to problems from IOCHRDY signal - Using interrupt 12 - Using memory between 12 and 16 MB - Requiring CMOS input on BIRQ signals for interrupt handling |
| | Lev. 04 | | Rev. 1.07 | Cuts and wirings performed at the Subsidiary to correct: <ul style="list-style-type: none"> - Real time clock problems on startup circuit - Timing problems during DMA cycles |
| | 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 | ROM H: PBU5 Rev. 1.05 ROM L: PBU4 Rev. 1.05 | System board M380/XP7 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 | | ROM H: PBZ1 Rev. 1.07 ROM L: 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 | ROM H: PBZ1 ROM L: PBZ0 Rev. 1.07 | M380/XP9 motherboard | |
| | Lev. 01 | | | Code added for H template of 82C206 component | |
| | Lev. 02 | | | Cutting and trimming to eliminate: - Real time clock problems on startup circuit - Timing problems during DMA cycles | |
| | Lev. 03 | | | From this level on, changes are no longer implemented by factory but are run by field engineers. Solved Panic Error problem in UNIX environment. Replaced component 74F373 with 2 74AS373 | |
| | Lev. 04 | | | ROM H: PBZP ROM L: 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 |
|--------------|-----------|-------------|---|--|
| BA833 | Nasc. | 412665 Z | ROM H: PBZ1 ROM L: PBZ0 Rev. 1.07 | M380/XP9 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 | From this level on, changes are no longer implemented by factory but are run by field engineers. 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 | | ROM H: PBZP ROM L: 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 |
|--------------|---------|-------------|--|---|
| BA839 | Nasc. | | ROM H: PBZH1 ROM L: PBZ0 Rev. 1.07 | M380/XP9 motherboard |
| | Lev. 01 | | ROM H: PBZP ROM L: 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"> - 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. |

HARD DISK AND FLOPPY DISK CONTROLLERS

| CONTROLLER | CHARACTERISTICS | LEV. | NOTES |
|--|--|--|---|
| GO733 (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 |
| GO535 (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 |
| GO565 (M380/XP9) | Replaces the GO535 controller | | |

| INTEGRATED CONTROLLERS | INTEGRATED CONTROLLERS |
|---|--|
| 80386 CPU 80387 Coprocessor Weitek WLT 3126 Coprocessor 82385 Cache controller | 82C206 Peripherals controller 8742 Keyboard and mouse controller UART 16550 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 | | | | | | |

9

** 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 | | | | | |

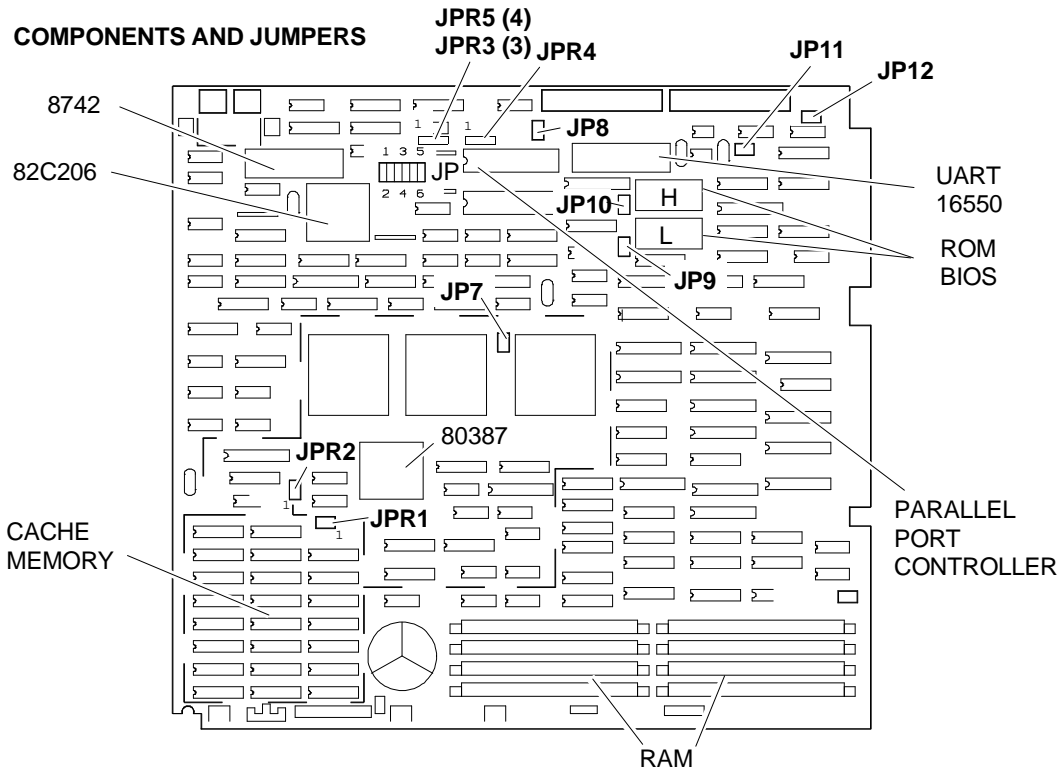
BOARDS

| 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"> - RAM management problems of CACHE in the presence of a Multiport board - Memory problems when using 512 - 640 KB paging - Interrupt 12 management | 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 GO535 and GO733 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 ₆ | COPROCESSOR CLOCK |
|-----------------|-----------------------|
| ON | External clock |
| OFF | System clock (normal) |

| JP ₅ | SYSTEM BOARD RAM ENABLE |
|-----------------|-------------------------|
| ON | Enabled (normal) |
| OFF | Not enabled |

| JP ₇ | 80386 OPERATING MODE |
|-----------------|-----------------------|
| ON | Pipeline |
| OFF | Non-Pipeline (normal) |

| JP ₁₁ | JP ₁₂ | RS232 COMPAT. |
|------------------|------------------|-----------------|
| OFF | OFF | COMPAQ (normal) |
| ON | ON | IBM |

| JP ₉ | JP ₁₀ | EPROM CAPACITY |
|-----------------|------------------|-----------------|
| ON | OFF | 256 KB (normal) |
| OFF | ON | 512 KB |

| JP ₈ | SERIAL PORT CLOCK |
|-----------------|-----------------------|
| ON | System clock (normal) |
| OFF | External clock |

| JP ₁ | JP ₂ | 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 ₃ | JP ₄ | 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

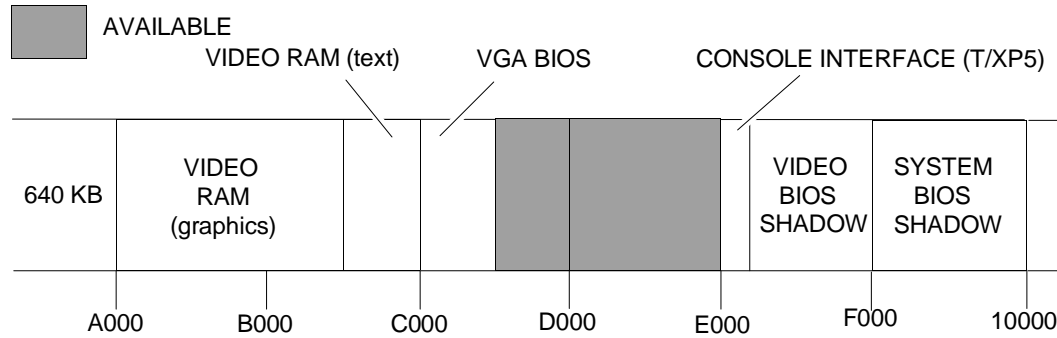
SOFTWARE COMPATIBILITY

| OPERATING SYSTEMS | NOTES |
|--|---|
| 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

| MODEMS | I/O INTERFACE PRODUCTS |
|--|---|
| 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 adapter 1505200 IBM Serial / Parallel card 6450215 National IEEE-488 card GPIB-PC. Rev.A |
| MEMORY EXPANSIONS | MOUSE |
| 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 |
| DISPLAY UNITS | NETWORKING & LAN PRODUCTS |
| 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 |
| GRAPHICS PRODUCTS | |
| 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

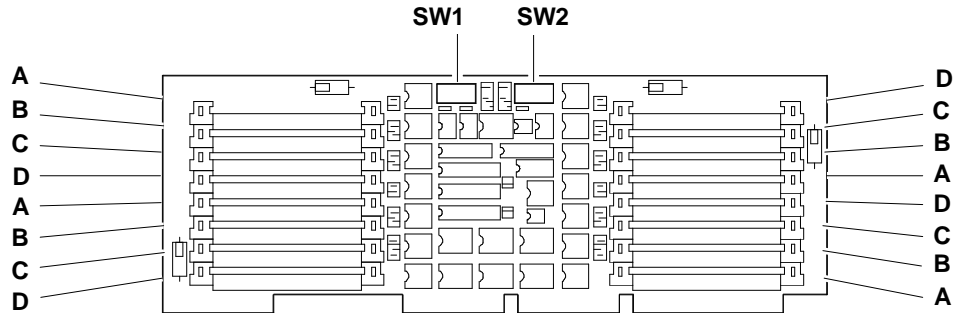
| PAGE 1 | | PAGE 2 | |
|------------------------|-----------------------------|------------------------------|------------------------|
| 1 Date | 7 Hard disk C | 1 System board serial port | 5 Scrolling type |
| 2 Time | 8 Hard disk D | 2 System board parallel port | 6 I/O delay |
| 3 Base memory size | 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

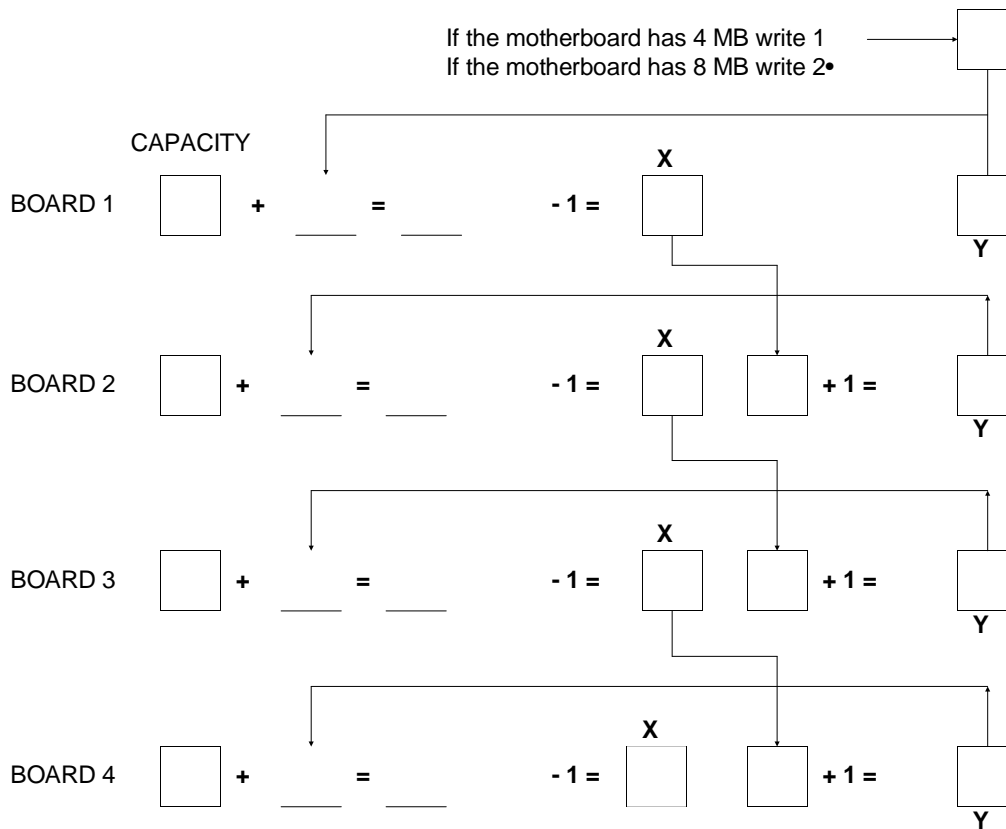


CONFIGURATION OF BOARD DIP-SWITCHES

| 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 |

9

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 | | | | | |
| | 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 | | | | | |
| | 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: SIMM of 286 Kb - 4 SIMM = 1 MB of memory SIMM of 1M x 9 - 2 SIMM = 2 MB of memory - 4 SIMM = 4 MB of memory - From 2 to 4 MB on memory expansion board AMB 2678 - motherboard memory can be expanded using the expansion kit EXM 26-502 (2 1Mx9 SIMMs) - The memory board can be expanded using the expansion kit EXM 25-852 (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 |

MOTHERBOARD

- 1) UC.097/093
- 2) UC.112/113

BIOS

Latest level:
 Rev. 1.10
 For the different versions see table:
Compatibility Notes

POWER SUPPLY

Hantarex 3613 B

VIDEO ADAPTER

GO481

MULTI-FUNCTION BOARD

GO477 Lev. 02 MI

EXPANSION BUS BOARD

IN 108
 8 slots: 5 AT and 3 XT

MOTHERBOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | NOTES |
|------------------|--------------|--------------------|-----------------|--|
| UC.097/09 | 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 | |
|----------------------------|---|------------------------|--|
| i386SX CPU | | 82335 | - Address map and decoder - DRAM controller - Parity check - Synchronisms - Reset circuit |
| 80387SX Coprocessor | | 82231 | - Timer 8254 - DMA 8237 (2) - 74LS612 Memory Mappers (2) - RAM logic refresh - DMA arbiter |
| 82230 | - 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 | | |
| PAL | See the System Board table | | |
| PGA | Parallel port controller | | |

10

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

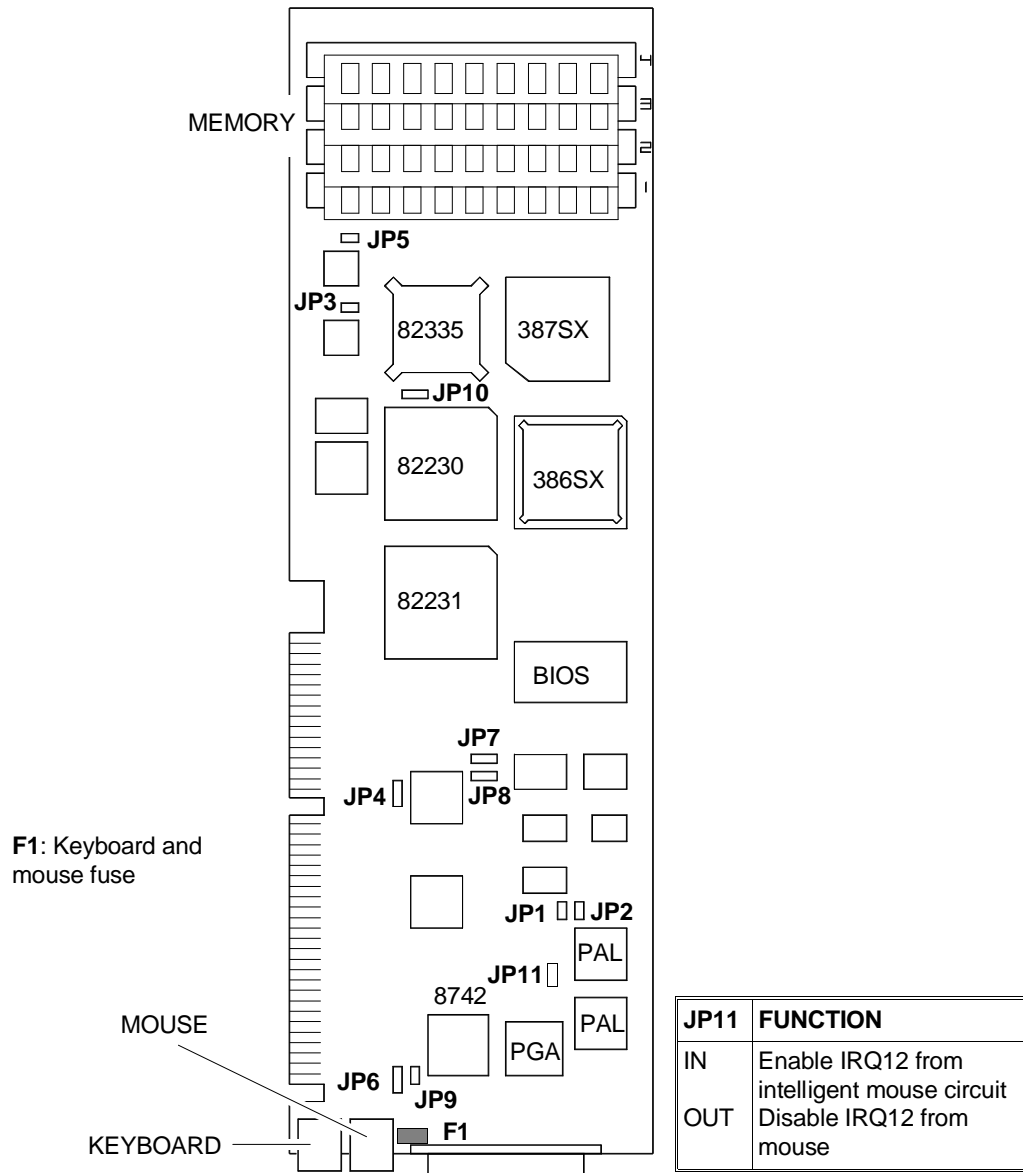
In this case: All system memory is extended memory.

| 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



10

| 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 |

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

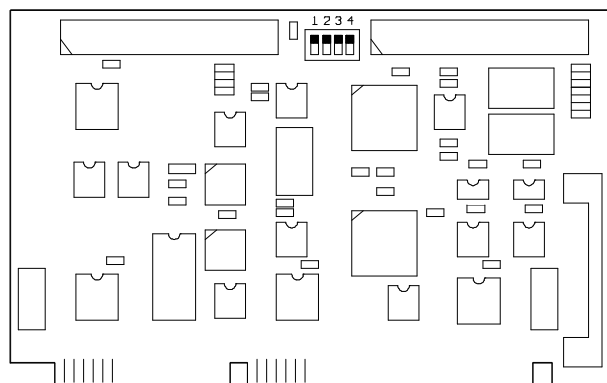
| JP3 - JP5 | FUNCTION |
|-----------|-------------------|
| IN | Always (normal) |
| OUT | Factory used only |

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

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

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

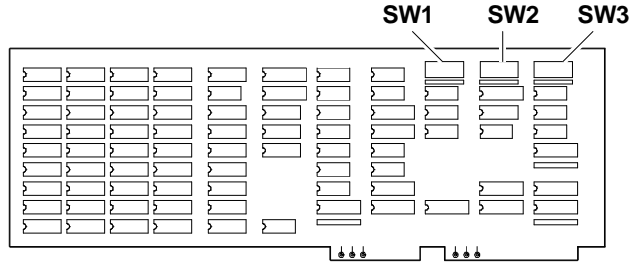
MULTI-FUNCTION BOARD GO477



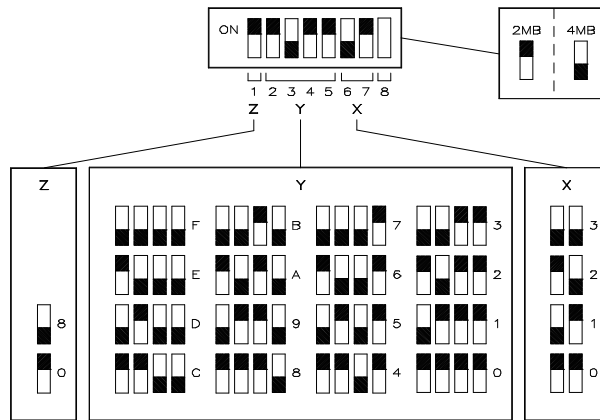
| SWITCH | POSITION | FUNCTION |
|--------|-----------|--|
| 1 | ON OFF | Disables the board Floppy Disk Controller Enables the board Floppy Disk Controller (normal) |
| 2 | ON OFF | Disables the system hard disk Enables the system hard disk (normal) |
| 3 | ON OFF | Disables the serial port Enables 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.

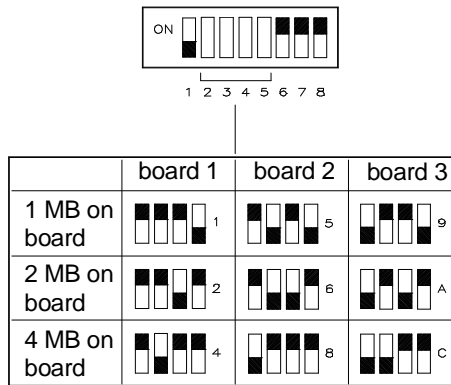
AMB 2678 MEMORY BOARD



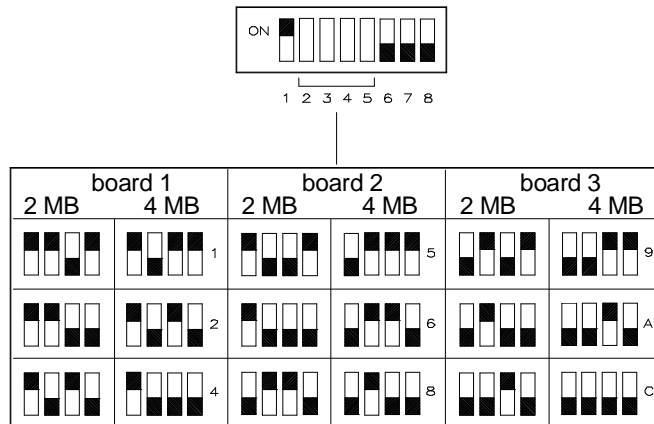
SW1
 XYZ: Selection of
 memory I/O addresses
 Normal address 120
 X = 1
 Y = 2
 Z = 0



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.



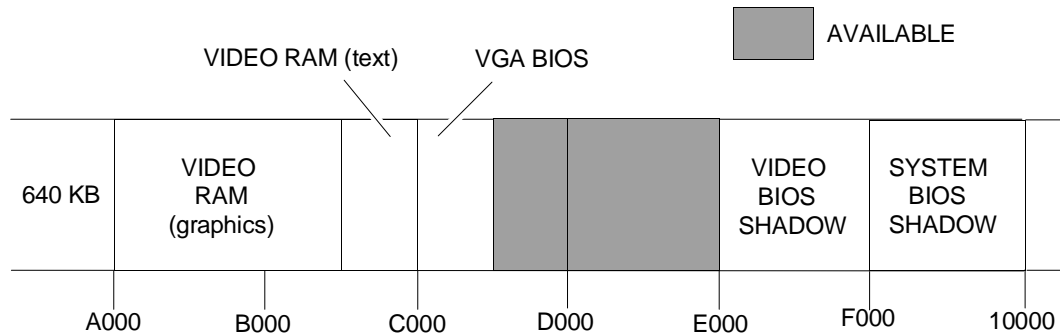
SOFTWARE COMPATIBILITY

| 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

| MODEM | I/O INTERFACE PRODUCTS |
|--|--|
| 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 | FUTURE DOMAIN HOST ADAPTER (MCS-350) IBM PS/2 Dual Async Adapter/A (6450347) |
| MEMORY EXPANSIONS | MOUSE |
| AST Rampage 286 RAMP286 AST Rampageplus 286 BOCARAM / ATPLUS INTEL Aboveboard plus 8 PCMB4525 | 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) |
| DISPLAY UNITS | NETWORKING & LAN PRODUCTS |
| 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 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 |
| GRAPHICS PRODUCTS | |
| 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 |

10

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

| ADDRESS | FUNCTION | ADDRESS | FUNCTION |
|----------------|---------------------------------|----------------|------------------------|
| 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 |

10

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: With 286 KB SIMMs Total memory on system board 1 MB not expandable. With 1 MB SIMMs - 2 banks of 2 MB on motherboard - 4 banks of 2 MB on expansion board MEM 26-503 - 4 banks of 2 MB on another memory board. Modules that can be installed in the memory banks are SIMM 1 MB x 9 EXM 26-502 |
| 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

11

SYSTEM BOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS |
|--------------|----------------------|--------------------|---|---|
| BA823 | 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. |
| | BA827 | - | | This board has evolved in the same way as BA823. |

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS |
|--------------|------------|-------------|--|---|
| BA242 | 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. |
| BA243 | - | | This board has evolved in the same way as BA242. | |

| INTEGRATED CONTROLLERS | INTEGRATED CONTROLLERS |
|---|---|
| i386SX CPU 80387SX Coprocessor 8272 Floppy disk Controller 8259A Two Interrupt Controllers 82308 MCA BUS Control Compatibility with the Microchannel BUS Support for 8 - 16 - or 32-bit data transfers 82307 DMA controller and Interrupt Arbiter 8 DMA channels Refresh generation for memory boards on BUS Interface between CPU and Coprocessor Decode of I/O device interrupts DMA controller 16550 Serial port controller MV146818 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 82306 Local Channel Support Controller Floppy Disk subsystem support I/O address decode 8254 compatible programmable timer System POS registers Registers for the system board functions NMI logic 8742 Keyboard controller PVGA1 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"> - Video test problems responsible for system crashes - The hard disk test problem which indicates test that has been passed even when the hard disk is not connected. |

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"> - System crashes during initialization of the mouse drive if the network password is enabled. The Keyboard controller can not accept the password - Problem with the Intel chip set during access to the system board port 107h. - Problem with the "Monitor detect routine" when the monitor is not present - Problem in hard disk initialization when an error is found in the configuration of the HD controller even when configured correctly - Problem in initialization of the IBM twin serial port board - Incorrect video management - System slow down caused by operation of Real Time Clock - System crash when the parallel port functions are used under Microsoft OS/2 and the ABIOS interface - ABIOS initialization problems |
| ROM BIOS 1.16 | Solves: Compatibility problems with standard VGA |
| ROM BIOS 1.18 | Solves: <ul style="list-style-type: none"> - PS/2 mouse faults - IBM 8514/A installation problems - Parity error when BUS is loaded with different boards - SW IBM 4700 problems in banking environment |
| 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 |

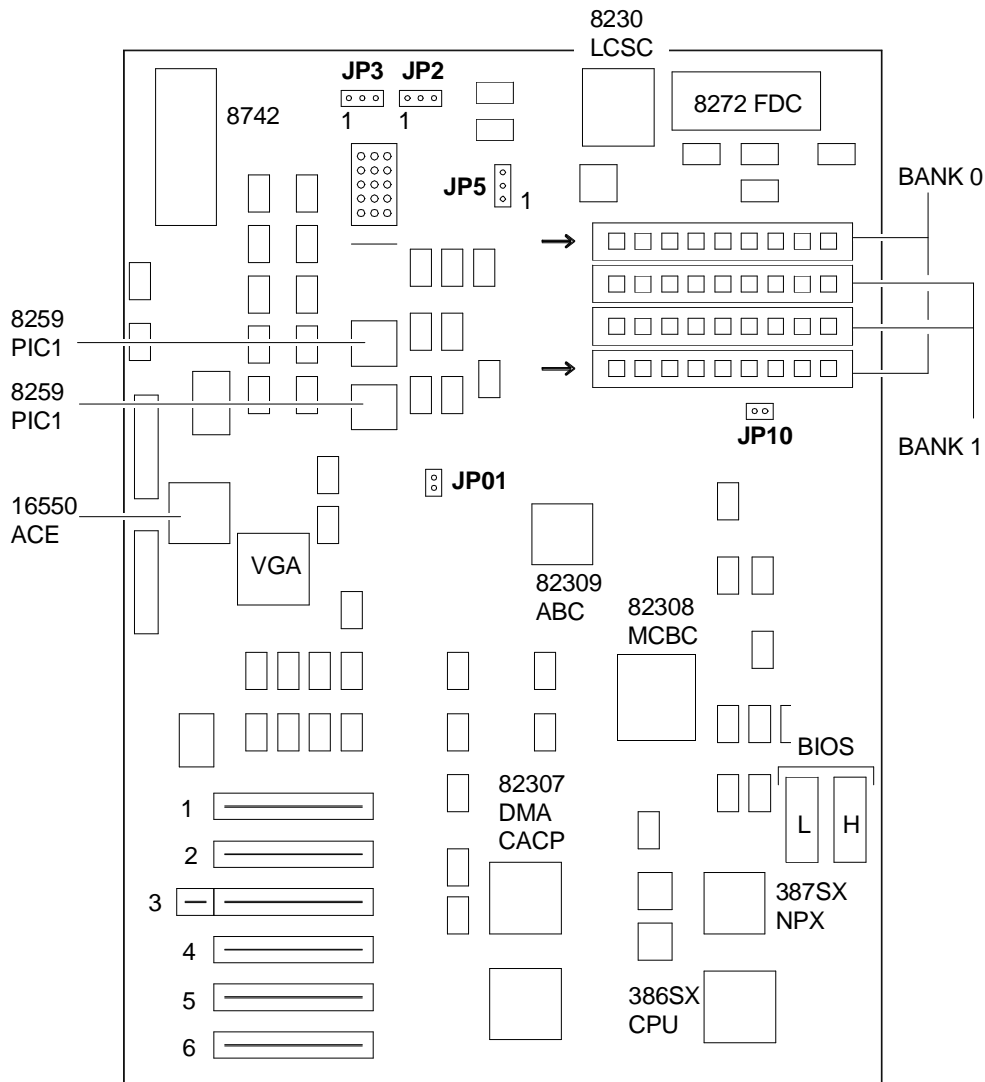
HARD DISK CONTROLLER

| | 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"> - Crashes in OS/2 ver. 1.10 environment with 2 units installed. - Incorrect management of accesses to alternative tracks. |
| | Lev. 0.1 | | Firmware Ver. 7.11-05 | Solves: <ul style="list-style-type: none"> - Incorrect management of installation of NOVEL Netware 286 v.2.15. - Impossibility of formatting a HDU with a Defect List with only one defect. - Incorrect management of read accesses to alternative sectors even with Retries disabled. |
| 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 |

P4.1 MOTHERBOARD COMPONENTS AND JUMPERS



11

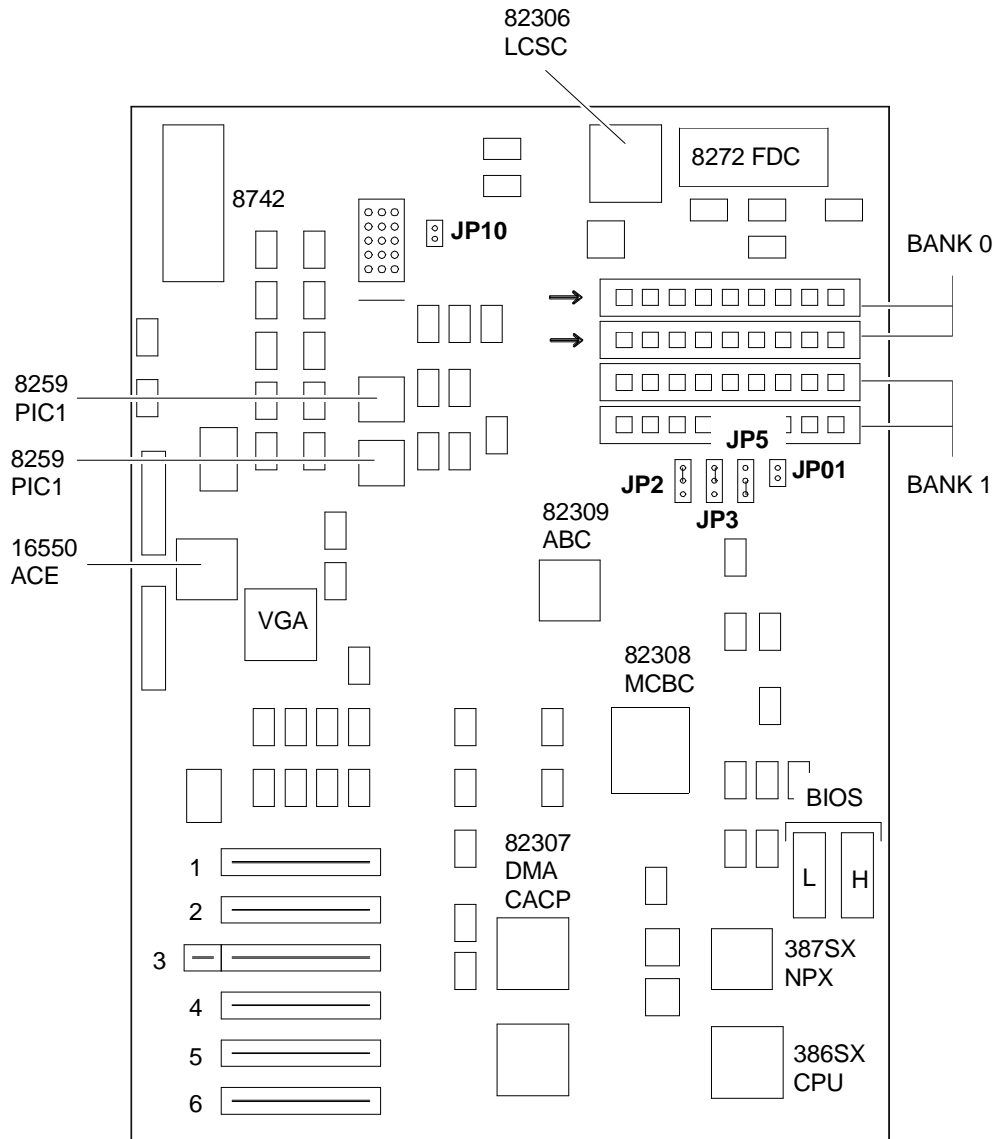
- JP01** **IN** One memory bank only installed (1MB SIMM) MEM 2 MB
OUT Two memory banks installed (4 246 Kb SIMMs or 4 1 MB SIMMs)
 1 or 4 MB memory

- JP2 & JP3** **Position 1-2** RAS 0 enable (bank 0)
Position 2-3 RAS 1 enable (bank 0 and bank 1)

- JP5** **Position 1-2** 1 MB SIMM Modules
Position 2-3 256 Kb SIMM Modules

- JP10** **IN** Disables the password at power-up
OUT Normal position

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

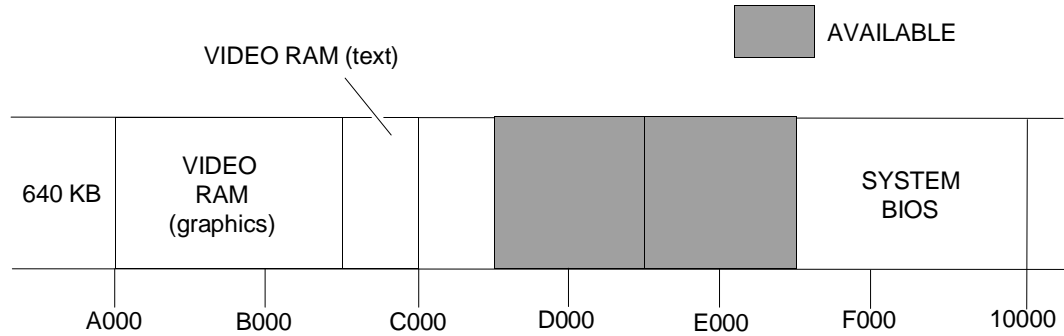
SOFTWARE COMPATIBILITY

| OPERATING SYSTEMS | NOTES |
|---|--|
| IBM DISK Operating System, Version 4.00 | During installation on hard disk, a formatted DSDD disk is required. |

HARDWARE COMPATIBILITY

| | |
|---|---|
| MODEMS | I/O INTERFACE PRODUCTS |
| Hayes Smartmodem 1200P Hayes Smartmodem 2400P IBM PS/2 300/1200 Internal Modem/A (6450349) | FUTURE DOMAIN HOST ADAPTER (MCS-350) IBM PS/2 Dual Async Adapter/A (6450347) |
| EXPANSION MEMORIES | MOUSE |
| IBM PS/2 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) |
| DISPLAY UNITS | NETWORKING & LAN PRODUCTS |
| IBM PS/2 Monochrome Display 8503 IBM PS/2 Color Display 8512 IBM PS/2 Color Display 8513 IBM PS/2 Color Display 8514 | IBM PC Network IBM PC Network (Baseband Adapter) IBM Token Ring Network Novell Network 3COM Network (Ethernet) 10NET Network |
| GRAPHICS PRODUCTS | OTHER PRODUCTS |
| IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller | SOFTWARE SECURITY Parallel Port Block |

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 | |

11

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"> - 2 banks of 4 MB on system board - 2 banks of 4 MB on expansion board MEM 26-804 - 2 banks of 4 MB on Proprietary memory MEM 26-806 Modules that can be installed in memory banks are SIMM 1 MB x 9 EXM 26-805 MEM 26-806 is a Proprietary memory expansion module of 4 MB expandable to 8 MB with SIMM module kit EXM 26-805 |
| 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 |
|--------------|---------------------------------------|-------------|---|---|
| BA826 | 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"> - Insertion of a PAL GL1G Rev. 2 Pos. U129 - Replacement of the PAL PLDM rev.1 with a PAL GL1H Rev. 2. Pos. U65 - Replacement of the PAL PLDJ rev. 3 with a PAL GL1J Rev. 4. Pos. U159 |
| | 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 |
|--|---|
| 82385 82C206 8042 82C451 16C552 WD57C65 CMOS RAM 82C226 82C231 MCA controller | 82C322 Memory Controller Supports 256 KB - 1M DRAM Shadow RAM Supports up to 16 MB Programming of wait states 82C325 Data Buffer Controller Bus Conversion and Bus Swapping function Generation and checking of parity errors in DRAM Contains POS register in MCA architecture 82C223 DMA Controller 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 |

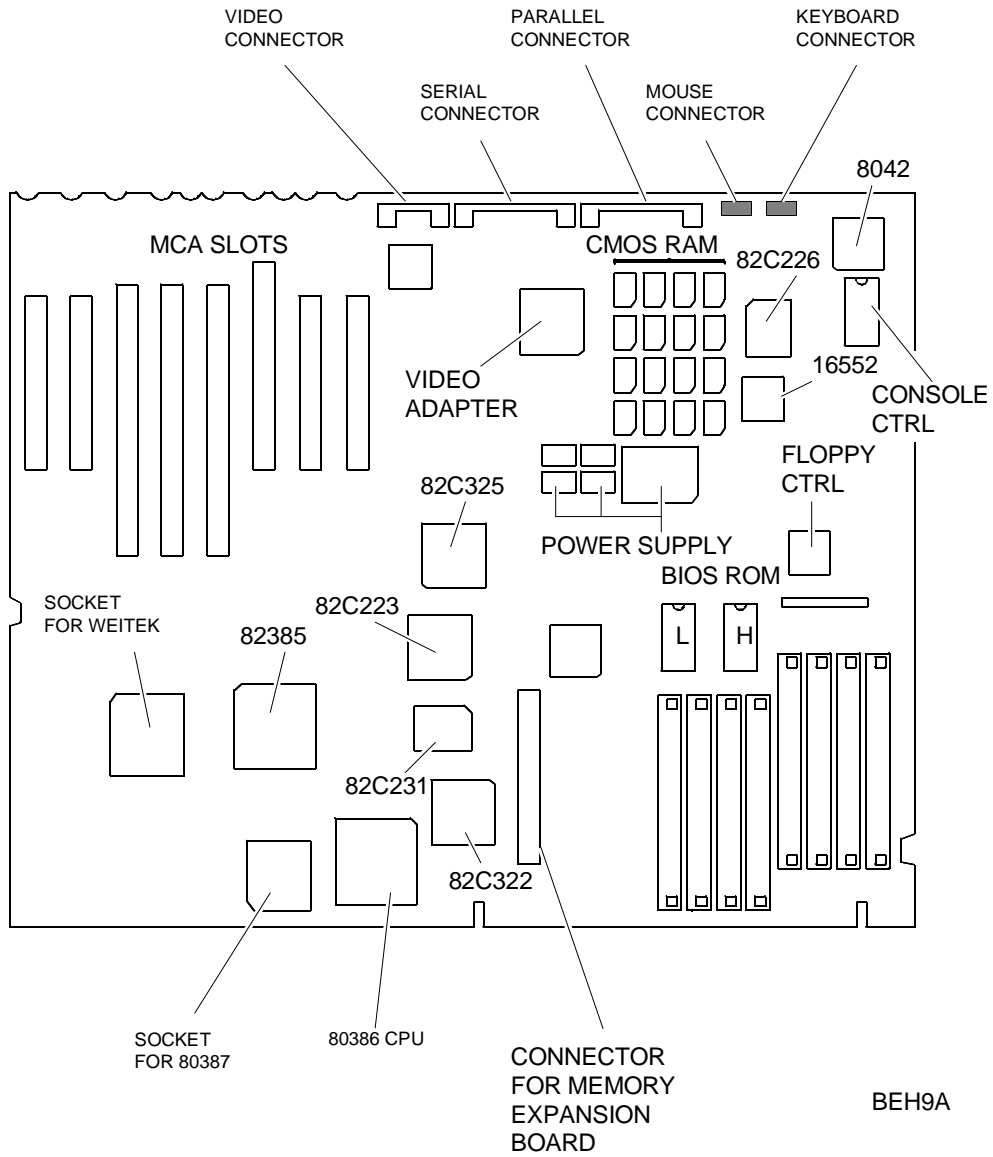
PS30C S.P.S.

