



User's Manual

3301770

Revision History

Title	3.5" Embedded Controller	
Revision Number	Description	Date of Issue
1.0	Initial release	November 18, 2005

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Safety Notice

Electrical shock hazards might occur while proceeding with the installation, repair and maintenance of this product. Therefore, the following precaution measures should be carefully observed:

1. All sorts of operations on this product must be carried out by certified technicians.
2. The chassis into which the embedded board and its associated backplane are installed should provide stable power supply and be properly grounded.
3. Power off the embedded board and unplug its power cord before handling.
4. When handling the embedded board, avoid touching any metal leads or connectors.
5. Please verify that the power supply is switched off before unplugging the power supply connector from the embedded board.

ESD Precautions

Observe all conventional anti-ESD methods while handling the embedded board. The use of a grounded wrist strap and an anti-static work pad is recommended. Avoid dust and debris or other static-accumulating materials in your work area.

Conventions Used in This Manual



WARNING!

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously. Warnings are easy to recognize. The word “warning” is written as “**WARNING**,” both capitalized and bold and is followed by the warning message.



CAUTION!

Cautionary messages should also be heeded to help you reduce the chance of losing data or damaging the system. Cautions are easy to recognize. The word “caution” is written as “**CAUTION**,” both capitalized and bold and is followed by the cautionary message.



NOTE:

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help you avoid making mistakes. Notes are easy to recognize. The word “note” is written as “**NOTE**,” both capitalized and bold and is followed by the cautionary message.

Lists

Bulleted Lists: Bulleted lists are statements of non-sequential facts that can be read in any order. Each statement is preceded by a square or round black dot.

Numbered Lists: Numbered lists describe sequential steps you should follow in order.

Software Updates

Please contact your system vendor for the latest software or BIOS updates. **NOTE** that the BIOS version and associated drivers installed on your system should provide the complete functionality listed in the Datasheet/User Manual.

We provide special revisions for various application purposes. Therefore, DO NOT upgrade your BIOS unless you fully understand what a revision will do.

Problems that occur during the updating process may cause unrecoverable errors and system down time. Always consult qualified technicians before proceeding with any upgrade.

Chapter

1

Introduction

Product Overview

1.1 General Information

The 3301770 is a highly-integrated embedded computer specifically optimized for multimedia applications requiring minimum installation space. It supports a full range of functionality for an AT/ATX-compatible industrial computer in a space-saving 3.5" profile. The 3301770 is equipped with a low-power consumption and high performance VIA processor on board. It also contains an SDRAM SODIMM socket that supports up to 512MB memory in size.

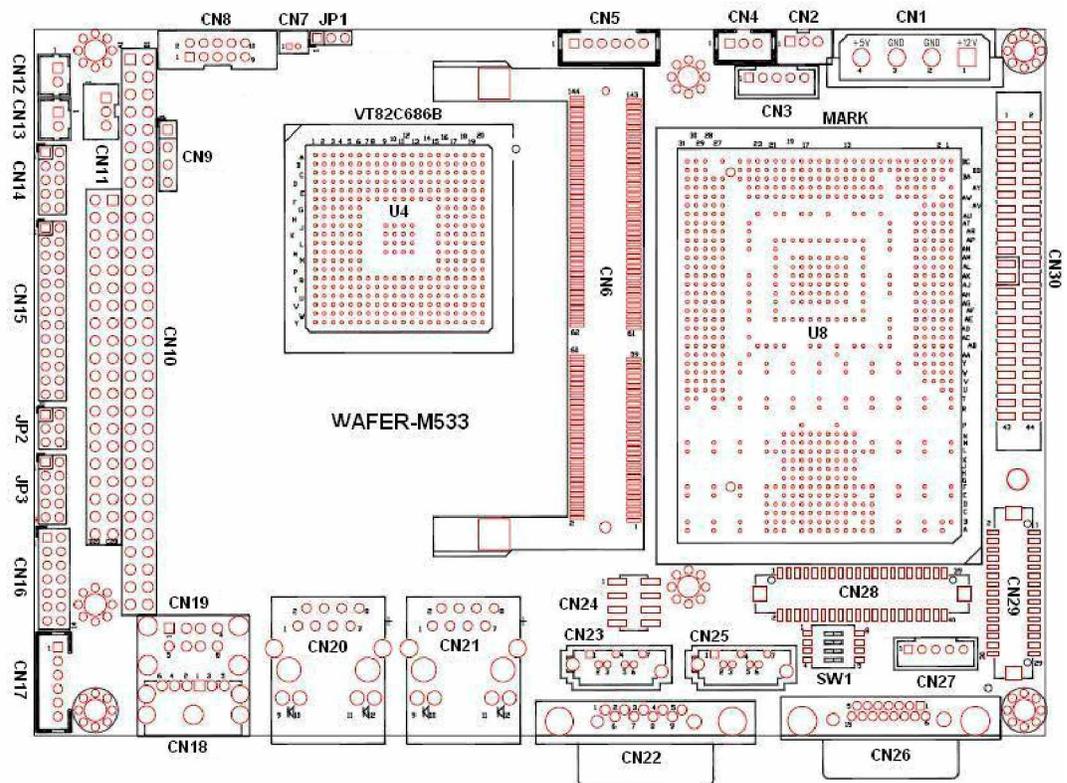


Figure 1-1 3301770 Board Layout

Connectivity

The 3301770 provides the following interface connections:

Label	Function
CN1	4P power connector
CN2	3-pin PS-ON/ATX feature connector
CN3	5-pin Inverter control
CN4	3-pin CPU fan connector
CN5	5-pin External LED connector (to chassis LED control PCB)
CN6	144-pin SDRAM SO-DIMM socket
CN7	2-pin connector to the external Lithium 3V coin cell battery-
CN8	10-pin audio connector (to the external adapter cable kit which should provide phone jacks for Line_out, Line_in, and MIC_in connectivity)
CN9	4-pin Audio CD_IN connector
CN10	PC/104 connector (104-pin ISA bus)
CN11	3-pin external VCC (supplementary for PC/104) power connector
CN12	2-pin Reset button switch (to the chassis front panel)
CN13	2-pin Power switch button (to the chassis front panel)
CN14	10-pin general purpose I/Os connector
CN15	26-pin parallel port pin header
CN16	14-pin internal serial port pin header (COM2)
CN17	6-pin keyboard/mouse connector (a 6-pin-to-PS/2 adapter cable is required)
CN18	Not implemented
CN19	External USB1.1 connector (2 ports)
CN20	10/100BaseT Ethernet port
CN21	10/100BaseT Ethernet port
CN22	External D-SUB 9 serial port connector (COM1)
CN23	Serial ATA connector
CN24	8-pin internal USB header (an adapter cable required)
CN25	Serial ATA connector

CN26	D-SUB 15-pin VGA connector
CN27	5-pin IrDA connector
CN28	TFT LCD connector (DF13-40P-1.25V)
CN29	LCD panel dual-channel 18-bit LVDS/TTL connector, 30 (2x15) pin header 1.25mm (DF13-30P-1.25V)
CN30	Primary IDE bus connector (44-pin 2.0mm)
CN31	FDC flat type floppy port (one floppy drive only)
CN32	Compact flash storage card socket

The 3301770 is built around a VIA MARK CoreFusion™ chipset which combines integrated ProSavage4 Graphics with video controller and VIA VT82C686B PCI to ISA bridge controller. The VIA MARK enables high-performance graphics features by the 64-bit processing power and the AGP 4X, 32-bit true color rendering, Anisotropic filtering, single-pass multiple textures, Specular lighting and diffuse shading, MPEG-2 playback, just to name a few.

The built-in ProSavage4 display controller supports both the CRT and LCD display simultaneously. It offers the resolutions of LCD screen up to 1600 x 1200 pixels, with 36-bit DSTN/TFT flat panel interface with 256 gray shade support. The extensive display support for LCD is capable of driving 2-channel 110MHz LVDS interface with panel power sequencing and hardware suspend/standby control. The onboard Flash ROM contains both the system BIOS and the VGA BIOS. Modifications could be done by programming the Flash ROM if necessary.

With a specially designed aluminum heatsink, this board can operate without a cooling fan at temperatures up to 60° C (140°F) and typically consumes low power watts while supporting numerous peripherals.

OSes tested and proved compliant include: DOS 6.22, Windows 2000, Windows XP, Red Hat 9.0, and SuSe 9.0.

