

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 Bank 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

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SYSTEM BOARD

	LEVEL	D.R.S. CODE	ROM BIOS	NOTES
BA324	Lev. Nasc.		Rev. 1.04 PZCR	System board with 2 MB soldered
	Lev. 01		Rev. 1.06 PD7X	New BIOS. The differences between the two releases are illustrated in the BIOS section of this chapter
	Lev. 02		Rev. 1.07 PD5A	<ul style="list-style-type: none"> - 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	Lev. 03		Rev. 1.07	For improved EMI margins, the four 100 pF LC filters on the keyboard mouse interface have been replaced by 470 pF filters.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

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BOARDS

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

USER DISKETTE

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

SYSTEM TEST

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.

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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:

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

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

TYPE	CAPACITY	CYL.	HEADS	SECTORS	WPC	LZ	MODEL
01	10 MB	306	4	17	128	305	STANDARD 10 MB, 85 ms
02	40 MB	925	5	17	128	924	CDC WREN I, Full, 35 ms
03	30 MB	697	5	17	128	696	WREN I, Full, 35 ms
04	42 MB	981	5	17	-1	980	WREN II Slim
05	53 MB	1024	6	17	-1	1023	Micropolis 1324, Full
06	56 MB	925	7	17	128	924	CDC WREN II, Full
07	71 MB	1024	8	17	-1	1023	Micropolis 1325, Full
08	72 MB	925	9	17	128	924	CDC WREN II, Full
09	44 MB	1024	5	17	-1	1023	Micropolis 1323-A
10	42 MB	820	6	17	-1	819	Seagate ST251, Half
11	104 MB	776	8	33	-1	775	CONNER CP3106 *
12	104 MB	776	8	33	-1	775	QUANTUM LPS105 AT *
13	121 MB	762	8	39	-1	762	W.D. AC2120 *
14	340 MB	726	15	61	-1	726	CONNER CP3304 *

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

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

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

TYPE	CAPACITY	CYL.	HEADS	SECTORS	WPC	LZ	MODEL
01	10 MB	306	4	17	128	305	STANDARD 10 MB, 85 ms
02	40 MB	925	5	17	128	924	CDC WREN I, Full, 35 ms
03	30 MB	697	5	17	128	696	WREN I, Full, 35 ms
04	42 MB	981	5	17	-1	980	WREN II Slim
05	53 MB	1024	6	17	-1	1023	Micropolis 1324, Full
06	56 MB	925	7	17	128	924	CDC WREN II, Full
07	71 MB	1024	8	17	-1	1023	Micropolis 1325, Full
08	72 MB	925	9	17	128	924	CDC WREN II, Full
09	44 MB	1024	5	17	-1	1023	Micropolis 1323-A
10	42 MB	820	6	17	-1	819	Seagate ST251, Half
11	45 MB	872	6	17	-1	871	RODIME RO3055
12	21 MB	612	4	17	128	663	MINISCRIBE M8425
13	65 MB	820	6	26	-1	819	SEAGATE ST277R
14	65 MB	820	6	26	128	819	OPE XM5340/60

SYSTEM TEST - CUSTOMER TEST

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

- Not Present** If no hard disk is installed
- Standard** In this case the system automatically acknowledges type and capacity of the hard disk installed.
This option can be used for hard disks that have the self-acknowledge feature and have a capacity of less than 526 MB.
- High Capacity** In this case the system automatically acknowledges type and capacity of the hard disk installed. This option must be used for hard disks with a capacity of more than 526 MB with the self-acknowledge feature and which have to be used with operating systems Olivetti OS/2/IBM OS/2 and MS-DOS.
- Compatible** This is the option to be used for hard disks that are compatible with the system but do not have the self-acknowledge feature. If this option is selected, a list will be displayed of hard disks with preset parameters (see the BUILT IN SETUP table).
Check that the parameter preset values correspond to those on the label of the hard disk being installed.
- Not Standard** This option allows the service engineer to personally define the parameters of a hard disk without the self-acknowledge feature and which is not included in the list of compatible hard disks.

