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 controlleri
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.	M6-420 motherboard. Uses the 33 MHz i486 SX CPU. This board has been replaced by boards BA2003 and BA2004.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. **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.**
BA2001	Nasc.			M6-440 motherboard. Uses the 33 MHz i486 DX CPU 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 **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.**
BA2002	Nasc.			M6-460 motherboard. Uses the 66 MHz i486 DX2 CPU 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 **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.**

	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			- 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. **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).
	Lev. 02 MI			Modified the value of the following 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 occurs only on boards using a certain type of buffer: Motorola F244 xxAE9302 and Texas F244.
	Lev. 03 MI			- 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. **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.
	Lev. 04 MI			- 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			A new ATI 68800-6 video controller replaces the ATI 68800. This also implies the following modifications: 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	- 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	- 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: - 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. - 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: - 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 Sl 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.
BA2004	Nasc. Lev. 01 MI Lev. 02 MI Lev. 03 MI	557980 T		System board without CPU and with 4 MB of memory. 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. 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. - 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			- 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	A new ATI 68800-6 video controller replaces the ATI 68800. This also implies the following: 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	- 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 System region Setup 1.08.
	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	Introduction of revision A of the CS4021 chipset which consists of 2 gate arrays: - 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.

	LEVEL	D.R.S CODE	ROM BIOS	NOTES
BA2004	Lev. 09	557980 T	Rev. 1.19	A socket with data bus terminations is used to correct the problems with Windows 3.1. This socket is called MI2037. - 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. 10		Rev. 1.19	The following modifications are made to correct the malfunctions of the DVA4000 board: - Signal PCLK was cut from the feature connector - A 33 Ohm resistor was added to the same pin from which the signal was cut.
	Lev. 10		Rev. 1.19	486DX2-50 Sl and 486DX2-66 SL processors are used as alternatives to the 486DX2-50 and 486DX2-66 processors. Board level does not change.
	Lev. 10		Rev. 1.19	100 MHz DAC BT481 controller is used as alternative to the 80 MHz DAC BT481. Board level does not change.

MOTHERBOARD INTEGRATED CONTROLLERS

MOTHERBOARD	INTEGRATED CONTROLLERS
BA2003 BA2004 BA2000 BA2001 BA2002	**CPU:** These systems can host the following CPUs: i486 SX - i486 DX - 486 DX2 **Overdrive II Performance Upgrade Socket**: This socket can host the following processors: i487 SX - i486 DX2 - P24T OverDrive Processor **82C4021** Integrates the following functions: - 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 **82C4025** Integrates the following functions: - Local data bus interface - Control unit for signal decoding - System data bus interface - Data buffer **Socket for the secondary level cache implementation module** **8042** Keyboard and mouse controller **87312** Integrates the following functions: - Floppy disk controller - Interface for two serial ports - Parallel interface - Intelligent hard disk drive interface **ATI 68800LX** Super VGA video controller **ICD2027** Programmable system clock generator **ATI-18811** Programmable video clock generator **BT481** RAMDAC video analog/digital converter **BIOS Flash EPROM** **EYE** Runs tests on the video subsystem

AUDIO BOARD

BOARD	LEVEL	NOTES
MI2002	Nasc.	
MI2017	Nasc Lev. 01	New printed circuit board incorporating the following changes: - New 47 pF capacitor between the IORD* and GND signal - New space on side B. 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	This release incorporates the following changes: - 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. This release requires BIOS release 1.08 or later.
Rev. 1.03	This release incorporates the following changes: - The memory test has been changed. - The floppy disk test has been changed.
Rev. 1.04	The following changes have been made to this release: - 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. This release requires BIOS release 1.10 or later.
Rev. 1.07	This release incorporates the following changes: - 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. This release requires BIOS 1.12 or later.

LEVEL	NOTES
Lev. 1.08	This vesion requires BIOS release 1.16 or later. This release includes the following modifications with respect to the previous versions: - 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	This version requires BIOS 1.08 or later. It has the following restrictions: - Memory test - the Cache Memory subtest is not supported. - VGA test - The DMA Transfer and Truecolor subtest are not supported.
Rel. 1.04	This version requires BIOS 1.08 or later. The following modifications have been incorporated: - 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	This version requires BIOS 1.10 or later. The following modifications have been incorporated: - 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	This version requires BIOS 1.10 or later. The following modifications have been incorporated: - 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	This version requires BIOS 1.10 or later. The following modifications have been incorporated: - 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	This version requires BIOS release 1.13 or later. True Color video management has been implemented in this release.

