

486-VAL

Mainboard User's Manual

DOC. NO. : U8D
Rev. : A
Date : Dec, 1992

Table of Contents

INTRODUCTION

486-VAL

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INSTALLATION

MEMORY SYSTEM

AWARD BIOS SETUP

HARD DISK SPECIFICATIONS

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Table of Contents

INTRODUCTION	1
SYSTEM GUIDE	1
SPECIFICATIONS	1
MOTHERBOARD LAYOUT	3
SYSTEM BLOCK DIAGRAM	4
INSTALLATION	5
CONNECTOR DESCRIPTION	5
JUMPER DESCRIPTION	10
VIDEO SETTING	11
CPU TYPE SELECTION	12
CACHE SELECT	12
MEMORY SYSTEM	15
MEMORY CONFIGURATION	15
CACHE RAM & CONFIGURING CACHE SIZE	16
AWARD BIOS SETUP	19
SETUP SYSTEM CONFIGURATION	19
STATUS PAGE SETUP	20
OPTIONS PAGE SETUP	20
SAVE AND EXIT	20
HARD DISK SPECIFICATIONS	21
CONNER	21
MAXTOR	22
QUANTUM	22
SEAGATE	22

INTRODUCTION

SYSTEM GUIDE

The 486-VAL Cache System Motherboard

The 486-VAL Cache System board is a high performance system board, utilizing the VIA Technology Inc. VT82C480 80486 PC/AT chipset, S3 86C805, and SMC 651 FDD/HDD and I/O controller, offering outstanding features and performance for building advanced personal computers or workstations.

High-speed Memory

The 486-VAL Cache System board is capable of accommodating 1 to 64 megabytes of on-board memory, using 1MB, 4MB or 16MB SIMMs.

SPECIFICATIONS

The 486-VAL Cache System board comes with the following features:

- Intel 80486DX/80486DX2/80486SX/80487SX microprocessor. Dual CPU in PQFP and PGA packages.
- VIA VT82C480 80486 PC/AT Chipset for high performance.
- Supports 0KB/64KB/128KB/256KB of direct mapped write-back cache memory.
- Supports 1MB up to 64MB of DRAM memory, provides page mode DRAM operation.
- Shadow RAM for fast BIOS access.
- 1MB user-friendly BIOS.
- One 16-bit expansion slot.

INTRODUCTION

- Real time clock/calendar.
- Built-in IDE HDD and FDD interface.
- Two serial ports and one parallel port.
- PS/2 mouse and PS/2 keyboard connector.
- VGA with 512K/1MB Video RAM on board.
- LPM-size board.

SYSTEM GUIDE

The 486-VAL Cx486 System Motherboard

The 486-VAL Cx486 System board is a high performance system board, offering the VIA Technology Inc. V187C486 SUPER VGA chip set, 512K/1MB Video RAM, and 1MB DRAM. It also offers a high speed bus and performance for building advanced personal-computer workstations.

