

4386 -VIO

**Mainboard
User's Manual**

CE

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INTRODUCTION

SYSTEM GUIDE

The **4386-VIO Cache System Motherboard** supports either **486** or **386** systems.

The *4386-VIO Cache System board* is a high performance system board that offers outstanding features and speeds for building advanced personal computers or workstations. It utilizes the VIA Technology Inc. VT82C480 80486 PC/AT chipset and W83757F FDD/HDD and I/O Controller.

The *4386-VIO Cache System board* can easily upgrade from 386DX system to 486DX system, and simultaneously use a 386 and 486 CPU.

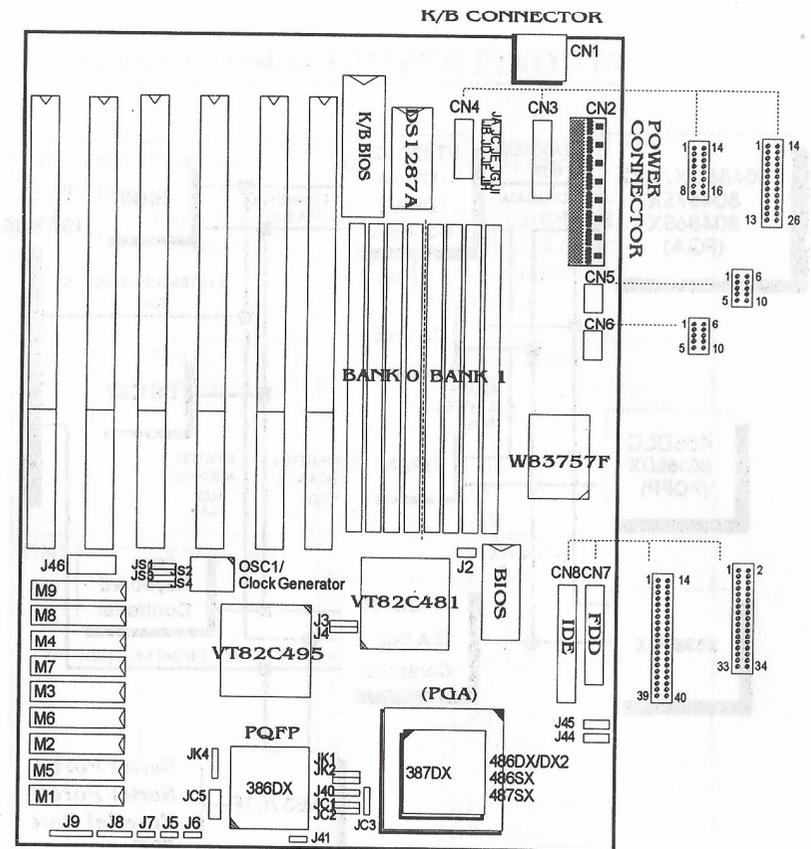
SPECIFICATIONS

The *4386-VIO Cache System board* comes with the following features:

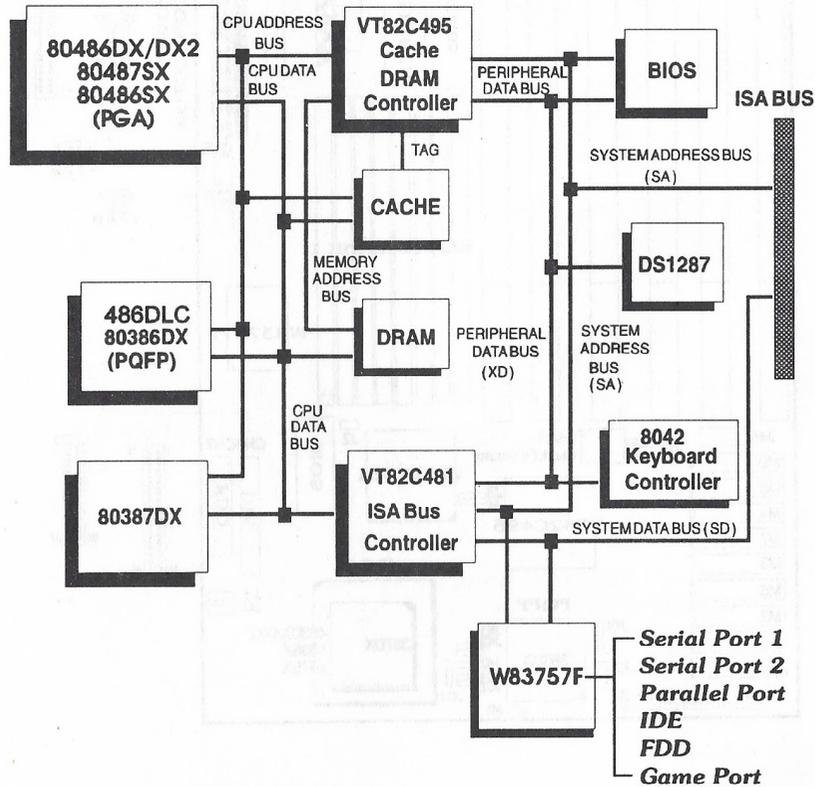
- Both **486**-Intel 80486DX/80486DX2/80486SX/80487SX, and **386**-Intel 80386DX/AMD80386DX/Cyrix 486DLC microprocessor. It includes dual CPU in PQFP and PGA packages.
- VIA VT82C480 80486 PC/AT chipset for high performance.
- Supports 0KB/64KB/128KB/256KB of direct mapped write-back cache memory.
- Supports 1MB up to 128MB of DRAM memory for 486 system, 1MB up to 32MB for 386 system; provides page mode DRAM operation.
- Shadow RAM for fast BIOS access.
- 64KB User-friendly BIOS.
- Six 16-bit expansion slots.

