

# **MAT-780**

Transmeta Crusoe  
TM5400 / TM5800  
ETX CPU Module

## **USER'S MANUAL**

Version 1.0A

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## Acknowledgments

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# Introduction

## Product Description

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MAT-780 is an ETX CPU pluggable module with a Transmeta Crusoe (TM5400 / TM5800) processor on board. The Transmeta Crusoe processor a revolutionary x86-compatible solution that features:

Remarkably low power consumption, allowing the processor to run cooler than conventional chips.

High performance, optimized for real-life usage patterns. Crusoe delivers, whether you're browsing the web, watching a DVD, or recalculating your spreadsheet.

Full x86 compatibility, so you are free to run the applications and Internet plugins of your choice.

ETX stands for Embedded Technology extended, a technology or form factor that offers flexible time-to-market solution, enabling product development time to shrink from four months to just four weeks. It also features low power consumption and low heat emission, eliminating the need for a CPU fan.

MAT-780 has four board-to-board high-density interface connectors for I/O signals that plug onto baseboards specific to customer's applications. ETX embedded solutions provide fast time-to-market through the interchangeability and scalability of both the ETX module and the baseboard.

System memory is provided by a SO-DIMM socket that supports up to 256MB of SDRAM memory. The Award BIOS facilitates easy system configuration and peripheral setup.

The on board VGA can be either an SMI SM722 and SMI SM712 graphics with 8MB and 2MB of embedded memory respectively. Ethernet function is supplied by the Realtek RTL8100BL single chip Ethernet controller with 10/100MB BaseT support.

With board size of 95mm by 114mm, MAT-780 supports through its ETX interface various interface such as PCI bus, USB, audio, VGA LCD, COM1, COM2, parallel port, FDD, IrDA, mouse, keyboard, IDE1, IDE2, Ethernet and ISA interface.

## Checklist

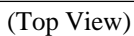
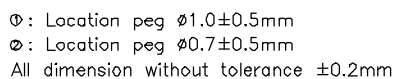
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Your MAT-780 package should include the items listed below.

- The MAT-780 CPU Module
- This User's Manual
- 1 CD containing the following:
  - Chipset Drivers
  - Flash Memory Utility

## Specifications

<b>Form Factor</b>	ETX
<b>CPU Type</b>	TM5400/TM5800
<b>CPU Voltage</b>	0.6V~1.75V operating in range of 533~800MHz,1-3 W average power consumption over most applications,
<b>System Speed</b>	TM5400/TM5800 for 533MHz/800MHz
<b>CPU External Clock</b>	66Mhz
<b>Chipset</b>	Transmeta Crusoe TM5400/TM5800 474 pin BGA South Bridge:VT82C686A/B 352 PIN BGA
<b>BIOS</b>	Award BIOS (2M serial flash ROM)
<b>Cache</b>	Integrated 64 kByte instruction and data caches, and 256 Kbyte(TM5400)/512kByte(TM5600/TM5800) L2 write-back cache
<b>On Board VGA</b>	SMI722G8 3D Graphics Controller, Embedded 8MB Display memory, Support CRT,TFT LCD 24 bit ( LVDS ) Or SMI712 2D Graphics Controller, Embedded 2MB Display memory, Support CRT,TFT LCD 24 bit ( LVDS )
<b>LAN</b>	Realtek RTL8100L Single Chip Ethernet Controller 10/100 BaseT support
<b>Sound</b>	VT82C686A/B Built-in Sound controller + AC97 Codec Realtek ALC101 (Line-out, Line-in, Mic.)
<b>Memory type</b>	On-board Memory 64/128MB 1x SODIMM 3.3V Max. 256MB.Support PC100/PC133 SO-DIMM Module
<b>SUPER I/O</b>	VIA VT82C686A/B: IrDAx1 Parallel x1, COM1/2(RS-232), FDC 2.88MB (3 Mode support ), Hardware monitor(3 thermal inputs,4 voltage monitor inputs, VID0-4,2 fan input
<b>RTC/CMOS</b>	VT82C686A/B Built-in
<b>Keyboard Controller</b>	VT82C686A/B
<b>Watchdog Timer</b>	32 level
<b>EPP/ECP</b>	Yes
<b>Local bus IDE</b>	VT82C686A/B built-in , IDE1,2 (Ultra DMA 33/66/100)
<b>ETX Interface</b>	Connectors x 4 For PCI-bus, USB, Sound, VGA LCD, COM1, COM2, LPT, Floppy, IrDA, Mouse, Keyboard, IDE1, IDE2, Ethernet, ISA
<b>USB</b>	4 ports, transfer rate up to 12Mb/s
<b>Board Size</b>	95mm x 114mm (3.74" x 4.5")





## Connectors on MAT-780

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**1. X1 (PCI-Bus, USB, Audio)**

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	VCC	52	VCC
3	PCICLK3	4	PCICLK4	53	PAR	54	SERRJ
5	GND	6	GND	55	GPERRJ	56	N C
7	PCICLK1	8	PCICLK2	57	PMEJ	58	USB20
9	REQJ3	10	GNTJ3	59	LOCKJ	60	DEVSELJ
11	GNTJ2	12	3V	61	TRDYJ	62	USB30
13	REQJ2	14	GNTJ1	63	IRDYJ	64	STOPJ
15	REQJ 1	16	3V	65	FRAMEJ	66	USB21
17	GNTJ0	18	N.C.	67	GND	68	GND
19	VCC	20	VCC	69	AD16	70	CBEJ2
21	SERIRQ	22	REQJ0	71	AD17	72	USB31
23	AD0	24	3V	73	AD19	74	AD18
25	AD1	26	AD2	75	AD20	76	USB00
27	AD4	28	AD3	77	AD22	78	AD21
29	AD6	30	AD5	79	AD23	80	USB10
31	CBEJ0	32	AD7	81	AD24	82	CBEJ3
33	AD8	34	AD9	83	VCC	84	VCC
35	GND	36	GND	85	AD25	86	AD26
37	AD10	38	AUXAL	87	AD28	88	USB01
39	AD11	40	MIC	89	AD27	90	AD29
41	AD12	42	AUXAR	91	AD30	92	USB11
43	AD13	44	ASVCC	93	PCIRSTJ	94	AD31
45	AD14	46	SNDL	95	IRQY	96	IRQZ
47	AD15	48	ASGND	97	IRQW	98	IRQX
49	CBEJ1	50	SNDR	99	GND	100	GND