High-speed Buses

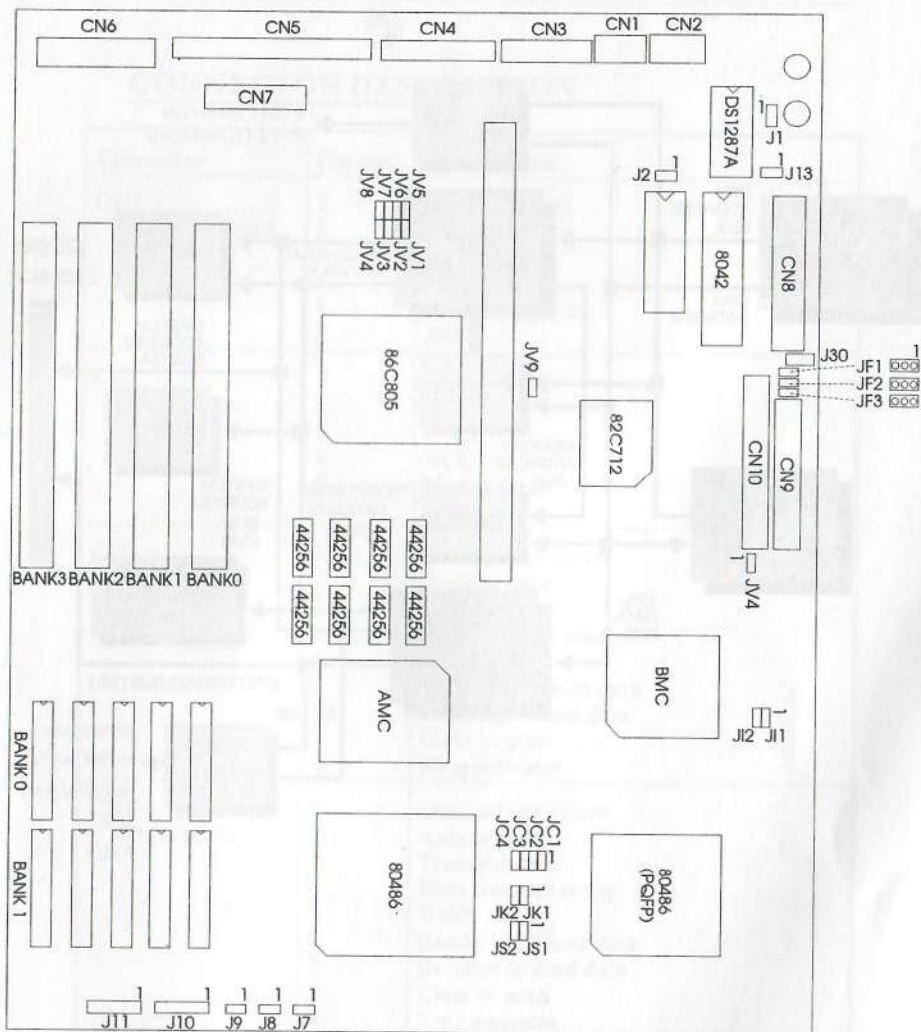
The 486-VAL Cx486 System board is capable of accommodating 100 Mbytes of expanded on-board memory using DRAM chips in 16MB blocks.

SPECIFICATIONS

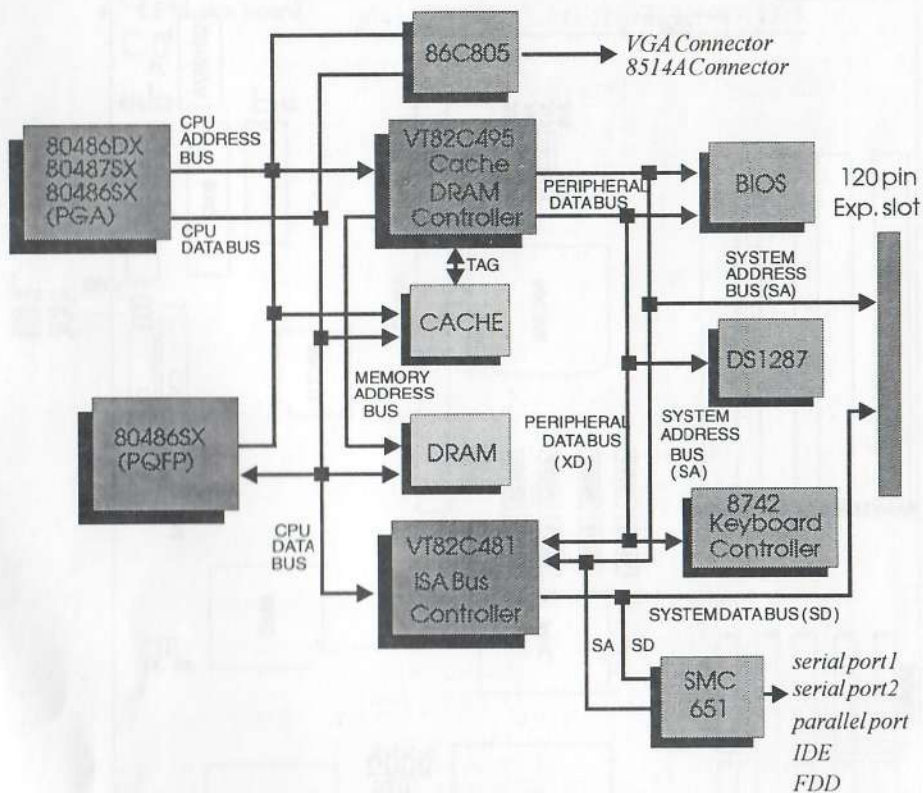
The 486-VAL Cx486 System board comes with the following features:

- 100 Mbytes of expanded on-board memory using DRAM chips in 16MB blocks.
- VIA V187C486 SUPER VGA chip set, 512K/1MB Video RAM.
- 1MB DRAM.
- 100 Mbytes of expanded on-board memory using DRAM chips in 16MB blocks.
- 100 Mbytes of expanded on-board memory using DRAM chips in 16MB blocks.
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- 100 Mbytes of expanded on-board memory using DRAM chips in 16MB blocks.