| 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"> - Diagnostic problems - Messages on screen |
| ROM BIOS 1.05 | Solves: <ul style="list-style-type: none"> - Disables all memory banks (except for bank 0) when one is found faulty. - Error signalled during the "Parallel Port Test" when an Olivetti parallel printer is connected. - Control of hard disk controller ID during initialization |
| BIOS GO525 | Solves: <ul style="list-style-type: none"> - System crashes when working in OS/2 ver 1.1 with 2 units installed. - Incorrect management of access to the alternative tracks |
| 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

| OPERATING SYSTEMS | NOTES |
|--|--|
| 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

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

12

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 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

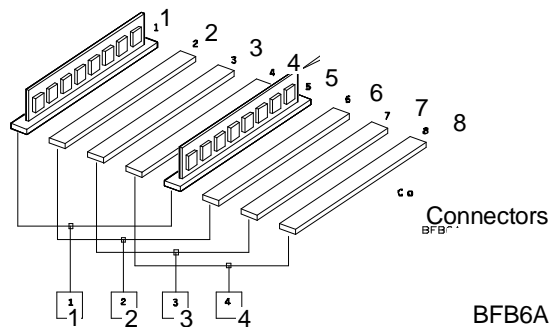
| | |
|--------------------------------------|---|
| Microprocessor | INTEL 80486 |
| Clock | 25 MHz |
| Architecture | 32-bit EISA (Extended Industry Standard Architecture) |
| Memory | 2 or 4 MB on system board expandable up to 16 MB by: EXM 26-482 2 SIMM 1 MB x 9 100 ns EXM 26-484 2 SIMM 2 MB x 9 100 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

13

SYSTEM BOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|---|--------------------|-------------|--|--|
| BA847 | 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. | | | | |
| BA847 | 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"> - Memory over 16 MB - Boot of 720 KB floppy drives - ADAPTEC EISA Controller - MYLEX SCSI Controller |
| 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"> - Support for more than 2 HDU - Support for several ESC-1 boards - Support for PEM - Support for telediagnostic board - Support for ESDI HDU |
| | 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"> - BOOT with non-formatted ESDI HDU - BOOT from diskless system - Compatibility |
| | 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"> - Allows introduction of step A2 of the EBC 82358 component replacing step A1 - Improved BCLK EISA BUS signal and EBC HCLKCPU signals - New BIOS to solve problems of the previous release <ul style="list-style-type: none"> - Memory over 16 MB - Boot of 720 KB floppy drives - ADAPTEC EISA Controller - MYLEX SCSI Controller |

INTEGRATED CONTROLLERS

| CONTROLLER | FUNCTION |
|------------------|---|
| 82537 ISP | DMA Controller Interrupt Controller 5 Timers I/O Ports |
| XL2865 | EEPROM Configuration |
| DS1287 | Real Time Clock/Timer |
| 8042/8742 | Keyboard and Mouse Controller |
| WD16C552 | Serial and Parallel Port Controller |
| 82358 EBC | 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 | KIT003-03 code 977732 S KIT003-04 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 | KIT003-01 code 977730 C KIT003-02 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 | KIT003-06 code 977803 T Composition: Material for BA847 change Material for GO738 change |
| BA847 Level 02/03 | GO738 Lev. 05 | KIT003-06 code 977800 C Composition: Material for BA847 change Material for GO738 change |

BA847 I/O DEVICES

| DEVICE | TYPE | LOCATION |
|--|-------------|-----------------|
| 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

| DEVICE | TYPE | LOCATION |
|--|-------------|-----------------|
| 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

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS |
|--------------|--------------|--------------------|---------------------------|--|
| G0734 | Lev. Nasc. | 412783 Q | PBZ2 Rev. 1.01 497534C | 82C452 super VGA RAM Video - 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. |
| G0739 | Lev. Nasc. | | PBZY Rev. 1.03 497461K | New printed circuit to remove cuts and wirings |

POWER SUPPLY UNITS

| POWER SUPPLY UNIT | LEVEL | NOTES |
|--------------------------|--------------|--|
| PS30 B 220/110 V | 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. |
| PS30 B 220 V only | 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) |
| PS30/B1 220/110 V | 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 |
|--------------|------------|-------------|---|--|
| G0736 | Lev. 0.1 | 412784 R | PPUA 497327L PPUB 497328U Rev. 1.10 | Processor 80186 - Local CPU BIMIC 82355 - EISA Bus Master controller 82077 - Floppy disk controller |
| | Lev. Nasc. | | PPUA 497327L PPUB 497328V Rev. 1.10 | 80186 CPU - Local CPU BIMIC 82355 - EISA Bus Master controller 82077 - Floppy disk controller |
| G0738 | 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 |
|--------------|------------|-------------|---|--|
| GO740 | 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 |

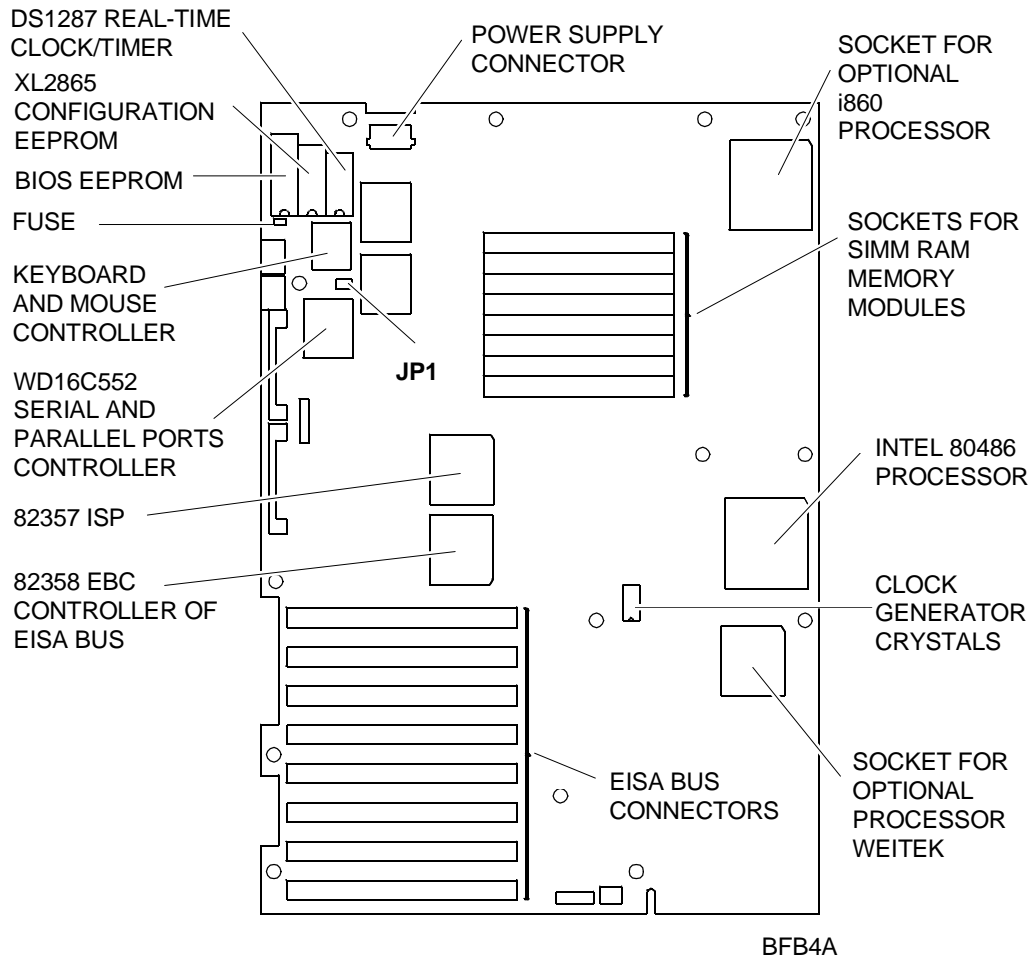
SYSTEM TEST

| 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

| BOARD OR HW/SW DEVICE | DESCRIPTION |
|--|---|
| 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"> - 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 |
| 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"> - COMPAQ compatibility - Hard disk IRQ13 problems - Power up selftest problems |
| 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

| 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 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 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) |
| GRAPHICS PRODUCTS | NETWORKING & 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) |

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 |

13

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 EXM 26-801 and 1M x 9 EXM 26-807 SIMM modules to expand memory to 10 MB Possibility of installing a 4 MB memory board expandable up to 8 MEM 26-806 . This board can be expanded using kit EXM 26-807 |
| 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 |
|--------------|------------|-------------|---|--|
| BA247 | Lev. Nasc. | 412907 | ROM L PEPY - U65 ROM H PEPX - U66 Rev. 1.04 | 82385 Cache controller 82C206 Non-volatile RAM NVRAM Real Time Clock RTC DMA controller Interrupt controller 8042 Keyboard and mouse controller 82C452 Super VGA video adapter 16C552 Serial port controller Parallel port controller DP8473 Floppy disk controller BCU Bus control unit DPU Data path unit MCU Memory control unit IOU 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 |
|--------------|--------------------------|-------------|---|--|
| BA255 | 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. |
| BA263 | 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 |

14

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 | | |

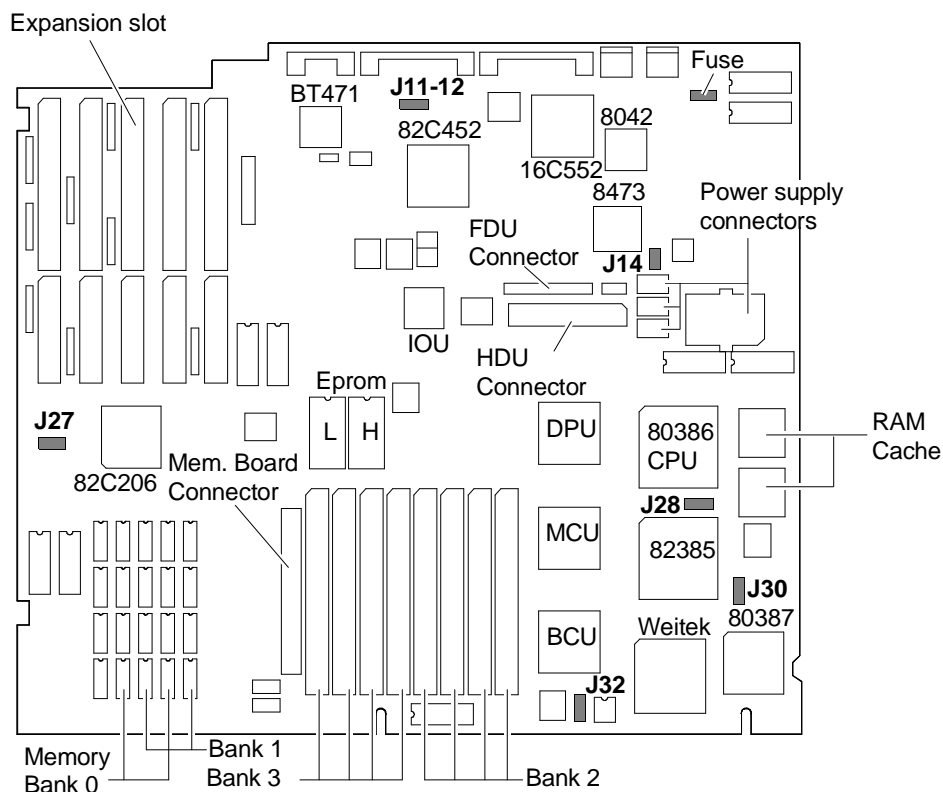
SOFTWARE COMPATIBILITY

| 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 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

| 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 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) |
| GRAPHICS PRODUCTS | NETWORK & 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 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 |
| 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



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

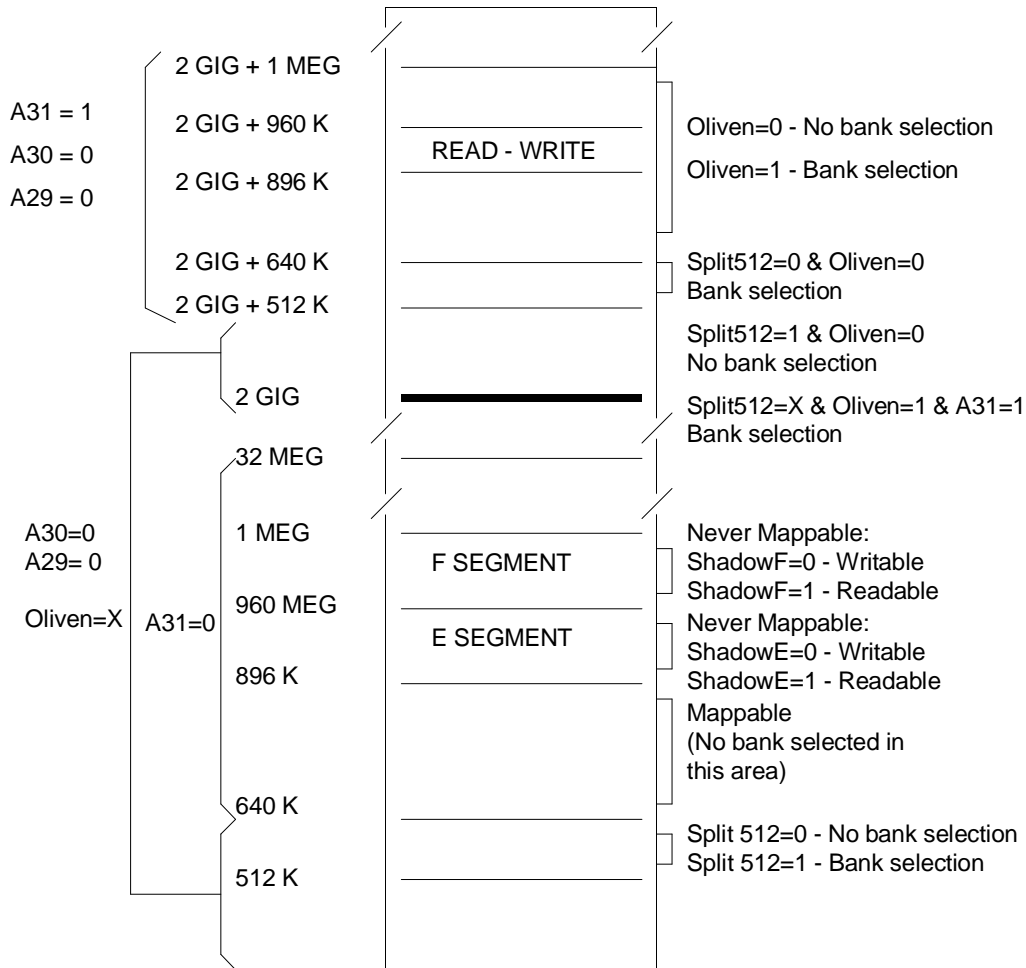
| ADDRESS | FUNCTION | ADDRESS | FUNCTION |
|------------|-------------------------------------|---------------|------------------------------|
| 000-01F h | DMA Controller (all channels) | 2F8-2FF h | Serial Port COM2 (alternate) |
| 020-021F h | Interrupt controller 1 | 378-37B h | Parallel port 1 |
| 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 |

14

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: - 2 MB on system board (8 SIMM 256 Kb x 9). Expandable only by replacing these SIMMs with those of 1 Mb x 9 EXM 26-807 - 4 MB on system board (4 SIMM 1 Mb x 9). Expandable by installing 4 more SIMMs 1 Mb x 9 EXM 26-807 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 EXM 26-807 . |
| 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

15

MOTHERBOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLER AND MODIFICATIONS |
|------------------|--|-------------|-------------------------------------|---|
| BA849 | 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 |
| BA558 | 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 | |
| BA880 | 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. | | | |
| New BA865 | 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 |
|--------------|------------|-------------|-------------------------------------|---|
| BA875 | 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>82C322 Memory Controller Supports 256 K - 1M DRAM Shadow RAM Supports up to 16 MB Programming of Wait states</p> <p>82C223 DMA Controller 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>8042 Keyboard and mouse controller 82C452 Super VGA Video adapter NS16550 A Serial port controller WD57C65 Floppy disk controller</p> | <p>82C325 Data Buffer Controller Bus Conversion and Bus Swapping function Generation and checking of parity errors in DRAM Contains POS registers in MCA architecture</p> <p>82C226 Non-volatile RAM Real Time Clock DMA controller Interrupt controller</p> <p>82C226 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>82C231 MCA controller 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

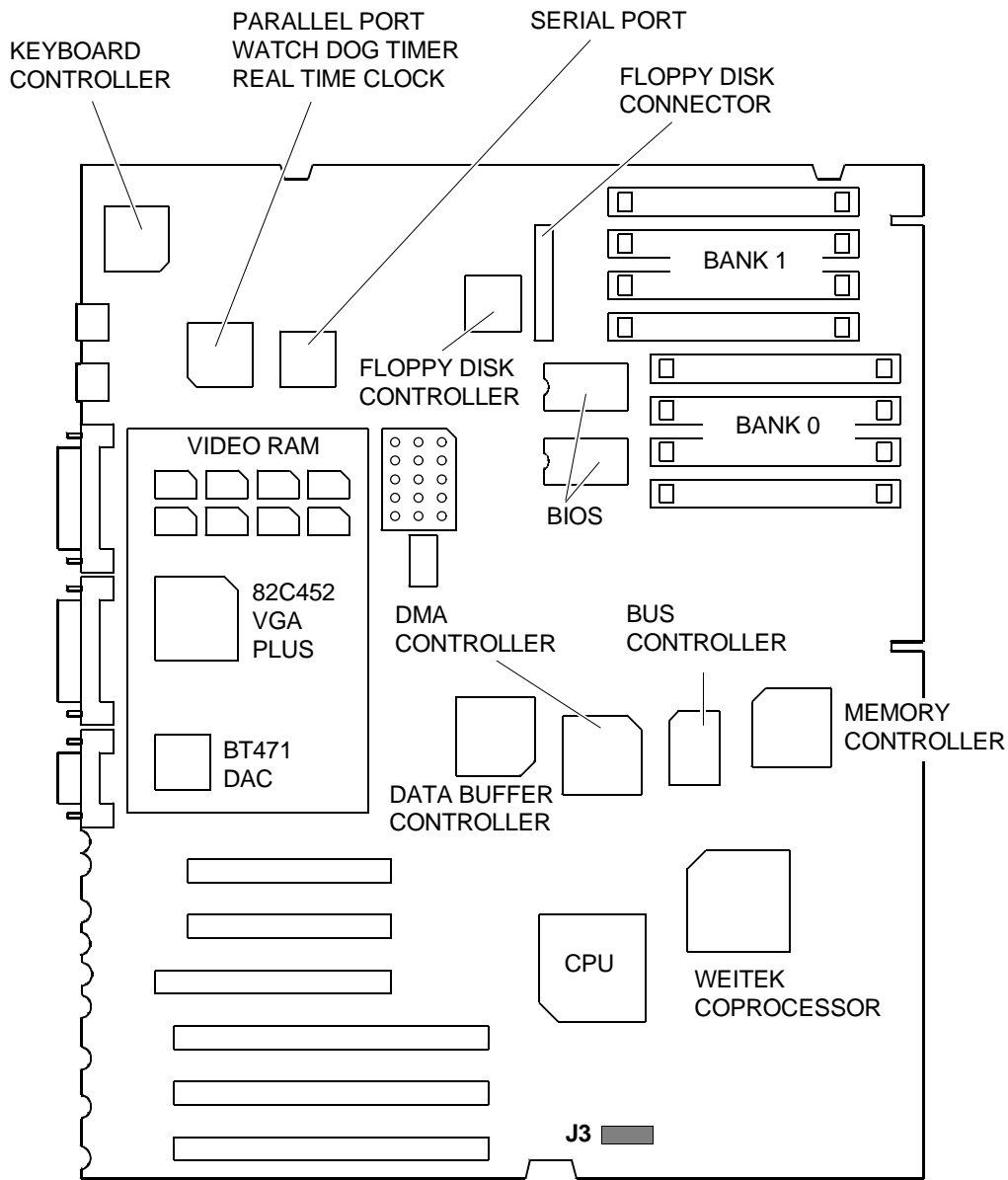
| POWER SUPPLY | LEVEL | NOTES |
|-----------------------------|--|---|
| PS14 Ver. 220 V HANTAREX | Lev. Nasc. Lev. 01 | Improved ventilation and electrical noise susceptibility. |
| | Lev. 02 | Introduced a mylar protection between L101 inductance and support for power supply unit compliance with safety 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. Lev. 01 | New supplier for this type of power supply. Same modifications as made to the 220 V version. |

15

MI549 HARD DISK INTERFACE

| LEVEL | NOTES |
|------------|-----------------------|
| 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

| OPERATING SYSTEMS | NOTES |
|---|--|
| 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

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

15

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 - 000FFFFFFF | 128 K | BIOS (SHADOW RAM) | YES |
| 00100000 - 007FFFFFFF | | System RAM | YES |
| 00800000 - 00FFFFFFF | | System RAM | YES |
| 01000000 - BFFFFFFF | | System RAM | YES |
| C0000000 - C1FFFFFFF | | Weitek Coprocessor | NO |
| C2000000 - DFFFFFFF | | System RAM | YES |
| E0000000 - FFFDFFFF | | System RAM | YES |
| FFFE0000 - FFFFFFFF | 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 | | | | | | |

15

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: EXM 26-482 2 MB - 2 SIMM 1 Mb x 9 EXM 26-484 4 MB - 2 SIMM 512 Kb x 36 EXM 6108 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

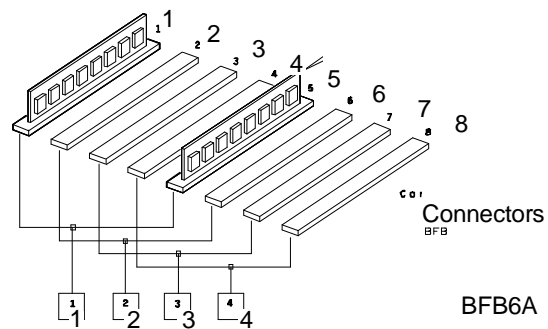
16

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

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|--------------|--------------|--------------------|-----------------------------|---|
| BA859 | 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 |
| BA860 | | 412932 D | | Same as BA859 but with a different 4 MB memory slice |

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|--------------|------------|-------------|---------------------------|---|
| BA867 | 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 |
| BA868 | | | | Same as BA867 but with a different 2 MB memory slice |

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|--------------|------------|-------------|--------------------------|--|
| BA882 | 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 |
|------------------|---|
| 82357 ISP | DMA Controller Interrupt Controller 5 Timers I/O Ports |
| XL2865 | EEPROM configuration |
| DS1287 | Real Time Clock/Timer |
| 8042/8742 | Keyboard and Mouse Controller |
| WD16C552 | Serial and Parallel Port Controller |
| 82358 EBC | 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 | KIT003-03 code 977732 S KIT003-05 code 977800 C Composition: Material for BA859/60 change Material for GO738 change |

16

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

| DEVICE | TYPE | LOCATION |
|--|-------------|-----------------|
| 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

| DEVICE | TYPE | LOCATION |
|--|-------------|-----------------|
| 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 |
|--------------|------------|-------------|---------------------------|--|
| G0734 | Lev. Nasc. | 412783 Q | PBZ2 Rev. 1.01 497534C | 82C452 super VGA RAM Video - 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 |
| G0739 | 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 |
|--------------|------------|-------------|---|---|
| G0738 | Lev. Nasc. | | PPUA 497327L PPUB 497328V Rev. 1.10 | Processor 80186 - Local CPU BIMIC 82355 - EISA Bus Master Controller 82077 - 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 |
|--------------|------------|-------------|---|---|
| GO740 | 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: - NOVELL DOS driver in AT mode - Problems on 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 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

| BOARD OR HW/SW DEVICE | DESCRIPTION |
|------------------------------|--|
| 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. |

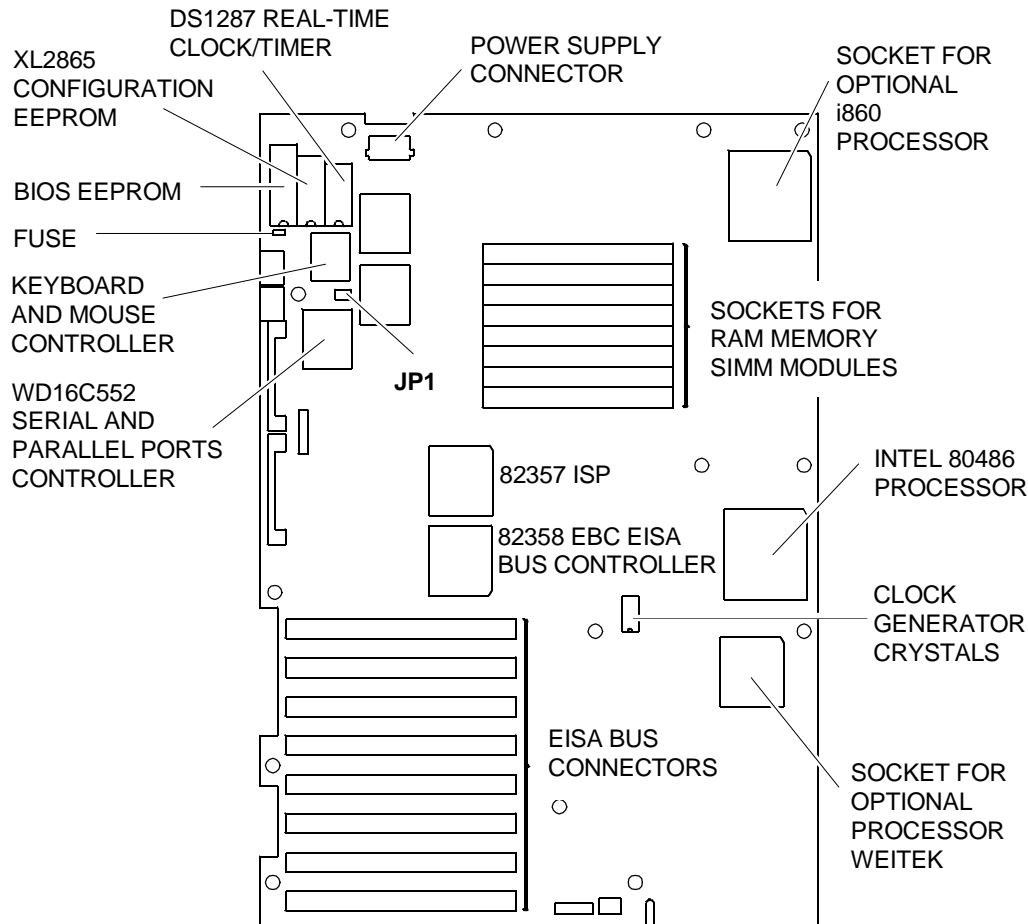
SOFTWARE COMPATIBILITY

| 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: EXM 26-482 2 MB - 2 SIMM 1 Mb x 9 EXM 26-484 4 MB - 2 SIMM 512 Kb x 36 EXM 6108 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 |

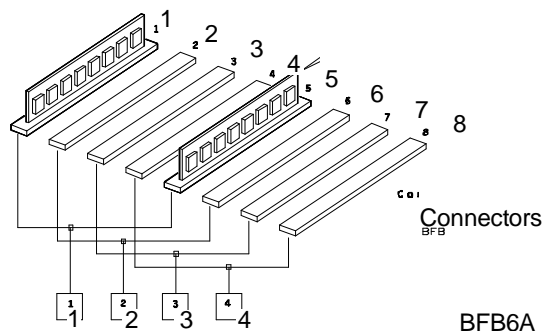
| |
|---|
| SYSTEM BOARD |
| BA859 P1.25 2 MB |
| BA860 P1.25 4 MB |
| BA868 P1.7 2 MB |
| BA869 P1.7 4 MB |
| BIOS |
| Rev. 2.03 |
| VIDEO ADAPTER |
| GO734 |
| GO739 |
| GO481 |
| HARD DISK - FLOPPY DISK CONTROLLER |
| GO740 |
| GO565 |
| POWER SUPPLY |
| PS20 A 220 V Level: 01 MI |
| PS20 A 110 V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

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|--------------|--------------|--------------------|-----------------------------|--|
| BA859 | 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 |
| BA860 | | 412932 D | | Same as BA859 but with 4 MB memory |

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|-------|-----------|-------------|---------------------------|--|
| BA867 | 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 |
| BA868 | | | | Same as BA867 but with a 2 MB memory |

INTEGRATED CONTROLLERS

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

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 | 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 |
|-------|------------|-------------|---------------------------|--|
| GO734 | Lev. Nasc. | 412783 Q | PBZ2 Rev. 1.01 497534C | 82C452 super VGA RAM Video - 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 |
| GO739 | Lev. Nasc. | | PBZV Rev. 1.03 497461K | Circuitry improvements |
| GO481 | Lev. Nasc. | | PDP5 - PDP7 Rev. 1.06 | ISA analog OVC video adapter board |

17

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 |
|--------------|------------|-------------|---|--|
| G0738 | Lev. Nasc. | | PPUA 497327L PPUB 497328V Rev. 1.10 | 0186 CPU - Local CPU BIMIC 82355 - EISA Bus Master controller 82077 - 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 |
|--------------|------------|-------------|---|--|
| GO740 | 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. |
| GO565 | 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

| BOARD OR HW/SW DEVICE | DESCRIPTION |
|------------------------------|---|
| 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. |

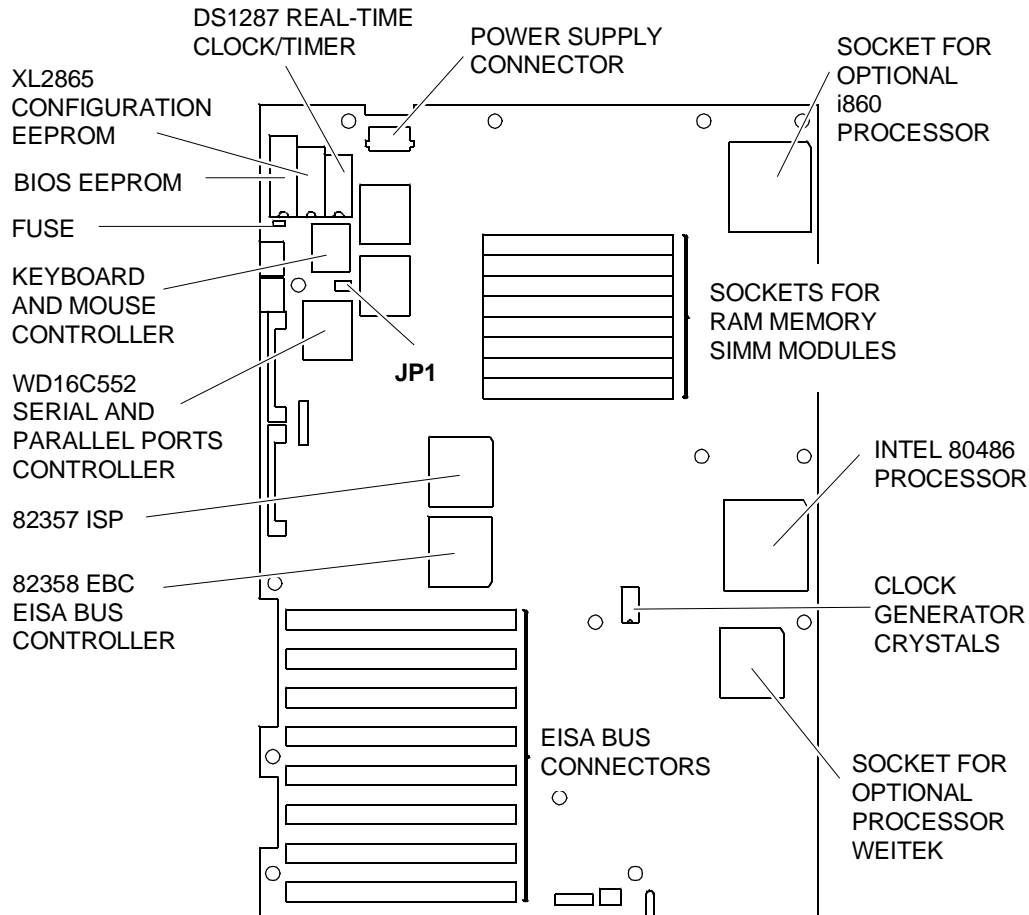
SOFTWARE COMPATIBILITY

| 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 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 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) |
| GRAPHICS ADAPTERS | 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 network 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

- 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

| 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 |



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 EXM 26-502 or 4 Mb x 9 EXM 26-809 or 1 Mb x 9 EXM 25-532 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

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|--------------|----------------------------------|--------------------|-----------------|---|
| BA267 | 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"> - AMD CPU alternative to the INTEL CPU - Component IPC82C206 alternative to the "Texas" component - W.D. 16C551 step C replaced by step D - 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 - New BIOS 1.06 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"> - AMD CPU alternative to the INTEL CPU - Component IPC82C206 alternative to the "Texas component" - W.D. 16C551 step C replaced by step D - 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 - New BIOS 1.06 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 |
|--------------|----------------------------------|-------------|----------------|---|
| BA274 | 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"> - AMD CPU alternative to the INTEL CPU - Component IPC82C206 alternative to the "Texas" component - W.D. 16C551 step C replaced by step D - 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 - New BIOS 1.06 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 |
|--------------|----------------------------------|-------------|-----------------------|--|
| BA288 | 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"> - New BIOS - Introduced TEXAS IPC 82C206 component in alternative to the C&T IPC 82C206. - The TEXAS component becomes the primary source and the C&T component the secondary source. - The WD16C551 Rev. C is replaced with WD16C551 Rev. D component. - Introduced AMD CPU in alternative to the Intel CPU |
| | Lev. 02 MI | | Rev. 1.06 PZCF | <ul style="list-style-type: none"> - New BIOS to handle keyboard password and System Password - Introduction of Keyboard Controller Revision 10.01 to handle these passwords. - To correctly handle these passwords use User Diskette Version 1.04 |
| | 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

| MOTERBOARD | INTEGRATED CONTROLLERS | |
|-------------------------|---|---|
| BA267 | 8742 PVGA1B 82C206 WD16C552 DP8473 MSI buffer NORD Gate Array SUD Gate Array | 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 BA274 BA288 | These boards have the same controllers as BA267 | |

BOARDS

| FUNCTION | DESCRIPTION | D.R.S. CODE | CHARACTERISTICS |
|--------------------|-------------|-------------|-----------------|
| 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

| LEVEL | COMPATIBILITY |
|--|--|
| 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"> - Management of Western Digital 40 MB and 120 MB hard disks - Management of keyboard Passwords introduced with new Keyboard controller Revision 10.01 - Management of System Password - Updating of message system |

SYSTEM TEST

| LEVEL | COMPATIBILITY |
|--------------|--|
| 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"> - The security features - New Keyboard Controller test to support releases 10.01 and later - Tables for management of W.D.40 MB and 120 MB hard disks |

COMPATIBILITY NOTES

| BOARD OR HW/SW DEVICE | DESCRIPTION |
|--|--|
| 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"> - Memory problems after POD - Incorrect initialization of POD for an eventual optional ROM - Loading problems of video parameters - Parallel port problems after a reset (CTRL-ALT-DEL) - Management of new hard disks |
| 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

| POWER SUPPLY | LEVEL | DESCRIPTION |
|---------------------|---|---|
| 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 | |

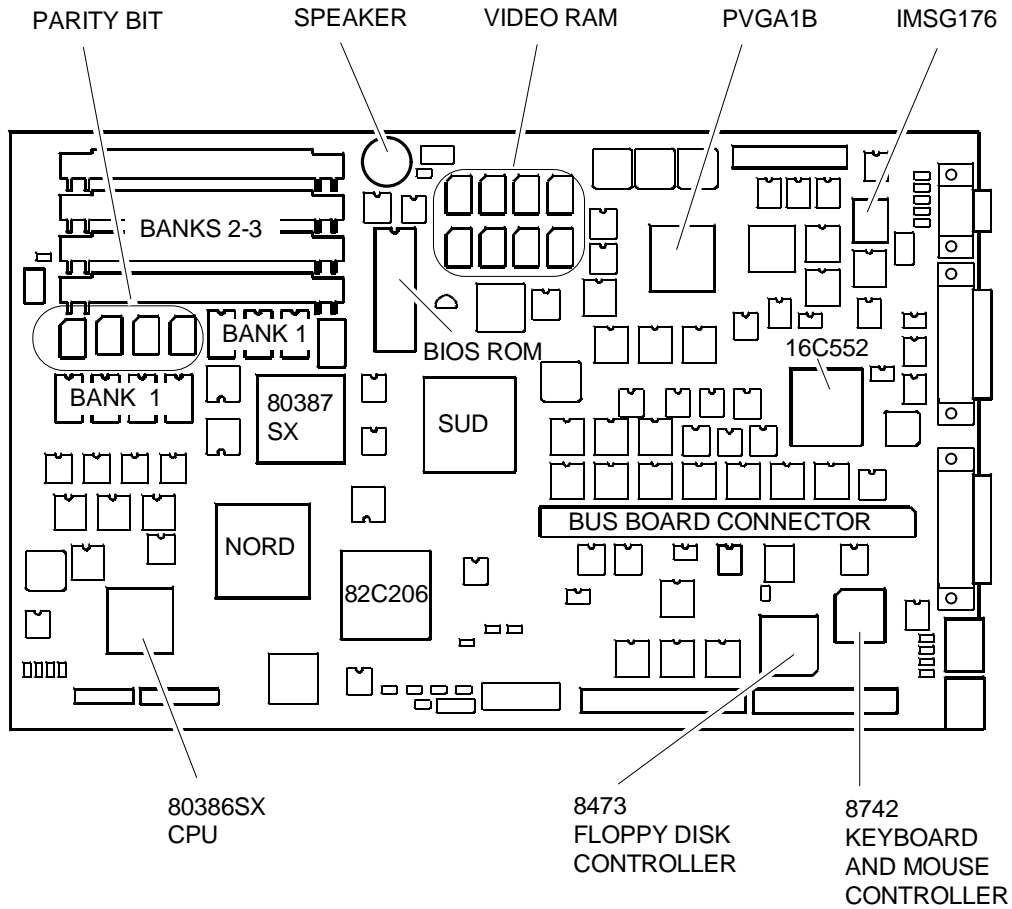
SOFTWARE COMPATIBILITY**18**

| 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. 1.10/1.20 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 |
| 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

| | |
|--|---|
| <p>MODEMS</p> <p>Hayes Smartmodem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 CEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smartmodem 1200 B</p> | <p>I/O INTERFACE PRODUCTS</p> <p>IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR</p> |
| <p>MULTIPOINT</p> <p>CHASE AT 8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8</p> | <p>MOUSE</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>GRAPHICS PRODUCTS</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>NETWORKING & LAN PRODUCTS</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>DISPLAY UNITS</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.