**2. X2 (ISA-Bus)**

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	VCC	52	VCC
3	SD14	4	SD15	53	SA6	54	IRQ5
5	SD13	6	MASTERJ	55	SA7	56	IRQ6
7	SD12	8	DREQ7	57	SA8	58	IRQ7
9	SD11	10	DACKJ7	59	SA9	60	SYSCLK
11	SD10	12	DREQ6	61	SA10	62	REFSHJ
13	SD9	14	DACKJ6	63	SA11	64	DREQ1
15	SD8	16	DREQ5	65	SA12	66	DACKJ 1
17	MEMWJ	18	DACKJ5	67	GND	68	GND
19	MEMRJ	20	DREQ0	69	SA13	70	DREQ3
21	LA17	22	DACKJ0	71	SA14	72	DACKJ3
23	LA18	24	IRQ14	73	SA15	74	IORJ
25	LA19	26	IR015	75	SA16	76	IOWJ
27	LA20	28	IRQ12	77	SA18	78	SA17
29	LA21	30	IRQ11	79	SA19	80	SMEMRJ
31	LA22	32	IRQ10	81	IOCHRD Y	82	AEN
33	LA23	34	IO16J	83	VCC	84	VCC
35	GND	36	GND	85	SD0	86	SMEMWJ
37	SBHEJ	38	M16J	87	SD2	88	SD1
39	SA0	40	OSC	89	SD3	90	NOWSJ
41	SA1	42	BALE	91	DREQ2	92	SD4
43	SA2	44	TC	93	SD5	94	IRQ9
45	SA3	46	DACKJ2	95	SD6	96	SD7
47	SA4	48	IRQ3	97	IOCHKJ	98	RSTDRV
49	SA5	50	IRQ4	99	GND	100	GND

### 3. X3 (VGA, LCD, Video, COM1, COM2, LPT, IrDA, Mouse, Keyboard)

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	N C	52	N C
3	R	4	B	53	VCC	54	GND
5	HSY	6	G	55	/STB	56	/AFD
7	VSY	8	DDCK	57	ic.	58	PD7
9	NC	10	DDDA	59	IRRX	60	/ERR
11	NC	12	NC	61	IRTX	62	PD6
13	NC	14	NC	63	RXD2	64	/INIT
15	GND	16	GND	65	GND	66	GND
17	NC	18	NC	67	RTS2J	68	PD5
19	NC	20	NC	69	DTR2J	70	/SLIN
21	GND	22	GND	71	DCD2J	72	PD4
23	TX3#	24	NC	73	DSR2J	74	PD3
25	TX3	26	NC	75	CTS2J	76	PD2
27	GND	28	GND	77	TXD2J	78	PD1
29	TX2#	30	TXCLK	79	RI2J	80	PD0
31	TX2	32	TXCLK#	81	VCC	82	VCC
33	GND	34	GND	83	RXD1	84	/ACK
35	TX0	36	TX1	85	RTS1J	86	/BUSY
37	TX0#	38	TX1#	87	DTR1J	88	PE
39	VCC	40	VCC	89	DCD1J	90	/SLCT
41	JILI_DAT	42	NC	91	DSR1J	92	MSCLK
43	JILI_CLK	44	BLON#	98	CTS1J	94	MSDAT
45	BIASON	46	DIGON	95	TXD1	96	KBCLK
47	NC	48	NC	97	RI1J	98	KBDAT
49	NC	50	NC	99	GND	100	GND

**4. X4 (IDE 1, IDE 2, Misc)**



Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
1	GND	2	GND	51	SIDE IOWJ	52	PIDE_IORJ
3	5V SB	4	PWGIN	53	SIDE DRQ	54	PIDE IOWJ
5	PS ON	6	SPEAKER	55	SIDE D15	56	PIDE DRQ
7	PWRBTNJ	8	BATT	57	SIDE D0	58	PIDE D15
9	NC	10	LILED	59	SIDE D14	60	PIDE D0
11	WDTRIG	12	ACTLED	61	SIDE D1	62	PIDE D14
13	NC	14	NC	63	SIDE D13	64	PIDE D1
15	NC	16	NC	65	GND	66	GND
17	VCC	18	VCC	67	SIDE D2	68	PIDE D13
19	OVC RJ	20	NC	69	SIDE D12	70	PIDE D2
21	EXTSMI	22	NC	71	SIDE D3	72	PIDE D12
23	SMBCLK	24	SMBDATA	73	SIDE11	74	PIDE D3
25	SIDE_CS3J	26	N.C.	75	SIDE D4	76	PIDE D11
27	SIDE CS1J	28	NC	77	SIDE D10	78	PIDE D4
29	SIDE A2	30	PIDE_CS3J	79	SIDE D5	80	PIDE D10
31	SIDE A0	32	PIDE CS1J	81	VCC	82	VCC
33	GND	34	GND	83	SIDE-D9	84	PIDE D5
35	NC	36	PIDE_A2	85	SIDE D6	86	PIDE D9
37	SIDE A1	38	PIDE_A0	87	SIDE-D8	88	PIDE D6
39	SIDE INTRO	40	PIDE A1	89	N.C.	90	N.C.
41	N.C.	42	N.C.	91	RXD-	92	PIDE D8
43	SIDE_AKJ	44	PIDE INTRO	93	RXD+	94	SIDE D7
45	SIDE_RDY	46	PIDE_AKJ	95	TXD-	96	PIDE D7
47	SIDE_IORJ	48	PIDE RDY	97	TXD+	98	HDRSTJ
49	VCC	50	VCC	99	GND	100	GND

## 5. J3: FDD Connector

Pin	Signal	Pin	Signal
1	VCC	2	INDEX
3	VCC	4	DRV_SEL
5	VCC	6	DSK_CH
7	NC	8	NC
9	NC	10	MOTOR
11	DINST	12	DIR
13	NC	14	STEP
15	GND	16	WDATA
17	GND	18	EGATE
19	GND	20	TRACK
21	GND	22	WPROT
23	GND	24	RDATA
25	GND	26	SIDE

## 6. JP1: Power Supply Type Select

Use JP1, a 3-pin header, to select between AT and ATX power supply.