MOTHERBOARD LAYOUT



SYSTEM BLOCK DIAGRAM



INSTALLATION

CONNECTOR DESCRIPTION

Connector	Pin out	Signal Name
CN2 - PS/2 Keyboard	1	Keyboard data
	2	NC
	3	GND
	4	VCC
	5	Keyboard clock
	6	NC
CN1 - PS/2 Mouse	1	Mouse data
	2	NC
	3	GND
	4	VCC
	5	Mouse clock
	6	GND
CN3 - Serial port1	1	Data carrier detect
	2	Receive data
	3	Transmit data
	4	Data transmit ready
	5	GND
	6	Ready to receive data
	7	Request to send data
	8	Clear to send
	9	Ring indicator
CN4 - Serial port2	1	Data carrier detect
	2	Receive data
	3	Transmit data
	4	Data transmit ready
	5	GND
	6	Ready to receive data
	7	Request to send data
	8	Clear to send
	9	Ring indicator

INSTALLATION

Connector	Pin out	Signal Name	
CN5 - Parallel port	1	LPT strobe.	
	2	LPT D0	
	3	LPT D1	
	4	LPT D2	
	5	LPT D3	
	6	LPT D4	
	7	LPT D5	
	8	LPT D6	
	9	LPT D7	
	10	LPT acknowledge	
	11	LPT busy	
	12	Paper end	
	13	Selected status	
	14	Auto line feed	
	15	LPT error	
	16	Initiate printer	
	17	Select printer	
18-25	GND		
CN6 - VGA connector	1	Red	
	2	Green	
	3	Blue	
	4	NC	
	5-8	GND	
	9	NC	
	10	GND	
	11-12	NC	
	13	Horizontal sync	
	14	Vertical sync	
	15	NC	
	CN8 - Power connector	1	Power good
		2	+ 5V
3		+ 12V	
4		-12V	
5-8		GND	
9		-5V	
10-12		+ 5V	

Connector	Pin out	Signal Name
CN7 - 8514A connector	1	VP0
	2	GND
	3	VP1
	4	GND
	5	VP2
	6	GND
	7	VP3
	8	Enable video data
	9	VP4
	10	Enable sync signal
	11	VP5
	12	Enable video dot clock
	13	VP6
	14	NC
	15	VP7
	16	GND
	17	Video dot clock
	18	GND
	19	Banking
	20	GND
	21	Horizontal sync
	22	GND
	23	Vertical sync
	24	NC
	25	GND
	26	NC

INSTALLATION

Connector	Pin out	Signal Name
CN9 - FDD connector	2	Density selection
	4	NC
	6	NC
	8	Index detection
	10	Select motor A
	12	Select drive B
	14	Select drive A
	16	Select motor B
	18	Direction control
	20	Step pulse
	22	Write data
	24	Write enable
	26	Track 0
	28	Write protect
	30	Read data
	32	Head select
	34	Disk change
	1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33	GND

Connector	Pin out	Signal Name
CN10 - IDE connector	1	Reset hard disk
	2	GND
	3	HD D7
	4	HD D8
	5	HD D6
	6	HD D9
	7	HD D5
	8	HD D10
	9	HD D4
	10	HD D11
	11	HD D3
	12	HD D12
	13	HD D2
	14	HD D13
	15	HD D1
	16	HD D14
	17	HD D6
	18	HD D15
	19	GND
	20-21	NC
	22	GND
	23	HD I/O write
	24	GND
	25	HD I/O read
	26	GND
	27	IOCHRDY
	28	HD address latch
	29	NC
	30	GND
	31	IRQ14
	32	IOCS16
	33	HD A1
	34	NC
	35	HD A0
	36	HD A2
	37	HD chip select 0
	38	HD chip select 1
	39	HD active
	40	GND

Connector	Pin out	Signal Name
J4 Hard disk LED	1 2	LED - LED +
J7 Turbo LED	1 2	LED- LED +
J8 Turbo switch	1 2	GND Turbo signal
J9 Reset switch	1 2	GND Reset signal
J10 Speaker connector	1 2 3 4	Speaker signal NC GND VCC
J11 Power LED & keylock	1, 2 3 4 5	Power LED GND Keyboard clock GND