18

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 EXM 26-502 or 4 Mb x 9 EXM 26-809 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 |
|--------------|------------|-------------|----------------|---|
| BA250 | Lev. Nasc. | 412998 Q | Rev. 1.01 PZBA | 8742 Keyboard and Mouse controller PVGA1B VGA super video adapter 82C206 Non-volatile RAM Real Time Clock DMA controller Interrupt controller WD16C552 Serial and parallel port controller DP8473 Floppy disk controller MSI buffer Intelligent hard disk interface NORD Gate Array 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 SUD Gate Array DMA controller Data BUS controller Clock generator Parity control BUS controller Read/write logic decode Signal generation A20GATE 82385 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 |
| BA275 | Lev. 01 | | | 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"> - Introduction of Keyboard Controller Rev. 10.01 to handle Keyboard Password and System Password - New BIOS. To allow the correct management of these passwords and install new Western Digital hard disks - To correctly manage the passwords it is necessary to use version 1.02 upd 1 of User Diskette |
| | 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"> - New board for trimming recovering - Replaced sockets for SIMM modules to improve factory process and quality of system board - Management of Keyboard Passwords and System Password |
| | Lev. 01 | | | Rev. 1.06 PZCJ |
| | Lev. 02 | | Rev. 1.06 | <ul style="list-style-type: none"> - Cuts and trimmings made to allow introduction of the AMD 386SX processor as an alternative to the INTEL 386SX processor |
| BA303 | Lev. Nasc. | 553062 V | Rev. 1.06 PZCJ | Replaces BA 289. <ul style="list-style-type: none"> - Can use the INTEL CPU or AMD CPU irrespectively. - Can house a VL16C551 component in place of a WD16C551 component |
| | Lev. 01 | | | The 330pF capacitor in position C141 has been removed to contain costs. |

POWER SUPPLY UNIT

| POWER SUPPLY | LEVEL | DESCRIPTION |
|---------------------|--|--|
| 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 Lev. 02 Lev. 03 Lev. 04 | This power supply has evolved in the same way as the 220 V model. |

BOARDS

| FUNCTION | DESCRIPTION | D.R.S. CODE | CHARACTERISTICS |
|--------------------|--------------------|--------------------|------------------------|
| 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

| LEVEL | COMPATIBILITY |
|-----------------------------|--|
| Lev. 1.0 Lev. 1.01 upd 1 | Solves SETUP problems |
| Lev. 1.02 upd 1 | <ul style="list-style-type: none"> - Solves hard disk test malfunctioning - 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 - Corrects some errors in message system |

SYSTEM TEST

| LEVEL | COMPATIBILITY |
|-----------------------------|--|
| Lev. 1.0 Lev. 1.01 upd 1 | BIOS 1.00 |
| Lev. 1.02 | <ul style="list-style-type: none"> - 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 - Tables have been included for management of the Western Digital 40 MB, 120 MB and 210 MB hard disks |

COMPATIBILITY NOTES

| BOARD OR HW/SW DEVICE | DESCRIPTION |
|---|--|
| 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. |

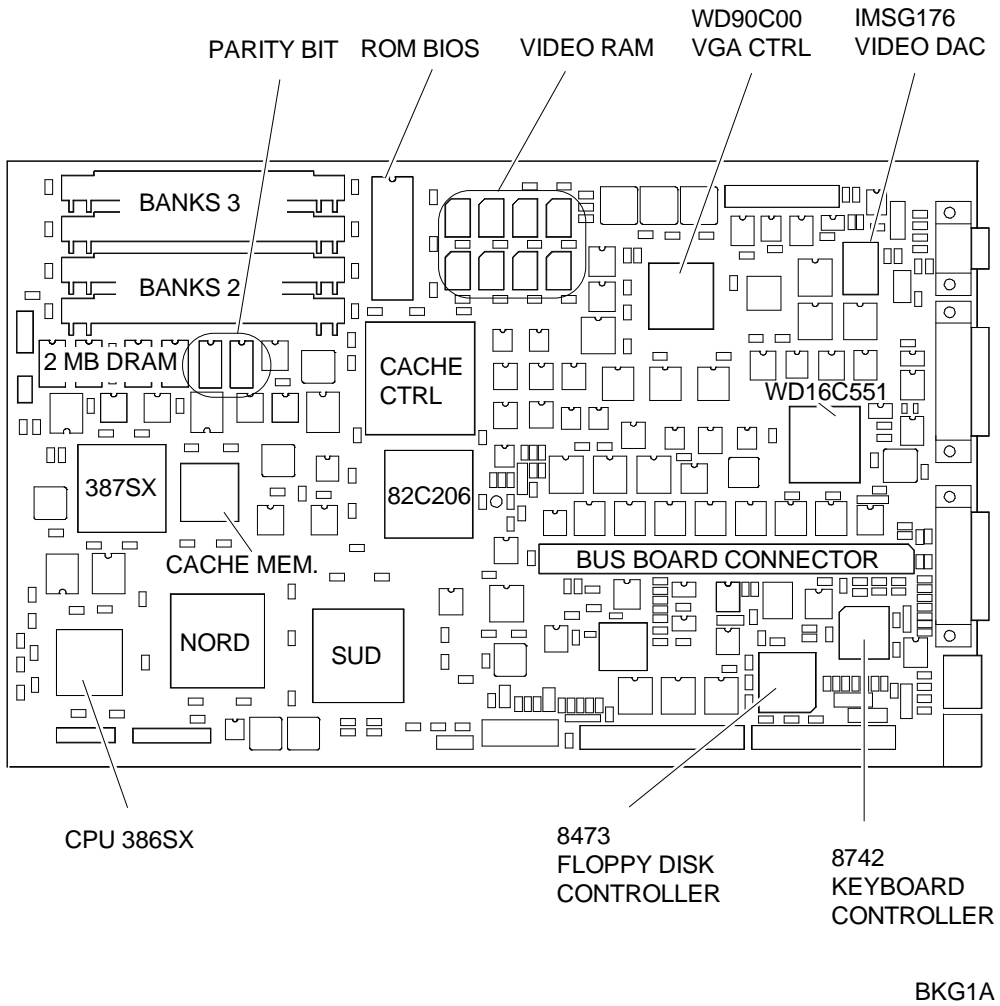
SOFTWARE COMPATIBILITY

| 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 | During installation on hard disk, a formatted DSDD disk is required. PS/2 mouse not recognised PS/2 mouse not recognised |
| WINDOWS | |
| DESEQ-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

| MODEMS | I/O INTERFACE PRODUCTS |
|--|--|
| 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 |
| MULTIPOINT | MOUSE |
| 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 |
| GRAPHICS PRODUCTS | NETWORKS & LAN PRODUCTS |
| 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 |
| DISPLAY UNITS | |
| 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 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 is 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 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 EXM 26-502 or 4 Mb x 9 EXM 26-809 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 | NCU 9142 (Ethernet) This board uses remote bootstrap EPROM RPL 3C503 ver. 1.5 NCU 9172 (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

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|--------------|----------------------------------|--------------------|-----------------|--|
| BA271 | 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: <ul style="list-style-type: none"> - 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 <ul style="list-style-type: none"> - 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 |
|--------------|----------------------------------|-------------|----------------|--|
| BA274 | 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"> - 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 features This release works only with BIOS 1.06 or later - New BIOS 1.06. 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 |
|--------------|----------------------------------|-------------|----------------|--|
| BA288 | 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"> - New BIOS - Introduced TEXAS IPC 82C206 component in alternative to C&T IPC 82C206. - The TEXAS component becomes the primary source and the C&T component the secondary source. - The WD16C551 Rev. C is replaced with WD16C551 Rev. D component. - AMD CPU alternative to the INTEL CPU |
| | Lev. 02 MI | | Rev. 1.06 PZCF | <ul style="list-style-type: none"> - New BIOS to handle keyboard password and System Password - Introduction of Keyboard Controller Revision 10.01 to handle these passwords. - To correctly handle these passwords use User Diskette Version 1.04 |
| | 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 | 8742 Keyboard and Mouse controller PVGA1B Super VGA video controller 82C206 Non-volatile RAM Real Time Clock DMA controller Interrupt controller WD16C552 Serial and parallel port controller DP8473 Floppy disk controller MSI buffer Intelligent hard disk interface NORD Gate Array 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 SUD Gate Array 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"> - Management of Western Digital 40 MB and 120 MB hard disks - Management of keyboard Passwords introduced with new Keyboard controller Revision 10.01 - Management of System Password - Updating of message system |

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"> - Memory problems after POD - Incorrect POD initialization of an optional ROM - Video parameters loading problems - Parallel port problems after a reset (CTRL-ALT-DEL) - Management of new hard disks |
| 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

| POWER SUPPLY | LEVEL | DESCRIPTION |
|---------------------|-----------------------|--|
| 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. 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 version |
| | Lev. 02 | |
| | Lev. 03 | |
| | Lev. 04 | |

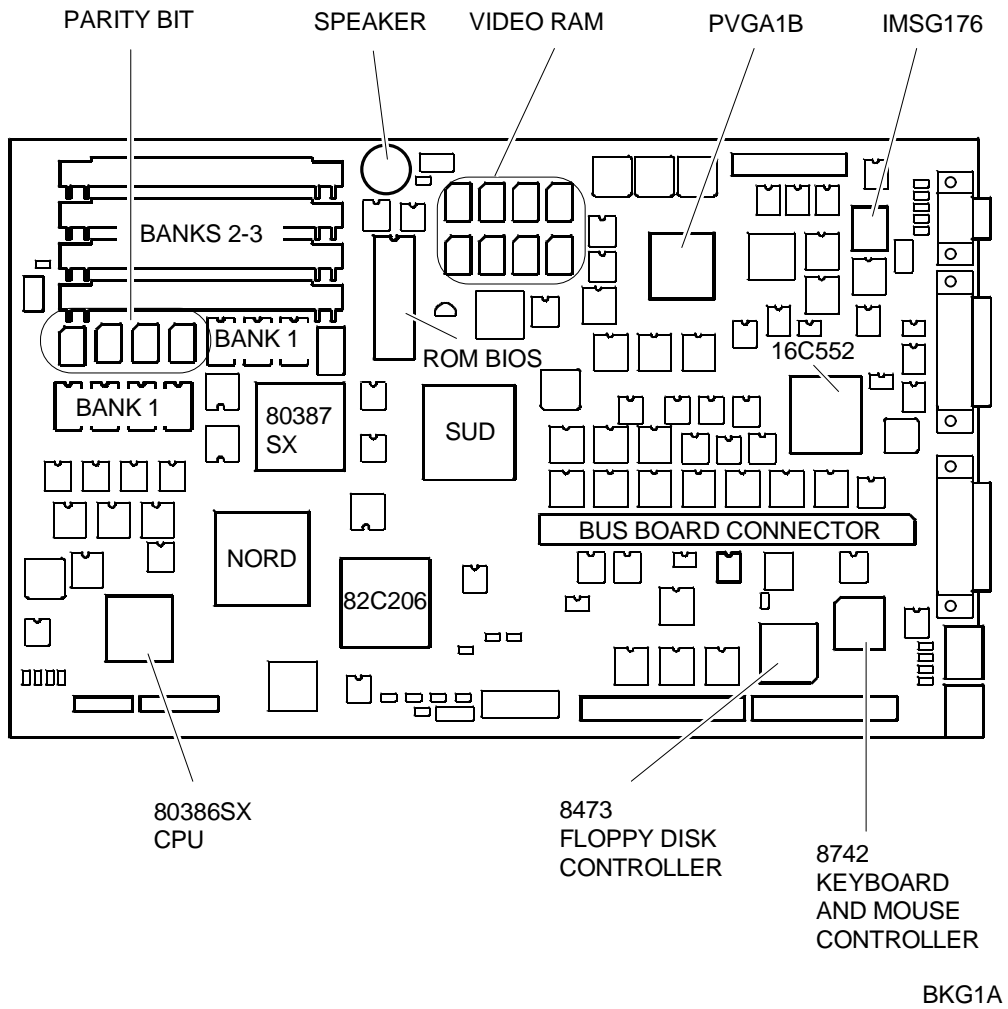
SOFTWARE COMPATIBILITY

| 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. 1.10/1.20 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 |
| 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

| | |
|--|---|
| <p>MODEMS</p> <p>Hayes Smartmodem 2400B FAXY PC MAXTER FURY 2400 PC MODEM AT&T 2224 CEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smartmodem 1200 B</p> | <p>I/O INTERFACE PRODUCTS</p> <p>IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR</p> |
| <p>MULTIPOINT</p> <p>CHASE AT 8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8</p> | <p>MOUSE</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>GRAPHICS PRODUCTS</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>NETWORKS & LAN PRODUCTS</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>DISPLAY UNITS</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"> - 1 bank of 4 MB soldered on motherboard (8 DRAM 1M x 4 chips+ 4 DRAM chips 1Mx1 parity) - 3 banks of 4 sockets each , where the following SIMM modules can be installed: <ul style="list-style-type: none"> - SIMM 256K x 9 EXM 26-801 - SIMM 1M x 9 EXM 26-807 - SIMM 4M x 9 EXM 26-809 <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>MOTHERBOARD</p> <p>BA 262</p> <p>BA 281</p> |
| <p>BIOS</p> <p>ROM BIOS is a FLASH EPROM. The BIOS Code is supplied on diskettes and must be copied into flash EPROM.</p> <p>Rel. 1.09</p> |
| <p>POWER SUPPLY</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>CONSOLE</p> <p>IF 469</p> |
| <p>BUS EXPANSION BOARD</p> <p>IN284</p> |

MOTHERBOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|--------------|------------|-------------|--|--|
| BA262 | Nasc. | | <p>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.</p> | <p>Intel 80386 Processor 82385 Cache controller Intel 80387 Optional coprocessor WTL 3167 Optional coprocessor 82C206 Real Time Clock RAM 128 KB with battery DMA controller Interrupt controller 8742 Keyboard controller 82C452 Video controllerr WD16C551 Serial port interface Parallel port interface 82077 Floppy disk controller CHIP SET BCUE I/O signal generation BUS timing control MCUE Memory logic controller DPU Data buffer Parity control 32- to 16-bit data conversion IOU Signal decode logic Chip select signal Open logic</p> |
| | Lev. 01 MI | | Lev. 1.00 | Solves EMI criticality with FCC/B rule |
| | Lev. 02 MI | | Lev. 1.03 | <ul style="list-style-type: none"> - 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 | <ul style="list-style-type: none"> - 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 |
|--------------|---------|-------------|-----------|---|
| BA281 | 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"> - Possible to replace 82C452 component with 82C452A component. They are alternatives. Board level does not change - Printed circuit modified to solve instability problems in the EM characteristics. The pcb changes to level 01 - TEXAS 82C206 component as alternative to C&T 82C206 component |
| | Lev. 03 | | Lev. 1.06 | <ul style="list-style-type: none"> - Replaced WD16C551 component mask C with WD16C551 component mask D - Sockets for the SIMM modules replaced to improve productivity - Keyboard controller 10.01 replaces the 8.00 keyboard controller which did not manage the security features and had problems with some software packages - 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) |
| | Lev. 04 | | Lev. 1.07 | <ul style="list-style-type: none"> - Printed circuit changed from 01 to 02 - New BIOS to solve the serial port FIFO reset problems, and 132-column video mode. This BIOS manages the HDU RDY/BSY signals. |
| | 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

| DEVICE BOARD | COMPATIBILITY |
|-----------------------------------|--|
| 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 |

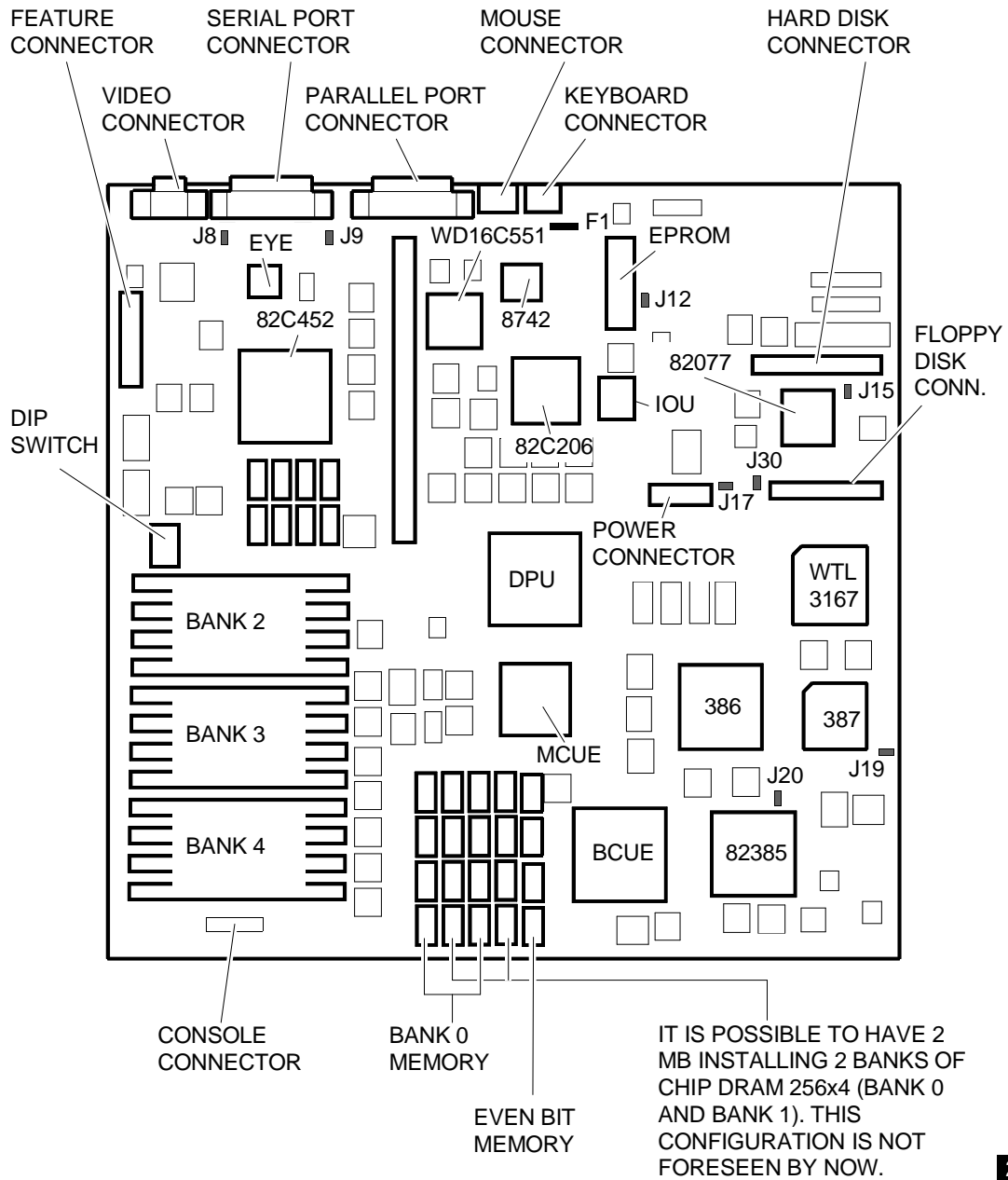
SOFTWARE COMPATIBILITY

| 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 |
| WINDOWS | |
| 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>MODEMS</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&T 2224 CEO modem</p> | <p>I/O INTERFACE PRODUCTS</p> <p>FUTURE DOMAIN HOST ADAPTER (TMC-830) IBM Asynchronous COM. CARD (1502074) IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL</p> |
| <p>MULTIPOINT</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>MOUSE</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>GRAPHICS PRODUCTS</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>NETWORKING & LAN PRODUCTS</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>DISPLAY UNITS</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>OTHER PRODUCTS</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

| 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 |
| 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

| SWITCH | POSITION | FUNCTION |
|---------------|-----------------|---|
| 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

| 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 |
| 081-08F h | DMA page registers | 3F0-3F7 h | Floppy disk controller |
| 0A0-0A1 h | Interrupt controller 2 | 3F8-3FF h | Serial port COM1 |
| 0C0-0DF h | DMA channels 4-7 | 46E8 h | VGA Control Registers |
| 1F0-1F8 h | Hard disk drive | 8000F0-8000FF | Coprocessor |
| 278-27B h | Parallel port 2 (alternate) | | |

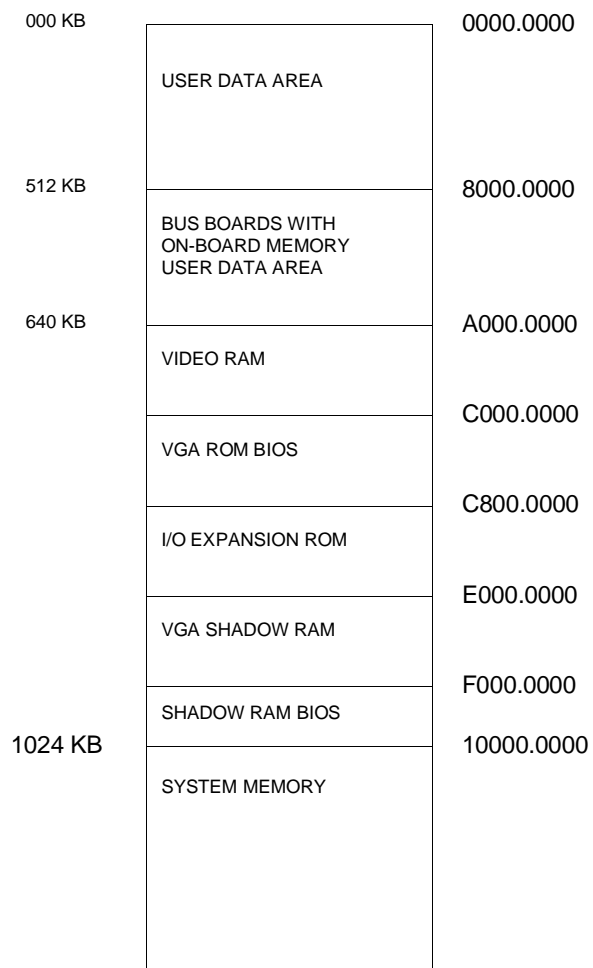
INTERRUPT LEVELS

| LEVEL | NAME | CONTROLLER | FUNCTION |
|--------|-------|------------|---|
| 1 | IRQ0 | 1 | Channel 0 timer OUT |
| 2 | IRQ1 | 1 | Keyboard |
| 3 - 10 | IRQ2 | 1 | Interrupt to 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 EXM 25-532 or 4 MB x 9 EXM 26-809 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
 PLESSEY

PS11A - 115 V
 PLESSEY

PS11A - 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 |
|--------------|------------|-------------|-----------|--|
| BA278 | Nasc. | 612301D | Rev. 1.09 | Intel 80286 Processor Intel 80287 Math coprocessor 27C010 ROM BIOS 8742 Keyboard and mouse controller WD90C11 Video adapter TOPCAT CHIP SET VL82C320 - Coprocessor interface - Shadow RAM - Programmable DRAM timing - Data buffer - BUS conversion cycle - EEMS handling support VL82C331 - Asynchronous DMA operations - Page address register - Timer - Interrupt controller - Refresh generation - Logic port A - Real Time Clock PC87310 NATIONAL - 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 |
| | 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

| BUS EXPANSION BOARD | LEVEL | D.R.S. CODE | NOTES |
|----------------------------|--------------|--------------------|---|
| 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

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

KEYBOARD AND MOUSE I/O BOARD

| BOARD NAME | LEVEL | D.R.S. CODE | NOTES |
|-------------------|--------------|--------------------|--------------|
| IF468 | Nasc. | 977928 X | |

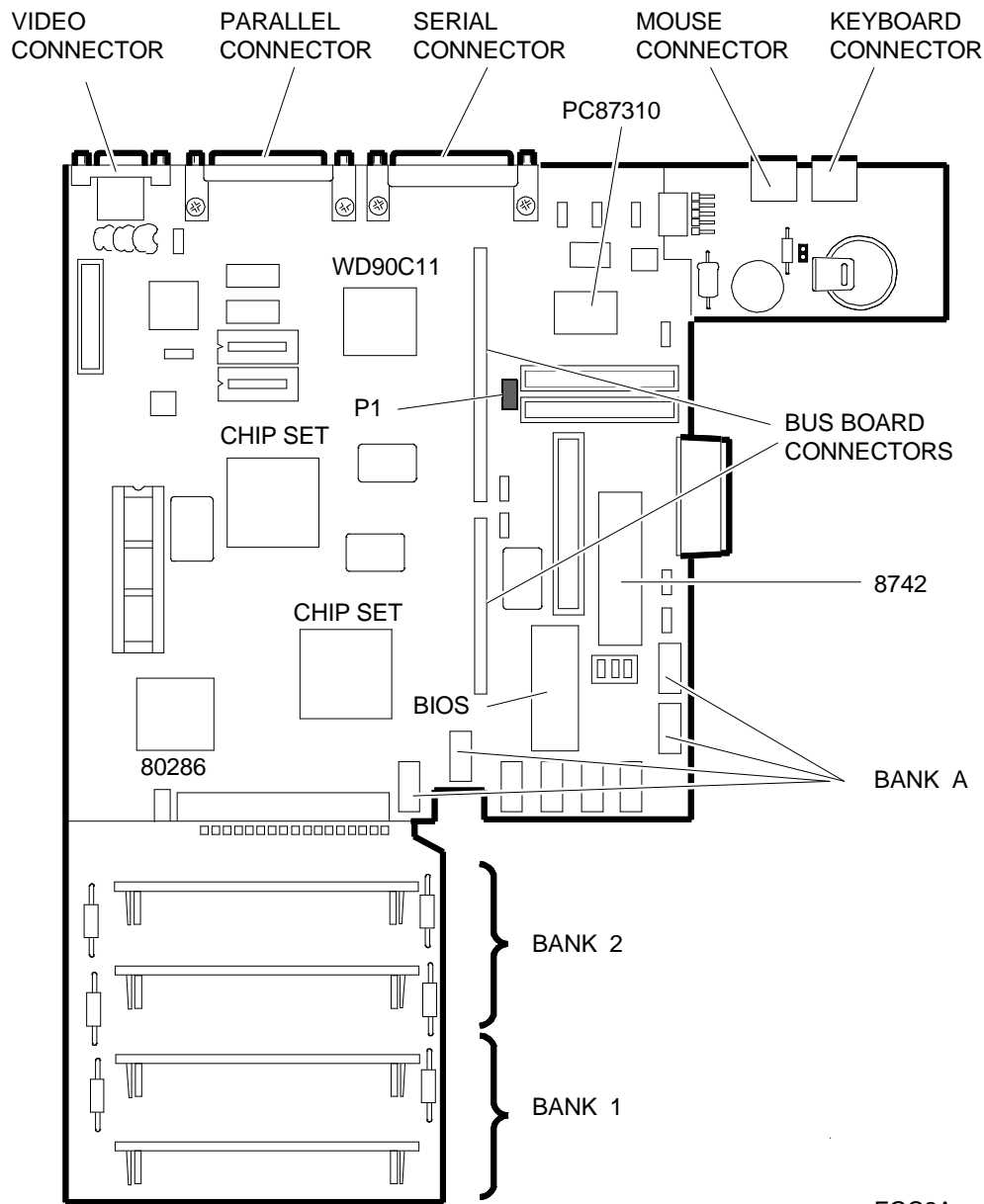
POWER SUPPLY UNIT

| POWER SUPPLY | LEVEL | DESCRIPTION |
|----------------------|------------------|---|
| 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

| LEVEL | COMPATIBILITY |
|--|----------------------|
| User Diskette Rel. 1.67 System Test Rel. 1.88 | |

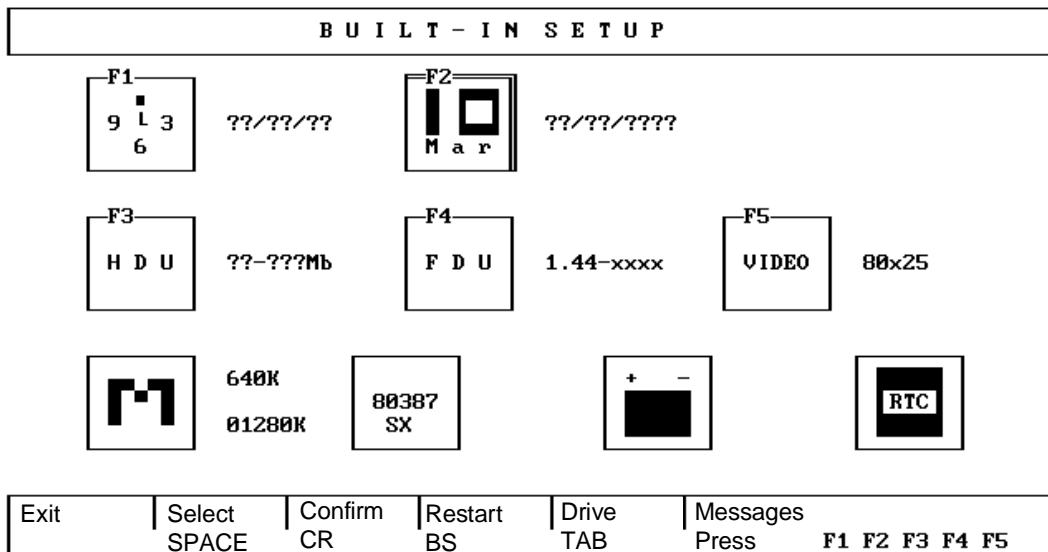
COMPONENTS AND JUMPERS ON THE MOTHERBOARD



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.

BUILT IN SETUP PROGRAM

When changing system configuration, or when installing the system for the first time, a BUILT IN SETUP screen will appear automatically at the end of Power On Diagnostics. This program is stored in ROM BIOS and allows the user to change some PC configuration parameters.



To change configuration parameters: press the function key which corresponds to the parameter to be changed (the function keys are indicated in the menu that appears on the screen). There are fields in which to insert values. Press space until the correct value appears. The following parameters can be changed:

- F1** Changes hour, minutes and seconds
- F2** Changes day, month and year
- F3** Changes hard disk type. When there are two hard disks, two fields are present. To move from one field to another, press the TAB key. The following table lists the hard disks that can be installed in the system:




| TYPE | MODEL | CAPACITY | CYL | T | SET | INT |
|------|-------------------|----------|------|---|-----|-----|
| 02 | Quantum LPS 53 AT | 40 MB | 1219 | 2 | 512 | 1 |
| | CONNER CP3046 | 40 MB | 1219 | 2 | 512 | 1 |
| | W.D. AC 140 | 40 MB | 1219 | 2 | 512 | 1 |
| 05 | W.D. AC 2120 | 120 MB | 1524 | 4 | 512 | 1 |
| | CONNER CP30126 | 120 NB | 1524 | 4 | 512 | 1 |

Where: CYL: No. of disk cylinders T: No. of disk heads
 SET: No. of disk sectors INT: Interleave factor.

- F4** Changes floppy disk type. When there are two floppy disks, two fields are present. To move from one field to another, press the TAB key
- F5** Changes video format at system power on

Another four icons are displayed for user information only:

Indicates that memory size has been changed

-  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>H DU</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>F DU</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>V DU</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; margin-bottom: 10px;"> <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

| 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 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 |
| 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

| | |
|---|--|
| <p>MODEMS</p> <p>HAYES SMARTMODEM (1200B) QUADRAM QUADMODEM II (QM2024) TELENETICS EXPRESSDATA 24i (24i-12i) VEN-TEL PC MODEM HALF-CARD (PCM XT) AT&T 2200 SERIES MODEM (2224-CD0) HAYES SMARTMODEM 1200</p> | <p>MEMORY EXPANSIONS</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>DISPLAY UNITS</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>MOUSE</p> <p>AT&T BUS MOUSE (459420) LOGITECH BUS MOUSE (P7-3F) MICROSOFT BUS MOUSE, REV. C MICROSOFT SERIAL MOUSE MOUSE SYSTEMS PC MOUSE (M1)</p> |
| <p>NETWORKING & LAN PRODUCTS</p> <p>AT&T STARLAN NETWORK IBM PC NETWORK IBM TOKEN RING NETWORK NOVELL NETWORK 3COM NETWORK</p> | <p>I/O INTERFACE PRODUCTS</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>GRAPHICS PRODUCTS</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 EXM 25-532 (2 SIMMs = 2 MB) - SIMM 4 Mb x 9 EXM 26-809 (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 | MEM 26-503 - 2 MB memory board expandable to 8 MB by SIMM modules 1 Mb x 9 EXM 25-502 |
| 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

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|--|--------------|--------------------|-----------------|---|
| BA856 | 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"> - 35 ns PAL GLBS 16R4 replaced by the 15 ns PAL GKCH 16R4. - Vcc and GND 10 mF filter capacitors replaced |
| | Lev. 04 | | | <ul style="list-style-type: none"> - Floppy disk controller 82077AA-1 is replaced by 82077SL and therefore the capacitor in position C47 is removed. - 80386 step C CPU is replaced by the 80386 step D CPU. - Component 16C552 mask C is replaced by the same component mask D. |
| | 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 |
|--------------|------------|-------------|-----------|---|
| BA888 | 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"> - 35 ns PAL GLBS 16R4 replaced by the 15 ns PAL GKCH 16R4. - Vcc and GND 10 mF filter capacitors replaced |
| | Lev. 04 | | Rev. 1.03 | - New BIOS to solve the problems with the 120 MB hard disk during system configuration. |
| | Lev. 05 | | Rev. 1.03 | <ul style="list-style-type: none"> - Floppy disk controller 82077AA-1 is replaced by 82077SL-1 and therefore the capacitor in position C47 is removed. - 80386 step C CPU is replaced by the 80386 step D CPU. |
| | 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 |
|-------|---------|-------------|-----------|--|
| BA889 | 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"> - 35 ns PAL GLBS 16R4 replaced by the 15 ns PAL GKCH 16R4. - Vcc and GND 10 mF filter capacitors replaced |
| | Lev. 04 | | Rev. 1.03 | <ul style="list-style-type: none"> - New BIOS to solve the problems with the 120 MB hard disk during system configuration. |
| | Lev. 05 | | Rev. 1.03 | <ul style="list-style-type: none"> - Floppy disk controller 82077AA-1 is replaced by 82077SL-1 and therefore the capacitor in position C47 is removed. - 80386 step C CPU is replaced by the 80386 step D CPU. - Component 16C552 mask C is replaced by the mask D version. |
| | 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 | |
|------------------------|---|------------------------|--|
| i386 | 20 MHz CPU | QFP132 | - Gate array implementing |
| i387 | 20 MHz math coprocessor | ASIC ADB | Addressing Buffers and data Buffers |
| DS1287 | - 128 KB non volatile RAM powered by internal lithium battery | | - Implements swapping function between 16 and 8 bits |
| | - Real Time Clock | 82303 | - Local I/O support |
| | - DMA controller | | - Implements the SETUP registers |
| | - Interrupt controller | | - Interfaces peripherals and bus |
| 8742 | Keyboard and mouse controller | 82307 | - DMA controller |
| LM386 | Speaker controller | | - BUS arbiter control |
| WD16C552 | Serial port and parallel port interface | | - Memory Refresh |
| 82077 | Floppy disk controller | | - Coprocessor interface |
| 82C452 | Super VGA video adapter | 82308 | BUS controller |
| 82304 | - Interrupt controller | 82309 | - 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. |

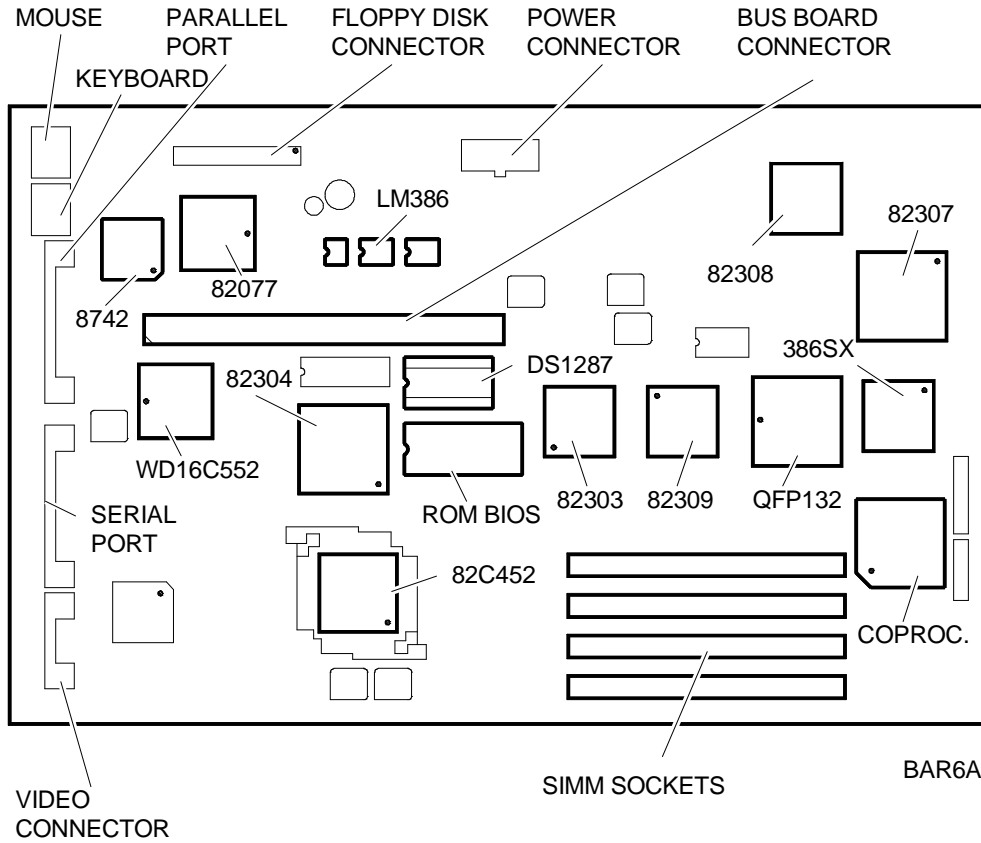
POWER SUPPLY UNIT

| POWER SUPPLY UNIT | LEVEL | DESCRIPTION |
|--------------------------|------------------|---|
| 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 | |

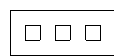
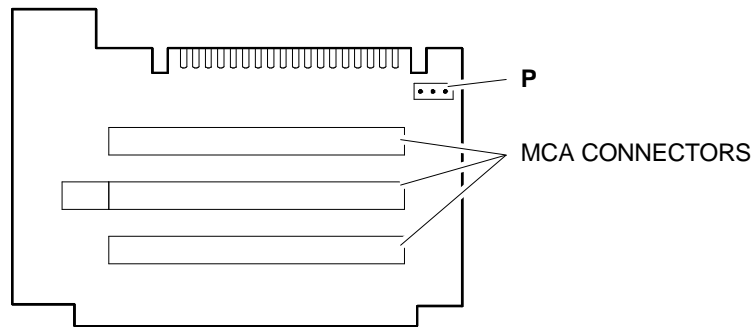
COMPATIBILITY NOTES

| BOARD or HW/SW DEVICE | DESCRIPTION |
|------------------------------|--------------------|
| | |

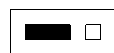
MOTHERBOARD COMPONENTS AND JUMPERS



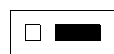
BUS ADAPTER BOARD JUMPERS



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

| OPERATING SYSTEMS | NOTES |
|---|--|
| IBM DISK Operating System, Version 4.00 | During installation on hard disk, a formatted DSDD disk is required. |

HARDWARE COMPATIBILITY

| | |
|---|---|
| MODEMS | I/O INTERFACE PRODUCTS |
| Hayes Smartmodem 1200P Hayes Smartmodem 2400P IBM PS/2 300/1200 Internal Modem/A (6450349) | FUTURE DOMAIN HOST ADAPTER (MCS-350) IBM PS/2 Dual Async Adapter/A (6450347) |
| MEMORY EXPANSIONS | MOUSE |
| 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) |
| DISPLAY UNITS | NETWORKING & LAN PRODUCTS |
| IBM PS/2 Monochrome Display 8503 IBM PS/2 Color Display 8512 IBM PS/2 Color Display 8513 IBM PS/2 Color Display 8514 | IBM PC Network IBM PC Network (Baseband Adapter) IBM Token Ring Network Novell Network 3COM Network (Ethernet) 10NET Network |
| GRAPHICS PRODUCTS | OTHER PRODUCTS |
| IBM PS/2 Display Adapter 8514/A MATROX PG2 - 1281 HI-RES Graphics Controller | SOFTWARE SECURITY Parallel Port Block |

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

| ADDRESS | FUNCTION | REGISTER LOCATION |
|--------------------------------|--|---|
| 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: 4 MB on system board (4 1 Mbx9 SIMMs) Expandable to 8 MB through KIT EXM 26-807 (4 1 Mbx9 SIMMs) Expandable only with the 4 MB memory expansion board MEM26-804 . This board can be expanded to 8 MB using KIT EXM 26-807 , to 20 MB using 2 EXM 26-809 KITS (2 4 Mbx9 SIMM), or to 32 MB by removing the SIMMs installed on the board and installing 4 EXM 26-809 KITS |
| 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 | ESDI interface MCA hard disks 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 SCSI hard disks 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 | MCA version - Intelligent hard disk drives SCSI version - SCSI hard disk controller GO582-GO610 |
| Mouse | PS/2- and AT-compatible GRD 25-025 |
| Keyboard | Compact 101/102-key ANK27-101 ANK27-102 |

MOTHERBOARD

BA880 - P2.1 - Base Assembly
BA865 - P2.1 - 4 MB
BA900 - P2.1 - 8 MB

BA951 - Base Assembly
BA952 - 4 MB
BA953 - 8 MB

BIOS

Rev. 1.06

POWER SUPPLY

HANTAREX

PS14 220 V - Lev. 04 MI
PS14 115 V - Lev. 04 MI

ALITEC

PS14 H 220 V - Lev. 01
PS12 H 115 V - Lev. 01

CONSOLE

IF 638 Lev. 01
IF 469 Lev. 01

HDU INTERFACE

GO582 - SCSI version

GO610 - SCSI version

Intelligent MCA interface buffers

MOTHERBOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS AND MODIFICATIONS |
|--------------|--|-------------|-------------------------------------|---|
| BA880 | 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 |
| BA900 | 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"> - Component 16550A at location U47 (NMOS technology) replaced by component 16550C (CMOS technology) - The 10 mF Vcc - GND filter capacitors are replaced by the corresponding ones with T = -20/+80 |
| | Lev. 03 | | Rev. 1.06 | <ul style="list-style-type: none"> - New BIOS to solve the problems with the 120 MB hard disk during system configuration. - To improve functional margins, a capacitor was installed at location C9413 and a resistor at location R148. |
| | 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"> - Component 16550A at location U47 (NMOS technology) replaced by component 16550C (CMOS technology) - The 10 mF Vcc - GND filter capacitors are replaced by the corresponding ones with T = -20/+80 |
| | Lev. SINF Suppressed | | Rev. 1.05 | This board will no longer be produced. 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>Memory Controller 82C322 Supports 256 K-1 M of DRAM Shadow RAM Supports up to 16 MB Wait state programming</p> <p>DMA controller 82C223 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>8042 Keyboard and mouse controller 82C452 Super V.G.A. video controller NS16550A Serial port controller WD57C65 Floppy disk controller</p> | <p>Data Buffer Controller 82C325 Bus Conversion and Bus Swapping functions Parity generation and error checking in the DRAM Contains the MCA architecture POS registers</p> <p>82C226 Non-Volatile RAM Real Time Clock DMA Controller Interrupt Controller</p> <p>82C226 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>MCA Controller 82C231 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

| POWER SUPPLY | LEVEL | DESCRIPTION |
|-------------------------------|--------------|---|
| 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

| LEVEL | NOTES |
|--------------|-----------------------------------|
| Lev. Nasc. | Specific for the P750 and M480-30 |

COMPATIBILITY

| BOARD/DEVICE | COMPATIBILITY |
|------------------------------|--|
| 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

| 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 Following are the differences between the two boards: <ul style="list-style-type: none"> - 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. - A different printed circuit board is used. - New BIOS |

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.