JP1	Setting	Power Supply Type
 1 2 3	Pin 1-2 Short/Closed	AT
 1 2 3	Pin 2-3 Short/Closed	ATX

**7. SW1: Panel/Resolution Switch Setting (For SMI SM722)**

Panel ID	SW 1-1	SW 1-2	SW 1-3	SW 1-4	Panel Type
0	ON	ON	ON	ON	640x480 TFT(18-bit)
1	OFF	ON	ON	ON	640x480 DSTN
2	ON	OFF	ON	ON	800x600 TFT(18-bit)
3	OFF	OFF	ON	ON	800x600 DSTN
4	ON	ON	OFF	ON	1024x768TFT(18-bit)
5	OFF	ON	OFF	ON	1024x768 DSTN
6	ON	OFF	OFF	ON	Reserved
7	OFF	OFF	OFF	ON	Reserved
8	ON	ON	ON	OFF	Reserved
9	OFF	ON	ON	OFF	800x600 TFT(24-bit)
10	ON	OFF	ON	OFF	Reserved
11	OFF	OFF	ON	OFF	*NEC 800x600(18-bit)
12	ON	ON	OFF	OFF	1024X768(24-bit)
13	OF	ON	OFF	OFF	Reserved
14	ON	OFF	OFF	OFF	Reserved

\* NEC Panel Model No.: NL8060BC26-17 (ID11)

**8. SW1: Panel/Resolution Switch Setting (For SMI SM712)**

Panel ID	SW 1-1	SW 1-2	SW 1-3	SW 1-4	Panel Type
0	ON	ON	ON	ON	640x480 TFT(18-bit)
1	OFF	ON	ON	ON	640x480 DSTN
2	ON	OFF	ON	ON	800x600 TFT(18-bit)
3	OFF	OFF	ON	ON	800x600 DSTN
4	ON	ON	OFF	ON	1024x768TFT(18-bit)
5	OFF	ON	OFF	ON	1024x768 DSTN
6	ON	OFF	OFF	ON	Reserved
7	OFF	OFF	OFF	ON	Reserved
8	ON	ON	ON	OFF	Reserved
9	OFF	ON	ON	OFF	800x600 TFT (24-bit)
10	ON	OFF	ON	OFF	Reserved
11	OFF	OFF	ON	OFF	Reserved
12	ON	ON	OFF	OFF	1024x768 TFT (24-bit)
13	OF	ON	OFF	OFF	Reserved
14	ON	OFF	OFF	OFF	Reserved

NOTE: ID9 and ID12 settings are optional.

## Watchdog Timer Configuration

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The function of the watchdog timer is to reset the system automatically and is defined at I/O port 0443H. To enable the watchdog timer and allow the system to reset, write I/O port 0443H. To disable the timer, write I/O port 0441H for the system to stop the watchdog function. The timer has a tolerance of 20% for its intervals.

The following describes how the timer should be programmed.

### Enabling Watchdog:

MOV AX, 000FH (Choose the values from 0)

MOV DX, 0443H

OUT DX, AX

### Disabling Watchdog

MOV AX, 00FH (Any value is fine.)

MOV DX, 0441H

OUT DX, AX

### WATCHDOG TIMER CONTROL TABLE

Level	Value	Time/sec	Level	Value	Time/sec
1	1F	0	9	17	8
2	1E	1	10	16	9
3	1D	2	11	15	10
4	1C	3	12	14	11
5	1B	4	13	13	12
6	1A	5	14	12	13
7	19	6	15	11	14
8	18	7	16	10	15
Level	Value	Time/sec	Level	Value	Time/sec
17	0F	16	25	07	24
18	0E	17	26	06	25
19	0D	18	27	05	26
20	0C	19	28	04	27
21	0B	20	29	03	28
22	0A	21	30	02	29
23	09	22	31	01	30
24	08	23	32	00	31



## BIOS Setup

This chapter describes the different settings available in the Award BIOS that comes with the CPU card. The topics covered in this chapter are as follows:

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Load Fail-Safe Defaults.....	28
Load Setup Defaults.....	28
Set Supervisor/User Password.....	28
Save & Exit Setup .....	28
Exit Without Saving.....	28

### BIOS Introduction

The Award BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel Pentium II/III processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also adds virus and password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

### BIOS Setup

The Award BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the Award BIOS is immediately activated. Pressing the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

Press <DEL> to Enter Setup

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

## Phoenix - AwardBIOS CMOS Setup Utility

Standard CMOS Features	Load Fail-Safe Defaults
Advanced BIOS Features	Load Optimized Defaults
Integrated Peripherals	Set Supervisor Password
Power Management Setup	Set User Password
PnP/PCI Configurations	Save & Exit Setup
PC Health Status	Exit Without Saving
ESC : Quit	↑ ↓ → ← : Select Item
F10 : Save & Exit Setup	
Time, Date, Hard Disk Type...	

The section below the setup items of the Main Menu displays the control keys for this menu. At the bottom of the Main Menu just below the control keys section, there is another section which displays information on the currently highlighted item in the list.

**Note:** *If the system cannot boot after making and saving system changes with Setup, the Award BIOS supports an override to the CMOS settings that resets your system to its default.*

**Warning:** *It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both Award and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

## Standard CMOS Setup

“Standard CMOS Setup” choice allows you to record some basic hardware configurations in your computer system and set the system clock and error handling. If the board is already installed in a working system, you will not need to select this option. You will need to run the Standard CMOS option, however, if you change your system hardware configurations, the onboard battery fails, or the configuration stored in the CMOS memory was lost or damaged.

Phoenix - AwardBIOS CMOS Setup Utility  
Standard CMOS Features

Date (mm:dd:yy)	Tue, Mar 26 2000	Item Help
Time (hh:mm:ss)	00 : 00 : 00	Menu Level
IDE Primary Master	None	Change the day, month, Year and century
IDE Primary Slave	None	
IDE Secondary Master	None	
IDE Secondary Slave	None	
Drive A	1.44M, 3.5 in.	
Drive B	None	
Video	EGA/VGA	
Halt On	All Error	
Base Memory	640K	
Extended Memory	129024K	
Total Memory	130048K	

At the bottom of the menu are the control keys for use on this menu. If you need any help in each item field, you can press the <F1> key. It will display the relevant information to help you. The memory display at the lower right-hand side of the menu is read-only. It will adjust automatically according to the memory changed. The following describes each item of this menu.

### Date

The date format is:

**Day :** Sun to Sat  
**Month :** 1 to 12  
**Date :** 1 to 31  
**Year :** 1994 to 2079

To set the date, highlight the “Date” field and use the PageUp/ PageDown or +/- keys to set the current time.