- Real time clock/calendar.
- Built-in IDE HDD and FDD interface
- Two serial ports and one parallel port
- One game port

MOTHERBOARD LAYOUT



SYSTEM BLOCK DIAGRAM



INSTALLATION

CONNECTOR & JUMPER PINOUTS

Connector & Jumper	Function	Pin outs	Signal name
CN1	Keyboard connector	1	Keyboard clock
		2	Keyboard data
		3	No connection
		4	Ground
		5	+ 5V
CN2	Power connector	1	Power good
		2	+ 5V
		3	+ 12V
		4	-12V
		5, 6, 7, 8	Ground
		9	-5V
		10, 11, 12	+ 5V
CN3	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
26	NC		

Connector & Jumper	Function	Pin outs	Signal name
CN4	Game port	1	VCC
		2	D4
		3	D0
		4	Ground
		5	Ground
		6	D1
		7	D5
		8	VCC
		9	VCC
		10	D6
		11	D2
		12	Ground
		13	D3
		14	D7
		15	VCC
		16	Not used
CN5	RS232 I	1	Data carrier detect
		2	Receiving data
		3	Transmit data
		4	Data terminal ready
		5	Signal ground
		6	Data set ready
		7	Request to send
		8	Clear to send
		9	Ring indicator
		10	Not used
CN6	RS232 II	1	Data carrier detect
		2	Receiving data
		3	Transmit data
		4	Data terminal ready
		5	Signal ground
		6	Data set ready
		7	Request to send
		8	Clear to send
		9	Ring indicator
		10	Not used

Connector & Jumper	Function	Pin outs	Signal name
CN7	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 & Jumper	Function	Pin outs	Signal name
CN8	HDD 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 D0
		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	IRQ 14
		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 & Jumper	Function	Pin outs	Signal name
J5	Turbo LED	1	LED+
		2	LED -
J8	Speaker connector	1	Speaker signal
		2	NC
		3	Ground
		4	+ 5V
J9	Key lock & power LED	1	Power signal
		2	Power signal
		3	Ground
		4	Keylock
		5	Ground
J44	HDD LED	1	LED+
		2	LED -

JUMPER DESCRIPTION

Jumper	Function	Settings		Description
		(JA)	(JB)	
JA, JB	RS232 I	1-2 shorted	1-2 shorted	Disable
		1-2 shorted	2-3 shorted	3E8
		2-3 shorted	1-2 shorted	3F8
		2-3 shorted	2-3 shorted	2E8
JC, JD	RS232 II	(JC)	(JD)	Disable
		1-2 shorted	1-2 shorted	2E8
		1-2 shorted	2-3 shorted	2F8
		2-3 shorted	1-2 shorted	3E8
		2-3 shorted	2-3 shorted	
JE, JF	LPT1	(JE)	(JF)	Disable
		1-2 shorted	1-2 shorted	378
		1-2 shorted	2-3 shorted	278
		2-3 shorted	1-2 shorted	278
		2-3 shorted	2-3 shorted	3BC
JG	LPT OE	1-2 shorted		O/P port
		2-3 shorted		Bi-direction
JH	IDE	2-3 shorted		Enable
		1-2 shorted		Disable
JI	FDC	2-3 shorted		Enable
		1-2 shorted		Disable

Jumper	Function	Settings	Description
J2	Video	Close Open	CGA Mono, EGA, VGA
J6	Turbo switch	Close Open	Low speed K/B select
J7	Reset	Close Open	System reset Normal
J40	387 Clock Mode	1-2 shorted 2-3 shorted	Sync. mode Async. mode
J45	BALE to IDE connector	Close Open	BALE connects to CN8 pin28. CN8 pin28 remains N.C.