SYSTEM REGION SET UP

LEVEL	NOTES
Rel. 1.01	This System Region Setup version allows User Disk Rel. 1.00 to be installed automatically in the system region of the hard disk drives. This version requires BIOS 1.05 or later, and has the following restrictions: - 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	This System Region Setup version allows User Disk Rel. 1.00 to be installed automatically in the system region of the hard disk drives. It has the same restrictions as the previous version.
Rel. 1.03	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: - 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. This release requires BIOS 1.08 or later.
Rel. 1.04	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 - Updated memory test. - Updated floppy disk test. This release requires BIOS 1.08 or later.
Rel. 1.05	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: - 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. This release requires BIOS release 1.10 or later
Rel. 1.08	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: - 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. This release requires BIOS 1.10 or later

LEVEL	NOTES
Rel. 1.09	This System Region Setup version allows User Disk Rel. 1.08 to be installed automatically in the system regions of the hard disk drives. This version requires BIOS release 1.16 or later. This release includes the following modifications with respect to the previous versions: - 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. Lev. 01 Lev. 02 Lev. 03 Lev. 04 Lev. 05	68000-3 68000-6	
BA2004	Nasc. Lev. 01 Lev. 02 Lev. 03 Lev. 04 Lev. 05 Lev. 06	68000-3 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: - 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: - Self-recognition of a pair of 8 MB SIMMs. In the previous relese 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: - 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: - 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: - 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	Solves the following problems of release 1.07: - 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	Solves the following problems of release 1.09: - 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	This BIOS release solves the following problems: - 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	This revision allows the management of memory between 512 KB and 1 MB with the second level of chipset CS4021. It also corrects the ATI 68800 (Setp 6) video controller fault which consisted of reducing video subsystem performance. This BIOS reveision was never produced, but is used to correct problems at field level.
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.