**Time**

The time format is: **Hour : 00 to 23**  
**Minute : 00 to 59**  
**Second : 00 to 59**

To set the time, highlight the “Time” field and use the <PgUp>/ <PgDn> or +/- keys to set the current time.

**IDE Primary HDDs / IDE Secondary HDDs**

The onboard PCI IDE connectors provide Primary and Secondary channels for connecting up to four IDE hard disks or other IDE devices. Each channel can support up to two hard disks; the first is the “Master” and the second is the “Slave”.

Press <Enter> to configure the hard disk. The selections include Auto, Manual, and None. Select ‘Manual’ to define the drive information manually. You will be asked to enter the following items.

**CYLS :**            Number of cylinders  
**HEAD :**           Number of read/write heads  
**PRECOMP :**      Write precompensation  
**LANDZ :**         Landing zone  
**SECTOR :**        Number of sectors

The Access Mode selections are as follows:

Auto  
 Normal (HD < 528MB)  
 Large (for MS-DOS only)  
 LBA (HD > 528MB and supports  
 Logical Block Addressing)

**Drive A / Drive B**

These fields identify the types of floppy disk drive A or drive B that has been installed in the computer. The available specifications are:

360KB	1.2MB	720KB	1.44MB	2.88MB
5.25 in.	5.25 in.	3.5 in.	3.5 in.	3.5 in.

### Video

This field selects the type of video display card installed in your system. You can choose the following video display cards:

EGA/VGA	For EGA, VGA, SEGA, SVGA or PGA monitor adapters. (default)
CGA 40	Power up in 40 column mode.
CGA 80	Power up in 80 column mode.
MONO	For Hercules or MDA adapters.

### Halt On

This field determines whether or not the system will halt if an error is detected during power up.

No errors	The system boot will not be halted for any error that may be detected.
All errors	Whenever the BIOS detects a non-fatal error, the system will stop and you will be prompted.
All, But Keyboard	The system boot will not be halted for a keyboard error; it will stop for all other errors
All, But Diskette	The system boot will not be halted for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not be halted for a keyboard or disk error; it will stop for all others.

## Advanced BIOS Features

This section allows you to configure and improve your system and allows you to set up some system features according to your preference.

Phoenix - AwardBIOS CMOS Setup Utility  
Advanced BIOS Features

		ITEM HELP
Virus Warning	Disabled	Menu Level  Allows you choose the VIRUS warning feature for IDE Hard Disk boot sector protection. If this function is enabled and someone attempt to write data into this area, BIOS will show a warning message on screen and alarm beep
CPU Internal Cache	Enabled	
Quick Power On Self Test	Enabled	
First Boot Device	Floppy	
Second Boot Device	HDD-0	
Third Boot Device	CDROM	
Boot Other Device	Enabled	
Swap Floppy Drive	Disabled	
Boot Up Floppy Seek	Disabled	
Boot Up Numlock Status	On	
Typematic Rate Setting	Disabled	
Typematic Rate (chars/Sec)	6	
Typematic Delay (Msec)	250	
Security Option	Setup	
OS Select For DRAM>64MB	Non-OS2	
Report No FDD For WIN95	Yes	
CPU Support CMPXCHG8B	Disabled	
Video BIOS Shadow	Enabled	
C8000-CBFFF Shadow	Disabled	
CC000-CFFFF Shadow	Disabled	
D0000-D3FFF Shadow	Disabled	
D4000-D7FFF Shadow	Disabled	
D8000-DBFFF Shadow	Disabled	
DC000-DFFF Shadow	Disabled	
Small Logo (EPA) Show	Enabled	

### Virus Warning

This item protects the boot sector and partition table of your hard disk against accidental modifications. If an attempt is made, the BIOS will halt the system and display a warning message. If this occurs, you can either allow the operation to continue or run an anti-virus program to locate and remove the problem.

### CPU Internal Cache

Cache memory is additional memory that is much faster than conventional DRAM (system memory). CPUs from 486-type on up contain internal cache memory, and most, but not all, modern PCs have additional (external) cache memory. When the CPU requests data, the system transfers the requested data from the main DRAM into cache memory, for even faster access by the CPU. These items allow you to enable (speed up memory access) or disable the cache function. By default, these items are **Enabled**.

### Quick Power On Self Test

When enabled, this field speeds up the Power On Self Test (POST) after the system is turned on. If it is set to *Enabled*, BIOS will skip some items.

### First/Second/Third Boot Device

These fields determine the drive that the system searches first for an operating system. The options available include *Floppy*, *LS/ZIP*, *HDD-0*, *SCSI*, *CDROM*, *HDD-1*, *HDD-2*, *HDD-3*, *LAN* and *Disable*.

### Boot Other Device

These fields allow the system to search for an operating system from other devices other than the ones selected in the First/Second/Third Boot Device.

### Swap Floppy Drive

This item allows you to determine whether or not to enable Swap Floppy Drive. When enabled, the BIOS swaps floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A. By default, this field is set to *Disabled*.

### Boot Up Floppy Seek

When enabled, the BIOS will seek whether or not the floppy drive installed has 40 or 80 tracks. 360K type has 40 tracks while 760K, 1.2M and 1.44M all have 80 tracks.

### Boot Up NumLock Status

This allows you to activate the NumLock function after you power up the system.

### Gate A20 Option

This field allows you to select how Gate A20 is worked. Gate A20 is a device used to address memory above 1 MB.

### Typematic Rate Setting

When disabled, continually holding down a key on your keyboard will generate only one instance. When enabled, you can set the two typematic controls listed next. By default, this field is set to *Disabled*.

### Typematic Rate (Chars/Sec)

When the typematic rate is enabled, the system registers repeated keystrokes speeds. Settings are from 6 to 30 characters per second.



**Typematic Delay (Msec)**

When the typematic rate is enabled, this item allows you to set the time interval for displaying the first and second characters. By default, this item is set to **250msec**.

**Security Option**

This field allows you to limit access to the System and Setup. The default value is **Setup**. When you select **System**, the system prompts for the User Password every time you boot up. When you select **Setup**, the system always boots up and prompts for the Supervisor Password only when the Setup utility is called up.

**OS Select for DRAM > 64MB**

This option allows the system to access greater than 64MB of DRAM memory when used with OS/2 that depends on certain BIOS calls to access memory. The default setting is **Non-OS/2**.