JUMPER DESCRIPTION

Jumper	Function	Open	Close
J1	RTC clear (1287A only)	Normal	Clear
J2	Flash ROM write (for Flash ROM use)	Disable	Enable
J13	Video	VGA/EGA/Mono	Color
J30	IOCHRDY for hard disk	No IOCHRDY for hard disk	IOCHRDY connected to hard disk
J11	K/B IRQ	1-2 for AMI 8042 KF 2-3 for other version	

Jumper	Function	Open	Close
J12	PS/2 Mouse IRQ	1-2 for AMI 8042KF 2-3 for other version	

VIDEO SETTING

JV1	Display RAM size				
	1-2 512KB 2-3 1MB				
JV2	Local type				
	1-2 Local is tri-state 2-3 Local is level				
JV3	Local and RDY for RAMDAC				
	1-2 Local Access for DAC 2-3 Not local access for DAC				
JV4	Local bus select				
	1-2 Enable 86C805 2-3 Disable 86C805				
JV7, JV6, JV5 Monitor type ID (1-2 for H, 2-3 for L)					
L	L	L	640 X 480	60Hz	Non-interlaced
L	L	H	640 X 480	70Hz	Non-interlaced
L	H	L	800 x 600	60Hz	Non-interlaced
L	H	H	800 x 600	70Hz	Non-interlaced
H	L	L	800 x 600	56Hz	Non-interlaced
H	L	H	1024 x 768	43Hz	Interlaced
H	H	L	1024 x 768	60Hz	Non-interlaced
H	H	H	1024 x 768	70Hz	Non-interlaced

INSTALLATION

JV8	Extension of monitor type ID
JV9	Video IRQ
	1-2 IRQ5 2-3 IRQ9

CPU TYPE SELECTION

CPU	JK1	JK2	JC1	JC2	JC3	JC4	OSC1 (MHz)
80486DX-50	2-3	2-3	1-2	1-2	1-2	1-2	50.00
80486DX-33	2-3	2-3	1-2	1-2	1-2	1-2	33.33
80486DX-25	1-2	1-2	1-2	1-2	1-2	1-2	50.00
80486DX-20	1-2	1-2	1-2	1-2	1-2	1-2	40.00
80486DX2-66	2-3	2-3	1-2	1-2	1-2	1-2	33.33
80486DX2-50	1-2	1-2	1-2	1-2	1-2	1-2	50.00
80487SX-25	1-2	1-2	1-2	1-2	2-3	2-3	50.00
80487SX-20	1-2	1-2	1-2	1-2	2-3	2-3	40.00
80486SX-33	2-3	2-3	2-3	2-3	2-3	OFF	33.33
80486SX-25	1-2	1-2	2-3	2-3	2-3	OFF	50.00
80486SX-20	1-2	1-2	2-3	2-3	2-3	OFF	40.00

CACHE SELECT

Jumper	64K	128K	256K
JS1	1-2	2-3	2-3
JS2	1-2	1-2	2-3

FLOPPY MODE

Jumper	Standard	2.88M
JF1	2-3	1-2 for SMC (FDC 37C661 only)
JF2	2-3	
JF3	2-3	

MEMORY SYSTEM

MEMORY CONFIGURATION

Total Memory	Bank 0	Bank 1	Bank 2 *	Bank 3
1M	1Mx1			
2M	1Mx1	1Mx1		
3M	1Mx1	1Mx1	1Mx1	
4M	1Mx1	1Mx1	1Mx1	1Mx1
4M	4Mx1			
5M	4Mx1	1Mx1		
6M	4Mx1	1Mx1	1Mx1	
7M	4Mx1	1Mx1	1Mx1	1Mx1
8M	4Mx1	4Mx1		
12M	4Mx1	4Mx1	4Mx1	
16M	4Mx1	4Mx1	4Mx1	4Mx1
16M	16Mx1			
17M	16Mx1	1Mx1		
18M	16Mx1	1Mx1	1Mx1	
19M	16Mx1	1Mx1	1Mx1	1Mx1
20M	16Mx1	4Mx1		
21M	16Mx1	4Mx1	1Mx1	
22M	16Mx1	4Mx1	1Mx1	1Mx1
24M	16Mx1	4Mx1	4Mx1	
28M	16Mx1	4Mx1	4Mx1	4Mx1
32M	16Mx1	16Mx1		
33M	16Mx1	16Mx1	1Mx1	
34M	16Mx1	16Mx1	1Mx1	1Mx1
36M	16Mx1	16Mx1	4Mx1	
40M	16Mx1	16Mx1	4Mx1	4Mx1
48M	16Mx1	16Mx1	16Mx1	
64M	16Mx1	16Mx1	16Mx1	16Mx1