CPU SELECTION

	JK1	JK2	JK4	JC1	JC2	JC3	JC5	OSC1 MHz	0OHM 10P5R
486DX-50	2-3	2-3	1-2	1-2	1-2	1-2	open	50.00	RN15
486DX-33	2-3	2-3	1-2	1-2	1-2	1-2	open	33.33	RN15
486DX-25	1-2	1-2	1-2	1-2	1-2	1-2	open	50.00	RN15
486DX-20	1-2	1-2	1-2	1-2	1-2	1-2	open	40.00	RN15
486DX2-66	2-3	2-3	1-2	1-2	1-2	1-2	open	33.33	RN15
486DX2-50	1-2	1-2	1-2	1-2	1-2	1-2	open	50.00	RN15
487SX-25	1-2	1-2	1-2	1-2	1-2	2-3	open	50.00	RN15
487SX-20	1-2	1-2	1-2	1-2	1-2	2-3	open	40.00	RN15

	JK1	JK2	JK4	JC1	JC2	JC3	JC5*	OSC1 MHz	0OHM 10P5R
486SX-33	2-3	2-3	1-2	2-3	2-3	open	open	33.33	RN15
486SX-25	1-2	1-2	1-2	2-3	2-3	open	open	50.00	RN15
486SX-20	1-2	1-2	1-2	2-3	2-3	open	open	40.00	RN15
386DX-40	1-2	1-2	2-3	1-2	1-2	1-2	open	80.00	RN16
386DX-33	1-2	1-2	2-3	1-2	1-2	1-2	open	66.66	RN16
486DLC-33	1-2	1-2	1-2	1-2	1-2	1-2	close	66.66	RN16
486DLC-40	1-2	1-2	1-2	1-2	1-2	1-2	close	80.00	RN16

*JC5 is a 2x3 pin: "open" means 1-2, 3-4, 5-6, open simultaneously.

"close" means 1-2, 3-4, 5-6, close simultaneously.

CLOCK GENERATOR SELECTION

If you install a clock generator on OSC1 instead of an oscillator, you should use jumper J46 to select the appropriate clock frequency according to the system board. If the OSC1 has been installed an oscillator, jumper J46 takes no effect.

J46	1-2	3-4	5-6	7-8	Clock (MHz)
	short	open	open	open	33.33
	short	open	short	short	40
	short	short	open	open	40
	open	open	short	short	50
	open	short	open	open	50
	open	short	open	short	66.66
	short	open	open	short	66.66
	short	short	open	short	80

MEMORY SYSTEM

MEMORY CONFIGURATION

386 System Memory spec	Bank 0	Bank 1
1MB	256K x 4	
2MB	256K x 4	256K x 4
5MB	256K x 4	1M x 4
17MB	256K x 4	4M x 4
4MB	1M x 4	
5MB	1M x 4	256K x 4
8MB	1M x 4	1M x 4
20MB	1M x 4	4M x 4
16MB	4M x 4	
17MB	4M x 4	256K x 4
20MB	4M x 4	1M x 4
32MB (Max.)	4M x 4	4M x 4

486 System Memory spec	Bank 0	Bank 1
1MB	256K x 4	
2MB	256K x 4	256K x 4
5MB	256K x 4	1M x 4
17MB	256K x 4	4M x 4
65MB	256K x 4	16M x 4
4MB	1M x 4	
5MB	1M x 4	256K x 4
8MB	1M x 4	1M x 4
20MB	1M x 4	4M x 4
68MB	1M x 4	16M x 4
16MB	4M x 4	
17MB	4M x 4	256K x 4
20MB	4M x 4	1M x 4
32MB	4M x 4	4M x 4
80MB	4M x 4	16M x 4

(Continued)

64MB	16M x 4	
65MB	16M x 4	256K x 4
68MB	16M x 4	1M x 4
80MB	16M x 4	4M x 4
128MB(Max.)	16M x 4	16M x 4