**Report No FDD For WIN 95**

If you are using Windows 95/98 without a floppy disk drive, select Enabled to release IRQ6. If you set this feature to Disabled, the BIOS will not report the missing floppy drive to Win95/98.

**Video BIOS Shadow**

This item allows you to change the Video BIOS location from ROM to RAM. Video Shadow will increase the video speed.

**C8000 - CBFFF Shadow/DC000 - DFFFF Shadow**

Shadowing a ROM reduces the memory available between 640KB to 1024KB. These fields determine whether or not optional ROM will be copied to RAM.

**Small Logo (EPA) Show**

This field enables the showing of the EPA logo located at the upper right of the screen during boot up.

## Integrated Peripherals

This section sets configurations for your hard disk and other integrated peripherals.

Phoenix - AwardBIOS CMOS Setup Utility  
Integrated Peripherals

		ITEM HELP
On-Chip IDE Channel 0	Enabled	Menu Level
On-Chip IDE Channel 1	Enabled	
IDE Prefetch Mode	Disabled	
IDE Primary Master PIO	Auto	
IDE Primary Slave PIO	Auto	
IDE Secondary Master PIO	Auto	
IDE Secondary Slave PIO	Auto	
IDE Primary Master UDMA	Auto	
IDE Primary Slave UDMA	Auto	
IDE Secondary Master UDMA	Auto	
IDE Secondary Slave UDMA	Auto	
OnChip USB	Enabled	
USB Keyboard Support	Disabled	
AC97 Audio	Auto	
IDE HDD Block Mode	Enabled	
Onboard FDD Controller	Enabled	
Onboard Serial Port 1	3F8/IRQ4	
Onboard Serial Port 2	2F8/IRQ3	
UART 2 Mode	Standard	
Onboard Parallel Port	378/IRQ7	
Onboard Parallel Mode	Normal	

### OnChip IDE Channel 0 / 1

The integrated peripheral controller contains an IDE interface with support for two IDE channels. Select *Enabled* to activate each channel separately.

### IDE Prefetch Mode

This field enables/disables the prefetch buffers in the PCI IDE controller. The prefetch buffers are used as a temporary storage place as data is transferred from one location to another.

### IDE Primary/Secondary Master/Slave PIO

These fields allow your system hard disk controller to work faster. Rather than have the BIOS issue a series of commands that transfer to or from the disk drive, PIO (Programmed Input/Output) allows the BIOS to communicate with the controller and CPU directly.

The system supports five modes, numbered from 0 (default) to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.

**IDE Primary/Secondary Master/Slave UDMA**

These fields allow your system to improve disk I/O throughput to 33Mb/sec with the Ultra DMA/33 feature. The options are *Auto* and *Disabled*.

**OnChip USB**

By default, this field enables the USB on the system board.

**USB Keyboard Support**

Enable this field if you are using a USB keyboard.

**AC97 Audio**

By default, the AC97 Audio is set to *Auto*.

**IDE HDD Block Mode**

This field allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive.

**Onboard FDD Controller**

Select *Enabled* if your system has a floppy disk controller installed on the CPU card and you wish to use it. If you install an add-in FDC or the system has no floppy drive, select *Disabled* in this field. This option allows you to select the onboard FDD port.

**UART 2 Mode**

This item allows you to determine which Infra Red (IR) function of onboard I/O chip. The options are *Standard*, *IrDA*, and *ASKIR*.

**Onboard Serial/Parallel Port**

These fields allow you to select the onboard serial and parallel ports and their addresses. The default values for these ports are:

Serial Port 1	3F8H/IRQ4
Serial Port 2	2F8H/IRQ3
Parallel Port	378H/IRQ7

**Parallel Port Mode**

This field allows you to determine parallel port mode function.

SPP	Standard Printer Port
EPP	Enhanced Parallel Port
ECP	Extended Capabilities Port

## Power Management Setup

The Power Management Setup allows you to save energy of your system effectively.

Phoenix - AwardBIOS CMOS Setup Utility  
Power Management Setup

ACPI Function	Disabled	ITEM HELP
Power Management	User Defined	Menu Level
Video Off Method	V/H Sync + Blank	
Standby Mode	Disabled	
HDD Power Down	Disabled	
Soft-Off by PBTN	Delay 4 sec	
Power-Supply Type	AT	
RI Resume	Disabled	
Modem Use IRQ	3	
RTC Resume	Disabled	
IRQ Wakeup Events	Press Enter	

Phoenix - AwardBIOS CMOS Setup Utility  
IRQ/Event Activity Detect

VGA	OFF	ITEM HELP
LPT & COM	LPT / COM	Menu Level
HDD & FDD	ON	
PCI Master	OFF	

## ACPI Function

Use this option to enable or disable the ACPI function

## Power Management

When you press Enter while selecting this field, the menu for Power Management appears. The following are the fields in this menu.

### Power Management

This field allows you to select the type of power saving management modes. There are four selections for Power Management.

Min. Power Saving	Minimum power management
Max. Power Saving	Maximum power management.
User Define	Each of the ranges is from 1 min. to 1hr.
(Default)	Except for HDD Power Down which ranges from 1 min. to 15 min.

### Video Off Method

This field defines the Video Off features. There are three options.

V/H SYNC + Blank	Default setting, blank the screen and turn off vertical and horizontal scanning.
DPMS	Allows the BIOS to control the video display card if it supports the DPMS feature.
Blank Screen	This option only writes blanks to the video buffer.

### Soft-Off by PWRBTN

This field defines the power-off mode when using an ATX power supply. The *Instant Off* mode allows powering off immediately upon pressing the power button. In the *Delay 4 Sec* mode, the system powers off when the power button is pressed for more than four seconds or enters the suspend mode when pressed for less than 4 seconds. The default value is ***Instant Off***.

### Power-Supply Type

By default, the power supply type is set to ***AT***.

### RI Resume

By the default the RI Resume is ***Disabled***.

### Modem Use IRQ

This field sets the IRQ used by the Modem. By default, the setting is ***3***.

### Wake Up Events

The HDD, FDD, COM, LPT Ports, and PCI PIRQ are I/O events which can prevent the system from entering a power saving mode or can awaken the system from such a mode. When an I/O device wants to gain the attention of the operating system, it signals this by causing an IRQ to occur. When the operating system is ready to respond to the request, it interrupts itself and performs the service.