1.2 3301770 Board Overview

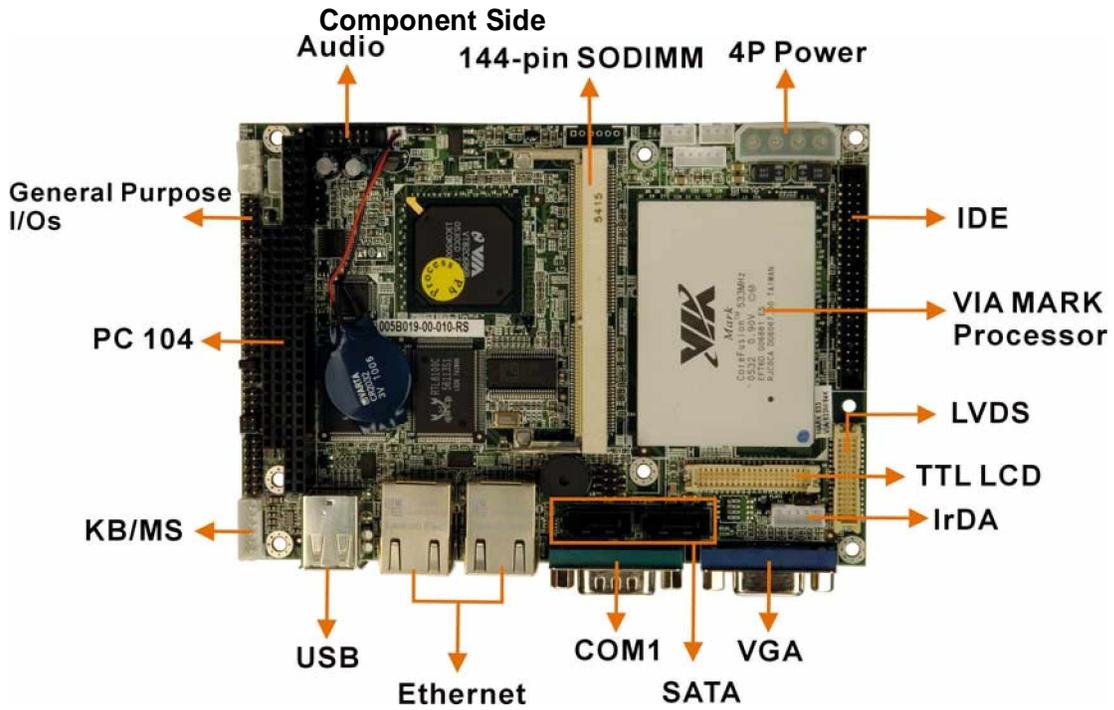


Figure 1-2 3301770 Board Overview

Soldering Side

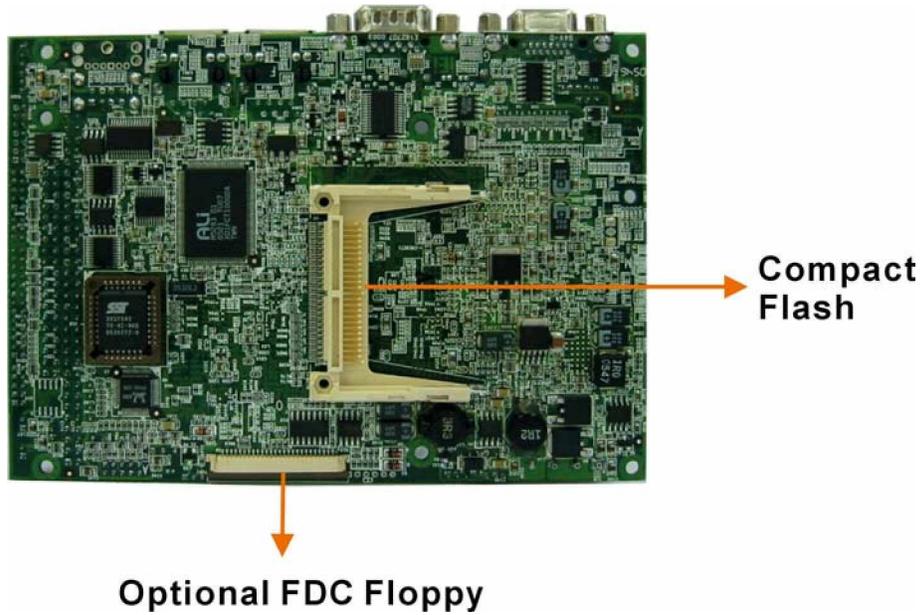


Figure 1-3 3301770 Board Overview

1.3 Technical Specifications

Table 1-1 Technical Specifications

CPU	<ul style="list-style-type: none"> z Embedded VIA® Mark CoreFusion Low Voltage processor at 533MHz - OR - z Embedded VIA® Mark CoreFusion Low Voltage processor at 800MHz
Chipset	<ul style="list-style-type: none"> z VT82C686B (Northbridge integrated with CPU) with S3 Savage4 3D/2D graphics engine
Memory	<ul style="list-style-type: none"> z One 64-bit PC 100/133 144-pin SODIMM socket that supports SDRAM memory up to 512MB
Display Controller	<ul style="list-style-type: none"> z Integrated ProSavage4 w/ 3D/2D/Video controller z Supports AGP 4x performance z Supports single cycle 128-bit 3D architecture z 24-bit TTL/dual 18-bit DSTN/TFT flat panel interface z Integrated 2-channel 110MHz LVDS interface z Support for all resolutions up to 1024X768 pixels z Hardware Suspend/Standby control
PCI Interface	<ul style="list-style-type: none"> z PCI 2.2 compliant, 32-bit 3.3V PCI interface w/ 5V tolerant inputs z Up to 5 PCI masters z PCI to system memory data streaming support
10/100Mbps Realtek8100C Ethernet Controller	<ul style="list-style-type: none"> z IEEE 802.3 10/100M Base-T standard auto-sensing interface to 10Mbps or 100Mbps networks through an onboard RJ-45 connector.
BIOS	<ul style="list-style-type: none"> z AMI 256KB Flash memory
Compact Flash Disk	<ul style="list-style-type: none"> z Runs in true IDE mode that simulates the operation of a physical IDE hard drive. It can be used with a passive adapter in a Type II socket in DMA mode.
IDE Interface	<ul style="list-style-type: none"> z Supports one ATA33/66/100 IDE channel with the connectivity to two hard disk drives
FDD Interface	<ul style="list-style-type: none"> z Supports one optional floppy disk drive, 3.5" (720KB or 1.44MB) by a 26-pin FPC connector cable.

Serial Ports	z Two RS-232 ports with 16C550 UART (or compatible) with 16-byte FIFO buffer. COM2 can support RS-422/485 through jumper setting.
Parallel Port	z One parallel port supports SPP/EPP/ECP mode
Audio Connector	z One 2x5 pin header supports AC'97 2.3 Line-in, Line-out, and Mic-in signals.
USB Interface	z Four (4) USB ports, Two external and two internal via pin header; USB 1.1 compliant.
Watchdog Timer	z Can be Set to 1 to 255 seconds period. Reset or NMI will be generated when CPU does not periodically trigger the timer.
PC-104 Interface	z Direct ISA DMA mode operation.
E2Key	z A non-volatile 1Kbit EEPROM is provided to retain application critical read/write data.
Power Supply	z +5V: 2.58A typical, VIA Mark 533MHz CPU w/ 1x128MB PC-100/133 module z +5V: 2.75A typical, VIA Mark 800MHz CPU w/ 1x128MB PC-100/133 module
Hardware Monitor	z System voltage detection z CPU temperature detection
IrDA Port	z Supports Serial Infrared (SIR) and Amplitude Shift Keyed IR (ASKIR) interface
Operating Temperature	z 0° to 60°C
Form Factors	z 5.75"(L) x 4"(W) x 1"(H)

AC '97 interface	<ul style="list-style-type: none"> z Provides 10 Pin Audio header. z 16-bit, full-duplex AC'97 Rev. 2.3 compatible six-channel audio CODEC designed for PC multimedia systems, including host/soft audio and AMR/CNR-based designs. <ul style="list-style-type: none"> „ Meets performance requirements for audio on PC99/2001 systems „ Meets Microsoft WHQL/WLP 2.0 audio requirements „ 16-bit Stereo full-duplex CODEC with 48KHz sampling rate „ Compliant with AC'97 Rev 2.3 specifications <ul style="list-style-type: none"> ¾ Front-Out, Surround-Out, MIC-In and LINE-In Jack Sensing ¾ 14.318MHz -> 24.576MHz PLL to eliminate crystal ¾ 12.288MHz BITCLK input ¾ Integrated PCBEEP generator to save buzzer ¾ Interrupt capability
-------------------------	--

Packing List

- 2xSATA cables
- 1xAudio adapter cable
- 1x4P-to-SATA power adapter cable
- 1xIDE flat cable 44p/40p/40p
- 1xsecond serial port (COM2) cable
- 1xKeyboard/ PS2 mouse cable
- 1xMini jumper pack
- 1xDriver and Utility CD
- 1xQIG (Quick Installation Guide)

System Monitoring

The 3301770 is capable of self-monitoring various aspects of its operating status:

- z Vcore voltage, +3.3V, +5V, and +2.5V
- z RPM of cooling fans (not implemented with this model)
- z CPU and board temperatures (by the corresponding embedded sensors)

Chapter

2

Functional Description

This chapter provides a functional description of the 3301770 embedded board designed for the integration into a compact size chassis. This chapter includes information about main processors, interface connectors, implementation options, and signal description.

2.1 CPU, Memory, and VIA Chipsets

CPU

The 3301770 comes with a soldered low voltage VIA MARK processor. The VIA MARK CoreFusion design integrates high-performance ProSavage4 3D/2D graphics controller, LCD and Flat Panel display interfaces, with the burst and concurrent operation pipelining capability for fast data distribution among CPU, DRAM, and PCI buses. CPU and the Northbridge functionalities are provided in a single processor package. The CPU is accompanied by the VT82C686B Southbridge featuring PC98/PC99 with integrated UltraDMA-66/100 IDE, USB, and a complete power management feature set. The VT82C686B also provides hardware monitoring, super I/O functions (floppy disk drive and serial/parallel ports. The AC'97 capabilities are provided by a Realtek ALC655 chip supporting digital audio output.