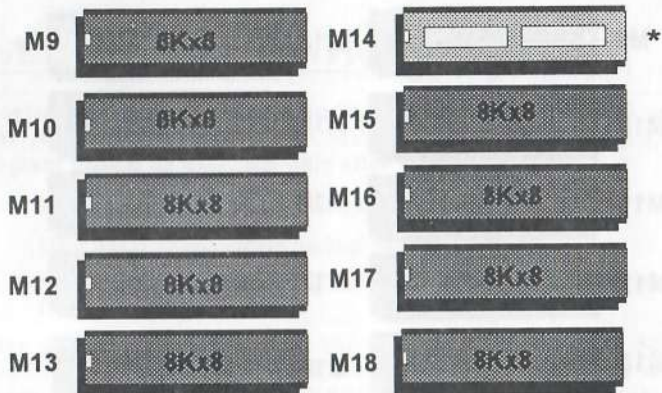
* Bank 2 and Bank 3 should use the same type of RAM modules.

CACHE RAM & CONFIGURING CACHE SIZE

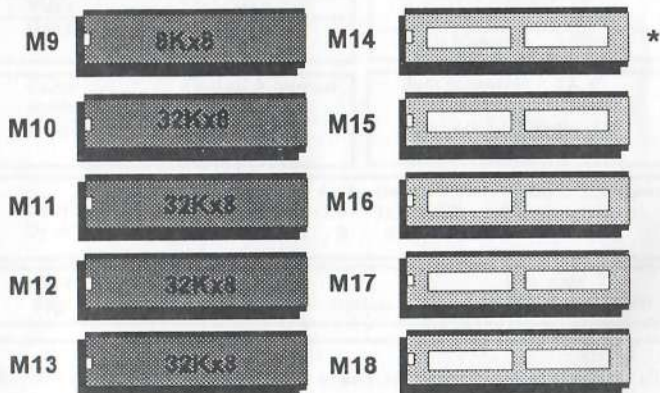
	64K	128K	256K
ALTER RAM	8Kx8	8Kx8	32Kx8
TAG RAM	8Kx8	8Kx8	32Kx8
DATA RAM	8Kx8	32Kx8	32Kx8

64Kbytes Direct Mapped Cache

The 64Kbytes Direct Mapped Cache option is achieved by installing eight 8Kx8 SRAM (DATA RAM) DIPs in M10, M11, M12, M13, M15, M16, M17, and M18. Also install one 8Kx8 SRAM (TAG RAM 28 pin) in M9.

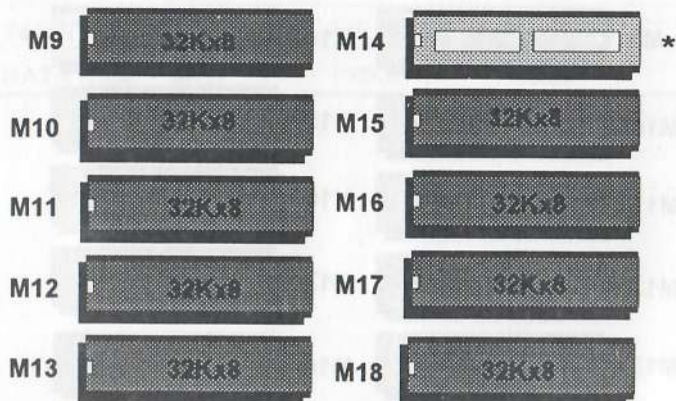
**128Kbytes Direct Mapped Cache**

The 128Kbytes Direct Mapped Cache option is achieved by installing four 32Kx8 SRAM (DATA RAM) DIPs in M10, M11, M12, M13. Also install one 8Kx8 SRAM (TAG RAM 28 pin) in M9.



256Kbytes Direct Mapped Cache

The 256Kbytes Direct Mapped Cache option is achieved by installing eight 32Kx8 SRAM (DATA RAM) DIPs in M10, M11, M12, M13, M15, M16, M17, M18. Also install one 32Kx8 SRAM (TAG RAM 28 pin) in M9.



* M14 is for Alter RAM and is optional.