## PNP/PCI Configurations

This option configures the PCI bus system. All PCI bus systems on the system use INT#, thus all installed PCI cards must be set to this value.

Phoenix - AwardBIOS CMOS Setup Utility  
PnP/PCI Configurations

PNP OS Installed	No	ITEM HELP
Reset Configuration Data	Disabled	Menu Level
Resources Controlled By	Manual	Default is Disabled. Select Enabled to reset Extended System Configuration Data (ESCD) when you exit Setup if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the OS cannot boot
IRQ Resources	Press Enter	
DMA Resources	Press Enter	
PCI/VGA Palette Snoop	Disabled	

### PNP OS Installed

Enable the PNP OS Install option if it is supported by the operating system installed. The default value is *No*.

### Reset Configuration Data

This field allows you to determine whether to reset the configuration data or not. The default value is *Disabled*.

### Resources Controlled by

This PnP BIOS can configure all of the boot and compatible devices automatically with the use of a use a PnP operating system such as Windows 95.

### PCI/VGA Palette Snoop

Some non-standard VGA display cards may not show colors properly. This field allows you to set whether or not MPEG ISA/VESA VGA cards can work with PCI/VGA. When this field is enabled, a PCI/VGA can work with an MPEG ISA/VESA VGA card. When this field is disabled, a PCI/VGA cannot work with an MPEG ISA/VESA card.

## PC Health Status

This section shows the parameters in determining the PC Health Status. These parameters include temperatures, fan speeds and voltages.

Phoenix - AwardBIOS CMOS Setup Utility  
PC Health Status

		ITEM HELP
CPU Warning Temperature	Disabled	
Current CPU Temp.	28°C/82°F	
Current System Temperature	34°C/95°F	
Vcore (V)	1.45V	
2.5V	2.47V	
3.3(V)	3.34V	
5(V)	5.05V	
12(V)	12.09V	

### CPU Warning Temperature

This field sets the temperature threshold that when reached, the system would give an audible warning. The default is 80°C.

### Temperatures/Voltages

These fields are the parameters of the hardware monitoring function feature of the CPU card. The values are read-only values as monitored by the system and show the PC health status.

### **Load Fail-Safe Defaults**

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high-performance features.

### **Load Setup Defaults**

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.

### **Set Supervisor/User Password**

These two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>. The Enter Password: message prompts on the screen. Type the password, up to eight characters in length, and press <Enter>. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

To disable a password, just press the <Enter> key when you are prompted to enter the password. A message will confirm the password to be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

### **Save & Exit Setup**

This option allows you to determine whether or not to accept the modifications. If you type “Y”, you will quit the setup utility and save all changes into the CMOS memory. If you type “N”, you will return to Setup utility.

### **Exit Without Saving**

Select this option to exit the Setup utility without saving the changes you have made in this session. Typing “Y” will quit the Setup utility without saving the modifications. Typing “N” will return you to Setup utility.



## **Drivers Installation**

This section describes the installation procedures for software and drivers under the Windows 98, Windows NT 4.0 and Windows 2000. The software and drivers are included with the CPU card. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

- VIA 4 in 1 Drivers Installation
- VGA Drivers Installation
- LAN Drivers Installation
- Audio Drivers Installation

## VIA 4 in 1 Drivers Installation

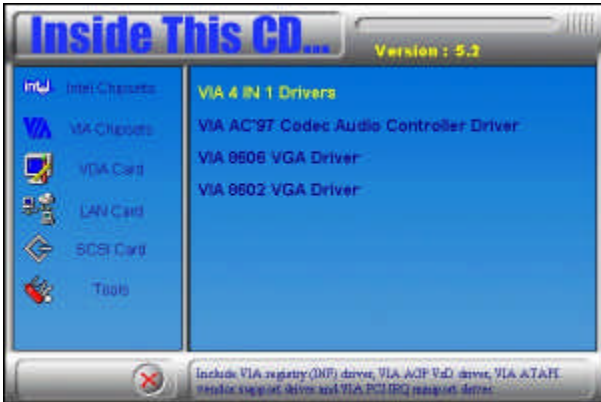
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Before installing the drivers for VGA, LAN and Audio, install the VIA 4 in 1 drivers first. Follow the instructions below to complete the installation.

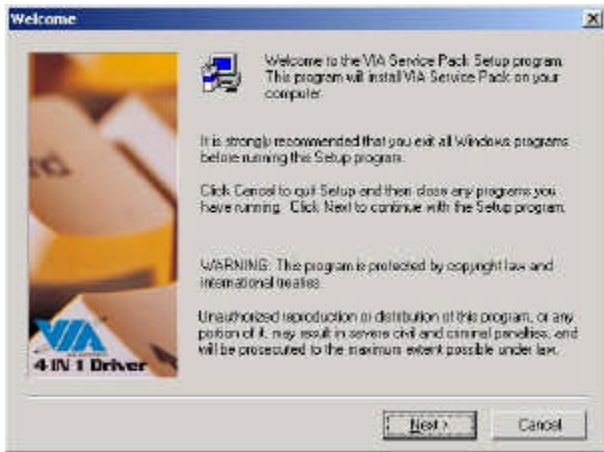
1. Insert the CD that comes with the CPU card and the screen below would appear. Click VIA Chipsets on the left side.



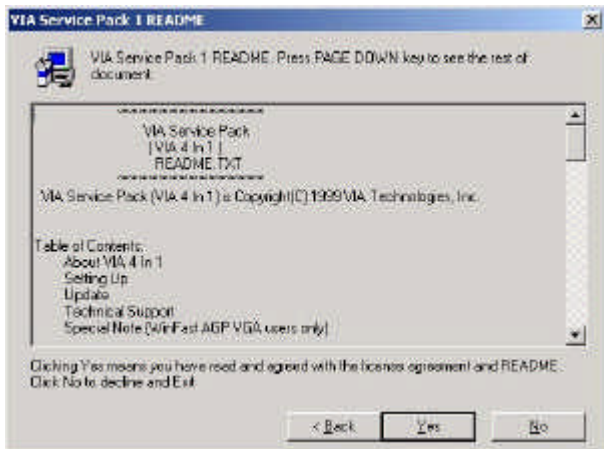
2. Click VIA 4 IN 1 Drivers.