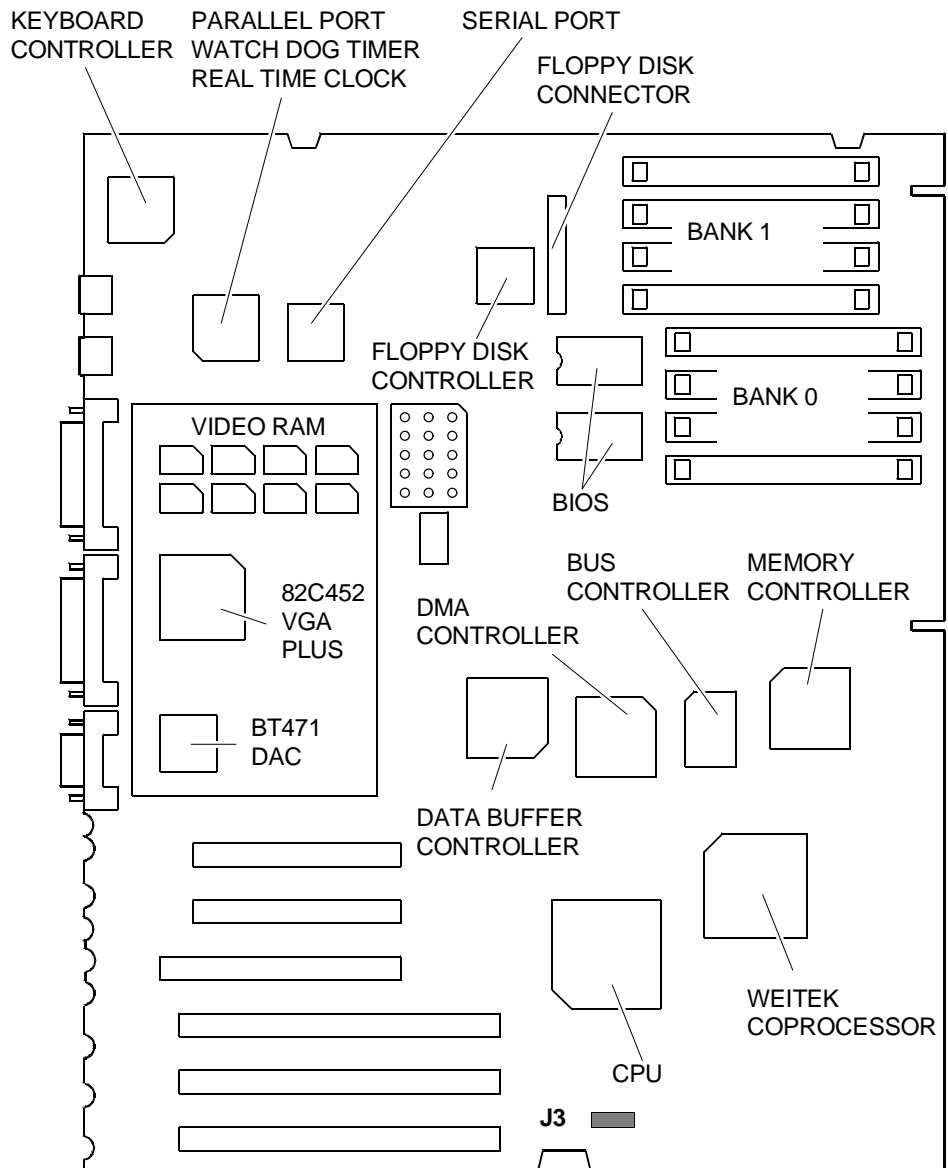
A second hard disk can be configured with any identifier from **0** to **5**.

SCSI IDENTIFIER

USE

| | |
|---|---|
| 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

| OPERATING SYSTEMS | NOTES |
|--|---|
| 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

| MODEM | I/O INTERFACE PRODUCTS |
|--|--|
| Hayes Smartmodem 1200P Hayes Smartmodem 2400P IBM PS/2 300/1200 Internal Modem/A (6450349) | FUTURE DOMAIN HOST ADAPTER (MCS-350) IBM PS/2 Dual Async Adapter/A (6450347) |
| EXPANSION MEMORIES | MOUSE |
| IBM PS/2 80386 2-6 MB Exp. Memory Option IBM PS/2 80386 2-8 MB Exp. Memory Option Olivetti Memory Expansion board MEM 26-503 Profit System Elite 16/2 | IBM PS/2 Mouse (6450350) Microsoft Serial Mouse MSC PC Mouse PS/2 Olivetti New Advanced Mouse (GRD 25-052) |
| DISPLAY UNITS | UNITS, NETWORKING & LAN PRODUCTS |
| IBM PS/2 Monochrome Display 8503 IBM PS/2 Color Display 8512 IBM PS/2 Color Display 8513 IBM PS/2 Color Display 8514 | IBM PC Network IBM PC Network (Baseband Adapter) IBM Token Ring Network Novell Advanced network ver. 2.12 3COM Network (Ethernet) 10NET Network |
| GRAPHIC PRODUCTS | OTHER PRODUCTS |
| 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"> - One bank of 4 MB soldered (8 1M x 4 DRAM chips plus 4 1Mx1 parity DRAM chips) - Three banks, each with 4 sockets, in which the following SIMM modules can be installed: <ul style="list-style-type: none"> - SIMM 1M x 9 EXM 26-807 - SIMM 4M x 9 EXM 26-809 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"> - In BA901 the 487SX replaces the CPU - In BA301 the 487SX has only one socket 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 (IN284 Board) |
| 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

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS/NOTES | |
|--------------|-------------------------------------|------------------------|---|---|--|
| BA296 | 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 | For the integrated controllers, see the following table. Board with 4 MB soldered. | |
| | Lev. 01 MI | | | | |
| | Rev. 1.04 | | | | Cuts and trimmings to solve the problem with the 340 MB CONNER hard disk. |
| | Rev. 1.05 | | | | New BIOS. The characteristics of the different BIOS versions and the problems solved are explained further on in this chapter. |
| | Rev. 1.06 Rev. 1.07 Rev. 1.08 | | | | New BIOS New BIOS New BIOS |
| | | | | This board will no longer be produced. The different memory expansion, which is the main difference between BA269 and BA297, will be implemented at system level. | |
| BA297 | Nasc. | 553000C | Rev. 1.01 | 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 | | | | |
| | Rev. 1.04 | | | | Cuts and trimmings to solve the problem with the 340 MB CONNER hard disk. |
| | Rev. 1.05 | | | | New BIOS |
| | Rev. 1.06 Rev. 1.07 Rev. 1.08 | | | | New BIOS New BIOS New BIOS |
| | | | | This board will no longer be produced. Only BA 131 will continue to exist. | |
| BA309 | Nasc. | | Rev. 1.01 | Board installed for Italy only. | |
| | Lev. 01 MI | | | | |
| | Rev. 1.04 | | | | Cuts and trimmings to solve the problem with the 340 MB CONNER hard disk. |
| | Rev. 1.05 | | | | New BIOS |
| | Rev. 1.06 Rev. 1.07 Rev. 1.08 | | | | 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 | |
| <p>This board will no longer be produced. The different memory expansion, which is the main difference between BA 312 and BA 313, will be implemented at system level so only BA 313 will continue to exist.</p> | | | | | |
| BA313 | Nasc. | 553060 F | Rev. 2.04 | 4 MB soldered. Replaces BA 296. | |
| | | | Rev. 2.05 | <ul style="list-style-type: none"> - New BIOS - 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. 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. |
| | Lev. 02 | | | Rev. 2.08 | New BIOS to correct the problems with IBM OS/2 version 2.0. |
| | | | | Rev. 2.08 | <ul style="list-style-type: none"> - Component 74F224 in position U37 is replaced by component 74F240 to solve the "snow" effect on high resolution monitors. |
| 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"> - 25 MHz Intel 486SX processor - Intel 487SX numeric coprocessor (must be installed in place of the CPU) - Socket for the 25 MHz Weitek WTL 4167 numeric coprocessor - 82C206: Real time clock 128 byte non-volatile RAM Timer DMA controller Interrupt controller - 8742 OPT PLCC keyboard mouse controller - 82C452A video controller - WD16C551-D: 16C550-compatible serial port AT/PS2-compatible parallel port - 82077 AA-1 floppy disk controller - Buffer for intelligent hard disks - BIOS Flash EPROM (1 Mbit) - Chip set consisting of 4 gate arrays: <ul style="list-style-type: none"> - BCUE bus controller - MCUE memory controller - DPU data flow controller - IOU I/O controller - System memory (from 4 to 52 MB) - EYE GA4Q component - 50 MHz oscillator |
| 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"> - There is no socket for the Weitek coprocessor which therefore cannot be installed. - 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. - Shielded keyboard and mouse connectors. |
| BA312 | BA301 | This system board is the same as BA 313 but has an 8 MB memory. |

USER DISKETTE / SYSTEM TEST / DRIVERS

| LEVEL | COMPATIBILITY / NOTES |
|---|---|
| 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)

| LEVEL | EVOLUTION |
|--------------|---|
| Rev. 2.00 | This release introduces the following features: <ul style="list-style-type: none"> - Automatic HDU acknowledgement selecting the "standard" function which will be included in the user diskette release 2.02. - Management of the new VESA 72.8 Hz monitors. - Management of 2.88 MB drives |
| Rev. 2.01 | This release has the following variations with respect to the previous one: <ul style="list-style-type: none"> - 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. - Banner change for introduction of the new type P24 50/66 MHz CPU - The "ROM checksum error" error on rebooting after the SETUP has been removed. - Various faults concerning new HDU management have been corrected. - New corrections made to 2.88 MB floppy drive management. - A new video table has been introduced for the 11h,12h,79h 72Hz modes due to VESA.N.B. timing problems. <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"> - Corrected the "Keyboard Error" problem appearing randomly during the POD after a Ctrl-Alt-Del. - Corrected problem of failure to Bootstrap from floppy disk when disconnecting an HDU previously installed on other systems. - Some corrections made in management of 2.88 MB floppy disks. - Some system faults with Shadow memory disabled have been corrected. - Problems concerning management of non-standard Hard Disks with high capacity (600 MB) have been solved. |
| Rev. 2.05 | This release has the following variations with respect to the previous release: <ul style="list-style-type: none"> - Corrected message concerning CPU type 486DX2. - Corrected message concerning Dedicated memory when disabling the memory between 512K and 640K and performing a controlled reset. - Corrected malfunctioning of the interrupt controller and refresh tests caused by the increase in clock frequency of the computer (486DX2 for M400-60). - Correction to eliminate malfunctioning of the floppy disk running Windows 3.0 in standard mode. <p>Windows release 3.1 does not have this problem.</p> <ul style="list-style-type: none"> - Change made for management of the 6K between C680 and C7FF as ROM option. <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"> - Bootstrapping delays with CP3304 HDUs and other MASTER HDUs - Spurious characters when a password is typed using slow keyboards - Cache for compatibility with COMPUTONE AT 8/16 boards - Cancelled the hidden partitions message displayed after the POD |
| 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 |

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. NOTE: 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. |

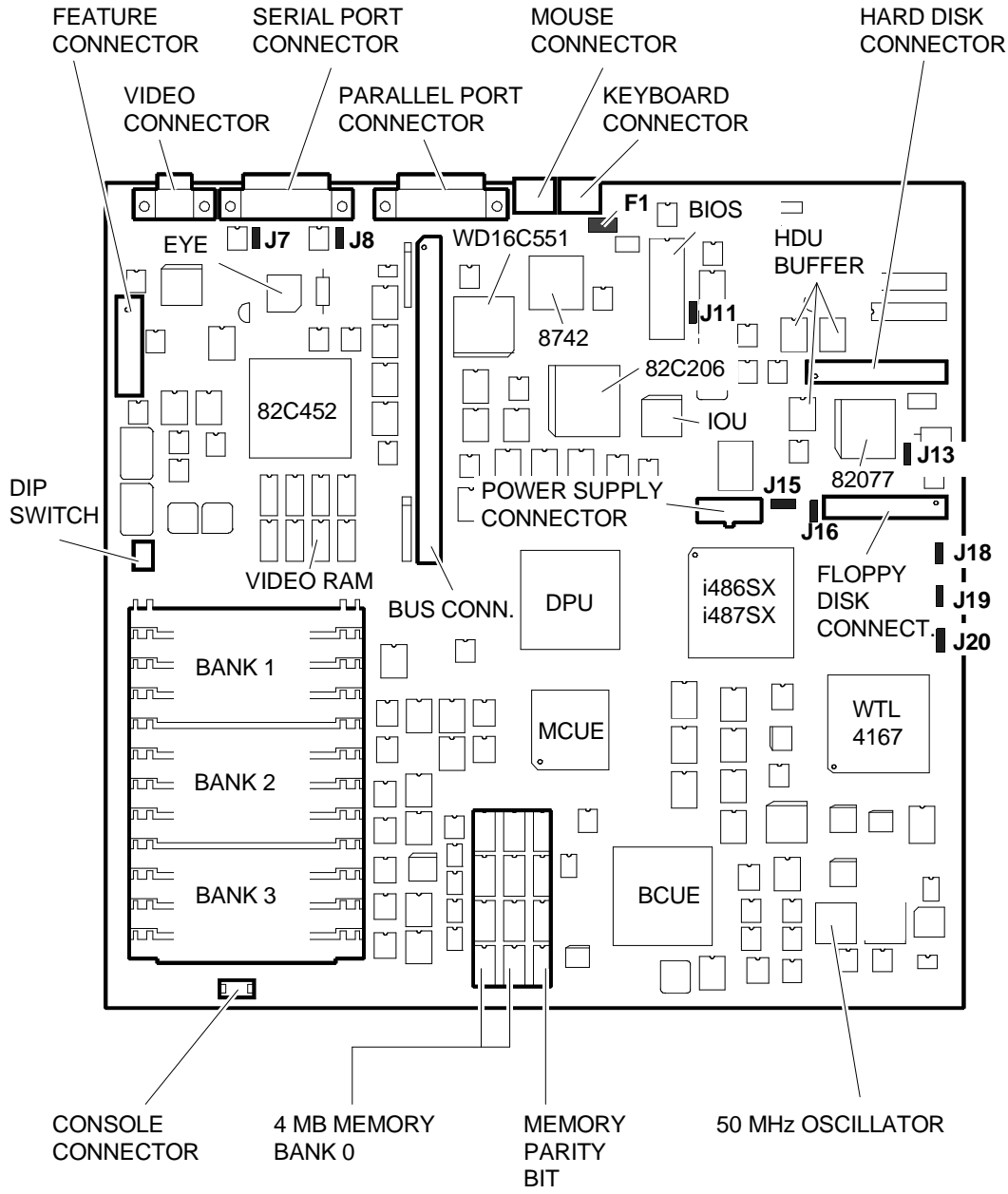
SOFTWARE COMPATIBILITY

| 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. |
| WINDOWS | |
| DESQ-VIEW 386 Ver. 2.31 GEM/3 Desktop, IBM-PC Ver. 3.13 MS-WINDOWS /286 Ver. 2.11 | MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0 |

HARDWARE COMPATIBILITY

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



AEC4A

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**

| JUMPER | POSITION | FUNCTION |
|---------------------|---------------------|---|
| 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

| 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 | 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

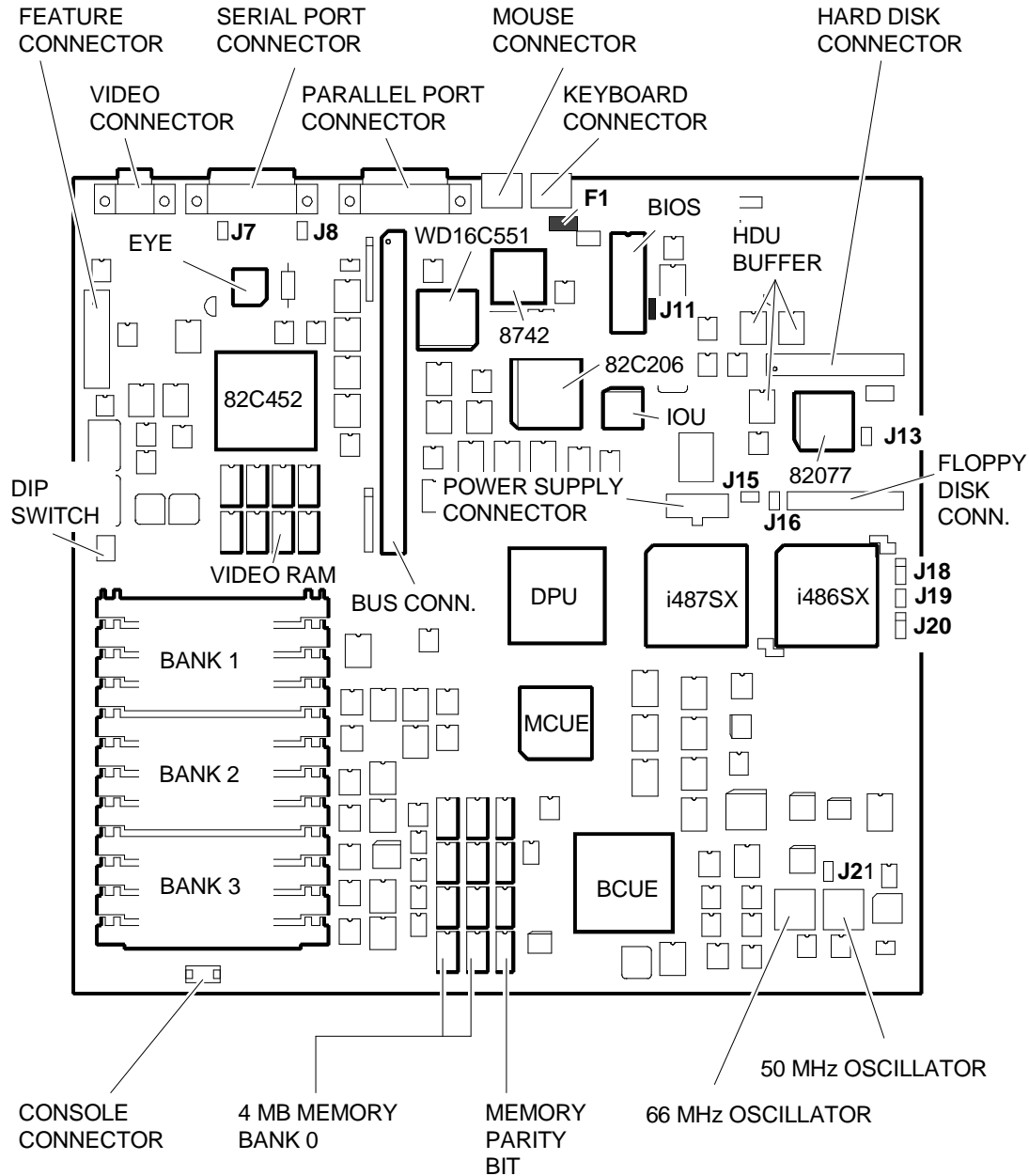
| SWITCH | POSITION | FUNCTION |
|---------------|-----------------|---|
| 1 | ON * OFF | Serial port enabled Serial port disabled |
| 2 | ON * OFF | BUILT IN SETUP enabled BUILT IN SETUP disabled |
| 3 | ON * OFF | Normal operation Disables floppy disk write operations |
| 4 | ON OFF | NOT USED |

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**

| JUMPER | POSITION | FUNCTION |
|---------------------|---------------------|--|
| 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

| 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 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

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

IN: Jumper installed

OUT: Jumper not installed

The asterisk indicates the default setting.

I/O ADDRESS MAP

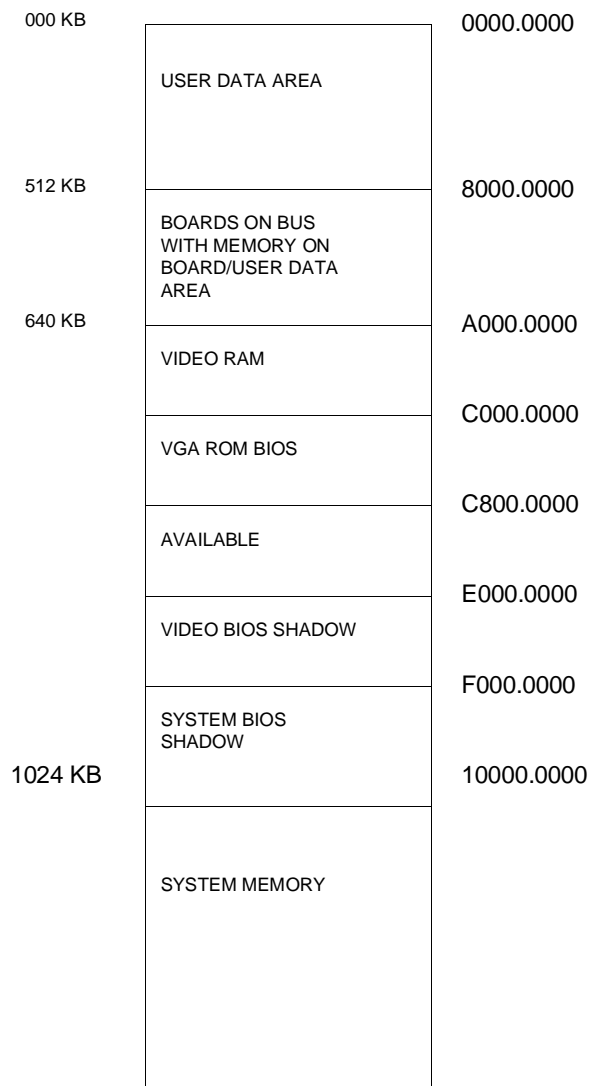
| ADDRESS | FUNCTION | ADDRESS | FUNCTION |
|----------------|-------------------------------------|----------------|------------------------------|
| 000-01F h | DMA controller (all channels) | 2F8-2FF h | Serial Port COM2 (alternate) |
| 020-021F h | Interrupt Controller 1 | 378-37B h | Parallel Port 1 |
| 040-043 h | Timer | 3B4-3B5 h | Video 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

| 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 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"> - One bank of 4 MB soldered on the system board (8 1M x 4 DRAM chips plus 4 1Mx1 parity DRAM chips) - Three banks, of 4 sockets each, in which the following SIMM modules are installed: <ul style="list-style-type: none"> - SIMM 1M x 9 EXM 26-807 - SIMM 4M x 9 EXM 26-809 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
 ASTEC

PS11/AR - 220 V
 ASTEC

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. This board will no longer be produced. 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. |

MAIN COMPONENTS OF THE SYSTEM BOARD

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

USER DISKETTE / SYSTEM TEST / DRIVERS

| LEVEL | COMPATIBILITY / NOTES |
|---|--|
| 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

| BOARD / DEVICE | COMPATIBILITY |
|------------------------------------|---|
| 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

| POWER SUPPLY | LEVEL | DESCRIPTION |
|----------------------|--------------|--|
| 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. NOTE: 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

| LEVEL | EVOLUTION |
|--------------|--|
| Rev. 2.00 | <p>This release introduces the following features:</p> <ul style="list-style-type: none"> - Automatic HDU acknowledgement selecting the "standard" function which will be included in the user diskette release 2.02. - Management of the new VESA 72.8 Hz monitors. - Management of 2.88 MB drives |
| Rev. 2.01 | <p>This release has the following variations with respect to the previous:</p> <ul style="list-style-type: none"> - 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. - Banner change for introduction of the new P24 50/66 MHz CPUs - The "ROM checksum error" error on rebooting after the setup has been removed. - Various malfunctionings concerning new HDU management have been corrected. - New corrections made to 2.88 MB floppy drive management. - A new video table has been introduced for the 11h,12h,79h 72Hz modes due to VESA.N.B. timing problems. <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"> - Corrected the "Keyboard Error" appearing randomly during the POD after a Ctrl-Alt-Del. - Corrected problem of failure to Bootstrap from floppy disk when a HD previously installed on other systems is disconnected. - Some corrections made in management of 2.88 MB floppy disks. - Some malfunctionings of the computer with the Shadow memory disabled have been corrected. - Problems concerning management of non-standard Hard Disks with high capacity (600 MB) have been solved. |
| Rev. 2.05 | <p>This release has the following variations with respect to the previous release:</p> <ul style="list-style-type: none"> - Corrected message concerning CPU type 486DX2. - Corrected message concerning Dedicated memory when disabling the memory between 512K and 640K and performing a controlled reset. - Corrected malfunctioning of the interrupt controller and refresh tests caused by the increase in clock frequency of the computer (486DX2 for M400-60). - Correction to eliminate malfunctioning of the floppy disk running Windows 3.0 in standard mode. - Windows release 3.1 does not have this problem. - Change made for management of the 6K between C680 and C7FF as ROM option. <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"> - Bootstrapping delays with CP3304 HDUs or other MASTER HDUs - Spurious characters when the password is entered on slow keyboards - Cache for compatibility with COMPUTONE AT 8/16 boards - Cancelled the message at the end of the POD indicating hidden partitions |
| 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.

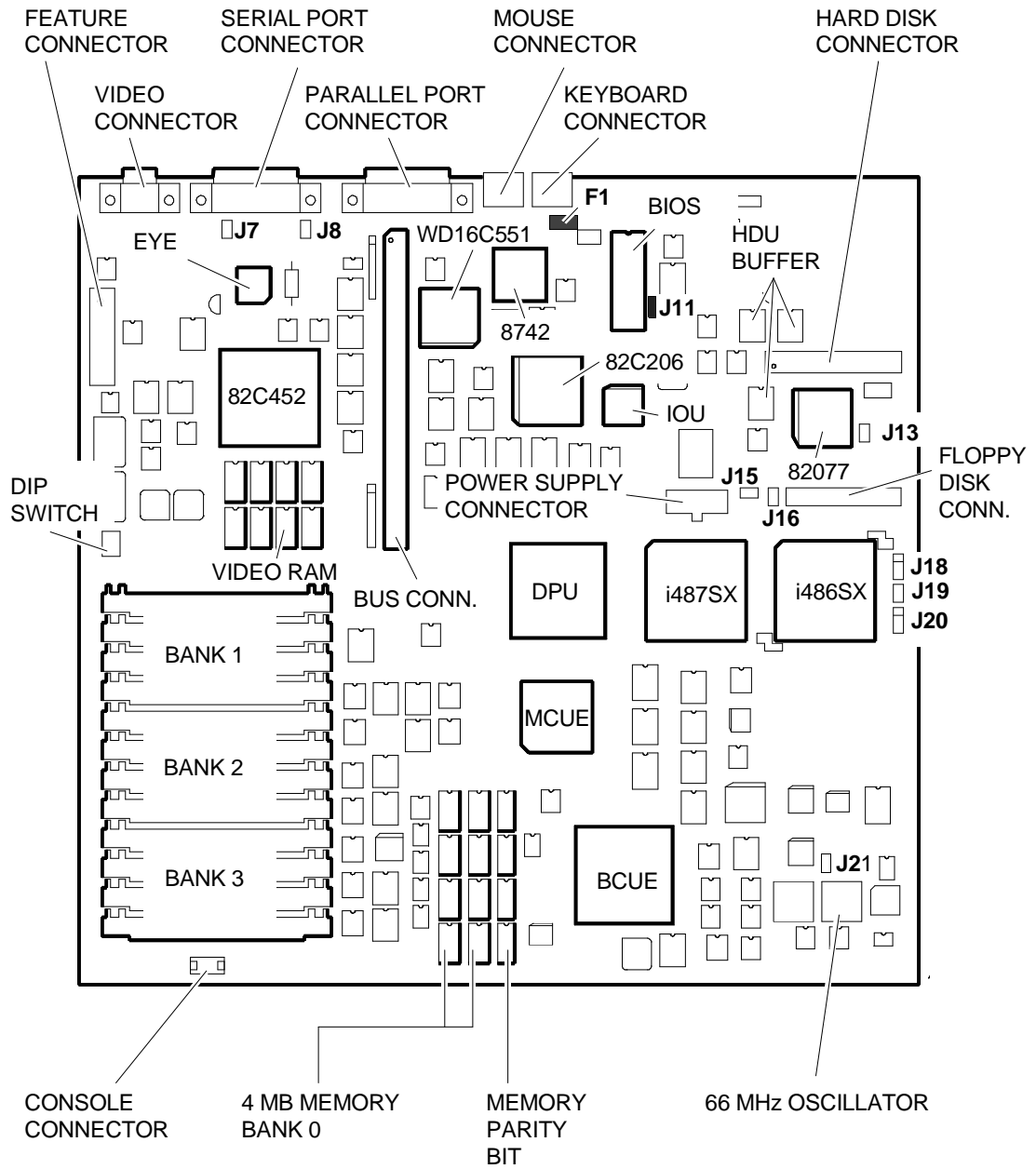
SOFTWARE COMPATIBILITY

| 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 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. |
| WINDOWS | |
| DESQ-VIEW 386 Ver. 2.31 GEM/3 Desktop, IBM-PC Ver. 3.13 MS-WINDOWS /286 Ver. 2.11 | MS-WINDOWS /386 Ver. 2.11 MS-WINDOWS 3 Ver. 3.0 |

HARDWARE COMPATIBILITY

| MODEMS | I/O INTERFACE PRODUCTS |
|---|---|
| Hayes Smartmodem 2400B / 1200 B DR: NEUHAUS FAXY PC MASTER FERRARI Fax Card Fury 2400 PC modem / Fury 2400 master AT&T 2224 CEO modem | IBM PRINTER ADAPTER (1505200) IBM SERIAL/PARALLEL |
| MULTIPOINT | MOUSE |
| Anvil Stallion Intelligent 16 Port Controller Chase AT16 / Chase AT8 Computone System Intelliport 16 Port AT16 Computone System Intelliport 8 Port AT8 Corollary 8 x 4 MUX Digiboard Digichannel COM/xi Intelligent 8 Port Specialix Si Intelligent I/O Controller Intel-Bell ACE 8 / Intel (Bell) ICC.6 Wyse WY-995 | IBM PS/2 Mouse (6450350) Logitech Bus Mouse (PF-3F) Logitech 3 button mouse MS-BUS mouse MS-Mouse serial Olivetti Bus Mouse (GRD 25-019) Olivetti New Advanced Mouse (GRD 25-025) |
| GRAPHIC PRODUCTS | NETWORK & LAN PRODUCTS |
| AST RESEARCH AST - VGA PLUS FASTWRITE 1024I FASTWRITE VGA HERCULES GRAPHICS CARD IBM EGA ADAPTER IBM VGA ADAPTER HERCULES GRAPHICS STATION CARD Olivetti AGC 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 |
| DISPLAY UNITS | OTHER PRODUCTS |
| IBM 8514 IBM COLOR GRAPHIC MONITOR 5153 IBM ENHANCED GRAPHIC MONITOR 5151 IBM ENHANCED GRAPHIC MONITOR 5154 IBM PS/2 COLOR DISPLAY 8512 IBM PS/2 COLOR DISPLAY 8513 IBM PS/2 MONOCHROME DISPLAY 8503 NEC MULTISYNC 2A NEC MULTISYNC 3D NEC MULTISYNC 4D NEC MULTISYNC 5D NEC MULTISYNC II PHILIPS 7BM749 PHILIPS 9CM82 | ADAPTEC 1542A SCSI HOST ADAPTER ADAPTEC 1542B SCSI HOST ADAPTER ADAPTEC 2322B-10 ESDI ADAPTER IRWIN STREAMER MODEL 285 IRWIN STREAMER MODEL 287 JETSCRIPT QMS 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**

| JUMPER | POSITION | FUNCTION |
|---------------------|---------------------|--|
| 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

| 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 | Only one hard disk 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 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

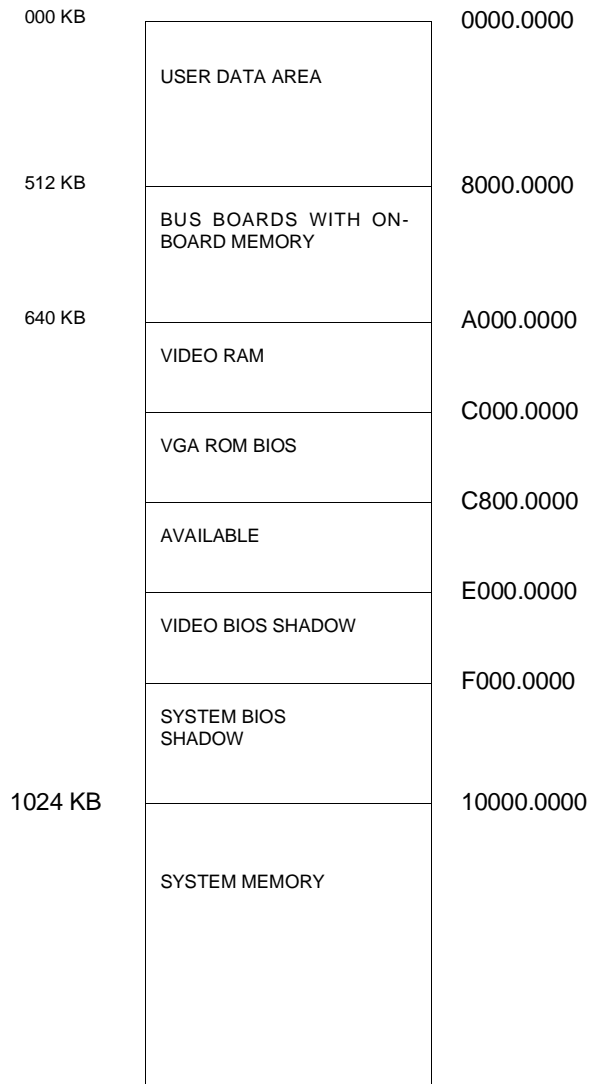
| ADDRESS | FUNCTION | ADDRESS | FUNCTION |
|------------|-------------------------------------|---------------|------------------------------|
| 000-01F h | DMA controller (all channels) | 2F8-2FF h | Serial Port COM2 (alternate) |
| 020-021F h | Interrupt controller 1 | 378-37B h | Parallel Port 1 |
| 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"> - One bank of 4 MB soldered on system board (8 1M x 4 DRAM chips plus 4 1Mx1 parity DRAM chips) - Three banks, each of 4 sockets, in which the following SIMM modules can be installed: <ul style="list-style-type: none"> - 1M x 9 EXM 26-807 SIMM - 4M x 9 EXM 26-809 SIMM <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 (IN 284 board) |
| Video adapter | 82C452A integrated on System Board |
| System board-integrated hard disk and floppy disk controller | FDU controller: Intel 82077AA-1 HDU controller: Logic gates and MSI Buffers implementing an IDE hard disk AT interface. |
| Cache controller | integrated in the CPU with 8 KB |
| Mouse | AT- and PS/2-compatible |
| Keyboard | 101/102-key keyboard, compact ANK 27-101 ANK 27-102 |