AWARD BIOS SETUP

SETUP SYSTEM CONFIGURATION

A setup program has been built into the system BIOS so the configurations stored in the CMOS RAM can be changed. This program should be executed only after:

- (1) User has changed system configuration.
- (2) User has changed system backup battery.
- (3) System has detected a configuration error and has asked the user to run the setup program.

After power-on RAM testing, the message: "TO ENTER SETUP BEFORE BOOT PRESS CTRL-ALT-ESC" is displayed on the screen. Press "CTRL+ ALT+ ESC" to run setup or do nothing to bypass. If the "CTRL+ ALT+ ESC" is pressed, the following message will be displayed:

Date	: 13 Jan 1992	ROM ISA BIOS (VENUS)				
Time	: 10:49:26	Award Software, Inc.				
Drive A	: 1.2M, 5in.	Base Memory	: 640K			
Drive B	: 1.44M, 3in.	Extended Memory	: 3072K			
Video	: EGA/VGA	Expanded Memory	: 0K			
Halt On	: All Errors	Other Memory	: 384K			
		Total Memory	: 4096			
Cache	: External & Internal	Boot Sequence	: A, C			
Shadow	: System & Video	Virus Warning	: Enable			
Security	: Disable	NumLock Boot Status	: On			
Drive C	: 9 (112Mb)	CYL	Head	Sector	Precomp	Landzone
Drive D	: None (****Mb)	900	15	17	None	901
		0	0	0	0	0
Alt-F1 for Menu Help		F10	exits			
Page 01 : Status Page	PgDn = Options Page	F2	change colors			

* Before disabling the system & video shadow, you must first disable the video cacheable and system cacheable functions in the options page setup.

STATUS PAGE SETUP

The setup program is completely menu-driven. Use the arrow keys to select an entry; "+" / "-" keys to change an entry; and "F10" key to exit. Help messages are displayed in the window on the screen.

If this option is chosen then the screen above is displayed. System BIOS automatically detects memory size, thus no changes are necessary. After the changes are made, press "F10" to exit.

OPTIONS PAGE SETUP

The Options Page Setup program functions the same way as the Status Page Setup, as shown below.

Users are not encouraged to run the Status Page Setup program, as your system should have been fine tuned before shipping. The following screen is only for your reference. Improper setup may cause the system to fail, so consult your dealer before making any changes.

BUS CONTROL		IO CONTROL	
ISA Command Delay	: Normal	COM1 Select	: Enable
ISA Wait state	: Normal	COM2 Select	: Enable
I/O Recovery Time	: Disable	Parallel Port Address	: 0378H
Extended ALE	: Disable	IDE Select	: Enable
Decouple Refresh	: Disable	FDC Select	: Enable
Cache Control			
256K/384K Relocation	: Disable		
Cache Timing	: Turbo		
Dram Timing	: Fast		
Video Cacheable	: Enable		
System Cacheable	: Enable		
Alt-F1 for Menu Help	PgUp = Status Page	F10 exits	
Page 02 : Options Page		F2 change colors	

SAVE AND EXIT

Once you have completed Setup, then press F10 to exit. If you did not make any changes, press F1 to exit; otherwise, press F5 to save and exit.

HARD DISK SPECIFICATIONS

CONNER

Model	Capacity	Cylinder	Head	Sector
CP-3000	40MB	977	5	17
CP-30064	60MB	762	4	39
CP-30064H	60MB	762	4	39
CP-30084	85MB	526	8	39
CP-30084E	85MB	526	8	39
CP-30104	120MB	762	8	39
CP-30104H	120MB	762	8	39
CP-30174	170MB	903	8	46
CP-30174E	170MB	903	8	46
CP-30204	200MB	683	16	38
CP-30204F	200MB	683	16	38

MAXTOR

Model	Capacity	Cylinder	Head	Sector
7120AT	120MB	1024	14	17
7213AT	203MB	683	16	38

QUANTUM

Model	Capacity	Cylinder	Head	Sector
PRO52AT	52MB	751	8	17
PRO80AT	80MB	611	16	17
PRO105AT	105MB	755	16	17
PRO120AT	120MB	901	5	53
PRO240AT	240MB	723	13	51

SEAGATE

Model	Capacity	Cylinder	Head	Sector
ST351A/X	40MB	977	5	17
ST3096A	85MB	1024	10	17
ST3120A	102MB	1024	12	17
ST3144A	125MB	1001	15	17
ST3283A	245MB	978	14	35