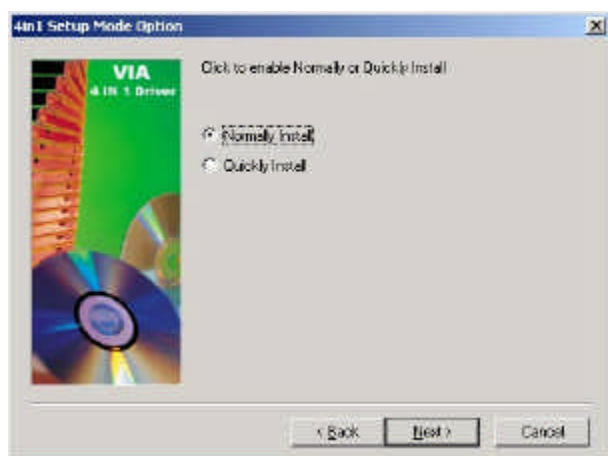
3. When the Welcome screen appears, click Next.



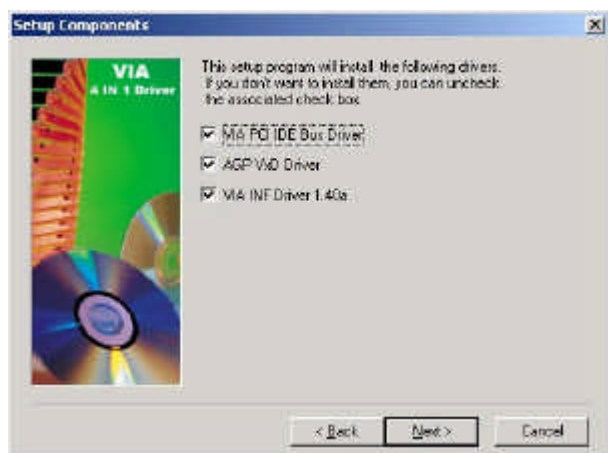
4. Click Next to agree with the license agreement statement and to continue.



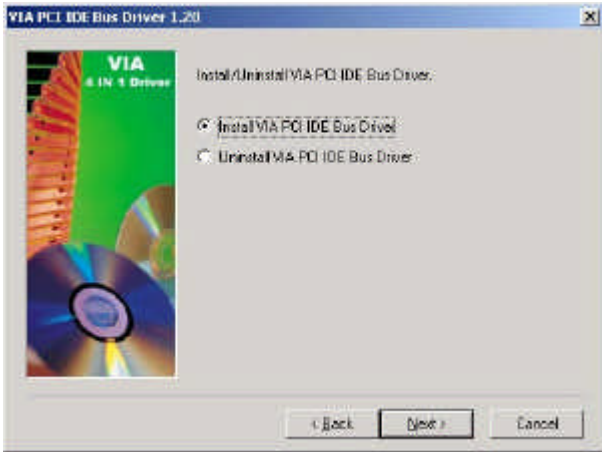
5. Select the Setup Mode and click Next to continue.



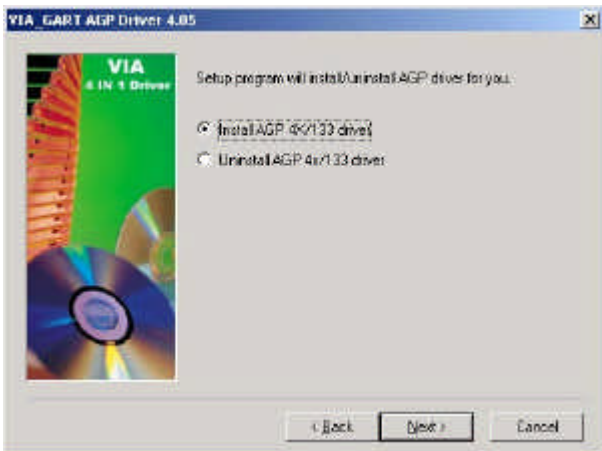
6. Click Next to install the drivers listed.



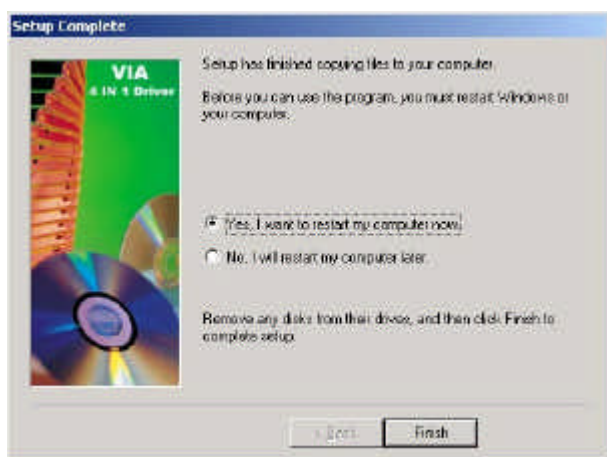
7. Click Next to install the VIA IDE Driver.



8. Click Next to install the AGP 4X/133 driver.



9. Click Finish to restart the computer and for changes to take effect.



## VGA Drivers Installation

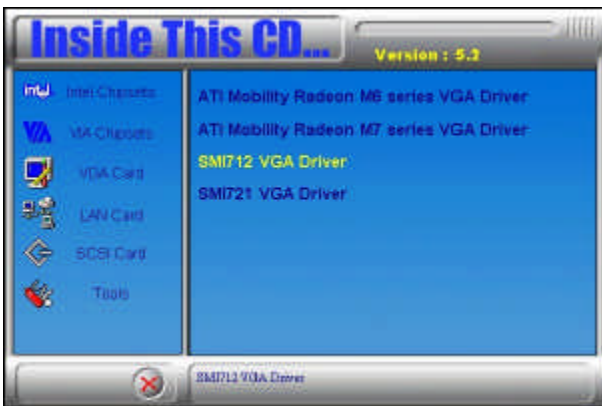
After installing the VIA 4 in 1 drivers, you may now install the SMI VGA drivers (SMI SM712 or SMI SM722). Follow the steps below to proceed with the installation.