SYSTEM BOARD

Printed Circuit
BA301:
System board BA334

BIOS

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

Rel. 2.08

POWER SUPPLY

PS11/A - 220 V
PLESSEY

PS11/A - 115 V
PLESSEY

PS11/A - only 220 V
ASTEC

PS11/AR - 220 V
ASTEC

SCSI PERIPHERAL CONTROLLER

ASC - 1

GRAPHICS ACCELERATOR

ATI 8514 Ultra

SYSTEM BOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | INTEGRATED CONTROLLERS / NOTES |
|--------------|------------|-------------|-----------|---|
| BA334 | Lev. Nasc. | 553076 T | Rev. 2.05 | Board with 4 MB soldered. |
| | Lev. 01 | | | Cuts, trimmings and replacement of PAL DPGSEL (GL9A) with PAL DPGSEL12 (GKCL) to solve the problem with the video controller during VIDEO RAM read operations. The ROM version of keyboard controller Rev. 10.01 is also introduced to cut costs. |
| | Lev. 02 | | Rev. 2.05 | <ul style="list-style-type: none"> - Floppy disk controller INTEL component 82077-AA1 is replaced by the floppy disk controller INTEL component 82077SL-1. - Component 74F224 at location U37 is replaced by component 74F240 to solve the "snow effect" problem on high resolution monitors. This problem does not occur on the M400-60 since this system uses a graphics accelerator. |
| | | | Rev. 2.06 | New BIOS. The characteristics of this BIOS and the problems it solves are explained further on in this chapter. |
| | | | Rev. 2.08 | New BIOS. |

MAIN COMPONENTS OF SYSTEM BOARD

| SYSTEM BOARD | PRINTED CIRCUIT | MAIN COMPONENTS |
|--------------|-----------------|--|
| BA334 | BA301 | <ul style="list-style-type: none"> - 50 MHz Intel 486DX2 processor - Numeric coprocessor integrated in the i486DX2 - Performance upgrade processor socket - 82C206: Real time clock 128 Byte Non-Volatile RAM Timer DMA controller Interrupt controller - Keyboard and mouse controller 8742 OPT PLCC - Video controller 82C452A - WD16C551-D: 16C550-compatible serial port AT/PS2-compatible parallel port - Floppy disk controller 82077 AA-1 - Buffer for intelligent hard disks - BIOS Flash EPROM (1 Mbit) - Chip set consisting of 4 gate arrays: <ul style="list-style-type: none"> - BCUE BUS controller - MCUE Memory controller - DPU Data flow controller - IOU Input/Output controller - System memory (from 4 to 52 MB) - EYE component GA4Q - 50 MHz oscillator |

USER DISKETTE / SYSTEM TEST / DRIVERS

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

COMPATIBILITY

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

POWER SUPPLY UNIT

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

BIOS EVOLUTION

| LEVEL | EVOLUTION |
|--------------|--|
| Rev. 2.05 | This BIOS revision has been extended to all the systems of the M400-10, M400-40 and M400-60 family. |
| Rev. 2.06 | This BIOS version solves the following: <ul style="list-style-type: none"> - Delayed bootstrapping with CP3304 HDUs or other Master HDUs - Spurious characters when entering a password on slow keyboards - Cache for compatibility with COMPUITONE AT 8/16 boards - Eliminates the message on hidden partitions that is displayed after the POD |
| Rev. 2.08 | This release corrects IBM OS/2 ver. 2.0 faults in DOS windows. |

HARD DISK SELF-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

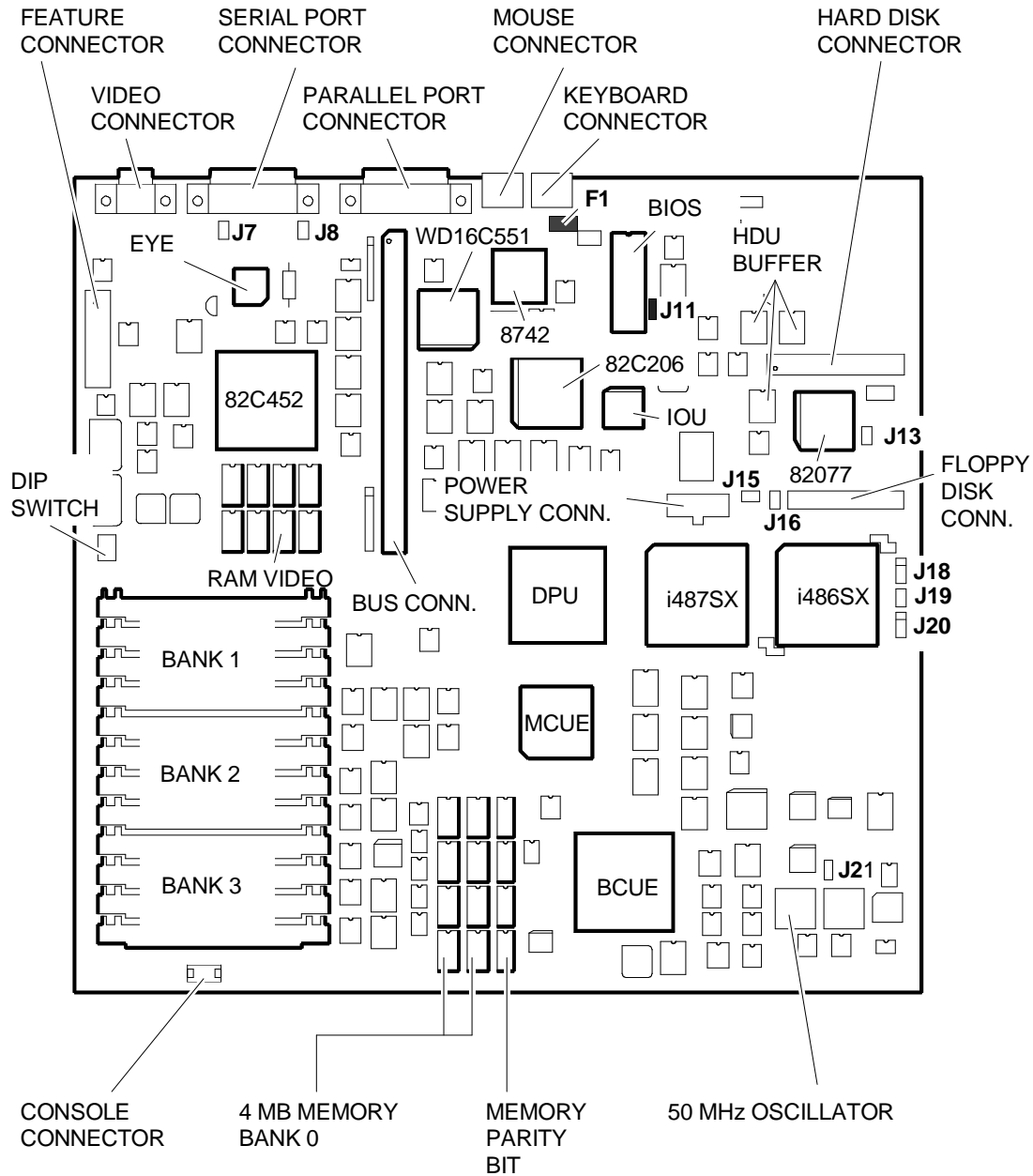
| OPERATING SYSTEMS | NOTES |
|--|---|
| IBM DISK Operating System, Ver. 3.30 IBM DISK Operating System, Ver. 4.01 Olivetti's Microsoft Disk Operating System. 3.30a Olivetti's Microsoft Disk Operating System, Ver. 4.01 Olivetti's Microsoft Disk Operating System, Ver. 5.00 Olivetti's Microsoft OS/2, Ver.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

HARDWARE COMPATIBILITY

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

27

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 |

27

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

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

DIP-SWITCHES

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

IN: Jumper installed

OUT: Jumper not installed

The asterisk indicates the default setting.

I/O ADDRESS MAP

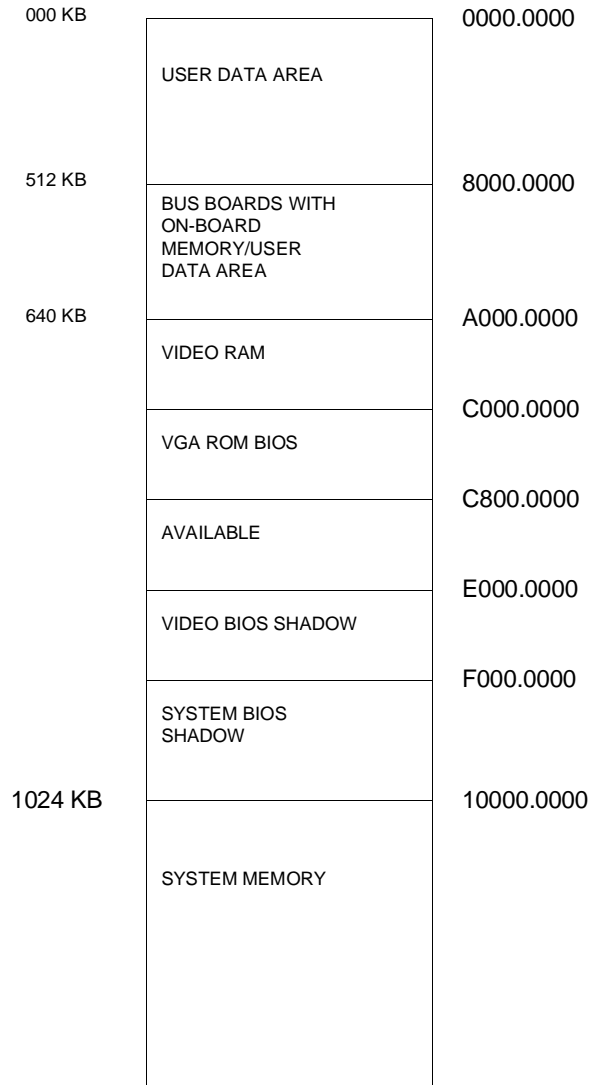
| ADDRESS | FUNCTION | ADDRESS | FUNCTION |
|----------------|-------------------------------------|----------------|------------------------------|
| 000-01F h | DMA controller (all channels) | 2F8-2FF h | Serial port COM2 (alternate) |
| 020-021F h | Interrupt controller 1 | 378-37B h | Parallel port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

INTERRUPT LEVELS

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

SYSTEM MEMORY MAP

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



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 EXM 27-820 (2 MB) 4 M x 9 EXM 27-821 (8 MB) Bank 2 Identical to bank 1 Banco 3 Identical to bank 1 NOTES: 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 VGA-MEM 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

28

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"> - Cuts and trimmings made to solve the parity error that occurs when boards working in master mode are installed on the bus. - New BIOS |
| | 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>This board will no longer be produced. 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 | 386SX CPU Socket for i387SX 8042 OAK OTI067 82C206 87310 NATIONAL MSI buffer 27C010 OPTI 82C283 EYE | 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 |

28

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

| LEVEL | COMPATIBILITY |
|-----------|--|
| 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

| POWER SUPPLY | LEVEL | DESCRIPTION |
|---------------|------------|---|
| 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"> - Inductor L5 has been added to the mains input area for improved EMI radio interference margins. - New printed circuit board to solves the problem of random voltage drops. |
| 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

| BOARD OR HW/SW DEVICE | DESCRIPTION |
|--|--|
| 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. |

28

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: <ul style="list-style-type: none"> - 640 x 480, 256 colors (mode 53h) - 1024 x 768, 16 colors (mode 56h) |
| EVD Rel. 2.00 for WINDOWS 3.0 | Improves the performance of the previous version |

BIOS

| LEVEL | NOTES |
|--------------|--|
| 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"> - Problems with the KP.EXE utility in the CUSTOMER DISK Rev. 1.00 - 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 |
| Rev. 1.03 | This release removes some bugs on the previous BIOS release (Rev. 1.02) <ul style="list-style-type: none"> - Video modes 72h and 79h have been removed - Problems with Windows 3 Video Mode 53h at 72Hz - Problems in enabling the high resolution <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"> - Incorrect initialization of the VGA AST board during POD - Keyboard interrupt management. - Bug on procedures for buzzer volume management - With shadow RAM disabled, the system does not configure correctly if the BUS is particularly full. - Management of the video test error code. - System crash following a Soft Reset with the video off. |
| 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:

28

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

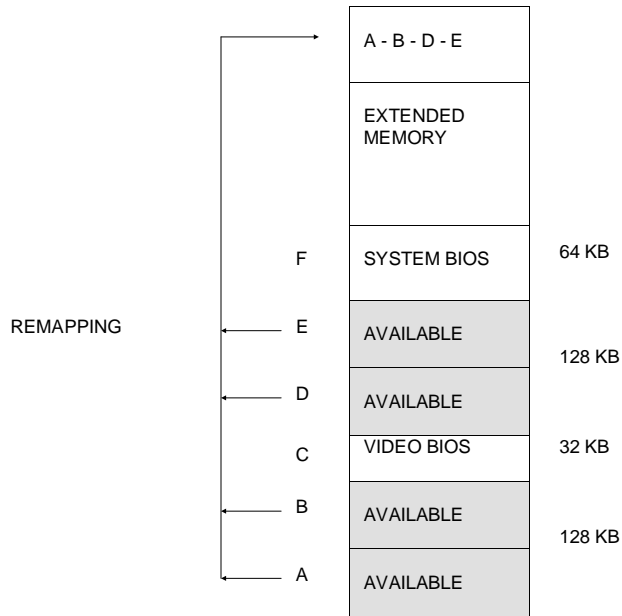
800 Only the 32 KB video BIOS

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.

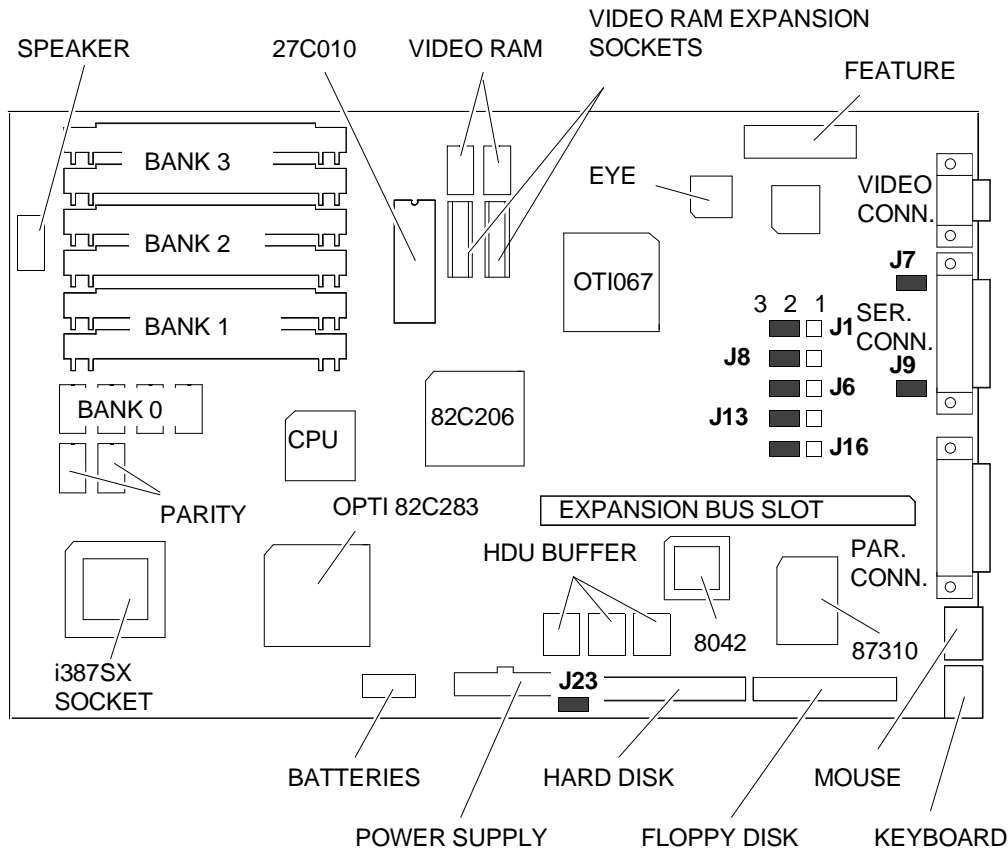
SOFTWARE COMPATIBILITY

| 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 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 |
| 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

| MODEMS | I/O INTERFACE PRODUCTS |
|---|--|
| 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 |
| MULTIPOINT | MOUSE |
| 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 |
| GRAPHICS PRODUCTS | NETWORKING & LAN PRODUCTS |
| 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 |
| DISPLAY UNITS | |
| 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



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

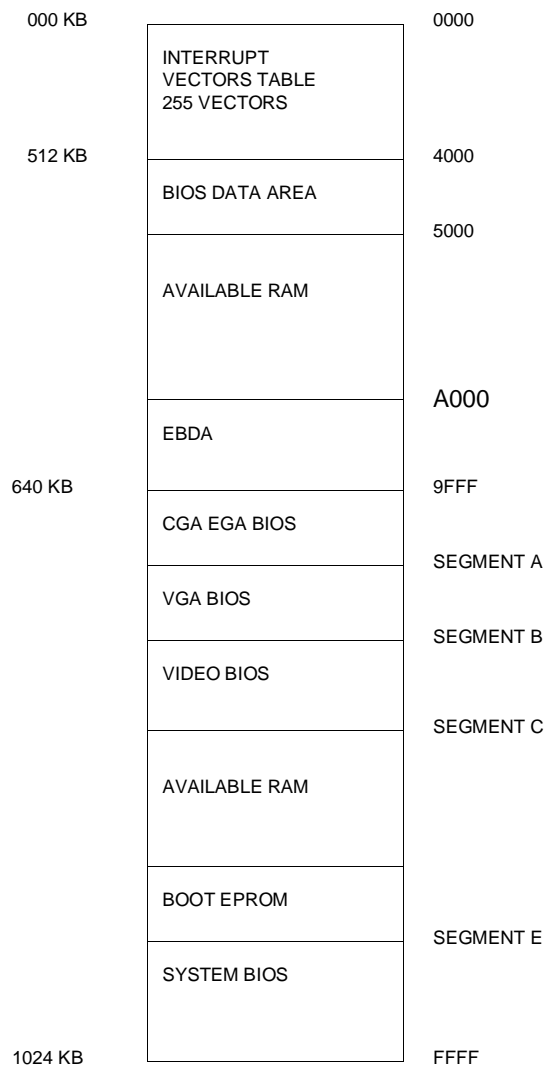
| LEVEL | NAME | CONTROLLER | FUNCTION |
|--------|-------|------------|---|
| 1 | IRQ0 | 1 | Channel 0 timer OUT |
| 2 | IRQ1 | 1 | Keyboard |
| 3 - 10 | IRQ2 | 1 | Interrupt to Controller 1 from Controller 2 |
| 3 | IRQ8 | 2 | Real time clock |
| 4 | IRQ9 | 2 | Available |
| 5 | IRQ10 | 2 | Available |
| 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 |

28

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 EXM 27-820 (2 MB) 4 M x 9 EXM 27-821 (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 |
|--------------|---------|-------------|----------------|--|
| BA320 | 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"> - 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. - New BIOS |
| | 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"> - The keyboard and mouse connectors have been replaced with shielded connectors. - The ACER 87310 I/O controller is introduced as an alternative to the National 87310 I/O controller |
| | 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 | 386SX CPU 25 MHz microprocessor Socket for i387SX numeric coprocessor 8042 Keyboard and mouse controller OAK OTI067 V.G.A. video controller 82C206 128 byte Non-Volatile RAM with battery back-up Real Time Clock DMA controller Interrupt controller Timer 87310 Serial and parallel port controller ACER Floppy disk controller MSI buffer Intelligent hard disk interface 27C010 BIOS Eprom OPTI 82C283 Memory controller AT BUS controller Data BUS controller EYE 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

| POWER SUPPLY | LEVEL | DESCRIPTION |
|---------------------|--------------|--|
| 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"> - Inductor L5 has been added to the mains input area to improve the EMI radio interference margins. - New printed circuit to solve the problem with random voltage drops. |
| 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

| BOARD OR HW/SW DEVICE | DESCRIPTION |
|--|--|
| 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) |

29

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.

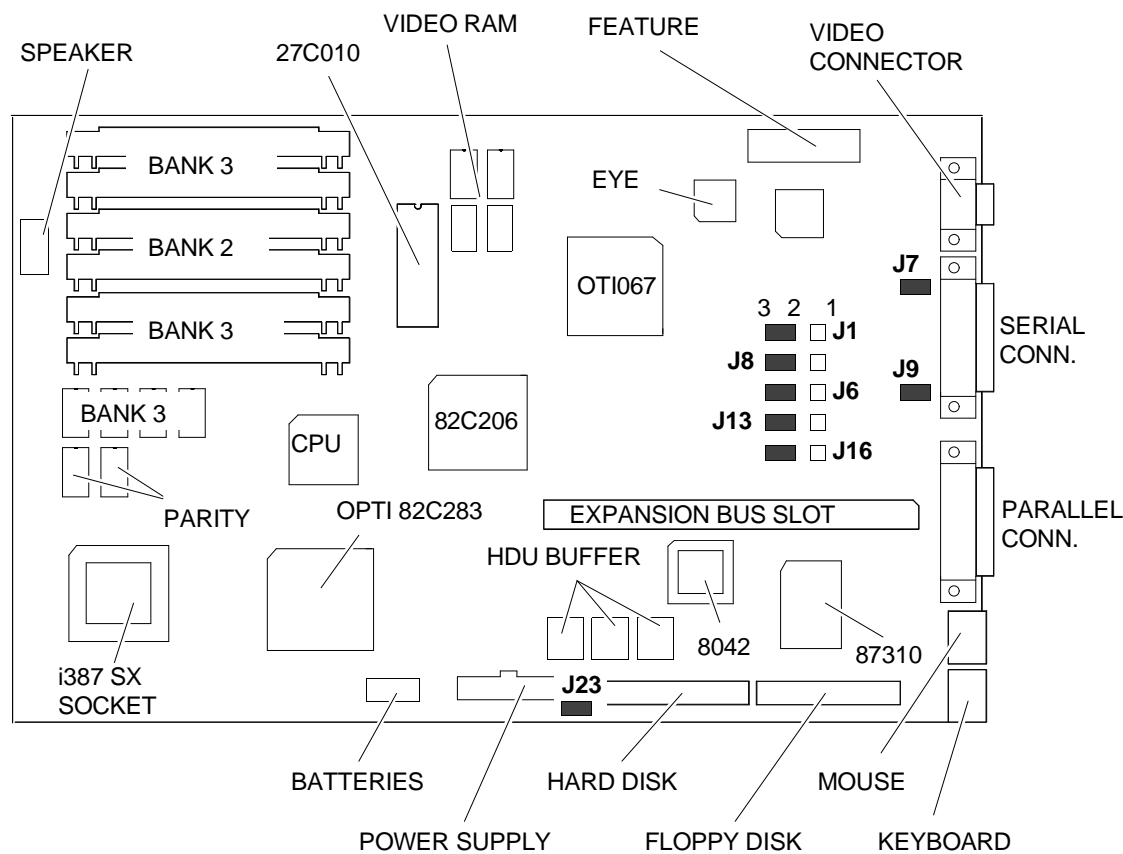
SOFTWARE COMPATIBILITY

| 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 PS/2 mouse not acknowledged PS/2 mouse 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

| MODEMS | I/O INTERFACE PRODUCTS |
|---|--|
| 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 |
| MULTIPOINT | MOUSE |
| 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 |
| GRAPHIC PRODUCTS | NETWORKING & LAN PRODUCTS |
| 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 |
| DISPLAY UNITS | |
| 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



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

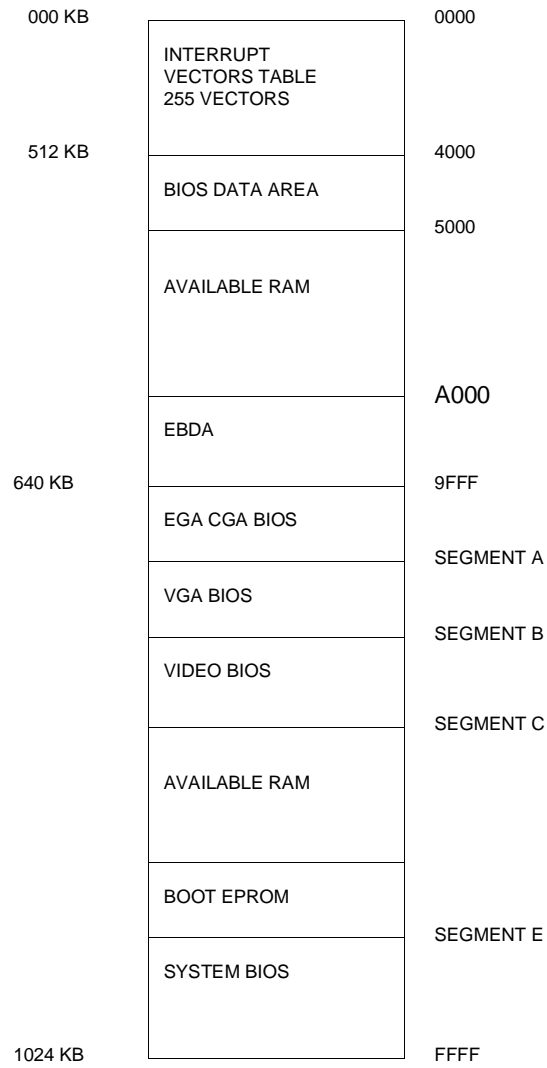
| LEVEL | NAME | CONTROLLER | FUNCTION |
|--------|-------|------------|---|
| 1 | IRQ0 | 1 | Timer channel 0 OUT |
| 2 | IRQ1 | 1 | Keyboard |
| 3 - 10 | IRQ2 | 1 | Interrupt to Controller 1 from Controller 2 |
| 3 | IRQ8 | 2 | Real time clock |
| 4 | IRQ9 | 2 | Available |
| 5 | IRQ10 | 2 | Available |
| 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 |

29

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 | MOTHERBOARD BA307 CPU BOARD UC 117 inserted in a dedicated slot on system board BIOS 1 st part of EPROM code on system board Rev. 2 nd part of code in first HDU of the system (IML) Rev. POWER SUPPLY PS40 of 400 W CONSOLE Hardware module comprising 2 boards: IF496 Interface circuits with 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 |
| 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 st pair connectors A1 and B1 (already mounted) 2 nd pair connectors A2 and B2 3 rd pair connectors A3 and B3 4 th 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: EXM 27-004 - 4 MB - 2 512 Kb x 36 SIMMs EXM 27-998 - 8 MB - 2 1 Mb x 36 SIMMs EXM 27-016 - 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 | XGA board GO589 VGA resolution only XGA-2 board GO2002 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 | |

30

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

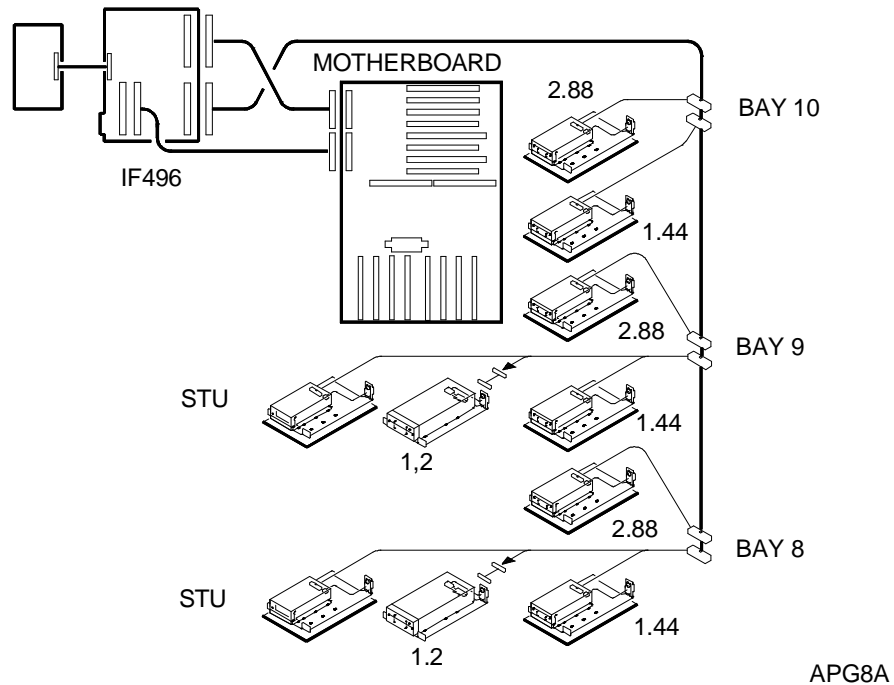
If there are no external SCSI devices, the hard disk or primary disk pack in bay 1 and the SCSI controller must always be terminated. If there are SCSI peripherals connected outside of the system module, the terminator must be removed from the SCSI controller and the last external peripheral connected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

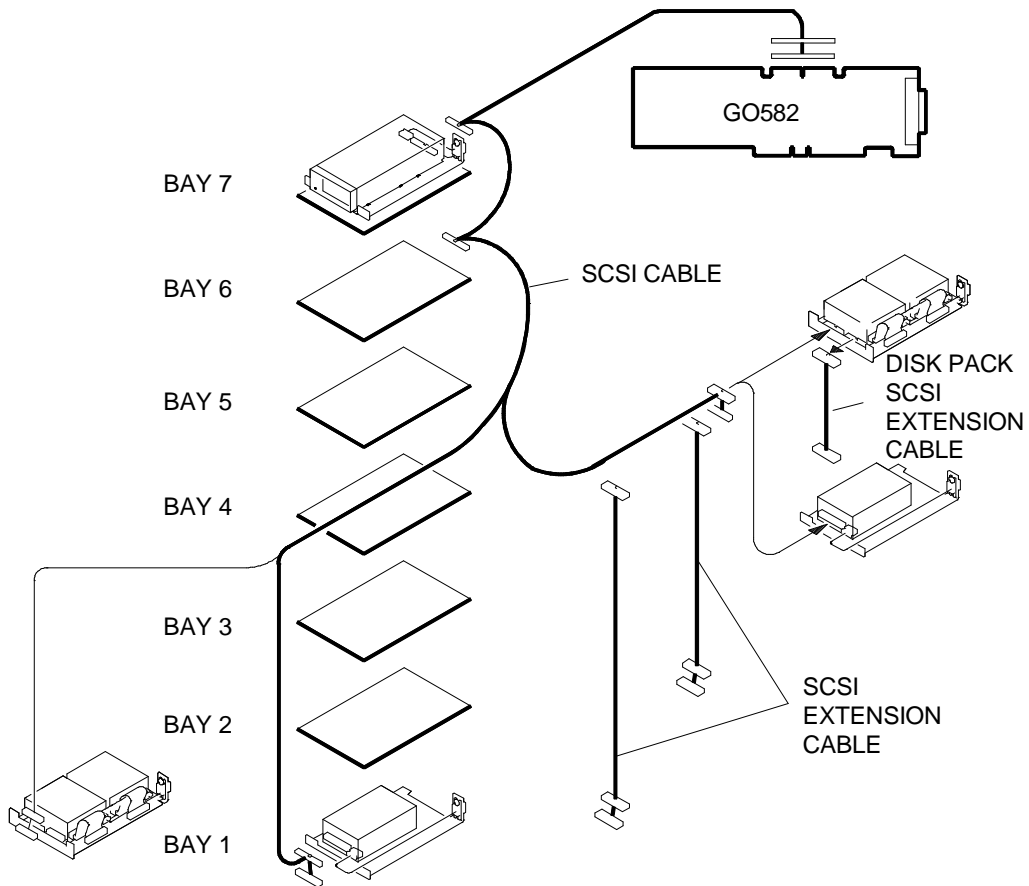


Wiring of SCSI interface peripherals

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"> - Connector for insertion of CPU board - Connectors for MCA expansion - Sockets for SIMM modules - CMOS RAM and Real Time Clock - Keyboard and mouse interface - Floppy interface - Serial interface - Parallel interface |

30

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"> - i486 DX processor - 128 KB of ROM BIOS - Memory Controller - DMA controller |

XGA VIDEO ADAPTER BOARD

| | LEVEL | D.R.S. CODE | BIOS | NOTES |
|--------|------------------|-------------|------|---|
| GO589 | Nasc. Lev. 01 | | | IBM XGA video adapter board. 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"> - The termination resistances are incorporated on board GO610 therefore this board does not require an external terminator on the cable as GO582 does. - Different printed circuit board - New BIOS |

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. |

30

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. |

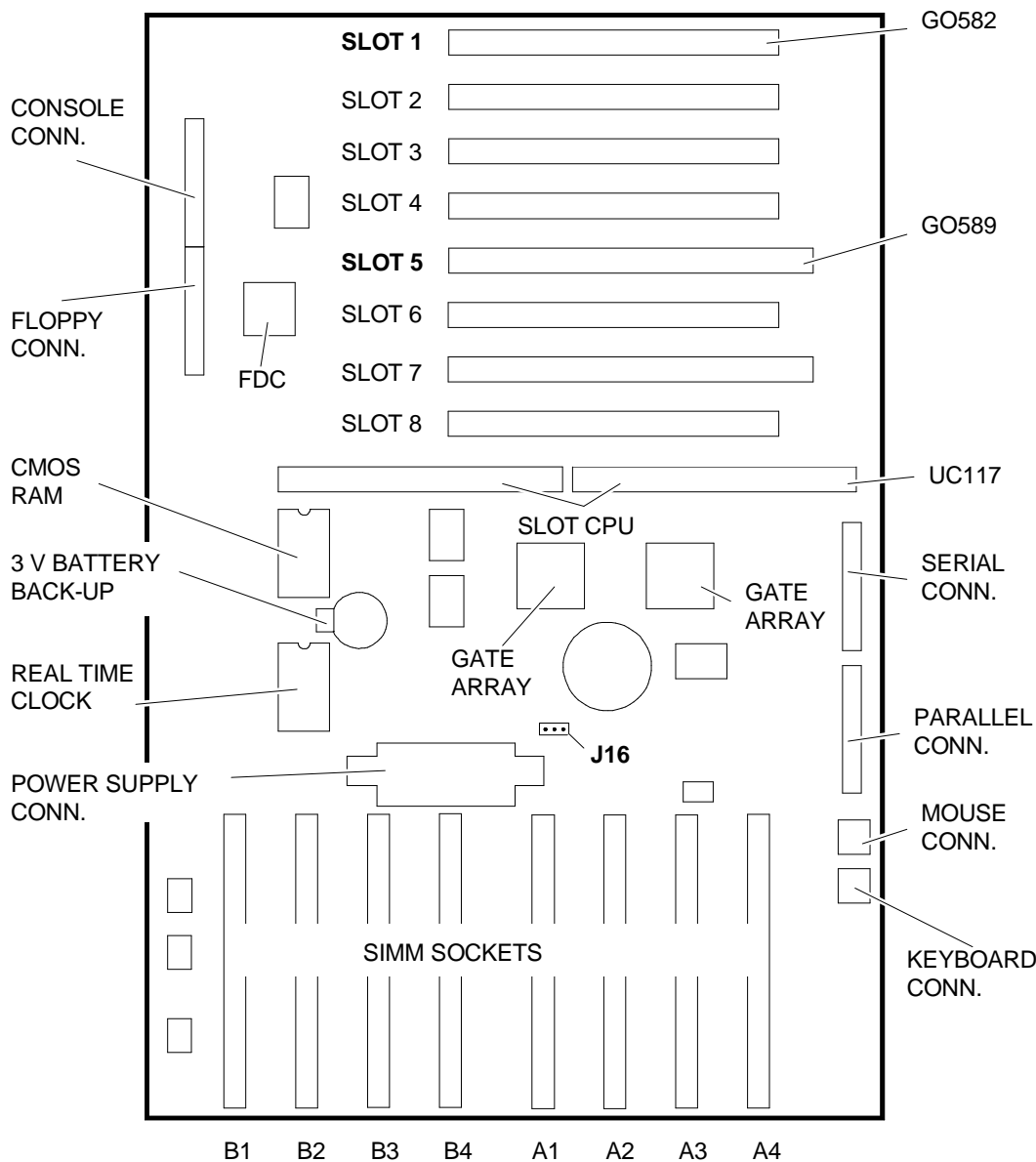
SOFTWARE COMPATIBILITY

| OPERATING SYSTEMS | NOTES |
|--|---|
| 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

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

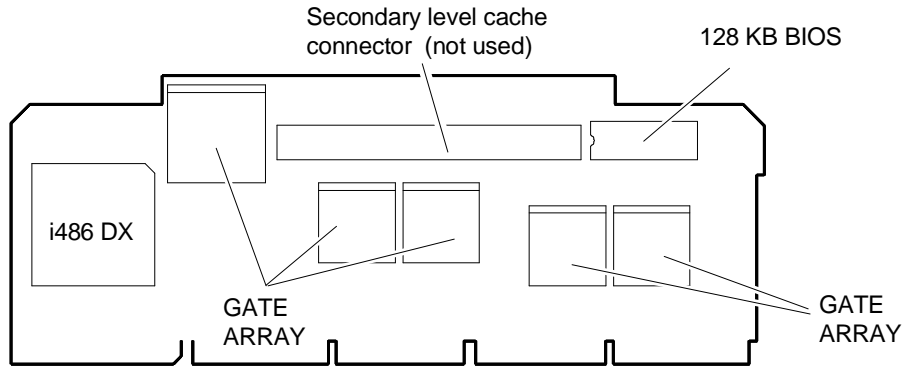
MOTHERBOARD COMPONENTS AND JUMPERS



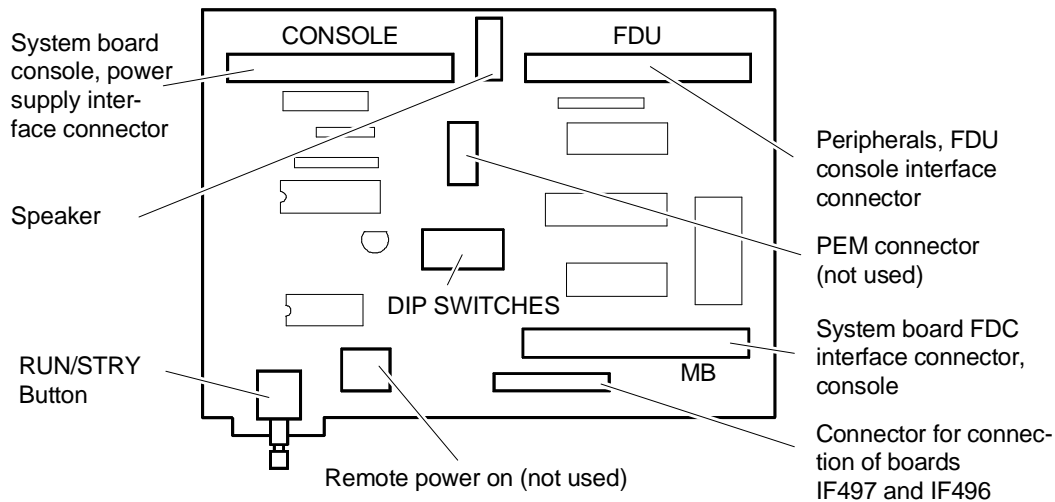
JUMPER J16 Password erase

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

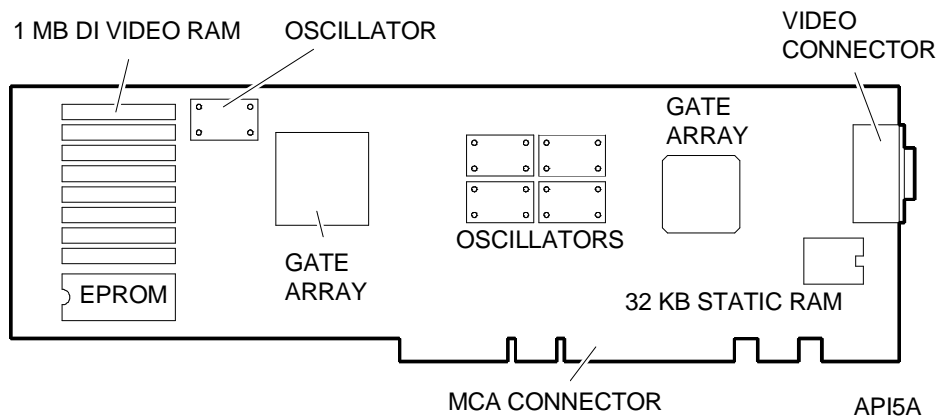


DIP-SWITCHES Configuration of floppy disk interface peripherals

| 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 | Lower | # | ON | ON | OFF | OFF | OFF | OFF | OFF |
| | 2.88 MB FDU | Upper | # | OFF | ON | OFF | OFF | OFF | OFF | OFF |
| | 1.2 MB FDU (with cable) | Lower | # | ON | OFF | OFF | OFF | OFF | OFF | OFF |
| | 80/120 MB STU | Lower | # | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| THIRD FLOPPY DISK INTERFACE PERIPHERAL | | | | | | | | | | |
| 8 | 1.44 MB FDU | Lower | # | # | # | ON | ON | OFF | OFF | OFF |
| | 2.88 MB FDU | Upper | # | # | # | OFF | ON | OFF | OFF | OFF |
| | 1.2 MB FDU (with cable) | Lower | # | # | # | ON | OFF | OFF | OFF | OFF |
| | 80/120 MB STU | Lower | # | # | # | OFF | OFF | OFF | OFF | OFF |

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

XGA VIDEO CONTROLLER COMPONENTS



30

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 | 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

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

1st part of the EPROM code on the system board

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

POWER SUPPLY

400 W PS40

CONSOLE

Hardware module composed of 2 boards:
IF496

Interface circuits with the system board

IF497

Display for messages

NETWORK BOARDS

NCU 9164 GO528
Token Ring 4 Mbit/s

NCU 9174 GO553
Token Ring 4-16 Mbit/s
LCU 3474

WAN line controller
LCU 9216 GO516
Intelligent WAN line controller

31

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.