SHADOW MEMORY FEATURE AND MEMORY REMAPPING

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

Shadow memory feature:

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

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

Only the 64 KB system BIOS

000 Only the 32 KB video BIOS

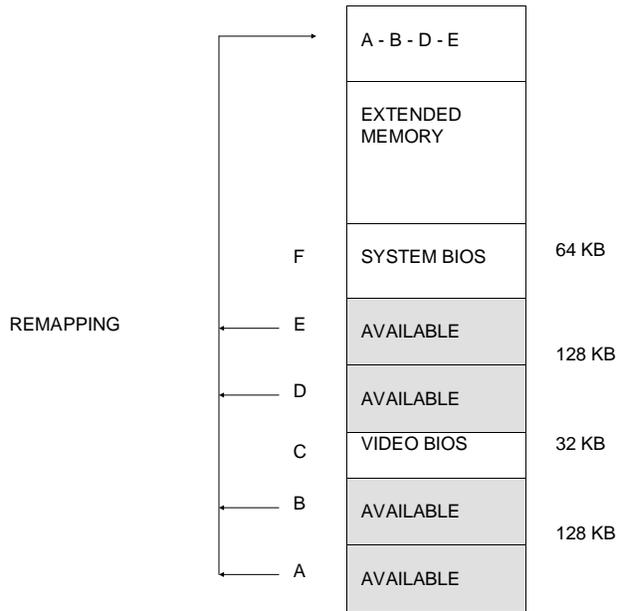
800 Only the 32 KB video BIOS

System BIOS and video BIOS

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

Remapping

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



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

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

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

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

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

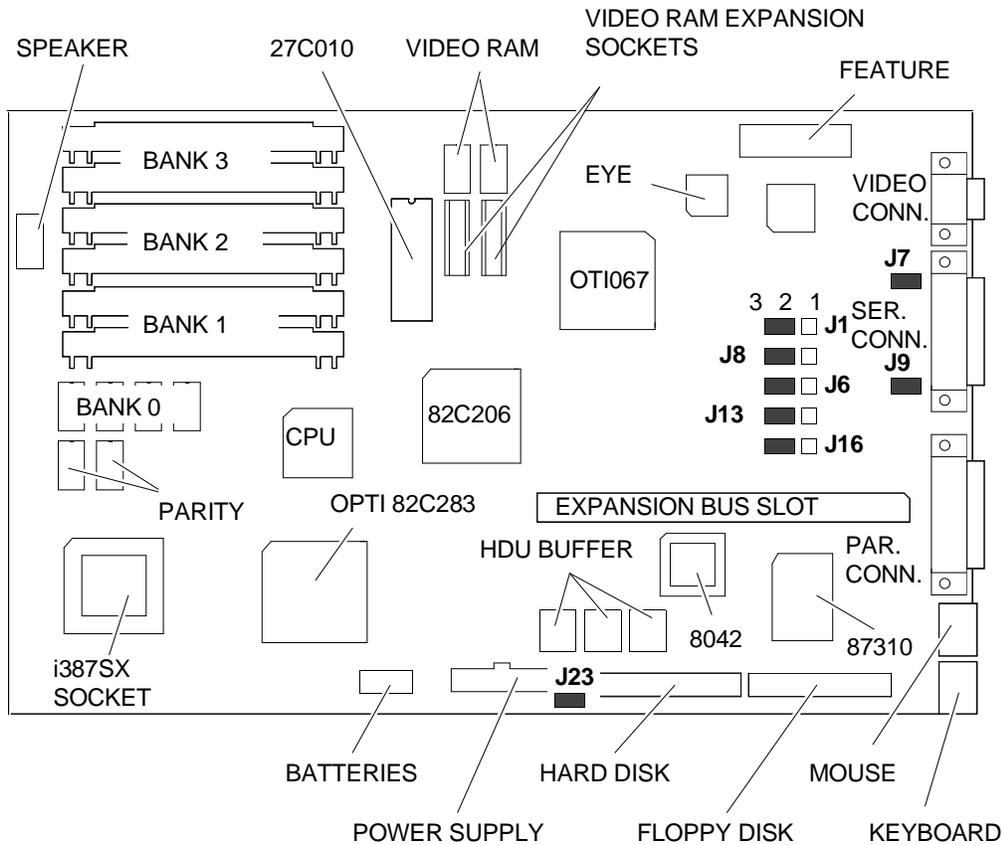
SOFTWARE COMPATIBILITY

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

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I/O ADDRESS MAP

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

SYSTEM MEMORY MAP