The CPU is passively cooled over a heatsink made in aluminum alloy and is ideal for small form factor computing applications with its low power consumption and minimum heat dissipation.

Shown below are some of the key features of the VIA MARK CoreFusion processor:

- z Integrated ProSavage4 Graphics with VT82C686B PCI-to-ISA bridge controller (352-pin BGA).
- z Advanced memory controller supporting up to PC133 SDRAM.
- z State-of-the-art power management by the VT82C686B Southbridge.
- z Ideal for applications such as thin client, POS, IPC, STB, PVR, and DVR.
- z 533MHz or 800MHz speed options.
- z Eight outstanding transactions (eight level deep In-Order command Queue (IOQ)).
- z Built-in Phase Lock Loop circuitry for optimal skew control within and between clocking regions.
- z Fast AES encryption using the Advanced Cryptography Engine (ACE)
- z Software compatible with thousands of x86 software applications

- z Two large (64KB each, 2-way) on-chip caches
- z 64KB Level 2 victim cache (16-way)
- z Unique and sophisticated branch prediction mechanisms

Memory

The 3301770 provides one (1) 144-pin SDRAM SODIMM socket without ECC support for building a buffer size up to 512MB. The memory is automatically identified. The memory interface supports PC100/133 144-pin SODIMM modules.

ProSavage4 Technologies

- „ Integrated with CPU with 2D/3D/Video controllers
- „ Optimized Shared Memory Architecture (SMA)
- „ Full internal AGP 4x performance
- „ Significant internal architecture upgrades from original S3 Savage4 standalone product
- „ 8/16/32MB frame buffer using system memory
- „ Works with VIA VT82C686A/B PCI-to-ISA South Bridge for advanced power management.



NOTE:

If you need to install VGA driver for the board in a Windows NT environment, make sure your NT version is later than WinNT40 Server Pack3 or later. The chipset vendor does not provide S3 VGA driver for earlier NT versions.

The 3301770 is powered by a VIA MARK chipset by VIA Technology Inc. featuring the embedded AGP/SVGA controller functionalities. It enables the connectivity to many popular LCD, LVDS LCD displays, and conventional analog CRT monitors. The VIA chipset supports color TFT LCD flat panel displays. Features also include interlaced and non-interlaced analog monitors (color and monochrome VGA) in high-resolution modes with the support for complete IBM VGA compatibility. Digital monitors (namely, MDA, CGA, and EGA) are NOT supported. The operation with Multiple frequency (multisync) monitors is transparently handled as if they were analog monitors.

VGA/LCD Interface

Chipset: VIA MARK CPU with integrated ProSavage4 2D/3D/Video Accelerator
 Frame buffer: Supports 4/8/16/32MB buffer with system memory
 Interface: 4X AGP VGA/LCD interface, supports for 18-, 24-bit LVDS or TFT panel

The graphics support includes VGA, SVGA, XGA, and SXGA+ TFT color panels with 9-bit, 12-bit, 18-bit (both 1 pixel/clock and 2 pixels/clock), and 24-bit CMOS interfaces. Enhanced DSTN hardware with 256 gray scale support, and advanced frame rate control to provide up to 16.7 million colors. In addition, the integrated 2-channel LVDS interface can support 18-bit color panels. All resolutions are supported up to SXGA+ (1400x1050).

Table 2-1 Supported CRT and Panel Screen Resolutions

Resolutions Supported	System Memory Frame Buffer Size	
	8MB	16/32MB
640x480x8/16/32	✓	✓
800x600x8/16/32	✓	✓
1024x768x8/16/32	✓	✓
1280x1024x8	✓	✓
1280x1024x16	✓	✓
1280x1024x32	✓	✓
1600x1200x8	✓	✓
1600x1200x16	✓	✓
1600x1200x32		✓
1920x1440x8		✓
1920x1440x16		✓

Block Diagram

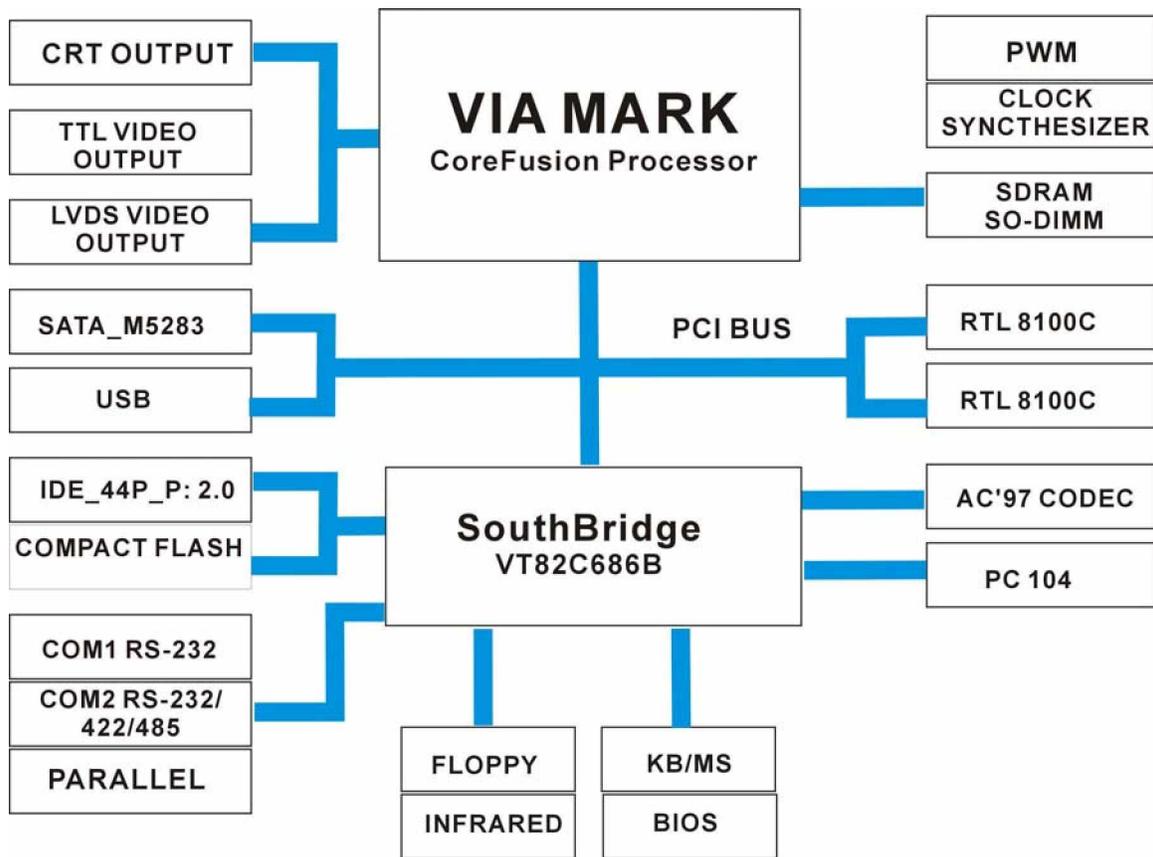


Figure 2-1 System Block Diagram

Important Features

Major functionalities provided by the 3301770 are listed below:

Table 2-2 Important Features

„	RoHS compliance
„	VIA long term support product; embedded VIA processor
„	PC104 PCI-to-ISA extension slot for stack-up configurations
„	CF II socket
„	Embedded ProSavage4 Graphics Controllers with the support for CRT and LVDS displays
„	Supports one 24-bit TFT, and with up to 1920 x 1440 resolutions
„	Aluminum alloy heatsink for optimum heat dissipation
„	Supports dual-channel 18-bit LVDS and/or 24-bit TFT LCD interface
„	System Memory: one 144-pin SODIMM socket for memory modules ranging from 64MB to 512MB in size.
„	64KB L2 cache for fast I/O turnarounds
„	Two serial ports, COM1 for RS-232, COM2 for RS-232/422/485
„	One parallel port supports SPP/EPP/ECP modes
„	USB compliant with the USB rev. 1.1 standard
„	System Chipset: VIA MARK CoreFusion + VIA VT82C686B
„	Hardware Monitor: built-in to monitor CPU Vcore, VCC, CPU/System fan speed, and temperature detection functionalities.
„	Independent DMA audio engines
„	PXE LAN support with ATX power supply
„	Realtek® 8100C: Supports 10/100BaseT Ethernet, IEEE 802.3U compatible full duplex flow control
„	Audio: AC'97 CODEC
„	IrDA support: 115kbps, IrDA 1.1 compliant

„ Watchdog Timer: 1-255 SEC ICP6629

„ Operating temperature: 0 to 60°C

„ Humidity: 0 to 95% relative humidity

„ Power consumption: 5V @2.01A (400MHz Celeron with 256MB memory;
with the connection to one hard disk drive)

2.2 External Interfaces

For the locations of external interfaces, please refer to the diagram below:

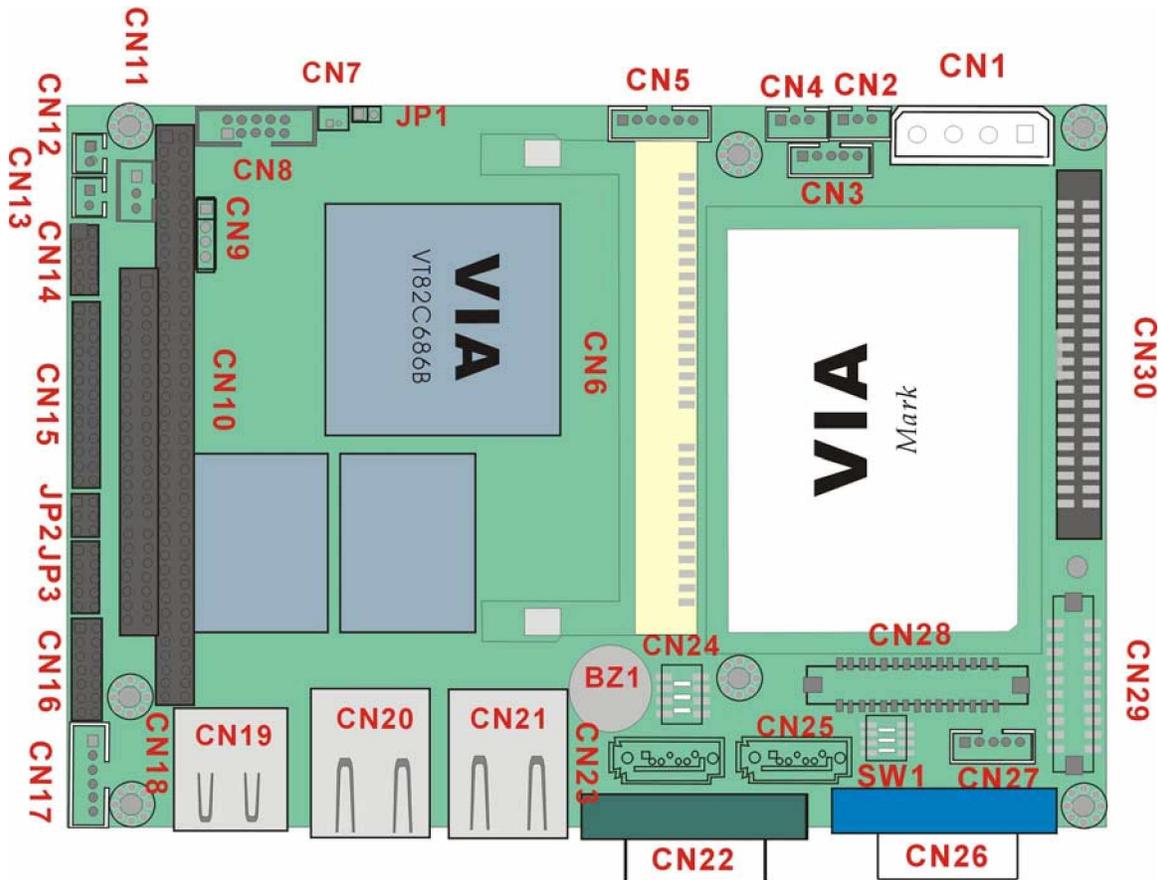


Figure 2-2 External Interfaces



NOTE:

1. The configuration options through jumper settings will be discussed in **Chapter 3: Installation**.
2. On the solder side, there are a CFII card socket and a FDC floppy connector.

Shown below is a diagram indicating the locations of configuration jumpers.

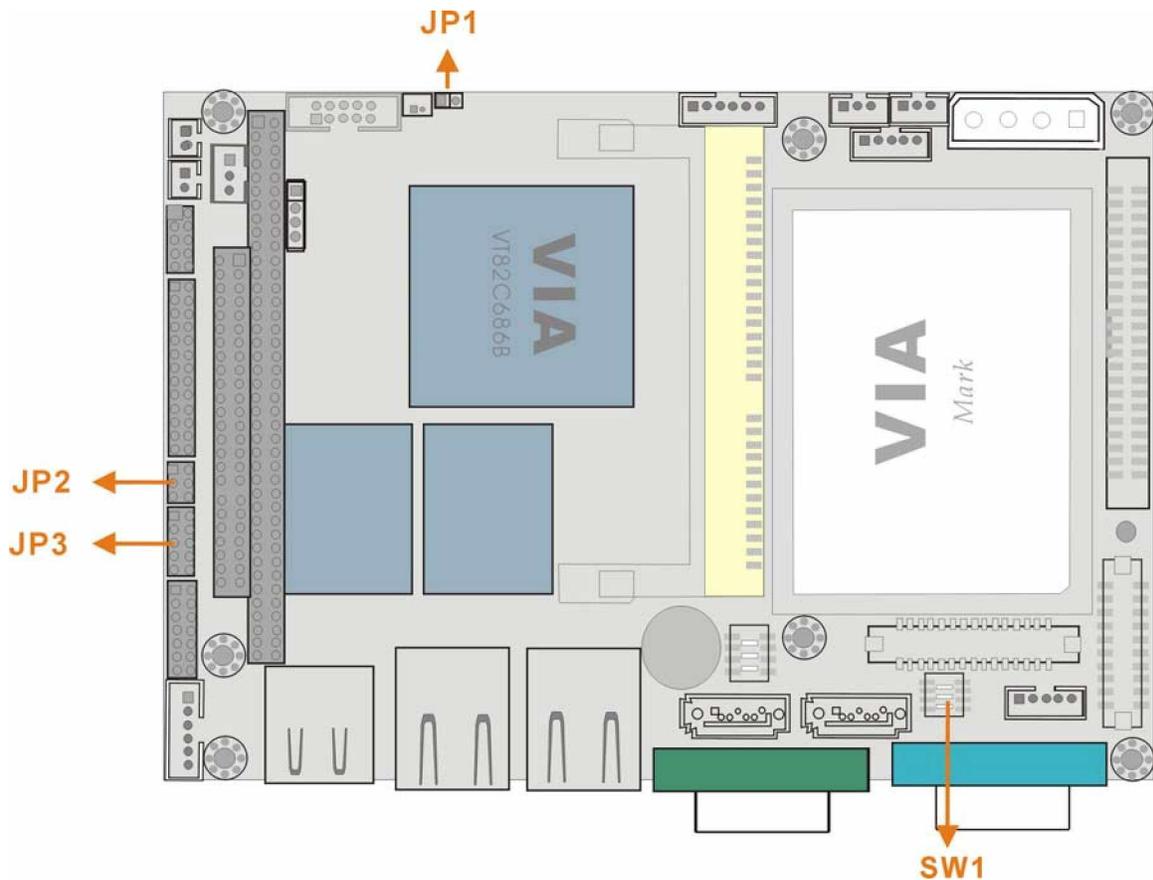


Figure 2-3 Locations of Configuration Jumpers



NOTE:

1. Only configuration jumpers are shown in the diagram above.
2. The SW1 DIP switch is left unused, and the associated LVDS mode configuration can be found in BIOS setting.
3. For more configuration details on jumper settings, please refer to ***Chapter 3 Installation***.

Table 2-3 Interface Connectors

	Function
CN1	4P power connector
CN2	3-pin PS-ON/ATX feature connector
CN3	5-pin Inverter control
CN4	3-pin CPU fan connector
CN5	5-pin External LED connector (to chassis LED control PCB)
CN6	144-pin SDRAM SO-DIMM socket
CN7	2-pin connector to the external Lithium 3V coin cell battery-
CN8	10-pin audio connector (to the external adapter cable kit which should provide phone jacks for Line_out, Line_in, and MIC_in connectivity)
CN9	4-pin Audio CD_IN connector
CN10	PC/104 connector (104-pin ISA bus)
CN11	3-pin external -VCC power connector. It is a peripheral power connector, provides a -5V and -12V sources as -VCC voltage that are supplementary to the PC104 (CN10) connector.
CN12	2-pin Reset button switch (to the chassis front panel)
CN13	2-pin Power switch button (to the chassis front panel)
CN14	10-pin general purpose I/Os connector
CN15	26-pin parallel port pin header
CN16	14-pin 2.0mm internal serial port pin header (COM2)
CN17	6-pin keyboard/mouse connector (a 6-pin-to-PS/2 adapter cable is required)
CN18	Not implemented
CN19	External USB1.1 connector (2 ports)
CN20	10/100BaseT Ethernet port
CN21	10/100BaseT Ethernet port
CN22	External D-SUB 9 serial port connector (COM1)
CN23	Serial ATA connector
CN24	8-pin internal 2.0mm USB header (an adapter cable required)
CN25	Serial ATA connector

CN26	D-SUB 15-pin VGA connector
CN27	5-pin 2.54mm IrDA connector
CN28	TFT LCD connector (DF13-40P-1.25V)
CN29	LCD panel dual-channel 18-bit LVDS/TTL connector, 30 (2x15) pin header 1.25mm (DF13-30P-1.25V)
CN30	Primary IDE bus connector (44-pin 2.0mm)
CN31	FPC flat type floppy port (one floppy drive only)
CN32	Compact flash storage card socket (behaves as an IDE device through BIOS setting)

2.2.1 Internal Connectors

1. CN1: Power 4P Connector

The 3301770-R10 is equipped with an onboard external power connector, CN1. You can connect power directly to CN1 or mount a PC104 compact-size power supply module on top of the board through the PC-104 interface.