31

Termination rules

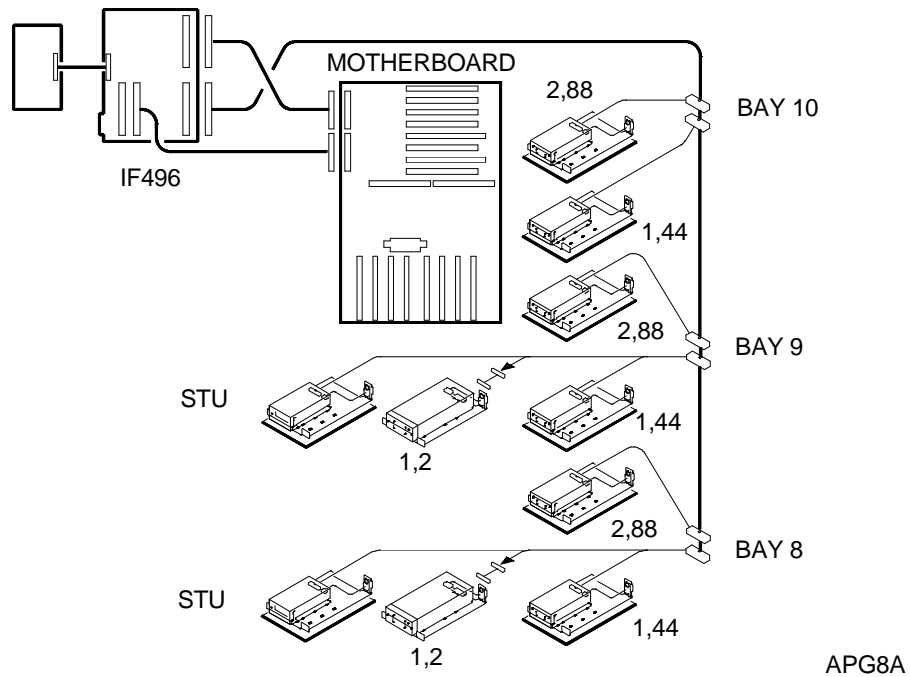
If there are no external SCSI peripherals, the hard disk or primary disk pack in bay 1 and the SCSI controller must always be terminated. If there are external SCSI peripherals connected to the basic module, the terminator must be removed from the SCSI controller and the last external peripheral connected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

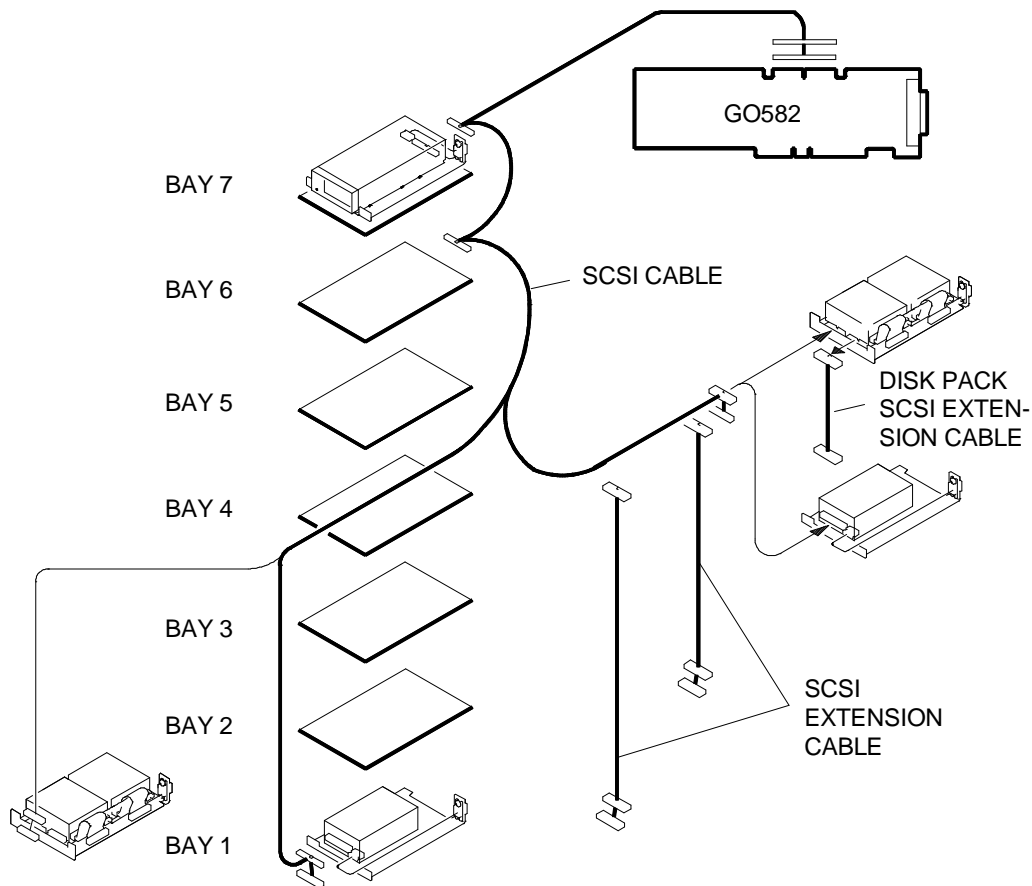


Wiring of peripherals with SCSI interface

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: <ul style="list-style-type: none"> - 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 |

31

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: <ul style="list-style-type: none"> - i486 DX processor - 128 KB BIOS ROM - Memory Controller - DMA controller |

XGA VIDEO CONTROLLER

| | LEVEL | D.R.S. CODE | BIOS | NOTES |
|--------|---------|-------------|------|---|
| GO589 | Nasc. | 553037 L | | IBM XGA video controller |
| | Lev. 01 | | | 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: <ul style="list-style-type: none"> - The termination resistances are incorporated on board GO610 so this board does not need an external terminator on the cable as board GO582. - Different printed circuit board - New BIOS |

DISK PACK IF 487 BOARD

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

CONSOLE

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

POWER SUPPLY DISTRIBUTION BOARD

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

USER DISKETTE

| LEVEL | COMPATIBILITY |
|-----------|---------------|
| Rev. 1.20 | |

SYSTEM TEST

| LEVEL | COMPATIBILITY |
|-------|---------------|
| | |

POWER SUPPLY

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

NOTES ON COMPATIBILITY

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

SOFTWARE COMPATIBILITY

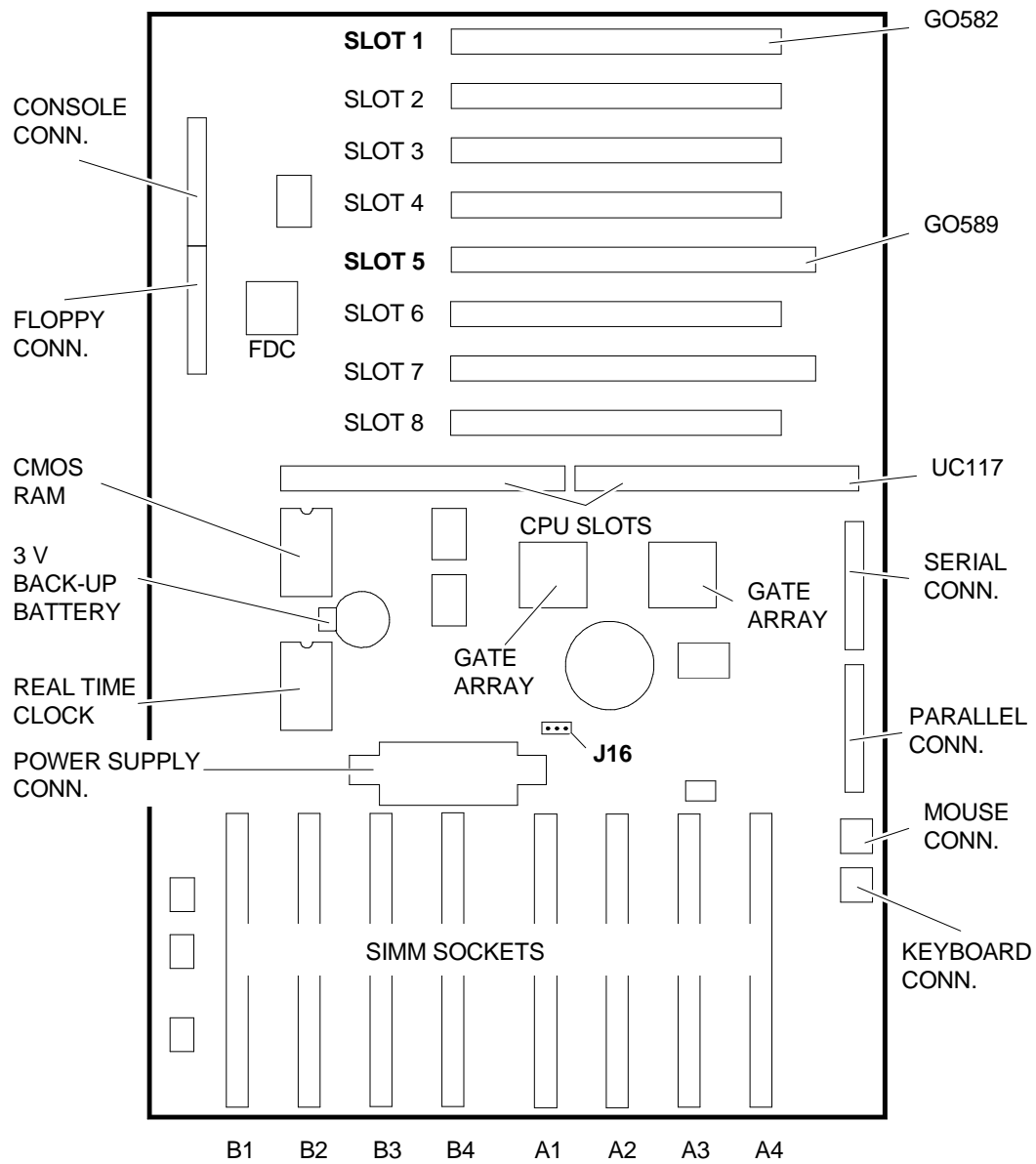
| OPERATING SYSTEM | NOTES |
|--|--|
| IBM DISK Operating System, DOS 3.3X, 4.XX, 5.XX and later releases. Olivetti OS/2, from Version 1.3 upd 2, 20.0 IBM Operating System/2 standard edition, Ver. 1.1, 1.2, 1.3 and later releases. IBM Operating System/2 Extended Edition, Ver. 1.1, 1.3 and later versions.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

31

HARDWARE COMPATIBILITY

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

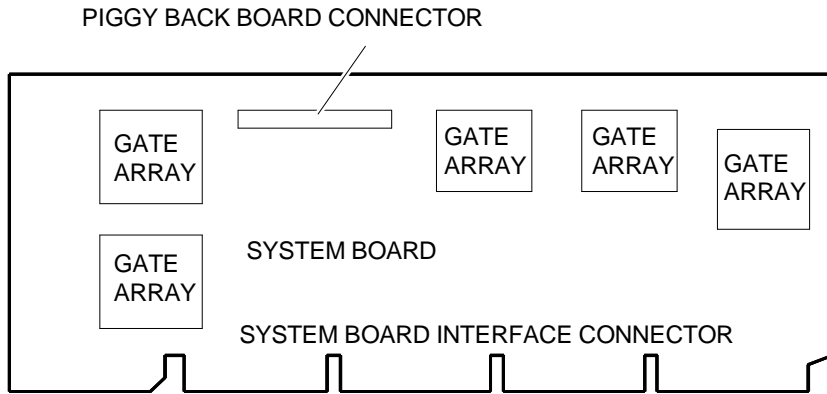
MOTHERBOARD COMPONENTS AND JUMPERS



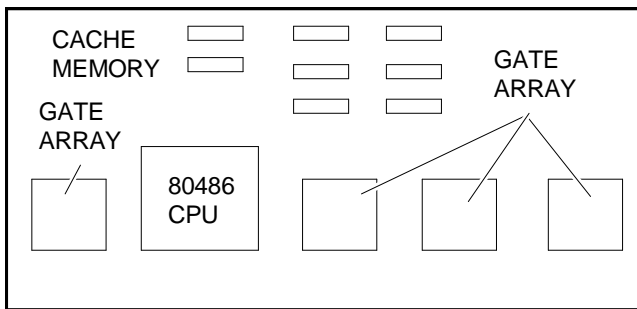
JUMPER J16 Password erase

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

CPU BOARD COMPONENTS



31

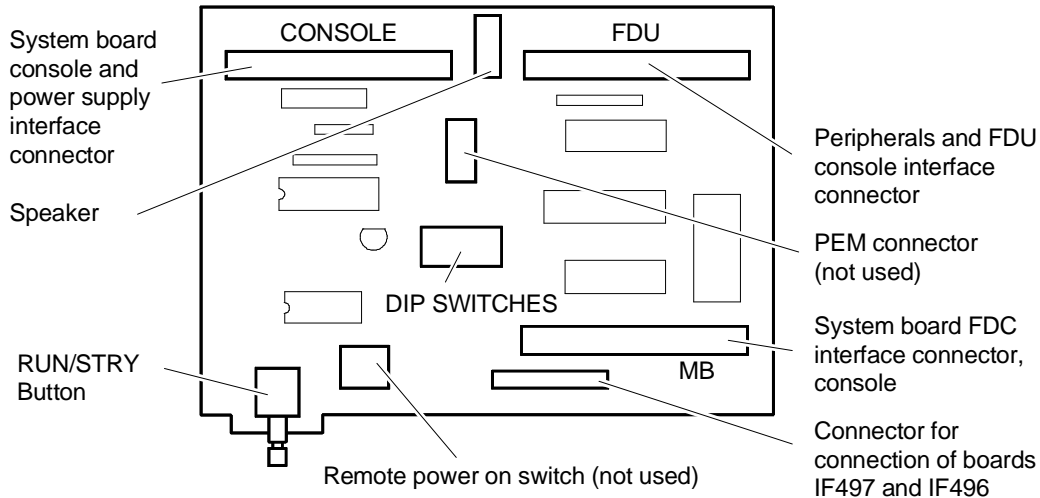


PIGGY BACK BOARD

API9A

There are no jumpers on this board.

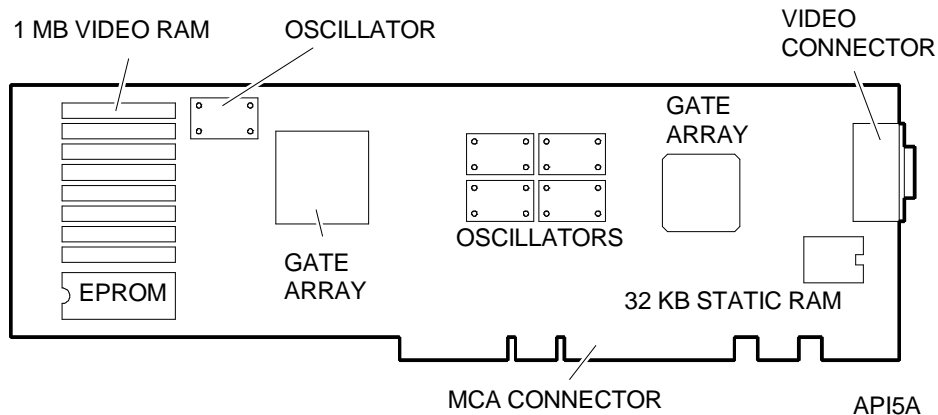
CONSOLE BOARD IF496 COMPONENTS AND JUMPERS



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 | ON | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| | 2.88 MB FDU | Upper | OFF | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| SECOND PERIPHERAL WITH FLOPPY DISK INTERFACE | | | | | | | | | | |
| 9 | 1.44 MB FDU | Lower | # | ON | ON | OFF | OFF | OFF | OFF | OFF |
| | 2.88 MB FDU | Upper | # | OFF | ON | OFF | OFF | OFF | OFF | OFF |
| | 1.2 MB FDU (with cable) | Lower | # | ON | OFF | OFF | OFF | OFF | OFF | OFF |
| | 80/120 MB STU | Lower | # | OFF | OFF | OFF | OFF | OFF | OFF | OFF |
| THIRD PERIPHERAL WITH FLOPPY DISK INTERFACE | | | | | | | | | | |
| 8 | 1.44 MB FDU | Lower | # | # | # | ON | ON | OFF | OFF | OFF |
| | 2.88 MB FDU | Upper | # | # | # | OFF | ON | OFF | OFF | OFF |
| | 1.2 MB FDU (with cable) | Lower | # | # | # | ON | OFF | OFF | OFF | OFF |
| | 80/120 MB STU | Lower | # | # | # | OFF | OFF | OFF | OFF | OFF |

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



XGA VIDEO CONTROLLER COMPONENTS

This board does not have any jumpers.

INTERRUPT LEVELS

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

I/O ADDRESS MAP

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

SYSTEM MEMORY MAP

| ADDRESS | SIZE | FUNCTION |
|----------------------|-------------|----------------------|
| 00000000 - 0007FFFF | 512 KB | System DRAM |
| 00080000 - 0009FFFF | 128 KB | I/O RAM |
| 000A0000 - 000BFFFF | 128 KB | Video controller RAM |
| 000C0000 - 000DFFFF | 128 KB | I/O ROM |
| 000E0000 - 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 EXM 25-532 (2 MB) 4 M x 9 EXM 26-809 (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 STU 38-120 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 |

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

32

MOTHERBOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | NOTES |
|--------------|---------|-------------|-----------|--|
| BA-08 | 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"> - New BIOS to solve the following problems: - Random system crashes - No system bootstrapping - Incorrect management of the S-RAM board and of the A20 GATE signal - New hard disk table - Video controller WD90C11 has been replaced by the equivalent controller WD90C11A-LR. |
| | 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 |
|-------------|---------|-------------|-----------------------------|
| M203 | Nasc. | 059135X | |
| | Lev. 02 | | The DIODE has been replaced |

MOTHERBOARD INTEGRATED CONTROLLERS

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

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"> - Random system crashes - No system bootstrapping - Incorrect management of the S-ROM board and of the A 20 GATE signal. - New hard disk table |

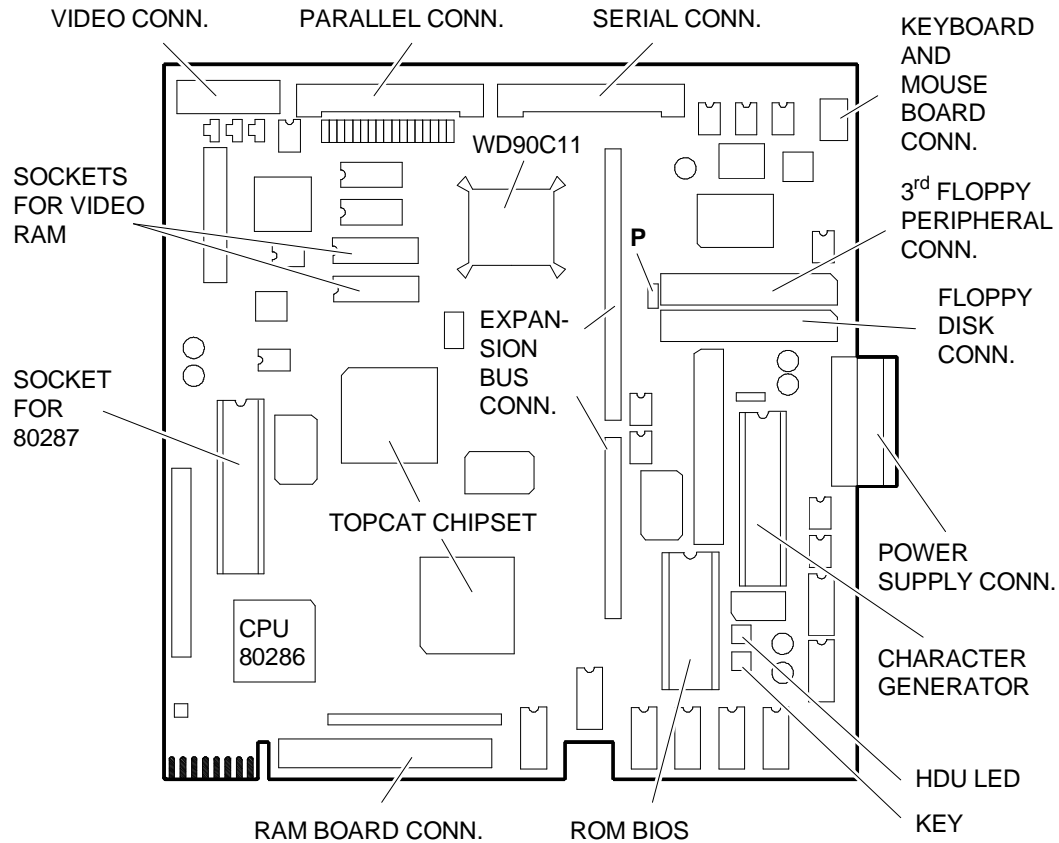
SOFTWARE COMPATIBILITY

| 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

| MODEMS | I/P INTERFACE PRODUCTS |
|---|--|
| 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 |
| MULTIPOINT | MOUSE |
| 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 |
| GRAPHIC PRODUCTS | NETWORK & LAN PRODUCTS |
| 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 |
| DISPLAY UNITS | |
| 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



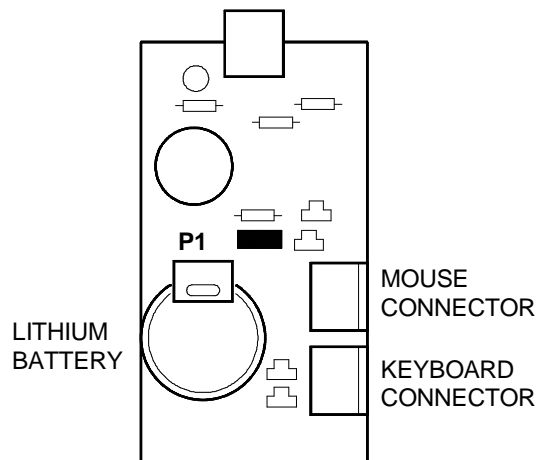
AMD3A

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

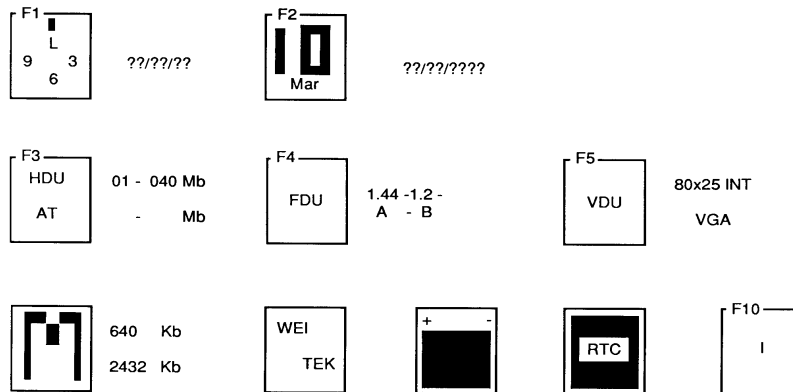
This program, resident in ROM BIOS, allows users to change some of the Personal Computer configuration parameters.

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.

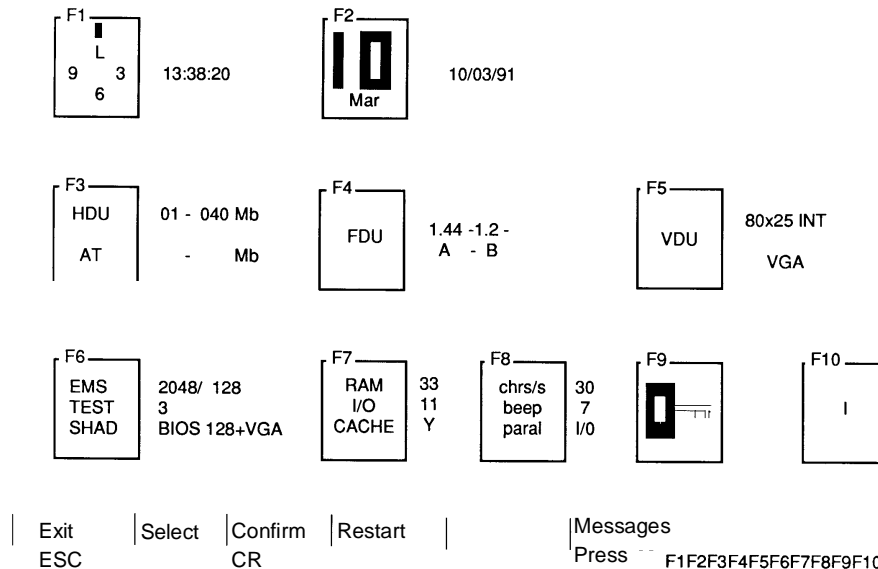
NOTE: To install a floppy interface streaming tape, the data field corresponding to this unit must not contain any value and the drive must have logic name B associated with it.

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

| | |
|----------------------------|---|
| Memory | 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. |
| 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 <i>Real Time Clock</i> . |
| Language | 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.



32

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.
- 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 | Cancels 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

| ADDRESS | FUNCTION |
|--------------------|--|
| 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 EXM 25-532 (2 MB) 4 M x 9 EXM 26-809 (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 STU 38-120 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

-

33

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 |
|-------------|--|
| | 386SX CPU 20 MHz microprocessor Socket for i387SX numeric coprocessor 8042 Keyboard and mouse controller WD90C11 V.G.A. video controller 87C310 Serial and parallel port controller NATIONAL Floppy disk controller Buffer MSI Intelligent hard disk interface 27C010 BIOS EPROM TOPCAT System controller 82C320 BUS controller 82C331 |

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 | - |

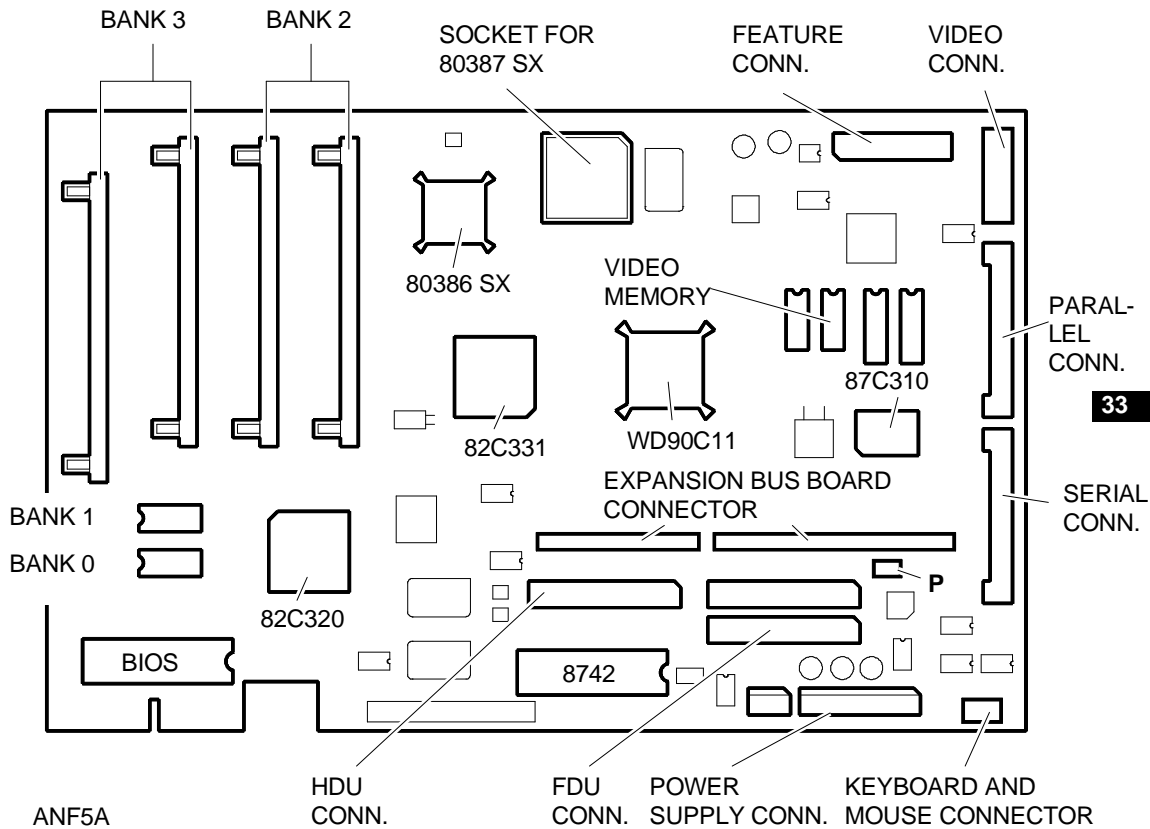
SOFTWARE COMPATIBILITY

| 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

| | |
|---|--|
| MODEM | I/O INTERFACE PRODUCTS |
| 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 |
| MULTIPOINT | MOUSE |
| 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 |
| GRAPHICS PRODUCTS | NETWORKING & LAN PRODUCTS |
| 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 |
| DISPLAY UNITS | |
| 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 |

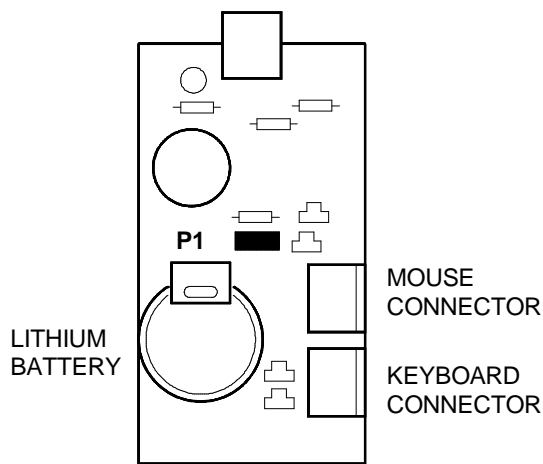
COMPONENTS AND JUMPERS OF THE SYSTEM BOARD



33

| | | |
|-----------------|--------------|-------------------|
| JUMPER P | Position 1-2 | Password disabled |
| | Position 2-3 | Password enabled |

COMPONENTS AND JUMPERS OF THE KEYBOARD AND MOUSE BOARD



| | |
|-------------------------|---------------------------------------|
| P1 inserted: | Battery enabled, data in the CMOS RAM |
| P1 not inserted: | Battery disabled, no data in CMOS RAM |

ANG1A

BUILT IN SETUP and EXTENDED SETUP Utilities

BUILT IN SETUP

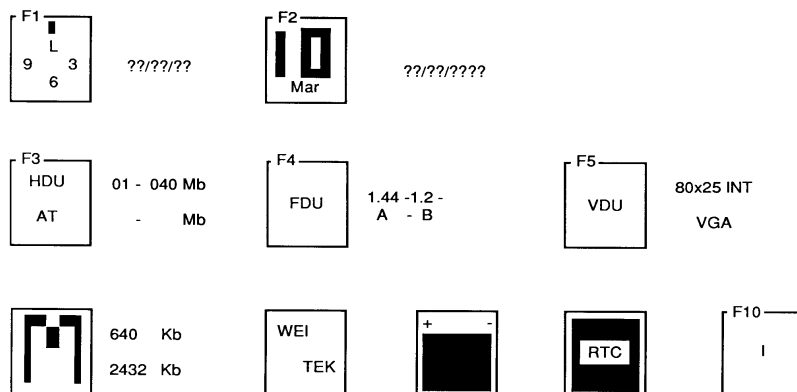
This program, resident in ROM BIOS, allows users to change some of the Personal Computer configuration parameters.

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

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.

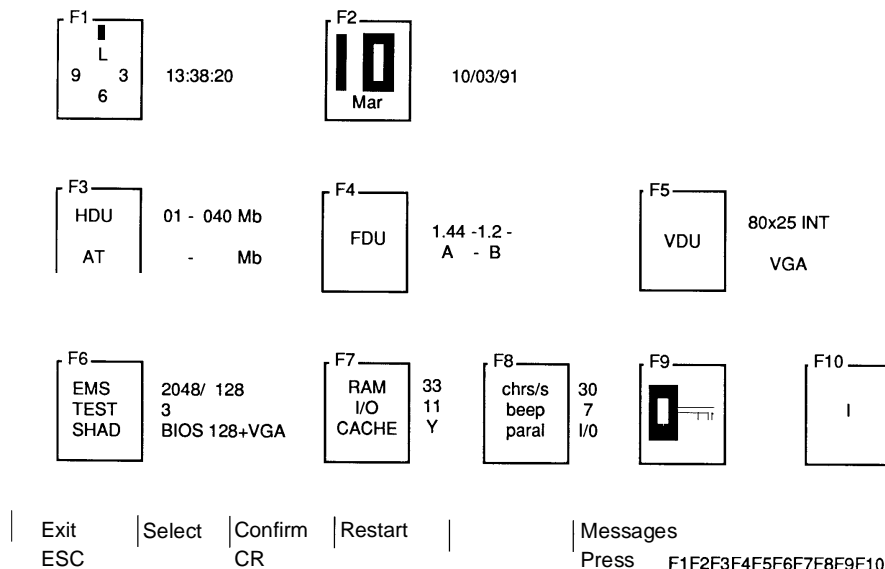
Real time clock This icon blinks when there is a failure of the system's *Real Time Clock*.

Language It is possible to select the language in which to have the messages of the BUILT IN SETUP displayed. Six languages are available.

33

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

| ADDRESS | MEMORY | FUNCTION |
|----------------------|---------------|---|
| 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 EXM 486-04 (for 4 MB) or four 4 MB x 9 SIMMs EXM 486-16 (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. This modification is only valid at field level, therefore board level changes from 03 to 03SI. |
| | 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 as long as memory expansions are made using <u>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"> - 20 MHz i486 SX CPU on the M480-10 33 MHz i486 CPU on the M480-20 - Socket for the 25 MHz WEITEK WTL 4167 on the M480-10 Socket for the 33 MHz WEITEK WTL 4167 on the M480-20 - Clock generators:14.318 MHz - 16 MHz - 50 MHz for the M480-10 Clock generators:14.318 MHz - 16 MHz - 66 MHz for the M480-20 - Keyboard controller and mouse interface 8742 OTP - VGA video adapter 82C453 - 1 MB video memory - Component BT476 - Video DAC - Color palette - ACER 87310 Serial port interface Parallel port interface Floppy disk peripherals controller Interface for intelligent AT hard disks - 128 KB ROM BIOS (2 27512 chips) - TOPCAT chip set consisting of 3 chips and integrating: <ul style="list-style-type: none"> - VL82C330 System controller - VL82C331 AT BUS controller - VL82C332 Data buffer. |

34

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"> - Excessive distribution of radio interference upon load variation - Does not comply with Danish norms. |

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. |

34

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"> - The Built-in Setup has been removed so the system is configured via User Disk - The Shadow is addressed at 0C000. - Three drives with floppy disk interface are no longer handled. - The 1.44 MB diskette drive can no longer be installed. - No longer possible to assign drive identifier A or B to any one of the two diskette drives. - The Olivetti standard fonts have been added, the Office fonts removed. - Only the Olivetti high resolution monitors can be used. - The Security utilities are handled. This requires User Disk or System Test version 3.01. |
| Rev. 2.07 | Solves the problems with Windows 3.1. |

BIOS OF THE NEW M480-20 MODELS

| LEVEL | NOTES |
|--------------|---|
| Rev. 2.07 | <p>This new BIOS revision controls the features offered by the new models:</p> <ul style="list-style-type: none"> - The Built-in Setup has been removed so the system is configured via User Disk - The Shadow is addressed at 0C000. - Three drives with floppy disk interface are no longer handled. - The 1.44 MB diskette drive can no longer be installed. - No longer possible to assign drive identifier A or B to any one of the two diskette drives. - The Olivetti standard fonts have been added, the Office fonts removed. - Only the Olivetti high resolution monitors can be used. - The Security utilities are handled. This requires User Disk or System Test version 3.01. |
| Rev. 2.08 | Solves the problems with Windows 3.1. |

SOFTWARE COMPATIBILITY

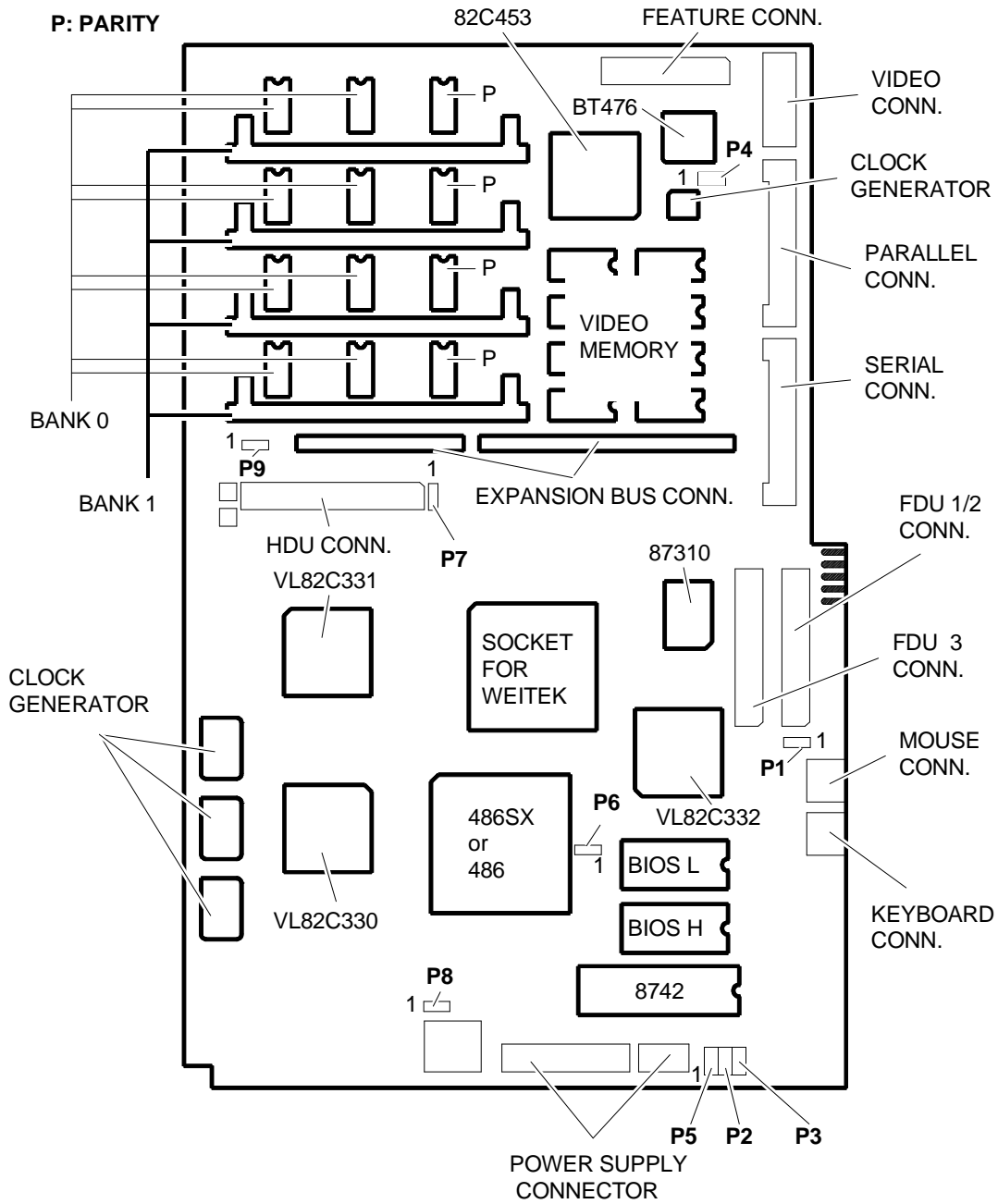
| OPERATING SYSTEMS | NOTES |
|--|--|
| IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01 MS-DOS Ver. 5.0 | A formatted DSDD diskette is required during installation on hard disk |
| IBM Operating System/2, Ver. 1.10 and 1.20 IBM Operating System/2 Extended Edition, 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 |
| 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

| MODEMS | I/O INTERFACE PRODUCTS |
|---|--|
| 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 |
| MULTIPOINT | MOUSE |
| 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 |
| GRAPHICS PRODUCTS | NETWORKING & LAN PRODUCTS |
| 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 |
| DISPLAY UNITS | |
| 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 |

34

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.