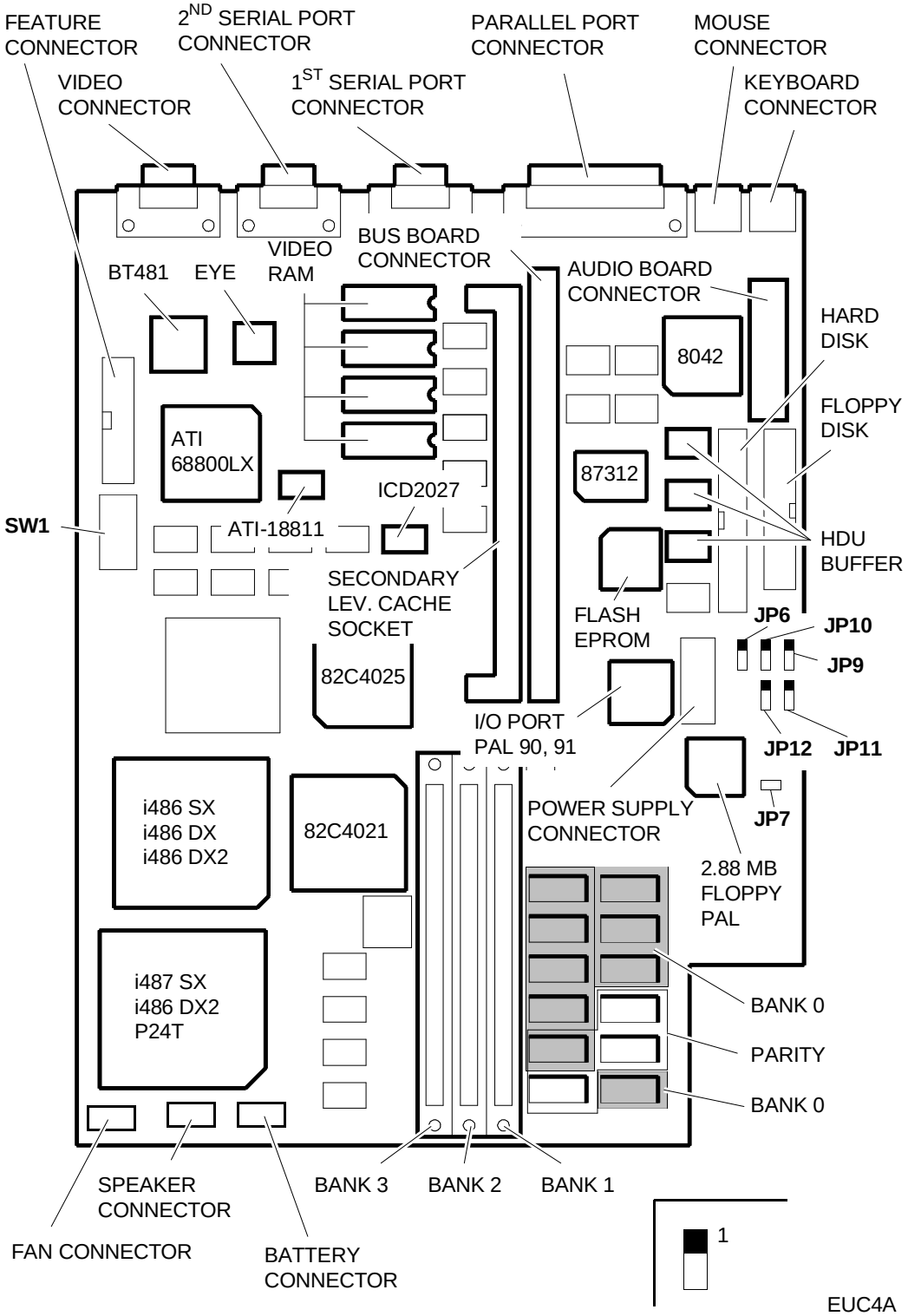
SOFTWARE COMPATIBILITY

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 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. 3.2.4 SCO XENIX 386, Rev. 2.3	 Requests for a formatted DSDD diskette during installation on hard disk. The PS/2 mouse is not recognized. The PS/2 mouse is not recognized.
WINDOWS	
GEM/3 Desktop, IBM-PC Ver. 3.02 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 CEO MODEM FURY 2400 MAXTER MODEM FURY 2400 TI/MNP Hayes Smart modem 1200 B	IBM PRINTER ADAPTER (1505200) STB 4-ON THE FLOOR
MULTIPORT	**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

JP10  1

1-2 DACK 1 selection
2-3 Reserved

JP9  1

1-2 DACK 0 selection
2-3 DACK 5 selection

JP12  1

1-2 DRQ 1 selection
2-3 Reserved

JP11  1

1-2 DRQ 0 selection
2-3 DRQ 5 selection

The jumper is shown in its default setting

Jumper JP6 RAM cancellation

JP6 

To cancel CMOS contents, install this jumper on pins 2 and 3.

Jumper JP7 System reset

JP7 

Jumper installed: system reset
Jumper not installed: normal operation

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: *POD Warning*.
		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: *Serial Port 0/1 Security Enabled*.
		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.

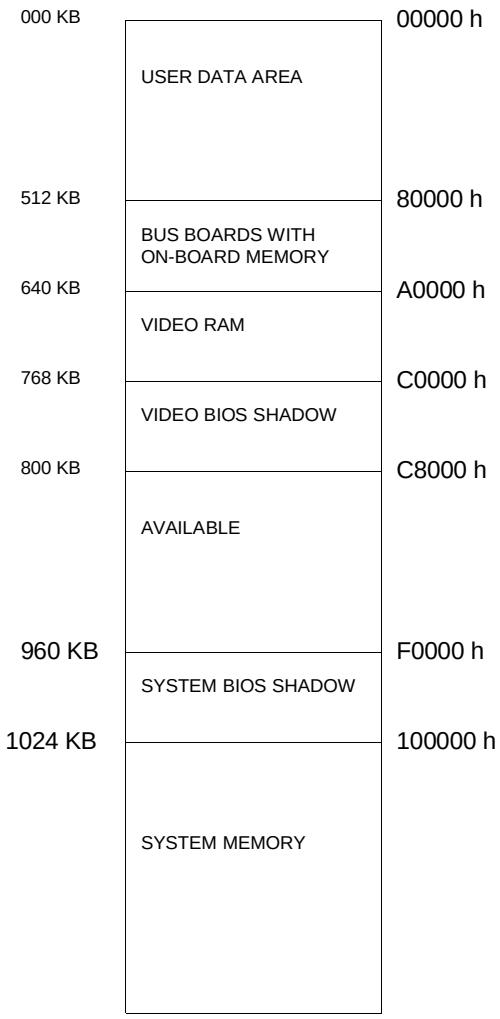
DMA CHANNELS

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



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