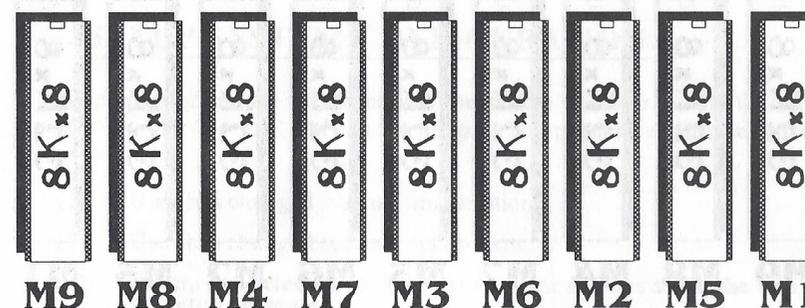
CACHE RAM & CONFIGURING CACHE SIZE

The 4386-VIO Cache System board uses the following four jumpers to configure the cache size.

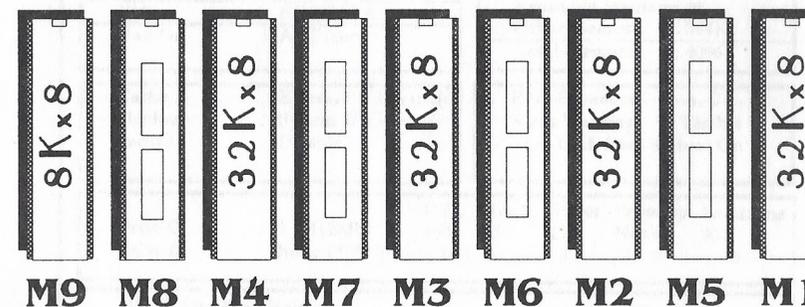
	64K	128K	256K
DATA RAM	8K x 8 (M1-M8)	32K x 8 (M1-M4)	32K x 8 (M1-M8)
TAG RAM	8K x 8 (M9)	8K x 8 (M9)	32K x 8 (M9)
JS1	1-2 shorted	1-2 shorted	2-3 shorted
JS2	1-2 shorted	2-3 shorted	2-3 shorted
JS3	1-2 shorted	2-3 shorted	1-2 shorted
JS4	1-2 shorted	2-3 shorted	1-2 shorted

With the power connector of the board facing forward, the cache memory area is located in the lower right corner of the board. There are nine cache RAM sockets in a row. Notice that the numbers of the cache RAMs are not arranged in order. Please refer to the following diagram for changing the cache size.

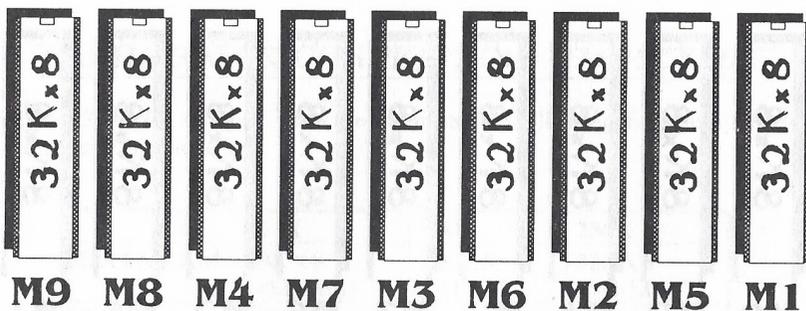
64Kbytes Direct Mapped Cache



128Kbytes Direct Mapped Cache



256Kbytes Direct Mapped Cache



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.		Expanded 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		Num Lock Boot Status : On			
Drive C : 9 (112Mb)	CYL : 900	Head : 15	Sector : 17	Precomp : None	Landzone : 901
Drive D : None (***Mb)	0	0	0	0	0
Alt-F1 for Menu Help			F10 exits		
Page 01 : Status Page		PgDn = Options Page		F2 change colors	

* Before you can disable the system & video shadow, you first have to disable the video cacheable and system cacheable function 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. Improper setup may cause the system to fail, so consult your dealer before making any changes.

Bus Control	
ISA Command Delay	: Normal
ISA Wait state	: Normal
I/O Recovery Time	: Disable
Extended ALE	: Disable
Decouple Refresh	: Disable
Cache/DRAM 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
Page 02 : Options Page	F10 exits
	F2 change colors

* On cache timing, the default setting is "Turbo"; if your system is 386DX-40, change the setting to "Fast".

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