Table 2-4 CN1: Power 4P Connector

PIN	DESCRIPTION
1	+5V
2	GND
3	GND
4	+12V

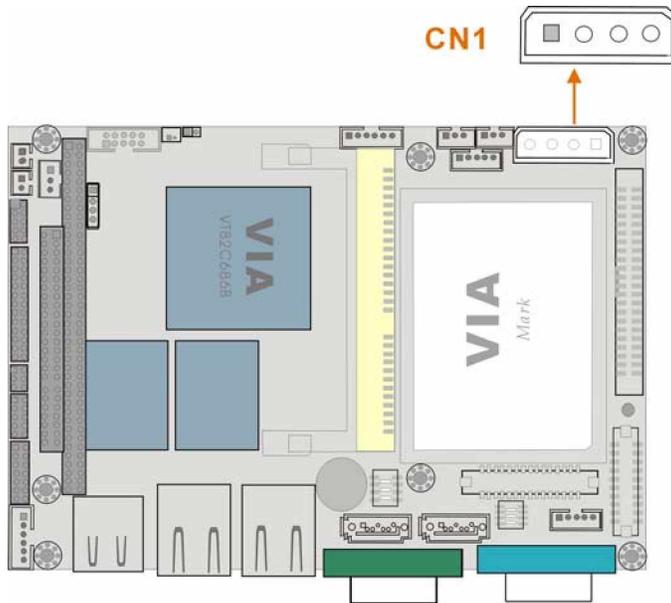


Figure 2-4 Power 4P Connector

2. CN2: SBVCC ATX Power Feature Connector

1x3 2mm connector

Using CN2 as a Power Feature Connector:

The SBVCC connector can support an advanced soft power switch function. If an ATX power supply is used, connect an ATX-to-4P power cable between the SBVCC connector and ATX power source. Also connect a power on/off switch to the ATX ON/OFF switch previously mentioned. Note that your ATX power supply should provide a 10mA load on the 5V source standby lead for this function to take effect.

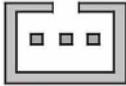
Provides is an ATX-to-4P adapter cable that comes with a 20-pin ATX connector, a 3-pin connector to the SBVCC connector, and a 4P power connector.

Using CN2 as a Configuration Jumper:

A jumper cap is installed on pins 1 and 2 as factory default (pin1=+5VSB; pin2=+5V). If the 3301770 is connected to an AT power, let the jumper stay on pins 1 and 2. If connected to an ATX power source, remove the jumper cap.

Table 2-5 CN2 SBVCC: ATX Power Feature Pinouts

PIN	DESCRIPTION
1	5VSB
2	+5V
3	GND



1

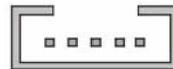
Figure 2-5 SBVCC ATX Power Feature

3. CN3: IVTC LCD Panel Inverter Backlight Control Connector

This connector comes as a 1x5 pin 2mm connector.

Table 2-6 CN3 IVTC Inverter Control Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC12	2	GROUND
3	VEEON	4	BLADJ
5	VCC5		



1

Figure 2-6**Inverter Backlight Control**

4. CN4: CPU Fan Connector

FAN1 provides access to a +5V power source and a sensor pin for connecting a cooling fan.

Table 2-7 CN4 Fan Connector

PIN	DESCRIPTION
1	Fan Speed Detect
2	+5V
3	GND



1

Figure 2-7 CN4 Fan Connector

5. CN5: Power and HDD LED Connector

This port provides the connectivity to the power and hard drive activity LEDs on the chassis front panel. An adapter cable is required.

Table 2-8 CN5 Pinouts

PIN	DESCRIPTION
1	VCC5
2	GROUND
3	POWER LED+
4	POWER LED-(GND)
5	HDD LED+
6	HDD LED-

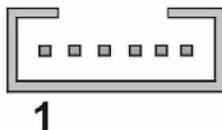


Figure 2-8 CN5 Power and HDD LED Connector

6. CN6: SDRAM 144-pin SODIMM Socket

This socket receives 100/133MHz SODIMM modules

7. CN7: Battery Connector

This 2-pin header connects to an externally mounted 3V, Lithium, cell coin battery (VARTA CR2032). The life expectancy of the battery is approximately 7 years. Depending on the working condition, the life expectancy may be shorter.

Replacing a battery is not a user operation.

If the battery starts to weaken and loses voltage, contact your vendor for a replacement module. Dispose of the used battery properly. You may contact your local waste disposal agency for disposal instructions. Do not dispose of a used battery with normal household

waste.



WARNING!

1. Keep a used battery away from children.
2. Danger of explosion if the battery is incorrectly replaced. Only certified module from GAI can be used as a replacement.
3. Do not expose the battery to excessive heat or fire.
4. If the battery shows signs of leakage, contact your local vendor immediately.

8. CN8: 2x5 2.0mm Audio Pin Header

This port connects to AC'97 compatible audio devices through an adapter cable, e.g., that features a 10-pin header to audio phone jacks on a slot bracket.

Table 2-9 CN8 Audio Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	LINE OUT R	2	LINE IN R
3	GROUND	4	GROUND
5	LINE OUT L	6	LINE IN L
7	GROUND	8	GROUND
9	MIC IN	10	N/C

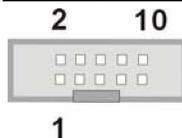


Figure 2-9 CN8 Audio Port

9. CN9: Audio CD_IN Header

This 4-pin header connects to audio source such as CD/DVD-ROM optical drives.

Table 2-10 CN9 Audio CD_IN Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	LINE_IN L	2	GND
3	GND	4	LINE IN R



Figure 2-10 CN9 Audio CD_IN Port

10. CN10: PC-104 (104-pin ISA bus) Connector

The 3301770 features a PC/104 expansion bus that let you attach any kind of PC-104 modules. The PC-104 bus has already become the industrial embedded PC bus standard, so you can easily install over thousands of PC-104 modules from hundreds of vendors in the world. There are two PC-104 connectors on this board: PC/104-64 and PC/104-40.

A -5V/-12V (-VCC) connector is provided to supply -VCC voltage that is routed through the PC 104 64-pin connector.

Table 2-11 PC/104-64 Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	IOCHECK#	33	GROUND
2	SD7	34	IRSTDRV
3	SD6	35	VCC
4	SD5	36	IRQ9
5	SD4	37	-5V
6	SD3	38	DRQ2
7	SD2	39	-12V
8	SD1	40	ZWS
9	SD0	41	+12V

10	IOCHRDY	42	GROUND
11	AEN	43	SMEMW#
12	LA19	44	SMEMR#
13	LA18	45	IOW#
14	LA17	46	IOR#
15	SA16	47	DACK3#
16	SA15	48	DRQ3
17	SA14	49	DACK1#
18	SA13	50	DRQ1
19	SA12	51	REFRESH#
20	SA11	52	SYSCLK
21	SA10	53	IRQ7
22	SA9	54	N/C
23	SA8	55	IRQ5
24	SA7	56	IRQ4
25	SA6	57	IRQ3
26	SA5	58	DACK2
27	SA4	59	TC
28	SA3	60	BALE
29	SA2	61	VCC
30	SA1	62	OSC
31	SA0	63	GROUND
32	GROUND	64	GROUND

Table 2-12 PC/104-40 Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GROUND	21	GROUND
2	MCS16#	22	SBHE#
3	IOCS16#	23	LA23
4	IRQ10	24	LA22
5	IRQ11	25	LA21
6	IRQ12	26	LA20
7	IRQ15	27	LA19

8	IRQ14	28	LA18
9	DACK0#	29	LA17
10	DRQ0	30	MEMR#
11	DACK5#	31	MEMW#
12	DRQ5	32	SD8
13	DACK6#	33	SD9
14	DRQ6	34	SD10
15	DACK7#	35	SD11
16	DRQ7	36	SD12
17	VCC	37	SD13
18	MASTER#	38	SD14
19	GROUND	39	SD15
20	GROUND	40	GROUND

11. CN11: External –VCC Power Connector

Table 2-13 CN11 -VCC PC/104 Supplementary Power

PIN	DESCRIPTION
1	-5V
2	GND
3	-12V



Figure 2-11 CN11 –VCC Power

12. CN12: Reset Button Connector

This connector connects to an externally implemented reset button through an adapter cable.

Table 2-14 CN12 Reset Button Connector Pinouts

PIN	DESCRIPTION
1	RST_SW
2	GND

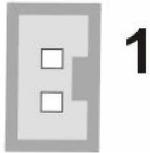


Figure 2-12 CN12 Reset Button Connector

13. CN13: Power ON/OFF Button Connector

This connector connects to an externally implemented ON/OFF button through an adapter cable.

Table 2-15 CN13 Power ON/OFF Button Connector Pinouts

PIN	DESCRIPTION
1	RST_SW
2	GND



Figure 2-13 CN13 Power ON/OFF Button Connector

14. CN14: Digital I/O Connector

This Digital I/O port is managed through VIA's VT82C686B Southbridge. The first table below shows the CN14 port pinouts. The second table displays the referential pin connection to the I/O chip.