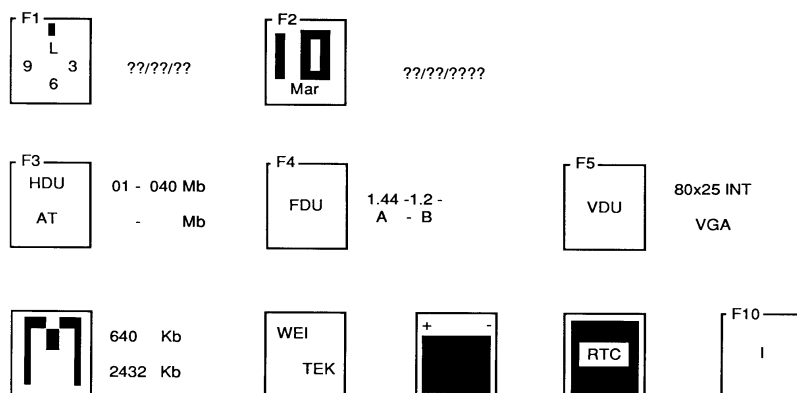
BUILT IN SETUP

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.

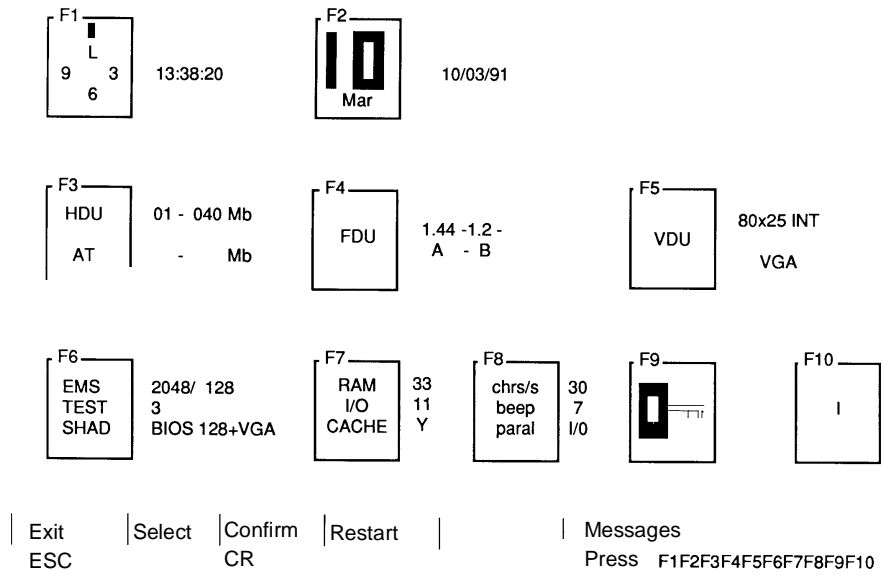
Batteries This icon is displayed only when the system is switched on for the first time or when the system batteries are not charging.

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 |

34

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: EXM 28-004 4 MB (1MB x36) SIMMs EXM 28-008 8 MB (2MB x 36) SIMMs EXM 28-016 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 STU 38-120 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

35

MOTHERBOARD

| | LEVEL | D.R.S. CODE | BIOS ROM | NOTES |
|--------------|---------|-------------|---|---|
| BA362 | 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"> - Two connectors for expansion boards - The CMOS RAM battery |
| | 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"> - The speaker - Hard disk LED. |

MOTHERBOARD INTEGRATED CONTROLLERS

| MOTHERBOARD | INTEGRATED CONTROLLERS |
|-------------|---|
| BA362 | i486SX CPU 25 MHz microprocessor Socket for the i487SX math coprocessor or for the Overdrive Coprocessor. 8042 Keyboard and mouse controller OAK OTI-077 VGA video controller 87C311 - Serial and parallel port controller Floppy disk controller - Intelligent hard disk interface VL-82C486 - DMA controller - Interrupt controller - Timer - System memory controller - System bus controller - Clock generator 82C113A - Real Time Clock - 128 byte CMOS RAM powered by a lithium battery - Address latch IMI SC407BXB System clock generator 1 MB Flash EPROM |

35

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. | Modifications to the metal cover. |
| | Lev. 01 | |
| ALI-LA/16B 220 V | Nasc. | Modifications to the metal cover. |
| | Lev. 01 | |

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 25 | |
| V032004 e 25 | |
| V032004 g .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 k 25 | This BIOS version solves the problem of the Security utilities not accepting numeric characters. |

SOFTWARE COMPATIBILITY

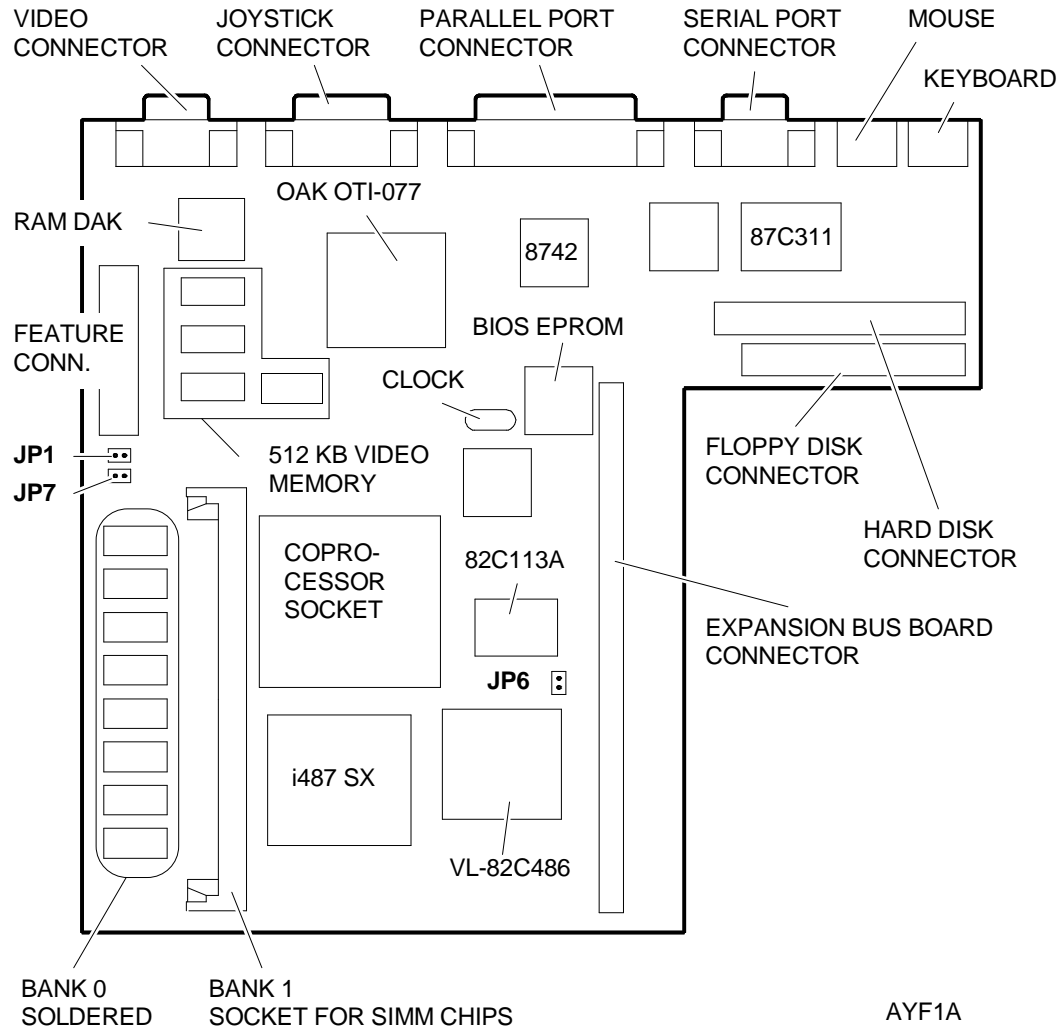
| OPERATING SYSTEMS | NOTES |
|--|--------------|
| MS-DOS Release 5.0 OS/2 Release 2.0 OS/2 Release 1.3 SE SCO UNIX System V Version 3.2.4 WINDOWS Ver. 3.1 | |

HARDWARE COMPATIBILITY

| MODEMS | I/O INTERFACE PRODUCTS |
|---|--|
| 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 |
| MULTIPOINT | MOUSE |
| 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 |
| GRAPHICS PRODUCTS | NETWORKING & LAN PRODUCTS |
| 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 |
| MONITORS | |
| IBM 8503 Monitor IBM 8514 Monitor NEC 3D Monitor | Multisync 3D monitor |

35

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.

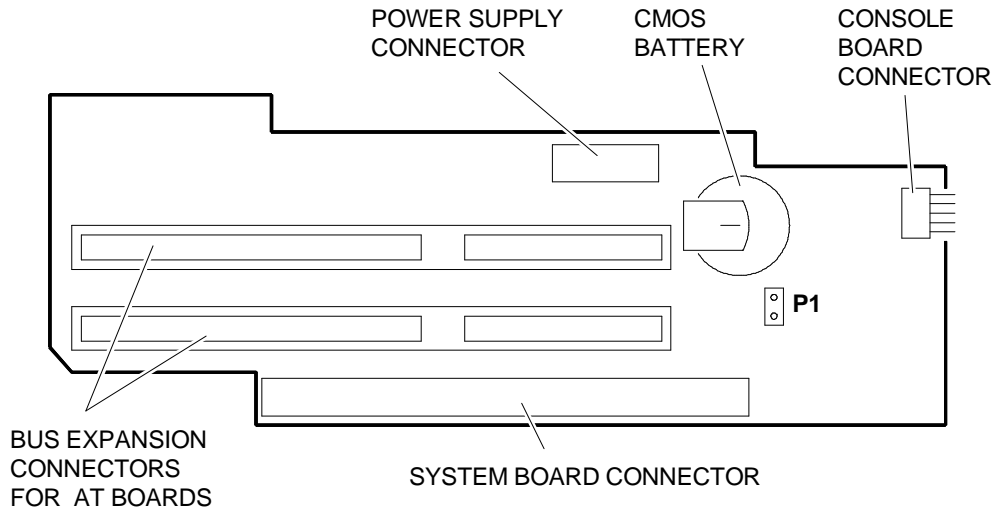
Installed The contents of the CMOS are cancelled and therefore system SETUP is lost.

JUMPER JP7

Not installed Normal operation. This is the default setting.

Installed The password is cancelled.

BUS EXPANSION BOARD COMPONENTS AND JUMPERS

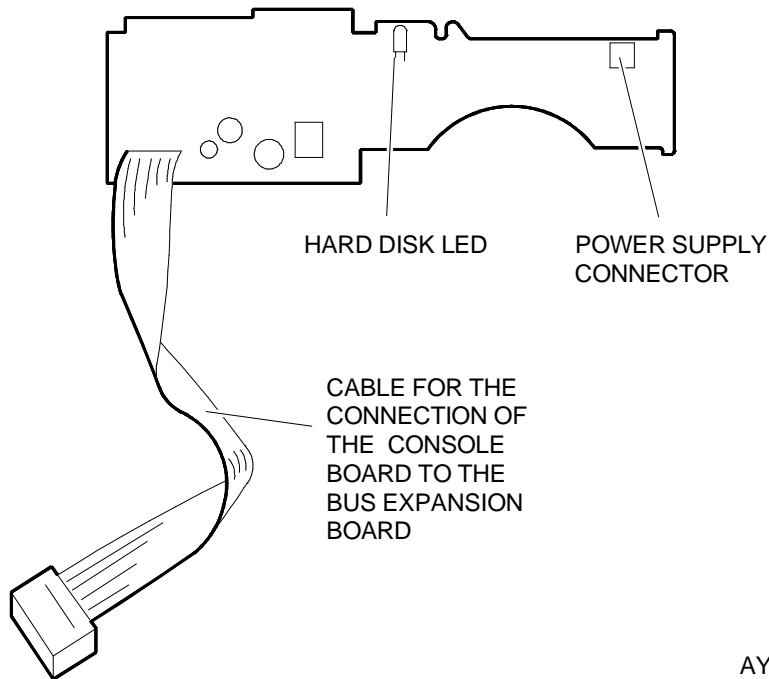


AYD3A

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.

1st 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.

35

| 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 |

| DISK | TYPE | CYLS | HDS | SEC | PRE | ZONE |
|-------------|-------------|--|------------|------------|------------|-------------|
| 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.

2nd 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.

3rd 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.

4th 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

| ADDRESS | FUNCTION | ADDRESS | FUNCTION |
|----------------|--|----------------|---|
| 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 | | |

INTERRUPT LEVELS

| INTERRUPT | FUNCTION |
|------------------|---|
| 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

| CHANNEL | FUNCTION |
|----------------|-------------------|
| 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

| ADDRESS | FUNCTION |
|-------------------|--|
| 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 |
|-------------------------|---|
| Welcome | <p>This program is used to customize the system. It must be launched after the POD when the system is powered-on for the very first time.</p> <p>WARNING: 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"> - Define the type of keyboard used and the national language version - Choose, install and configure the software platform - Install the MS-DOS 5.0 operating system. Make a back-up copy of this operating system - Install Windows 3.1 - Install Antivirus Norton - Install DoubleDisk - Run the Tutorial - Install the Enhanced Video Drivers |
| MS-DOS 5.0 | Operating system |
| Windows 3.1 | Graphics environment |
| Norton Antivirus | Antivirus utility. |
| DoubleDisk | Hard disk data compression utility. Virtually extends the capacity of the hard disk. |
| Tutorial | Gives technical information on the system, hardware modules and software. |

35

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 Bank 0: 4 MB soldered Banks 1, 2 and 3: Three SIMM sockets: 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 - 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 Irwin 31250A with floppy inter. 150 MB SCSI Wangtek 5159ES 320 MB SCSI Wangtek 5525ES - 5525ES-ACA . Requires the ASC-2 controller |
| Slots | Four 16-bit connectors on the expansion bus Continued |

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>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.</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>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.</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>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.</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"> - New printed circuit wirings. - 100 Ohm resistances R521, R522 have been changed to 200 Ohm. This modification solves the problem with background colors when using Windows 3.1. <p>NOTE: 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"> - 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. - 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. <p>NOTE: 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"> - 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. - To cut costs, some capacitors have been replaced. |
| 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"> 1) Resistance R522 and capacitor C280 no longer need to be mounted 2) R407 switches from 33 Ohm to 0 Ohm 3) New BIOS Rev. 1.10 |

| | LEVEL | D.R.S CODE | ROM BIOS | NOTES |
|--------|---------|------------|-----------|--|
| BA2003 | Lev. 06 | 557980 T | Rev. 1.14 | <ul style="list-style-type: none"> - The values of some capacitors have been changed in order to solve the problems with the DM 124, DM 324 and DM 624 printers. - Some resistances have been replaced in order to solve noise problems at the audio output. - 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. |
| | 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"> - The AMP 50x2 ISA BACKPLAIN connector is replaced by the FOX CONN 50x2 ISA BACKPLAIN connector. (This modification is not necessary on board BA2004.) - Introduction of revision A of the CS4021 chipset which consists of 2 gate arrays: <ul style="list-style-type: none"> - 84021A (corrects the faults) - 84025A (production improvements) Since only gate array 84021A corrects the faults, the 84021 Rev. A can be mounted together with the earlier 84025. 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"> - In production this socket is inserted at system level, so the board does not change level. - In field this socket must be installed between SK9 and the processor. 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"> - Signal PCLK was cut from the feature connector - A 33 Ohm resistor was added to the same pin from which the signal was cut. |

| | 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. NOTE: 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"> - 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. - 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. NOTE: 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"> - 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. |
| | 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"> 1) Resistance R522 and capacitor C280 no longer need to be mounted 2) R407 switches from 33 Ohm to 0 Ohm 3) New BIOS Rev. 1.10 |
| | Lev. 07 MI | | Rev. 1.14 | <ul style="list-style-type: none"> - The values of some capacitors have been changed in order to solve the problems with the DM 124, DM 324 and DM 624 printers. - Some resistances have been replaced in order to solve noise problems at the audio output. - New BIOS 1.13 for True Color video mode management. The following new diagnostic releases have to be used: <div style="margin-left: 40px;">System Test 1.08</div> <div style="margin-left: 40px;">System region Setup 1.08.</div> |
| | 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"> - 84021A (corrects the faults) - 84025A (production improvements) <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 |
|---------------|----------------|------------|-----------|---|
| BA2004 | <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"> - In production this socket is inserted at system level, so the board does not change level. - In field this socket must be installed between SK9 and the processor. <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"> - Signal PCLK was cut from the feature connector - A 33 Ohm resistor was added to the same pin from which the signal was cut. |
| | <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>CPU: These systems can host the following CPUs: i486 SX - i486 DX - 486 DX2</p> <p>Overdrive II Performance Upgrade Socket: This socket can host the following processors: i487 SX - i486 DX2 - P24T OverDrive Processor</p> <p>82C4021 Integrates the following functions:</p> <ul style="list-style-type: none"> - DMA controller - memory controller - interrupt controller - Timer - Secondary level cache controller - Clock generator - System reset and sync signals generator - System bus controller - Local data bus interface - Local address bus interface - Real Time Clock (system date and time) - CMOS RAM - 128 KB of non-volatile RAM powered by a Lithium battery that stores data when the system is powered off <p>82C4025 Integrates the following functions:</p> <ul style="list-style-type: none"> - Local data bus interface - Control unit for signal decoding - System data bus interface - Data buffer <p>Socket for the secondary level cache implementation module</p> <p>8042 Keyboard and mouse controller</p> <p>87312 Integrates the following functions:</p> <ul style="list-style-type: none"> - Floppy disk controller - Interface for two serial ports - Parallel interface - Intelligent hard disk drive interface <p>ATI 68800LX Super VGA video controller</p> <p>ICD2027 Programmable system clock generator</p> <p>ATI-18811 Programmable video clock generator</p> <p>BT481 RAMDAC video analog/digital converter</p> <p>BIOS Flash EPROM</p> <p>EYE 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"> - New 47 pF capacitor between the IORD* and GND signal - New space on side B. |
| | 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"> - 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.. - 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. - The On-Line Documentation manual has been changed. - The Settex utility has been modified. - The Sound utility has been modified for the 66 MHz i486 DX2 CPU. - The serial port test has been optimized. - The passwords have been modified so that they can be handled as ASCII codes - The CPU test recognizes the i486 DX2 processor. <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"> - The memory test has been changed. - The floppy disk test has been changed. |
| Rev. 1.04 | <p>The following changes have been made to this release:</p> <ul style="list-style-type: none"> - 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.. - Possibility of managing memory above 100 MB. - The firmware revision utility has been changed. - The way in which 1.2 drives are managed has been changed. <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"> - The hard disk test also recognizes SEAGATE hard disks. - A test is run on Dedicated Memory Calculation. - The test on the 1.2 MB floppy disk drive has been changed. - The keyboard test is capable of recognizing between PS/2 and AT keyboards. - The M6-450 logotype has been added. - The video test for the graphics accelerator has been added. <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"> - The hard disk test has been modified so that 1 GB hard disks can be tested. - The floppy disk test has been modified to optimize its code. - The keyboard test has been modified. The interrupt subtest has been added. |

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"> - Memory test - the Cache Memory subtest is not supported. - VGA test - The DMA Transfer and Truecolor subtest are not supported. |
| 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"> - The Setup utility has been updated as far as the management of memory above 100 MB is concerned. - Possibility of configuring high capacity hard disk drives - The sound utility has been modified for the 66 MHz i486 DX2 CPU. - The floppy disk test has been added. |
| 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"> - Updated memory test. - 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.. - The firmware revision utility has been changed. - Updated floppy disk test. |
| 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"> - The hard disk test also recognizes SEAGATE hard disks. - A test is run on Dedicated Memory Calculation. - The test on the 1.2 MB floppy disk drive has been changed. - The keyboard test is capable of recognizing between PS/2 and AT keyboards. - The M6-450 logotype has been added. - The video test for the graphics accelerator has been added. |
| 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"> - The hard disk test has been introduced. - The keyboard test is capable of recognizing between PS/2 and AT keyboards. - The mouse test has been optimized. - Updated CPU cache test. |
| 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"> - The Parking Heads utility is not present. - 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. |
| 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"> - 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. - 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. - The On-Line Documentation manual has been changed. - The Settex utility has been modified. - The Sound utility has been modified for the 66 MHz i486 DX2 CPU. - The serial port test has been optimized. - The passwords have been modified so that they can be handled as ASCII codes - The CPU test recognizes the i486 DX2 processor. <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"> - Updated memory test. - Updated floppy disk test. <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"> - 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. - Possibility of managing memory above 100 MB. - The firmware revision utility has been changed. - The way in which 1.2 drives are managed has been changed. <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"> - The hard disk test also recognizes SEAGATE hard disks. - A test is run on Dedicated Memory Calculation. - The test on the 1.2 MB floppy disk drive has been changed. - The keyboard test is capable of recognizing between PS/2 and AT keyboards. - The M6-450 logotype has been added. - The video test for the graphics accelerator has been added. <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"> - The hard disk test has been modified so that 1 GB hard disks can be recognized. - The floppy disk test has been modified to optimize its code. - The keyboard test has been modified. The interrupt subtest has been added. |

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

| DRIVER | NOTES |
|--|--|
| 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">- MS-DOS and Windows (VESA Display Power Management)- Allows the operation of OS/2 Ver. 2.1 drivers- Allows True Color mode operation at 640x480 resolution with Windows 3.1. |

BIOS

| LEVEL | NOTES |
|--------------|---|
| 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"> - Self-recognition of a pair of 8 MB SIMMs. In the previous release these SIMM pairs were not recognized. - Audio board management. - Faster test routine on the secondary level cache when RAM between 512 KB and 640 KB is disabled. - Correction of the problems concerning the recognition of the size of secondary level cache following a reset by the Setup program. - Management of the i486 DX2 50 MHz and 66 MHz clock. - Management of the ROMCS signal in the Chips & Technology 4021 chip set. |
| Rev. 1.04 | Solves the following problems of release 1.03: <ul style="list-style-type: none"> - CPU recognition with an invalid CMOS RAM. - Management of the memory gap between 12 MB and 16 MB after a hardware reset. - Video refresh rate adjustments. - Management of the system and video BIOS in the ROM BIOS. - Management of the EYE component when a VGA board is installed on the bus. - Memory test with a 33 MHz i486 DX2 CPU (66 MHz internal clock). |
| Rev. 1.05 | Solves the following problems of release 1.04: <ul style="list-style-type: none"> - 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. - Memory filling above 16 MB in case a gap forms between 12 MB and 16 MB. - Management of the Computone board installed between 512 KB and 640 KB after a jump at f000:fff0 (reset simulation) - Management of the COM2 serial port on the bus. |
| Rev. 1.06 | Solves the following problems of release 1.05: <ul style="list-style-type: none"> - Adjustment of the video timing values that cause the picture to be slightly shifted with respect to the center of the screen. - 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. - Management of the hidden partitions on high capacity hard disk drives (above 510 MB). This feature must, however, be use with the appropriate program that automatically installs hidden partitions. |
| 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"> - No "Large" memory test during the Power On Diagnostics. - 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 - 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. |
| Rev. 1.10 | <p>Solves the following problems of release 1.09:</p> <ul style="list-style-type: none"> - Possibility of disabling the second serial port through Setup. - Possibility of configuring the I/O address of the primary parallel port through Setup. - 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 - Management of the TI 68800-AX-6 video controller. |
| 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"> - Distinguishes the 486 CPU from the 486SX2 CPU during system bootstrap - Correctly handles the ETHERLINK 16 3C507 line board - Handles the Siemens SIMMs - Handles the second level of Chips and Technology's 4021 chipset - Handles hard disks with timing problems, in particular CONNER 85 MB and 170 MB drives. |
| 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

| NAME | LEVEL | NOTES |
|--------|----------------------|---|
| 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. |

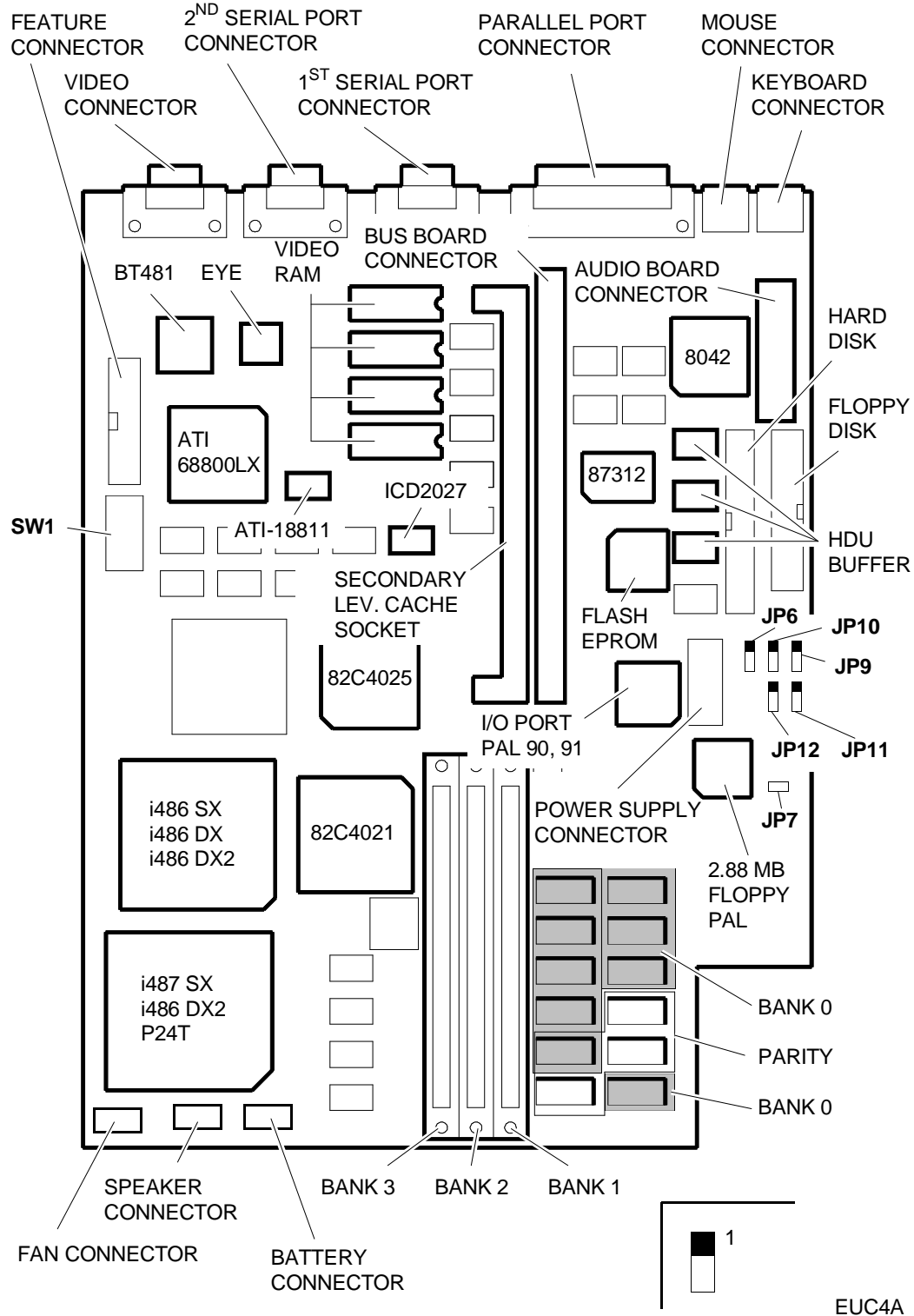
SOFTWARE COMPATIBILITY

| OPERATING SYSTEMS | NOTES |
|--|--|
| 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 | |
| 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 |

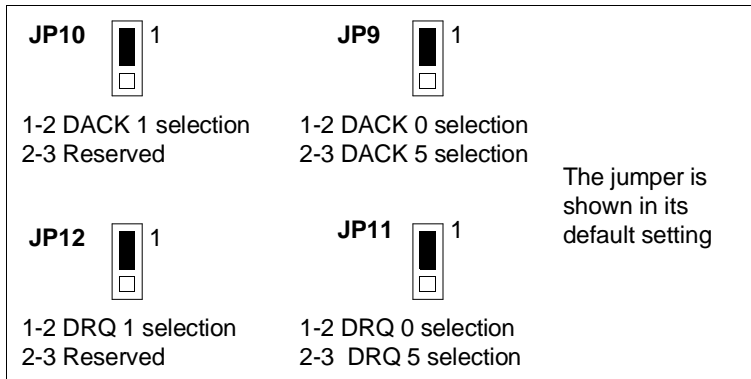
HARDWARE COMPATIBILITY

| | |
|---|--|
| MODEMS | I/O INTERFACE PRODUCTS |
| 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 |
| MULTIPOINT | MOUSE |
| 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 |
| GRAPHICS PRODUCTS | NETWORKING & LAN PRODUCTS |
| 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 |
| DISPLAY UNITS | |
| 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 |

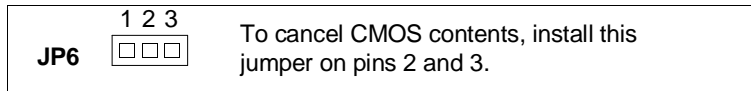
MOTHERBOARD COMPONENTS AND JUMPERS



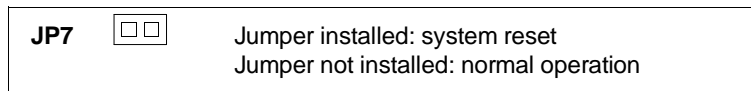
Jumpers for the audio board DMA channel selection



**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.

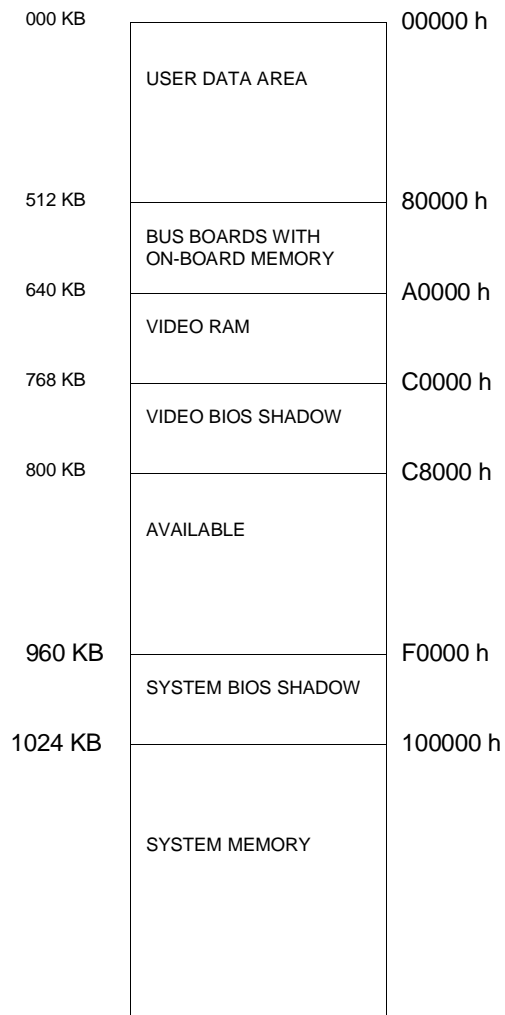
DMA CHANNELS

| 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

| ADDRESS | FUNCTION | ADDRESS | FUNCTION |
|----------------|---|----------------|--|
| 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 Bank 0: 2 MB soldered Banks 1 and 2: Four sockets that can host the following SIMMs: EXM 27-820 - 2 MB - Two 1MBx9 SIMMs EXM 27-821 - 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 VGA-MEM/02 - 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 Irwin 31250A 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

38

MOTHERBOARD

| | LEVEL | D.R.S. CODE | ROM BIOS | NOTES |
|---------------|--------------|--------------------|-----------------|---|
| BA2012 | 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>CPU 40 MHz AMD 80386 SX Math coprocessor socket 40 MHz CYRIX 80387 SX 82C390SX Integrates the following functions:</p> <ul style="list-style-type: none"> - RESET signal generator - Clock generator - System and CPU bus controller - Control of the arbitration between Device MAsTers, DMA and memory refresh - Control port B and NMI logic registers - Management of the A20 GATE signal - Cache controller - Memory controller - BIOS shadow control - Memory relocation control - Control of concurrent memory refresh and normal PC refresh - 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) - Math coprocessor interface - Generation of the system sync signals <p>MCM6264 Components implementing 16 KB cache memory 83C206Q Integrates the following functions:</p> <ul style="list-style-type: none"> - 114 bytes of CMOS RAM backed up by a lithium battery to maintain the data stored even after the system is powered off. - Real Time Clock - DMA controller - Interrupt controller <p>27C010 128 Kb x 8 ROM BIOS 87310 Integrates the following functions</p> <ul style="list-style-type: none"> - Floppy disk controller - Interface for two serial ports - Interface for the parallel port - Interface for intelligent hard disk drives <p>8042 Keyboard and mouse controller CL-GD5422 Super VGA controller ICD2027 System programmable clock generator 74LS293 Speaker volume control</p> |

38

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 | <p>Requires BIOS release 1.01 or later.</p> <p>This release has the following restrictions:</p> <ul style="list-style-type: none"> - The Hard Disk parking utility is not present. - 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 - The video tests of release 1.01 do not support the "high resolution graphics" video mode |
| Rel. 1.01 | <p>Requires BIOS release 1.02 or later.</p> <p>The following modifications are made with respect to the previous release:</p> <ul style="list-style-type: none"> - 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. - The video test has been modified to support the new vertical refresh rates. - The floppy disk test has been modified so that it can work correctly on 1.2 MB drives - The Monitor Utility has been modified to support the new vertical refresh rates. <p>This release has the following restrictions:</p> <ul style="list-style-type: none"> - The graphics accelerator subtests are not supported by this system's video controller. - The TrueColor subtest does not work correctly if video RAM has a capacity of less than 1 MB. |

SYSTEM TEST

| LEVEL | NOTES |
|-----------|---|
| Rel. 1.01 | <p>Requires BIOS release 1.01 or later.</p> <p>This release has the following restrictions:</p> <ul style="list-style-type: none"> - The Hard Disk parking utility is not present. - 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 - The video tests of release 1.01 do not support the "high resolution graphics" video mode |
| Rel. 1.02 | <p>Requires BIOS release 1.02 or later.</p> <p>The following modifications are made with respect to the previous release:</p> <ul style="list-style-type: none"> - 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. - The video test has been modified to support the new vertical refresh rates. - The floppy disk test has been modified so that it can work correctly on 1.2 MB drives - The Monitor Utility has been modified to support the new vertical refresh rates. <p>This release has the following restrictions:</p> <ul style="list-style-type: none"> - The graphics accelerator subtests are not supported by this system's video controller. - The TrueColor subtest does not work correctly if video RAM has a capacity of less than 1 MB. |

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"> - The Hard Disk parking utility is not present. - 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 |
| 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"> - 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. - The video test has been modified to support the new vertical refresh rates. - The floppy disk test has been modified so that it can work correctly on 1.2 MB drives - The Monitor Utility has been modified to support the new vertical refresh rates. <p>This release has the following restrictions:</p> <ul style="list-style-type: none"> - The graphics accelerator subtests are not supported by this system's video controller. - The TrueColor subtest does not work correctly if video RAM has a capacity of less than 1 MB. |

POWER SUPPLY**38**

| 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"> - This release allows the following video vertical refresh rates to be used: 56, 84, 75, 87 Hz - Solves the problem with Windows in the 800x600 and 256-color 1024x768 video modes. - Introduces the new 16-color 800x600 and 1024x768 video modes. - New ways to configure the parallel and serial ports - Solves the problem of the optional ROM not allowing the correct management of the CPU cache. |
| 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

