

# M300-01

## CHARACTERISTICS

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

### SYSTEM BOARD

BA 271  
Lev. 06 MI

BA 274  
Lev. 06 MI

BA 288  
Lev. 05 MI

### BIOS

Rev. 1.08

### EXPANSION BUS

IN283  
Lev. 02

IN124  
Lev. 01

### POWER SUPPLY

PS11 220 V  
Lev. 06

PS11 115 V  
Lev. 04

PS11 220 V only  
ASTEC Lev. 05

**SYSTEM BOARD**

	<b>LEVEL</b>	<b>D.R.S. CODE</b>	<b>ROM BIOS</b>	<b>INTEGRATED CONTROLLERS / NOTES</b>
<b>BA271</b>	Lev. Nasc.		Rev. 1.03 PEQT	The integrated components are described in the tables that follow
	Lev. 01 MI		Rev. 1.04 PEQP	New BIOS
	Lev. 02 MI		Rev. 1.04	Replace PAL BCONV GLZ5 at location U91 with PAL GLZ8 to eliminate the faults of some boards on the bus during refresh cycles.
	Lev. 03 MI		Rev. 1.05 PUN2	New BIOS and hardware changes to solve problems of Duplicator software and PCTOOLS 6.0
	Lev. 04 MI		Rev. 1.06 PZCF	This change applies only at field level as the board is no longer produced. The changes are: <ul style="list-style-type: none"> <li>- AMD CPU in alternative to the INTEL CPU</li> <li>- IPC82C206 component alternative to the "Texas" component</li> <li>- W.D. 16C551 step C replaced by step D</li> <li>- Keyboard controller moves up from Rev. 7.02 to Rev. 10.01 for introduction of the security feature.</li> </ul> This release works only with BIOS 1.06 or later <ul style="list-style-type: none"> <li>- New BIOS 1.06.</li> </ul> All these changes update BA 271 and make it functionally equivalent to BA 288 level 03
	Lev. 04 MI No change of level		Rev. 1.07 PZCK	New BIOS to solve slow mouse problem in Windows 3.0 environment when there is floppy disk access simultaneous with mouse movement
	Lev. 05 MI		Rev. 1.08 PZCL	New BIOS to solve problems with DEPCA board on some monochrome monitors when displaying the 132-column mode Applied only at field level
	Lev. 06 MI		Rev. 1.08	Cuts, wirings and replacement of PAL GLZB in position U96 with PAL GLWK to solve the problems with the QBAIC software when the numeric coprocessor is installed

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

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

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

**BOARDS**

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

**USER DISKETTE**

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

**SYSTEM TEST**

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

**NETWORK BOARD DIAGNOSTICS**

Test for NCU 9142

Test for NCU 9172

**COMPATIBILITY NOTES**

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

**POWER SUPPLY UNIT**

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

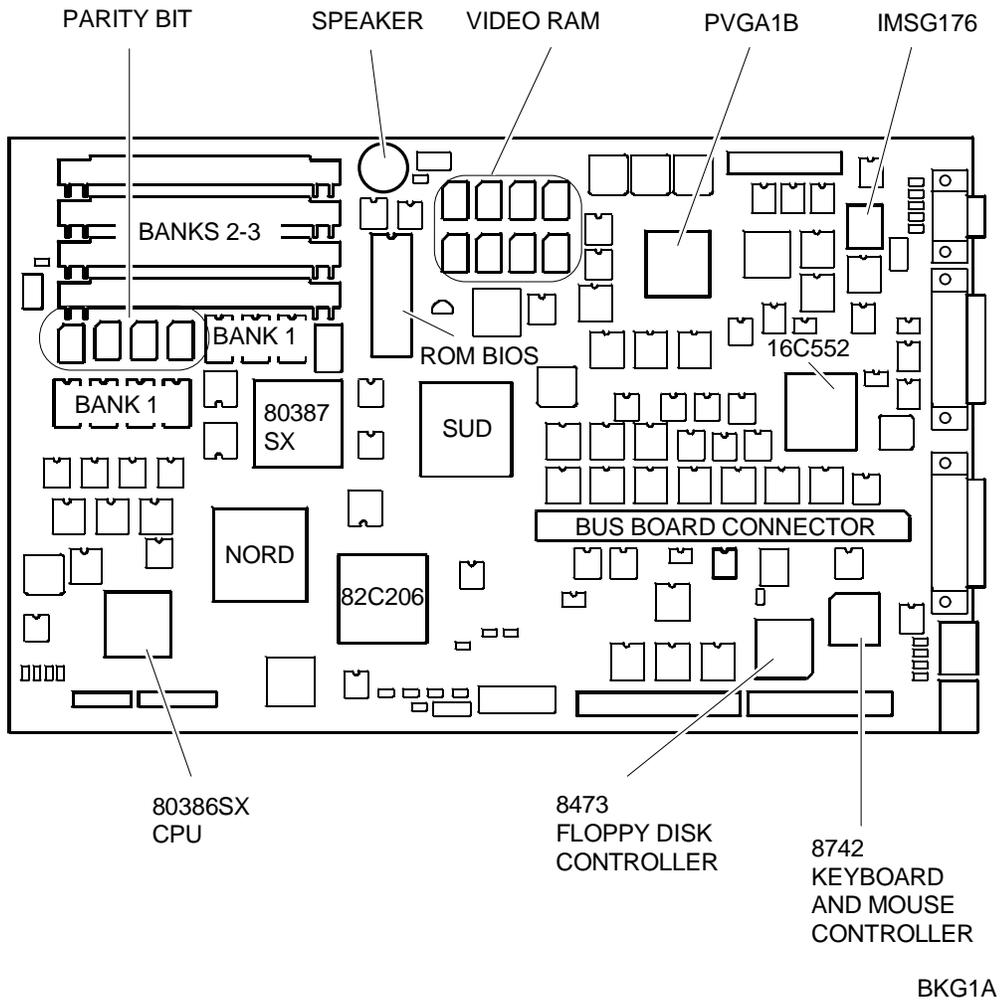
**SOFTWARE COMPATIBILITY**

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

**HARDWARE COMPATIBILITY**

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

SYSTEM BOARD COMPONENTS



**INTERRUPT LEVELS**

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

**I/O ADDRESS MAP**

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

## SYSTEM MEMORY MAP

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

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

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

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

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

## LIMITATIONS FOR MEMORY CONFIGURATION

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

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

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

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

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

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

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

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

### **Shadow RAM disabled**

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

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

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

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

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

**COMPATIBLE HARD DISKS**

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

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

T: No. of disk heads

WPC: Precompensation cylinder number

LZ: Head parking cylinder number

SET: No. of disk sectors.