Table 2-16 CN14 Digital I/O Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	+5V
3	DIO_IN0	4	DIO_OUT0
5	DIO_IIN1	6	DIO_OUT1
7	DIO_IN2	8	DIO_OUT2
9	DIO_IN3	10	DIO_OUT3

Table 2-17 Digital I/Os to Southbridge Reference Chart

PIN	CN14 PINS	SOUTHBRIDGE PINS	DESCRIPTION
1	GND	-	-
3	DIO_IN0	SDD6/JBY	-
5	DIO_IIN1	SDD7/JBX	-
7	DIO_IN2	BATLOW/GPI2	Connect to 10K-ohm pull-up to +3.3V suspend power if the function is not applied.
9	DIO_IN3	SM BALT/GPI6	„ Connect to 10K-ohm pull-up to +3.3V suspend power if the function is not applied. „ Connect to 4.7K-ohm pull-up to +3.3V.
PIN	CN14 PINS	SOUTHBRIDGE PINS	DESCRIPTION
2	+5V	-	-
4	DIO_OUT0	GPIOA/GPIO8	Connect to 2.2K-ohm series resistor.
6	DIO_OUT1	Fan2/GPIOB/GP 10	Connect to 10K-ohm pull-up to +3.3VBAT power if no multiplexed function is applied.

8	DIO_OUT2	MCCS/GPIOD	Connect to 10K-ohm pull-up to +3.3VBAT power if no multiplexed function is applied.
10	DIO_OUT3	PCI STP/GPO5	Connect to 4.7K-ohm pull-up to +3.3V power if the function is not applied.

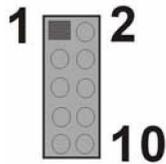


Figure 2-14 CN14 Digital I/O Connector

15. CN15: Parallel Port Connector

2x13 pin header 2mm connector

CN15 is an IEEE1284 compatible interface. Usually, the parallel port connects to a printer. This port is provided as a 26-pin 2.0mm pin header.

An adapter cable is required, (2x13 pin header-to-parallel D-SUB w/ screws for securing to a chassis panel)

Table 2-18 CN15 Parallel Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED#
2	DATA0	15	ERROR#
3	DATA1	16	INITIALIZE
4	DATA2	17	PRINTER SELECT LN#
5	DATA3	18	GROUND
6	DATA4	19	GROUND
7	DATA5	20	GROUND
8	DATA6	21	GROUND
9	DATA7	22	GROUND
10	ACK-	23	GROUND
11	BUSY	24	GROUND

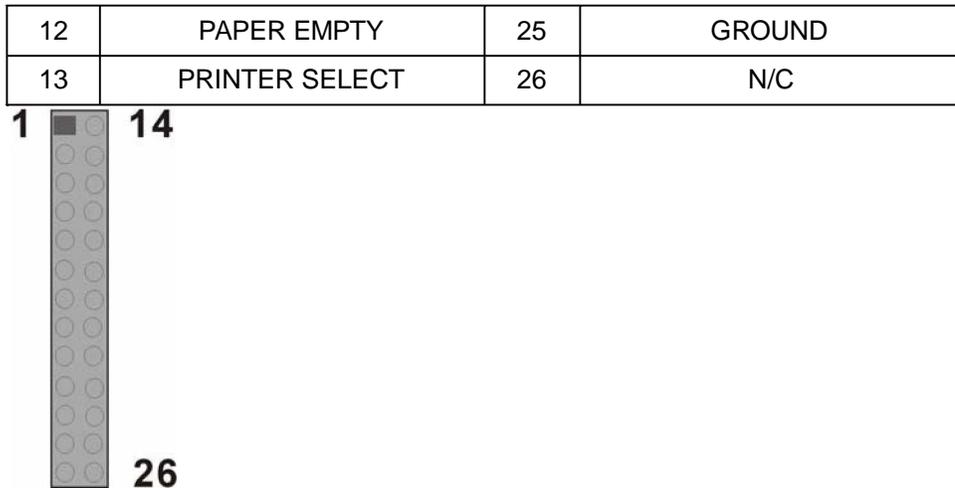


Figure 2-15 CN15 Parallel Port

16. CN16: COM2 RS-232/422/485 Serial Port Header

Table 2-19 COM2: 14 (2x7) Pin 2.0mm Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	NRLSD2	2	NDSR2
3	NRX2	4	NRTS2
5	NTX2	6	NCTS2
7	NDTR2	8	COM_R12
9	GND	10	GND
11	TX2+	12	TX2-
13	RX2+	14	RX2-

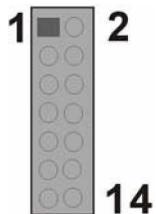


Figure 2-16 COM2 Connector

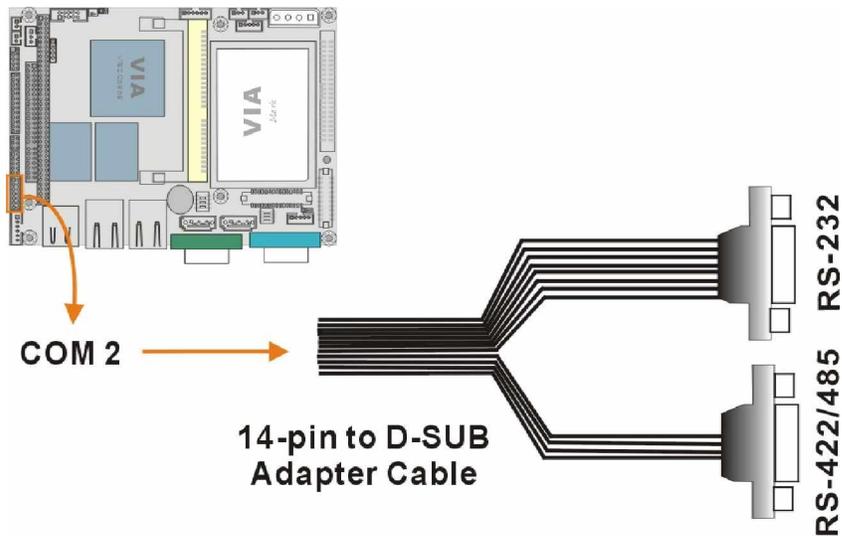


Figure 2-17 COM2 Adapter Cable



NOTE:

1. If you want to use the RS485 mode, just connect to TX2-, TX2+. If you want to use the RS422, please connect to TX2-, TX2+, RX2+, and RX2-.
2. Please refer to **Chapter 3** for details on serial port operation modes.

17.CN17: Keyboard/Mouse Pin Header

This port connects to a PS/2 keyboard or mouse using a 6-pin-to-PS/2 adapter cable. An adapter cable, 6-pin-to-two PS/2, is required.

Table 2-20 CN17 Keyboard/Mouse Header Pinouts

PIN	DESCRIPTION
1	+5V
2	MS_DATA
3	MS_CLK
4	KB_DATA
5	KB_CLK
6	GND



Figure 2-18 CN17 Keyboard/Mouse Pin Header

18. CN18:

Factory reserved.

19. CN19, CN20, CN21, CN22, and CN26: Front Panel Connectors

These are front panel connectors. Please refer to the next section for details.

20. CN23 & CN25: Serial ATA Disk Drive Connectors

These 7-pin standard Serial ATA ports connect to SATA I-compatible hard disk drives. SATA drives are managed by the ALi chipset onboard.

Table 2-21 Serial ATA Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	STXP
3	STXN	4	GND
5	SRXN	6	SRXP
7	GND		

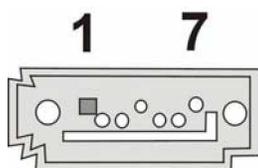


Figure 2-19 Serial ATA Port

21. CN24: Internal USB Header (Two Ports)

USB0/1: 2x4 8-pin Header

This header provides the connectivity to additional USB devices through an adapter cable. Various adapters may come with USB ports on a slot bracket or ports that can be attached to D-SUB openings on a chassis.

Table 2-22 CN24 USB Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	8	GND
2	USBDT2N	7	USBDT3P
3	USBDT2P	6	USBDT3N
4	GND	5	+5V

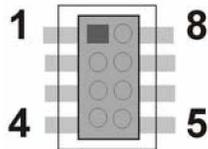


Figure 2-20 CN24 USB (1.1) Port

22. CN27: IrDA Port

This pin header allows you to connect external Infrared devices through an adapter cable. The IrDA port supports either a Serial Infrared (SIR) or an Amplitude Shift Keyed IR(ASKIR) interface. The header comes as a 1x5 pin 2.54mm pin header.