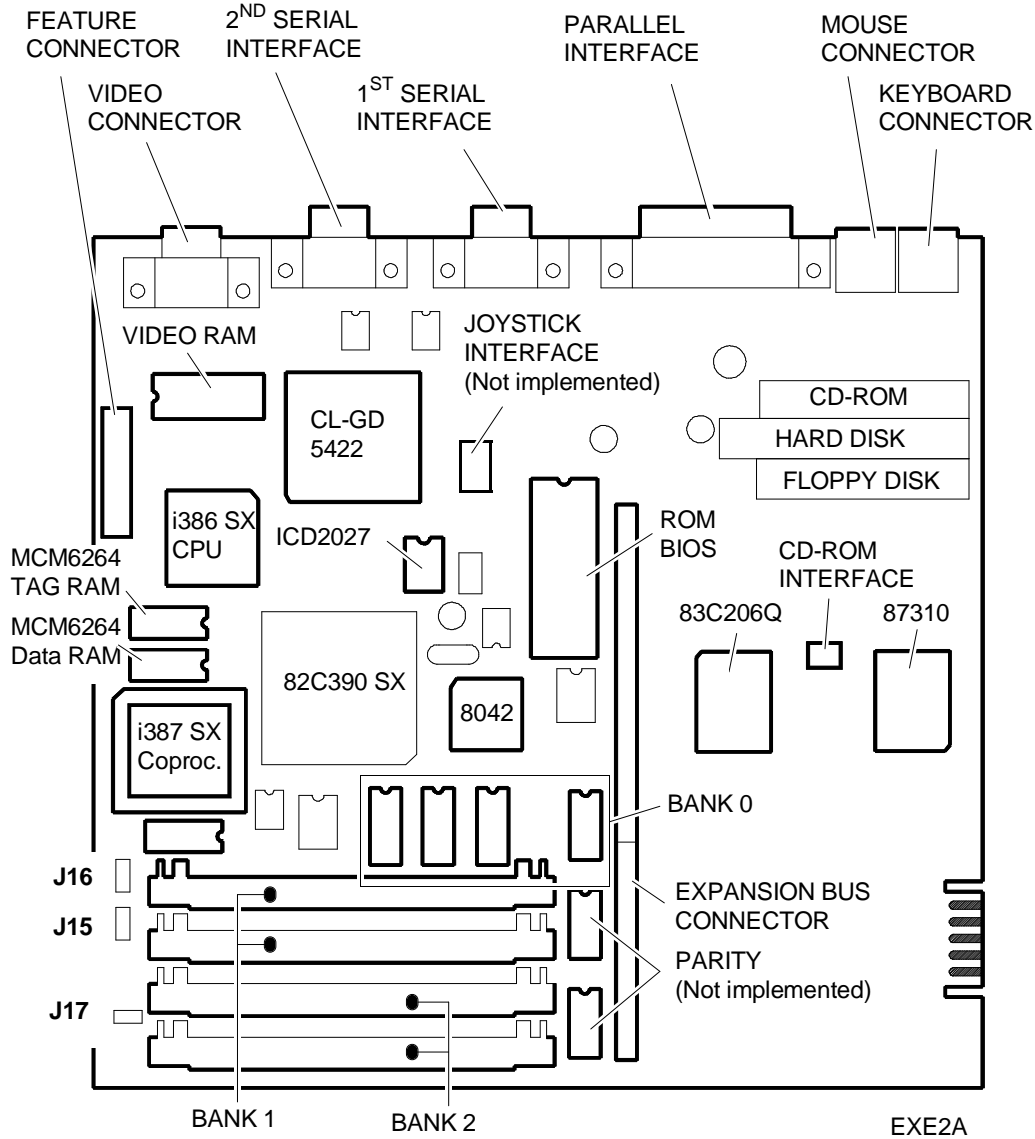
| OPERATING SYSTEMS | NOTES |
|--|--|
| IBM DISK Operating System, Ver. 3.30 MS-DOS (Compaq) IBM DISK Operating System, Ver. 4.01 MS-DOS Release 5.0 OS/2 Release 2.0 OS/2 Release 1.3 SE | Requests for a formatted DSDD diskette during installation on hard disk. |
| IBM Operating System/2, Ver. 1.10 and 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 | |
| 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

| MODEM | I/O INTERFACE PRODUCTS |
|---|--|
| 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 |
| MULTIPOINT | MOUSE |
| 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 |
| GRAPHICS PRODUCTS | NETWORKING AND LAN PRODUCTS |
| 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 |
| DISPLAY UNITS | |
| 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

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:

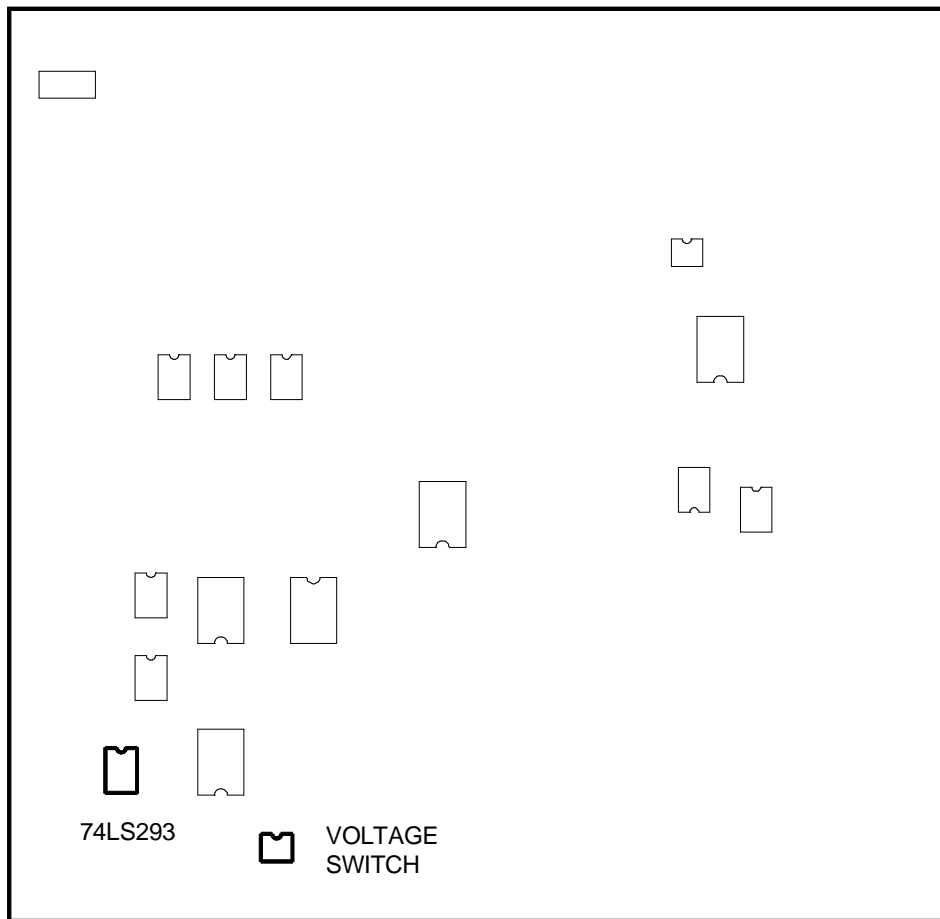
The User Program that allows the system to be configured and which is stored in the system region of the hard disk drive, is not launched. If the configuration of the system has been changed, the only way to reconfigure the system is by using the System Test diskette. If this security feature was enabled, 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



38

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.

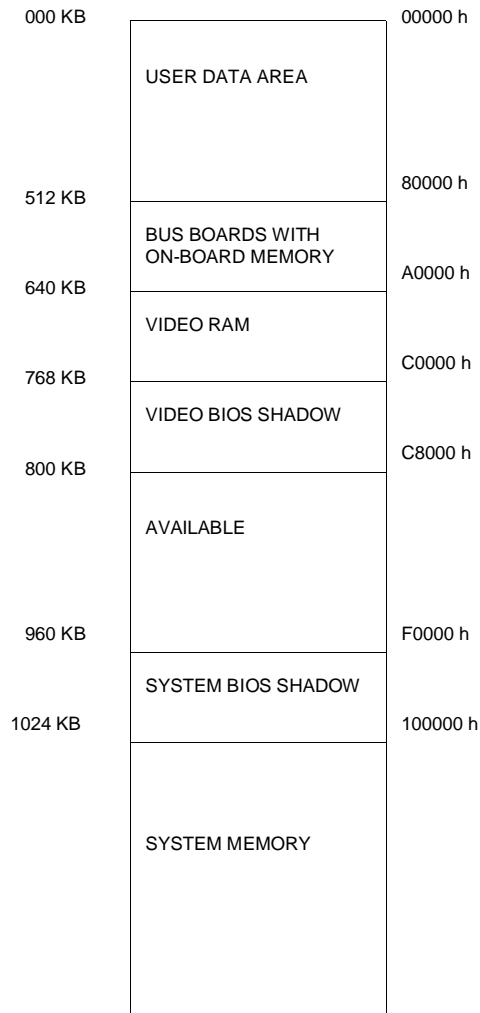
DMA CHANNELS

| 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

| ADDRESS | FUNCTION | ADDRESS | FUNCTION |
|----------------|---|----------------|--|
| 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 nd 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 nd level | 8 AT 6 dispo. |

39

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: EXM-820/D - 4 MB - four 1MB x 9 SIMMs EXM-821/D - 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: EXM-820/D - 4 MB - four 1MB x 9 SIMMs EXM-821/D - 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 Ilrwin 31250A 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 |

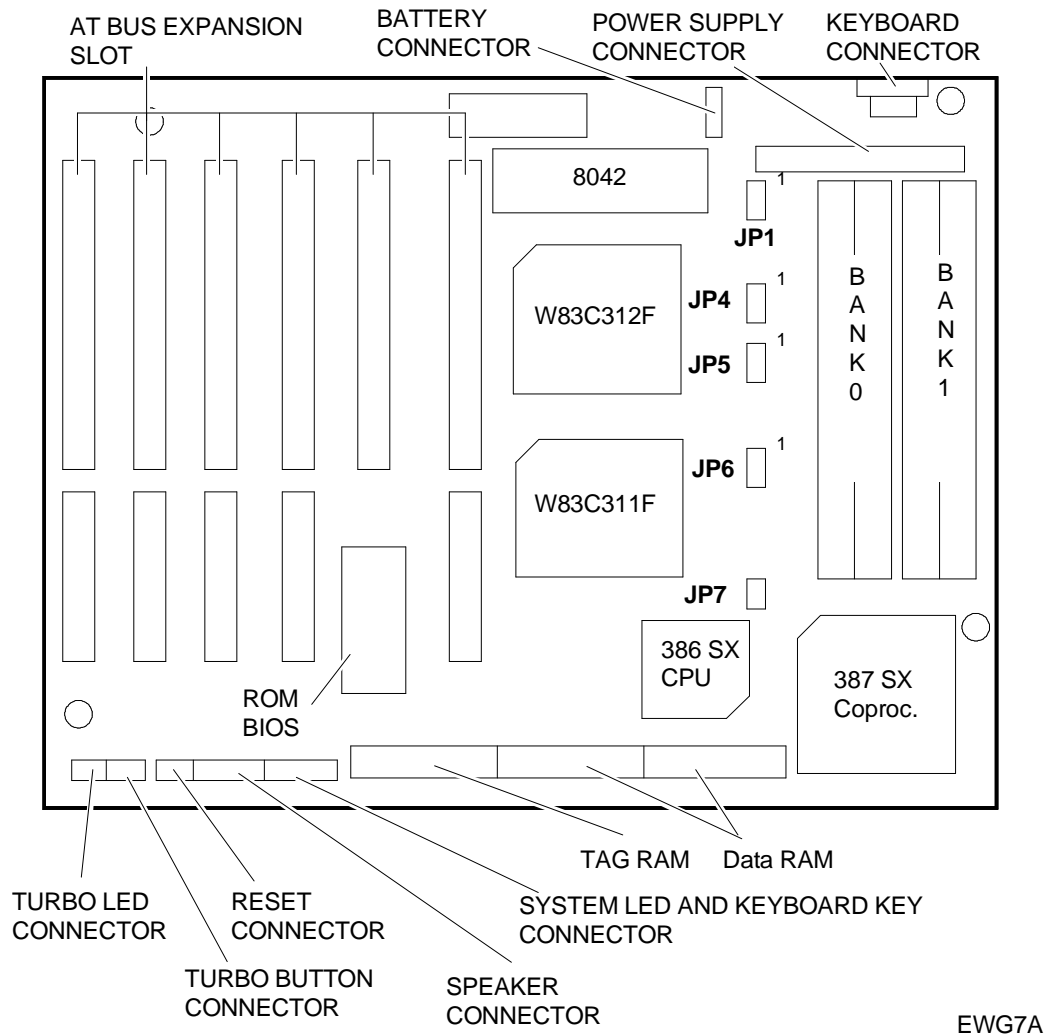
| |
|--|
| <p>BIOS</p> <p>System Board WH 386 SX BIOS from American Megatrends Inc.</p> <p>System Board 4386-VC-HD BIOS from Harward</p> <p>System Board 486-VC BIOS from Harward</p> |
| <p>POWER SUPPLY</p> <p>MAX POWER MPV-200 90 - 130 V 180 - 260 V</p> |

SYSTEM TEST

| LEVEL | NOTES |
|------------------------|---|
| Rev. 1.00 Rev. 1.01 | <ul style="list-style-type: none"> - Hard disk test has been added - Video test has been optimized - Some CPU tests have been modified |

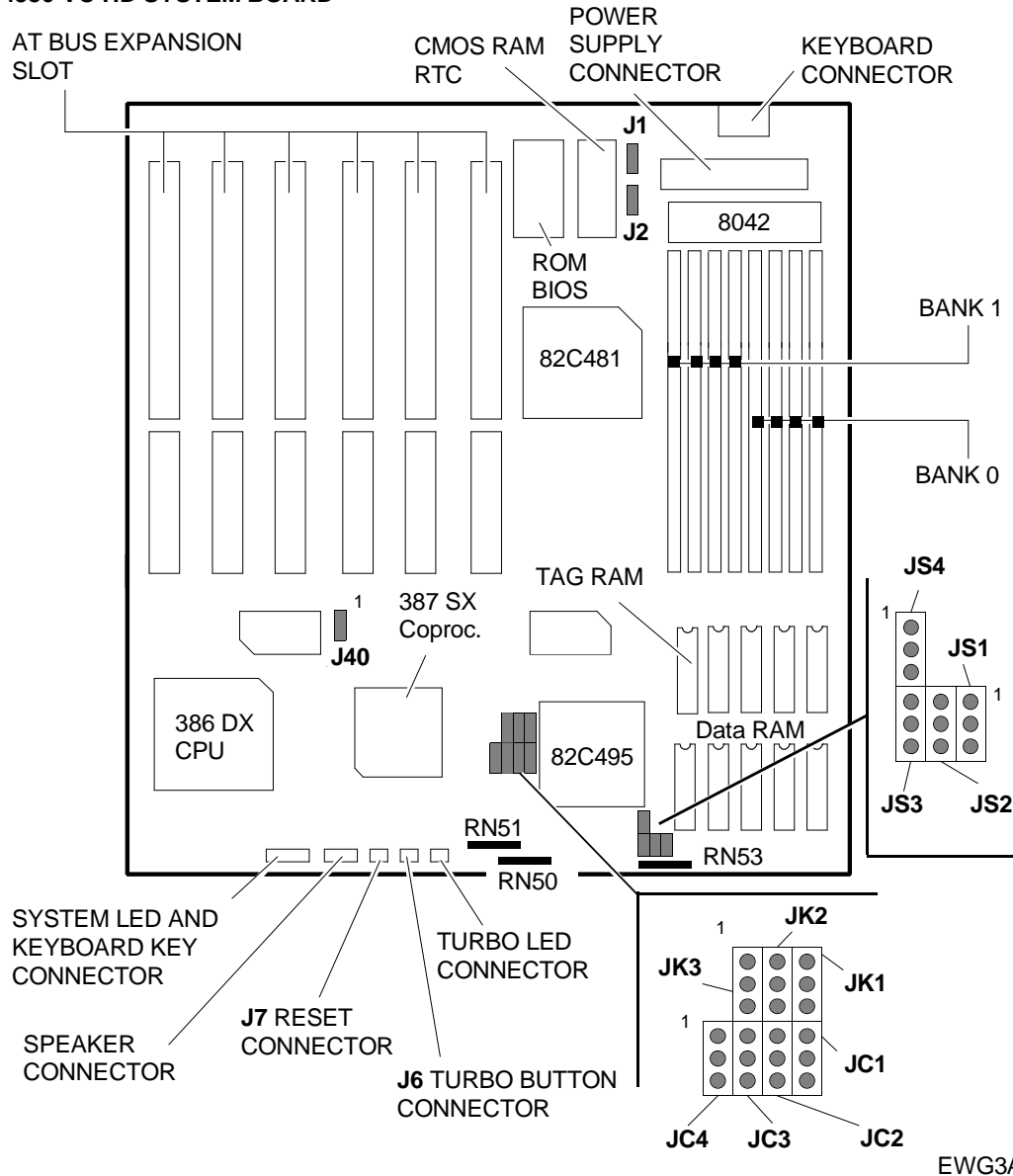
SYSTEM BOARD COMPONENTS AND JUMPERS

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



39

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

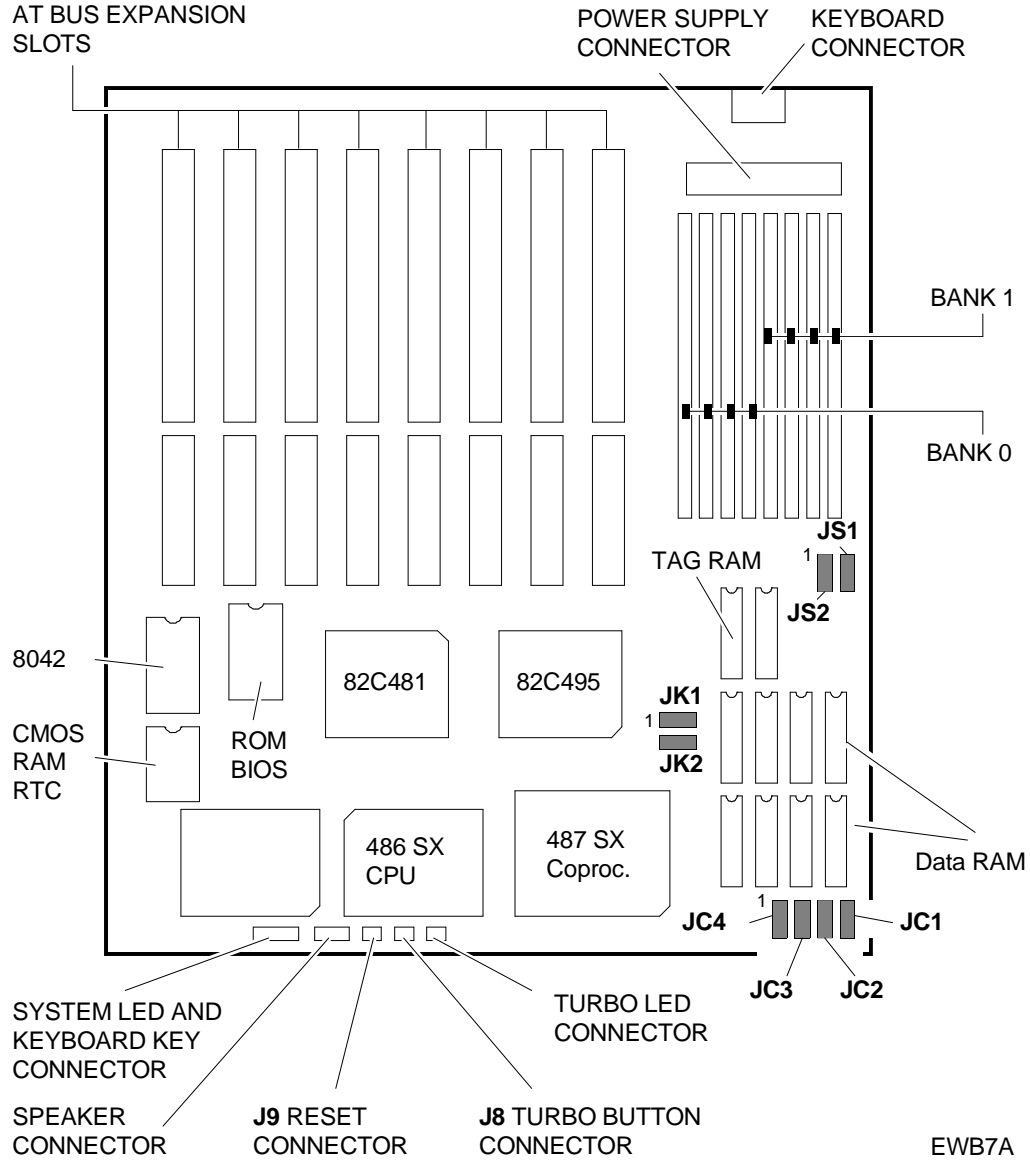
| CPU | JUMPERS | | | | | | | 1 MHz OSCILL. | 0 OHM 10P5R | 22 OHM 8P4R |
|-----------------|------------|------------|------------|------------|------------|------------|------------|------------------|----------------|----------------|
| | JK1 | JK2 | JK3 | JK4 | JC1 | JC2 | JC3 | | | |
| 486DX-50 | 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 |
| 386DX-40 | 1-2 | 1-2 | 1-2 | 2-3 | 1-2 | 1-2 | 1-2 | 80.00 | RN50 | RN53 |
| 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 |
| PONTICELLI | | | |
| 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



39

| 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 |

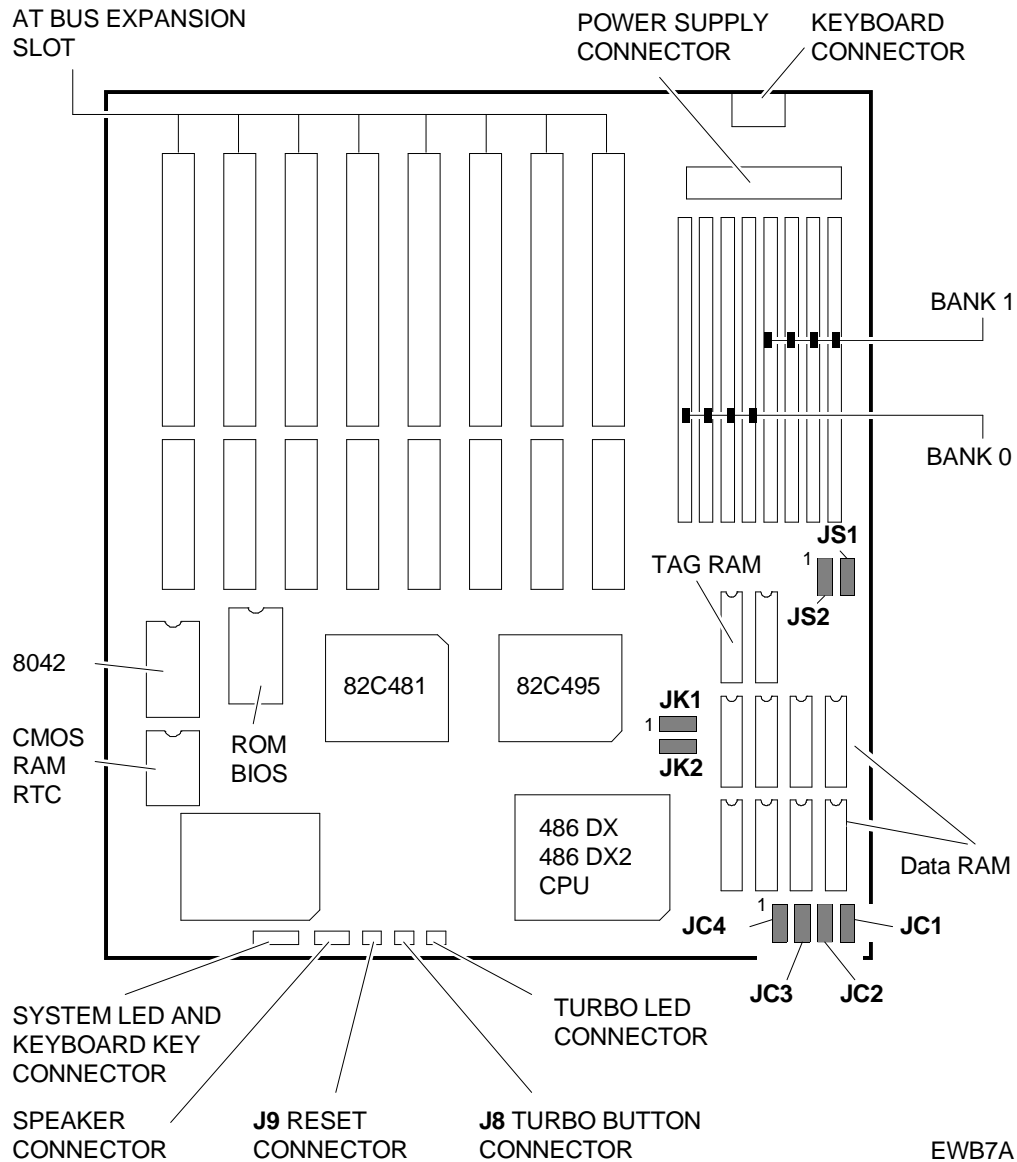
CPU Clock Selection

| 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 |
| JUMPERS | | | |
| JS1 | On 1 - 2 | On 1 - 2 | On 2 - 3 |
| JS2 | On 1 - 2 | On 2 - 3 | On 2 - 3 |

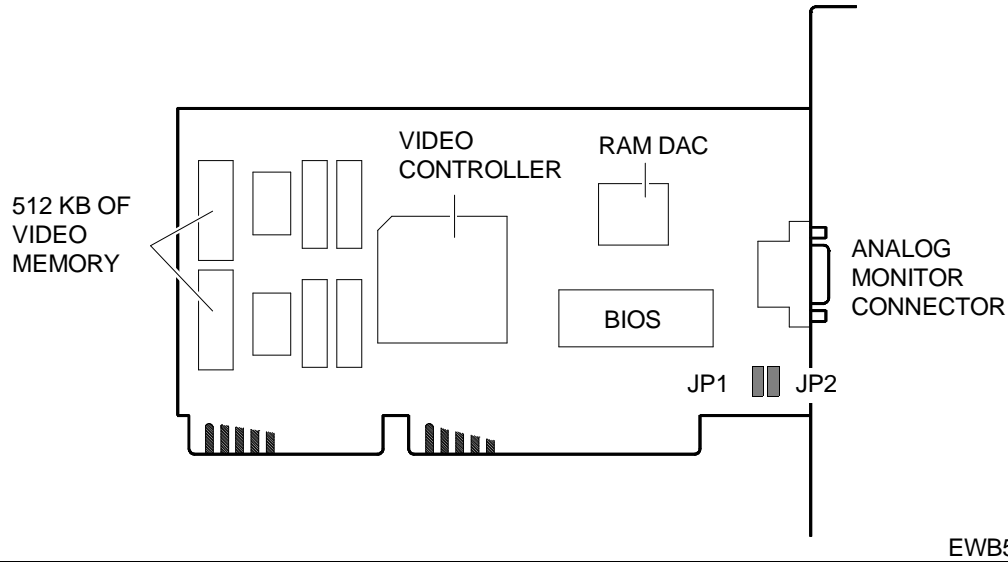
486-VC SYSTEM BOARD WITH 80486 DX AND 80486 DX2



39

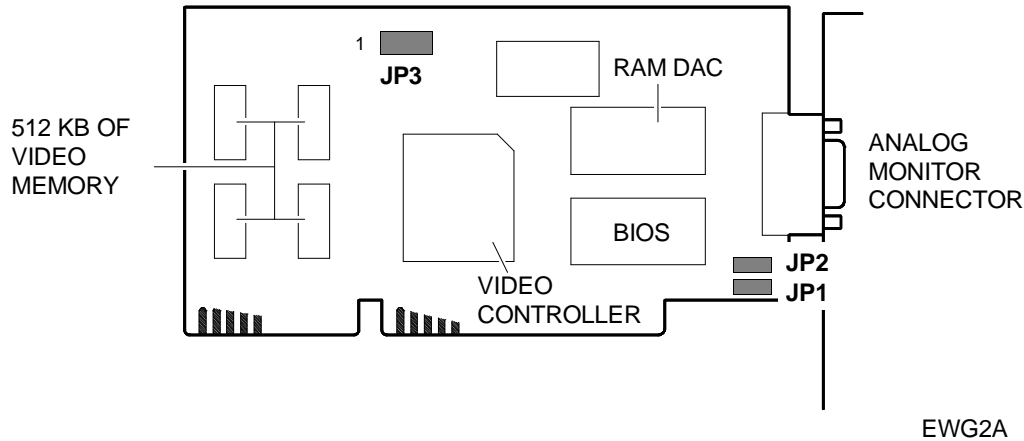
The jumpers on this board have the same meanings as those on the previous board.

1570 SX Rev. A VIDEO CONTROLLER



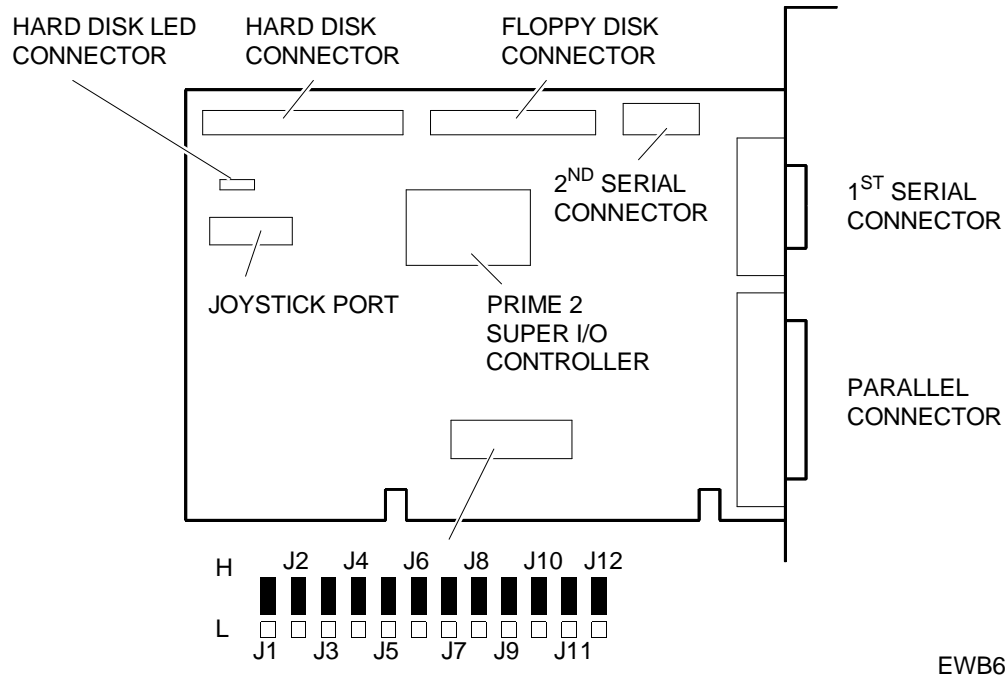
| JUMPERS | SETTING | FUNCTION |
|---------|-------------------------|----------------------------|
| JP1 | On 1 - 2 | Interlaced video (default) |
| | On 2 - 3 | Non-interlaced video |
| JP2 | Riservato (2-3 Default) | |

1580 Rev. A VIDEO CONTROLLER



| 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 EXM 25-532 (2 MB) 4 M x 9 EXM 26-809 (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 STU 38-120 - 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"> - 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. - Cuts and trimmings to guarantee a stabile picture on the screen when using a high resolution 1024x768 monitor. |
| | | | 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

| MOTHERBOARD | INTEGRATED CONTROLLER |
|--------------------|--|
| | CPU 386SX 16 or 25 MHz microprocessor Socket for the i387SX math coprocessor 8042 Keyboard and mouse controller WD90C11C VGA video controller. WD90C64 Video controller clock generator ADV BT476 DAC 87C310 Parallel and serial interface controller ACER Floppy disk controller Buffer MSI Intelligent hard disk interface 27C010 BIOS EPROM TOPCAT VL82C320 system controller VL82C331 bus controller |

BOARDS

| FUNCTION | DESCRIPTION | D.R.S. CODE | CHARACTERISTICS |
|--------------------|--------------------|--------------------|------------------------|
| 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 | - |

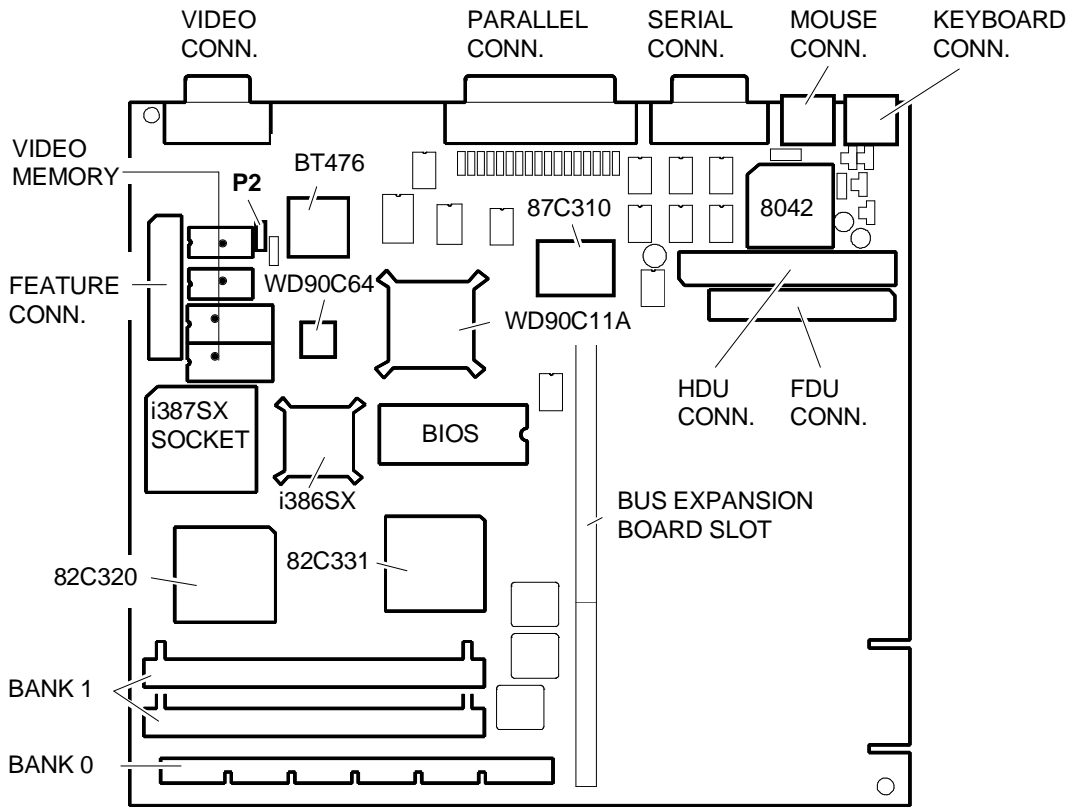
SOFTWARE COMPATIBILITY

| 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 | 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. |
| 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

| | |
|--|---|
| <p>MODEMS</p> <p>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</p> | <p>I/O INTERFACE PRODUCTS</p> <p>IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR</p> |
| <p>MULTIPOINT</p> <p>CHASE AT8 COMPUTONE AT 8 COMPUTONE AT 16 INTEL Bell ICC.6 SPECIALIX SI / 8</p> | <p>MOUSE</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>GRAPHICS PRODUCTS</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>NETWORKING & LAN PRODUCTS</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>DISPLAY UNITS</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> |

MOTHERBOARD COMPONENTS AND JUMPERS

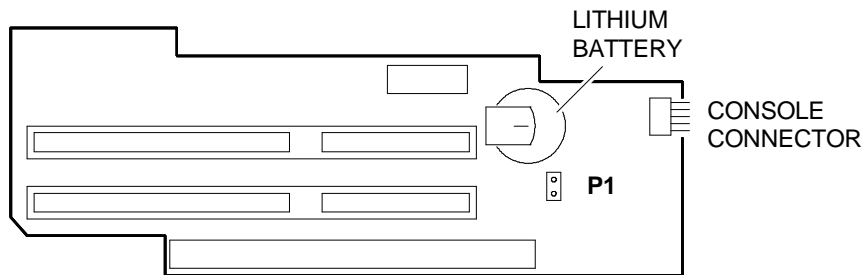


40

ASB7A

| | | |
|------------------|--------------|-------------------|
| JUMPER P2 | Position 1-2 | Password disabled |
| | Position 2-3 | Password enabled |

BUS EXPANSION BOARD COMPONENTS AND JUMPERS



AYD3A

| | |
|-------------------------|---|
| P1 installed: | Battery connected |
| P1 not installed | Battery not connected (Personal Computer not operative) |

BUILT IN SETUP and EXTENDED SETUP Utilities

BUILT IN SETUP

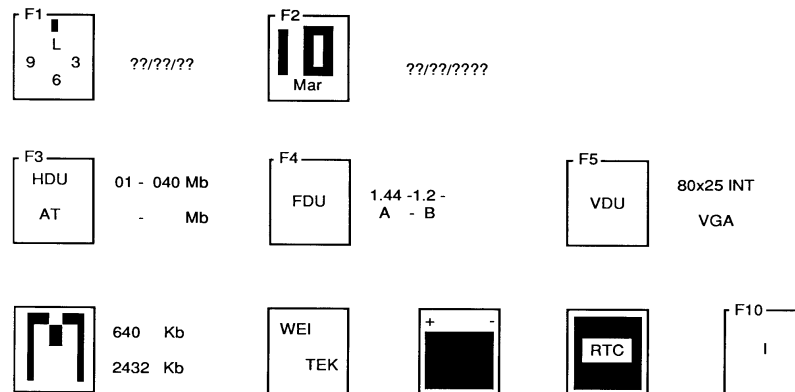
This ROM BIOS-resident program allows you to change some of the Personal Computer's configuration parameters.

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.

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).

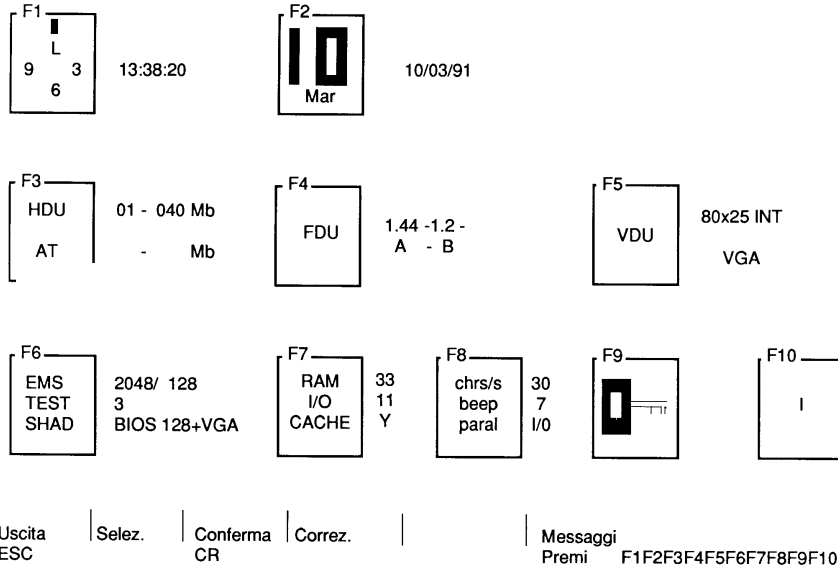
NOTE: If a streaming tape drive with floppy disk interface is installed, the data field corresponding to this drive must not contain any value, and this drive must always be indicated as logic drive B.

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 <i>Real Time Clock</i> 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 | | |

40

SYSTEM MEMORY MAP

| ADDRESS | MEMORY | FUNCTION |
|----------------------|---------------|--|
| 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) |