**NOTE: Before installing the VGA drivers on Windows NT 4.0, you need to install Service Pack 3 or above.**

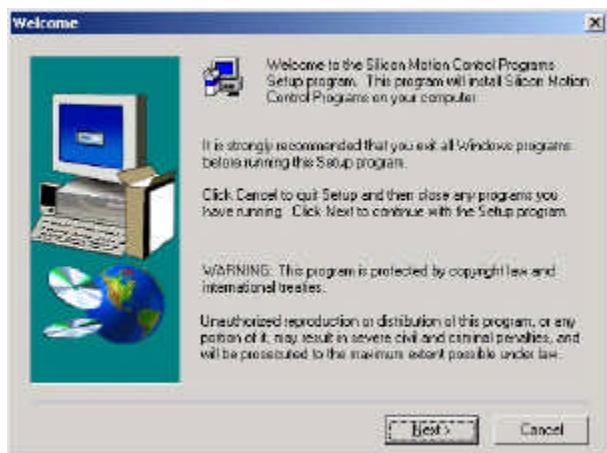
1. Insert the CD that comes with the CPU card and the screen below would appear. Click VGA Card on the left side.



2. On the right side of the screen, click on SMI712 VGA Driver or SMI722 VGA Driver depending on the VGA controller that is on your main board. **NOTE: SMI721 and SMI722 use the same drivers.**



3. A Welcome screen would then appear. Click Next to start copying of files needed for the driver installation.



4. After file copying is done, restart the computer when prompted for changes to take effect.





## LAN Drivers Installation

Follow the steps below to proceed with the LAN drivers installation.

1. Insert the CD that comes with the CPU card and the screen below would appear. Click LAN Card on the left side and select Realtek RTL 8139x LAN Drivers.



2. The Welcome screen of the InstallShield Wizard will appear. Click Next to continue.



3. In the Add New Hardware Wizard window, click Next to search for the driver.



4. On the next screen, specify the location of the LAN drivers depending on the operating system you are using. Please refer to the picture below.



5. When the driver file is found, click next to install the driver. Reboot the computer when prompted for changes to take effect.



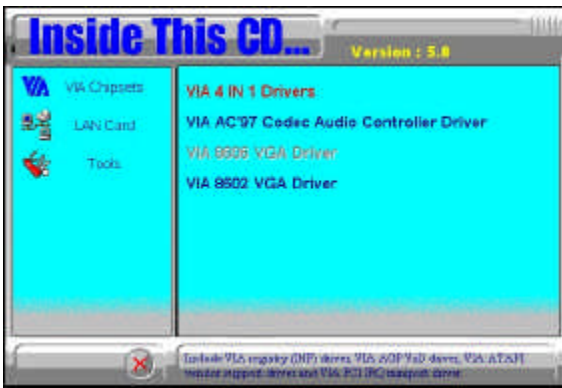
## Audio Drivers Installation

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This chapter describes the VIA 686A/B audio driver installation process for Windows 98SE and Windows NT. Follow the installation steps below to finish the audio driver installation.

### Windows 98SE Audio Driver Installation

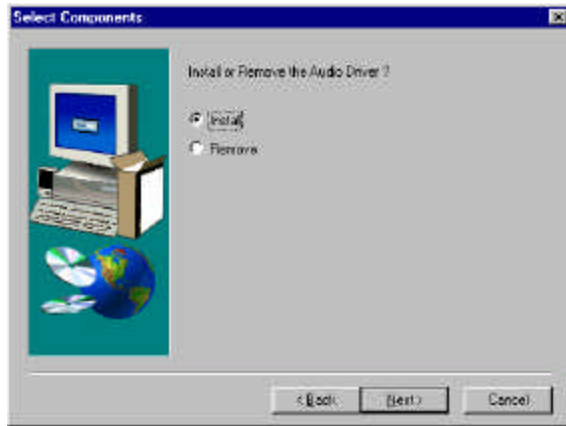
1. Insert the driver CD disc to the CD-ROM drive. The CD-ROM autoruns and displays the selections available. Click on **VIA Chips Driver** and the following window appears. Click **VIA 686A/B PCI Multimedia Audio Driver**.



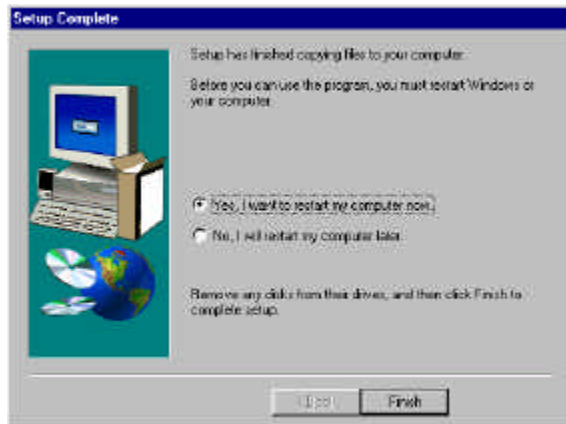
2. When the **Welcome** screen appears, click **Next** to proceed with the audio driver installation.



3. The **Select Components** window will appear. Click **Next** to install the audio driver.



4. After the necessary files are copied, click **Finish**.



5. When Windows restarts, the new hardware wizard window will appear. The wizard searches for the drivers for VIA PCI Audio Controller (WDM). Click Next to continue.
6. In the next window, select Search for the best driver for your device (Recommended). Click Next.

7. Now, select Specify a location, then key in location path as  
d:\via\via686A\win98\win98se, assuming that D: is your CDROM  
drive and the driver CD is in the CDROM. Now, click Next → Next.
8. When prompted to insert the Windows 98SE CD, do so accordingly  
and click OK. When the screen appears with a message can't find  
viaaudio.dat, insert the driver CD into the CDROM and key in the file  
path as d:\via\via686a\win98\win98se and click Finish.
9. Restart your computer when prompted for changes to take effect.

## Appendix

### A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses, which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 07Fh	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
278 - 27F	Parallel Port #2(LPT2)
2F8h - 2FFh	Serial Port #2(COM2)
2B0 - 2DF	Graphics adapter Controller
378h - 3FFh	Parallel Port #1(LPT1)
360 - 36F	Network Ports
3B0 - 3BF	Monochrome & Printer adapter
3C0 - 3CF	EGA adapter
3D0 - 3DF	CGA adapter
3F0h - 3F7h	Floppy Disk Controller
3F8h - 3FFh	Serial Port #1(COM1)

## **B. Interrupt Request Lines (IRQ)**

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Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

<b>Level</b>	<b>Function</b>
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt Cascade
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Reserved
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 Mouse
IRQ13	80287
IRQ14	Primary IDE
IRQ15	Secondary IDE