Table 2-23 CN27 IrDA Interface Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	+5V	2	N/C
3	IR-RX	4	GROUND
5	IR-TX		



**Figure 2-21
CN27 IrDA Interface Port**

23. CN28: Flat Panel Display Connector

TFT LCD (24-bit one channel; DF13-40DP-1.25V)

Table 2-24 CN28 Flat Panel Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
2	LCD5V	1	LCD5V
4	GROUND	3	GROUND
6	LCD3V	5	LCD3V
8	GROUND	7	N/C
10	FPD1	9	FPD0
12	FPD3	11	FPD2
14	FPD5	13	FPD4
16	FPD7	15	FPD6
18	FPD9	17	FPD8
20	FPD11	19	FPD10
22	FPD13	21	FPD12
24	FPD15	23	FPD14
26	FPD17	25	FPD16
28	FPD19	27	FPD18
30	FPD21	29	FPD20
32	FPD23	31	FPD22
34	GROUND	33	GROUND
36	FPVS	35	FPCLK
38	FPHS	37	FPDEN
40	ENVEE	39	N/C

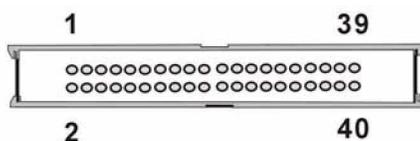


Figure 2-22 CN28 TFT Panel Display Connector

24. CN29: LVDS Panel Display Connector

LVDS LCD (18-bit) 2x15 pin header 1.25mm (DF13-30DP-1.25V)

Table 2-25 CN29 LVDS Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
2	GND	1	GND
4	LVDSA_Y0-	3	LVDSA_Y0+
6	LVDSA_Y1-	5	LVDSA_Y1+
8	LVDSA_Y2-	7	LVDSA_Y2+
10	LVDSA_CLK-	9	LVDSA_CLK+
12	N/C	11	N/C
14	GROUND	13	GROUND
16	LVDSB_Y0-	15	LVDSB_Y0+
18	LVDSB_Y1-	17	LVDSB_Y1+
20	LVDSB_Y2-	19	LVDSB_Y2+
22	LVDSB_CLK-	21	LVDSB_CLK+
24	N/C	23	N/C
26	GROUND	25	GROUND
28	VCC5_LVDS	27	VCC5_LVDS
30	VCC3_LVDS	29	VCC3_LVDS

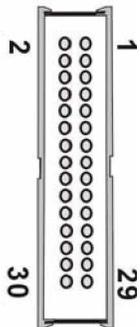


Figure 2-23 CN29 LVDS Panel Display Connector

25. CN30: IDE Connector

One IDE connector can connect to one (1) IDE cable, and the single IDE cable can then connect to two IDE devices. An optional IDE adapter cable is available.

Table 2-26 CN30 IDE Connector Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RESET#	2	GROUND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	SIGNAL GND	20	(KEY)
21	HDD 0	22	GROUND
23	IO WRITE	24	GROUND
25	IO READ	26	GROUND
27	HD READY	28	N/C
29	HDACK 0	30	GROUND
31	IRQ14	32	N/C
33	ADDR 1	34	N/C
35	ADDR 0	36	ADDR 2
37	HDD SELECT 0	38	HDD SELECT 1
39	IDE ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GROUND	44	N/C

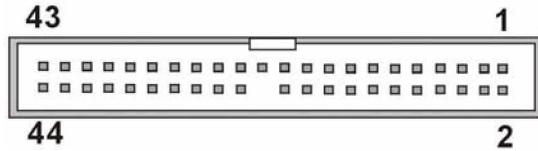


Figure 2-24 IDE Connector

26. CN31: Optional Floppy Connector (On the Soldering Side)

A 26-pin FPC connector cable is required for connecting to the optional floppy port. You can connect one (1) 3.5" (720 KB, 1.44 MB, and 2.88 MB) drive to this port.

Table 2-27 CN31: Optional Floppy Connector

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	14	STEP#
2	INDEX#	15	GROUND
3	VCC	16	WDATA#
4	DISKSEL0#	17	GROUND
5	VCC	18	WGATE#
6	DSKCHG#	19	GROUND
7	N/C	20	TRAK0#
8	N/C	21	GROUND
9	N/C	22	WRTPRT#
10	MTR0#	23	GROUND
11	N/C	24	RDATA#
12	DIR#	25	GROUND
13	N/C	26	HDSEL#



Figure 2-25

CN31 Floppy Port

27. CN32: Compact Flash Connector)

The CN32 socket allows you to attach a Compact Flash Disk that occupies the secondary IDE channel. The CN32 socket supports both the TYPE II and TYPE I modules.

Table 2-28 CN32 Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GROUND	26	VCC-IN CHECK1
2	DATA3	27	DATA11
3	DATA4	28	DATA12
4	DATA5	29	DATA13
5	DATA6	30	DATA14
6	DATA7	31	DATA15
7	HDC_CS0#	32	HDC_CS1
8	N/C	33	N/C
9	GROUND	34	IOR#
10	N/C	35	IOW#
11	N/C	36	VCC_COM
12	N/C	37	IRQ15
13	VCC_COM	38	VCC_COM
14	N/C	39	CSEL
15	N/C	40	N/C
16	N/C	41	HDD_RESET
17	N/C	42	IORDY
18	SA2	43	SDREQ
19	SA1	44	SDACK#
20	SA0	45	HDD_ACTIVE#
21	DATA0	46	PDIAG
22	DATA1	47	DATA8
23	DATA2	48	DATA9
24	N/C	49	DATA10
25	VCC-IN CHECK2	50	GROUND

2.2.2 Front Panel Connectors

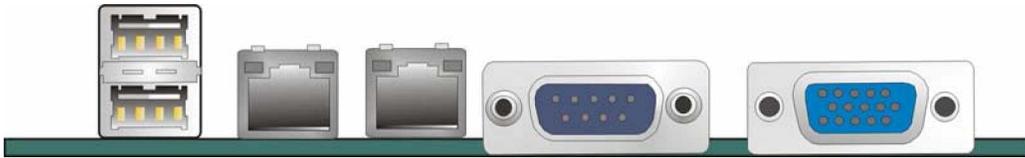


Figure 2-26 Front Panel Connectors

CN19: USB Combo Connector (2 Ports)

The combo connector provides two USB ports. These two USB ports connect to USB1.1 devices.

CN20 & CN21: 10/100BaseT Ethernet (RJ-45) Ports

These RJ-45 connectors provide 10/100BaseT Ethernet connection to a local or internet network. Refer to the table below for the Ethernet port LED indication.

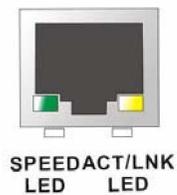


Figure 2-27 10/100BaseT Ethernet (RJ-45) Port

Table 2-29 Ethernet Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	TX-	5	N/C
2	N/C	6	RX-
3	TX-	7	N/C
4	RX+	8	N/C

Ethernet Port LED Indicators

Table 2-30 Ethernet Port LED Indications

ACTIVITY LED		LINK LED	
Status	Description	Status	Description
GREEN	Activity	YELLOW	Linked

CN22: Serial Port COM1

This serial port is defined as COM1 and provides serial connection in the RS-232 mode.

Table 2-31 Serial Port COM1 Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	NRLSD1	6	NDSR1
2	NRX1	7	NRTS1
3	NTX1	8	NCTS1
4	NDTR1	9	COM_RI1
5	GND		

CN26: VGA Port

This 15-pin D-SUB VGA port connects to a CRT or LCD display monitor.

Table 2-32 VGA Port Pinouts

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VGA_R	9	N/C
2	VGA_G	10	GND
3	VGA_B	11	N/C
4	N/C	12	SSDA
5	GND	13	VGA_HS
6	GND	14	VGA_VS
7	GND	15	SSCL
8	GND		

Chapter

3

Installation

3.1 Considerations Prior to Installation

Preparing Your Embedded Board

The embedded board contains numerous delicate electronic circuits and components, which can become damaged as a result of electrostatic discharge (ESD). Thus, prior to installation, please follow the instructions below:

1. Please turn off the computer and unplug its power cord.
2. When handling the board, avoid touching any metal leads or connectors.
3. It is best to wear an electrostatic discharge (ESD) cuff when handling electronic components (CPU, RAM).
4. Prior to installing the electronic components, please have these items on top of an antistatic pad or within an electrostatic shielding container.
5. Please verify that the power supply is switched off before unplugging the power supply connector from the motherboard.

Installation Notices

1. Prior to installation, please do not remove the stickers on the system board. These stickers are required for warranty validation.
2. Prior to the installation of the system board or any hardware, please first carefully read the information in the provided manual.
3. Before using the product, please verify that all cables and power connectors are connected.
4. To prevent damage to the PCB board, please do not allow screws to come in contact with the PCB circuit, connector pins, or its components.
5. Please make sure there are no leftover screws or metal components placed on the PCB board or within the computer casing.
6. Please do not place the computer system on an uneven surface.
7. Turning on the computer power during the installation process can lead to damage to system components as well as physical harm to the user.
8. If you are uncertain about any installation steps or have a problem related to the use of the product, please consult a certified computer technician.

Airflow Consideration

Although the embedded board can operate without active cooling, it is still necessary to install the board in a chassis with ventilation holes on the sides allowing airflow to travel through the heatsink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

Unpacking Precautions

Some components on the 3301770 are very sensitive to static electric charges and can be damaged by a sudden rush of power. To protect it from unintended damage, be sure to follow these precautions:

- z Ground yourself to remove any static charge before touching your PCB. You can do so by using a grounded wrist strap at all times or by frequently touching any conducting materials that is connected to the ground.
- z Handle your PCB by its edges. Do not touch IC chips, leads or circuitry if not necessary.
- z Do not plug or unplug any connector or jumper while the power is on.
- z Do not place a PCB on top of an anti-static bag. Only the inside of the bag is safe from static discharge.

Approved Memory Modules

(144pin SODIMM modules)

- | | |
|--------------------------|-------------------------------------|
| 1). 128MB SDRAM (PC-100) | UG NEC (D45128163G5-A80-9JF) |
| 2). 256MB SDRAM (PC-100) | Transcend SAMSUNG (K4S280832A-TC1H) |
| 3). 64MB SDRAM (PC-133) | UG HYUNDAI (HY57V651620B) |
| 4). 128MB SDRAM (PC-133) | NEC (D45128841G5-A75-9JF) |
| 5). 256MB SDRAM (PC-133) | UG SAMSUNG (K4S560832B-TC75)) |
| 6). 512MB SDRAM (PC-133) | UG (V54C3256804VBSG) |
| 7). 512MB SDRAM (PC-133) | Apacer V54C3256804AB7 |

3.2 Mechanical Diagrams

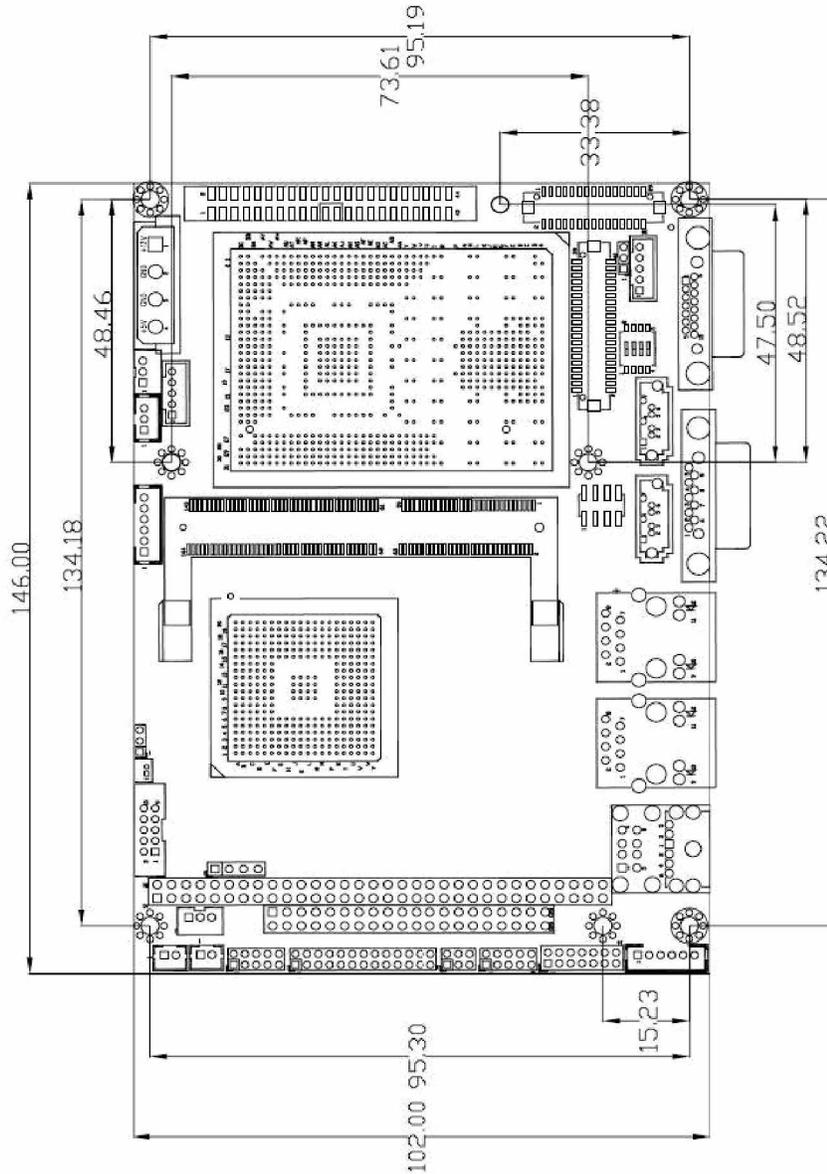


Figure 3-1 Board Dimensions and Mounting Hole Locations



NOTE:

Use the mounting holes on the four corners of the PCB for securing within a chassis. Holes in the middle of the board are used for securing a heatsink.

3.3 Jumper Settings



NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

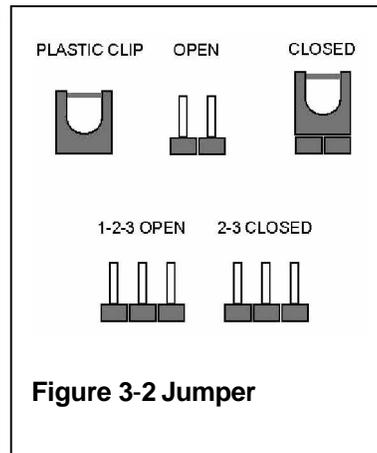


Figure 3-2 Jumper

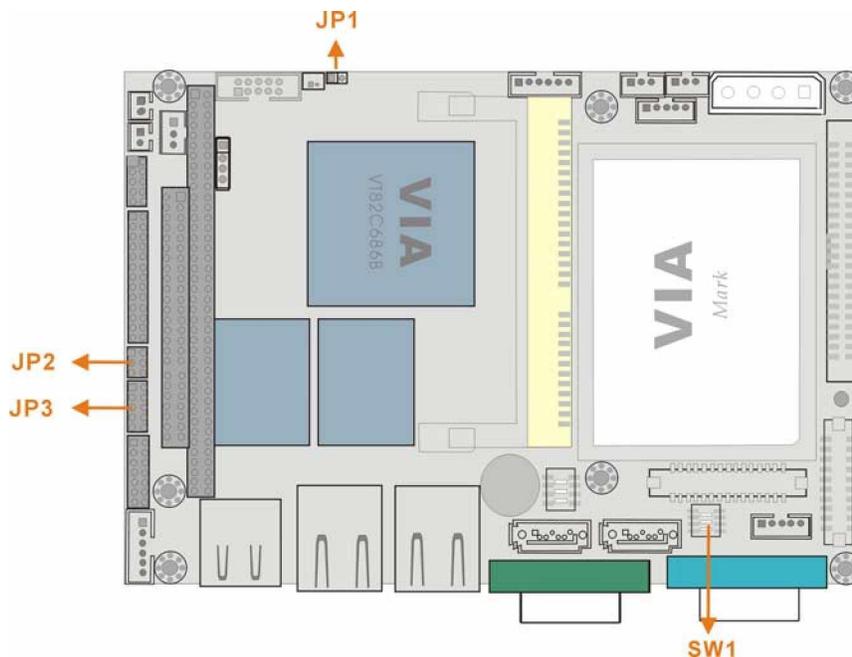


Figure 3-3 Locations of Configuration Jumpers

JP1 (Clear CMOS)

In case the embedded board fails to boot due to user's improper BIOS setting, this jumper can be used to clear the CMOS data and reset the system BIOS information. To clear the CMOS contents, shunt pins 2 and 3 for a few seconds, and then reinstall the jumper clip back to pins 1 and 2.

If the "CMOS Settings Wrong" message displays during the boot up process, you may then try to correct the fault by pressing the F1 to enter the CMOS Setup menu. You may then enter the correct CMOS setting, Load Optimal Defaults, or Load Failsafe Defaults. Save your changes and exit the CMOS Setup menu.

JP1 Pin Configuration

Table 3-1 JP1 Pin Configuration

JP1	CLEAR CMOS
1-2 closed	Normal (default)
2-3 closed	CLEAR CMOS



CAUTION!

1. In normal condition, pins 1 and 2 must always stay in a CLOSED condition.
 2. Power must be turned OFF before clearing CMOS data.
-

JP2: COM2 Serial Port Operation Mode Selector

This jumper block allows you to select an operation mode for the COM2 serial port (Default: 1-3).

Table 3-2 JP2 Pinouts

PIN COMBINATION	DESCRIPTION
1-2	RS-232
3-4	RS-422
5-6	RS-485

JP3: COM2 Signal Selector

Table 3-3 JP3 COM2 Signal Selector

COM1 Pin-9 Signal Selection		COM2 Pin-8 Signal Selection	
PIN COMBINATION	DESCRIPTION	PIN COMBINATION	DESCRIPTION
1-3	12V	2-4	12V
3-5	5V	4-6	5V
5-7	5V	6-8	5V
7-9	RI1	8-10	RI2

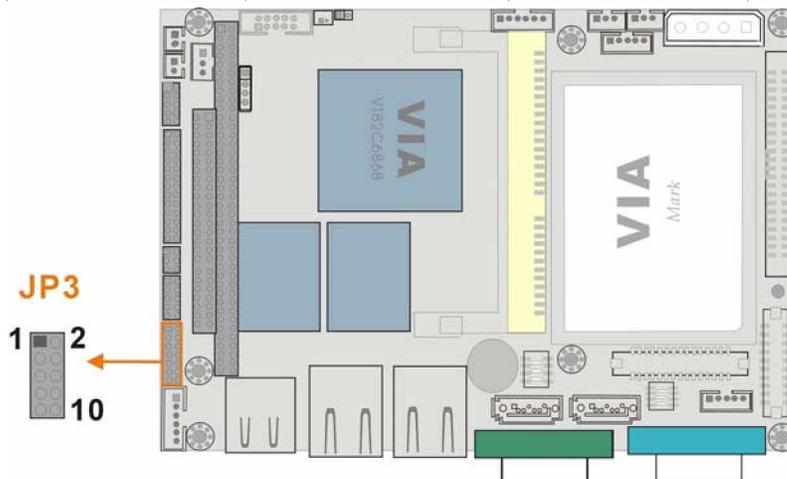


Figure 3-4 JP3 Pin Locations

3.4 Installation

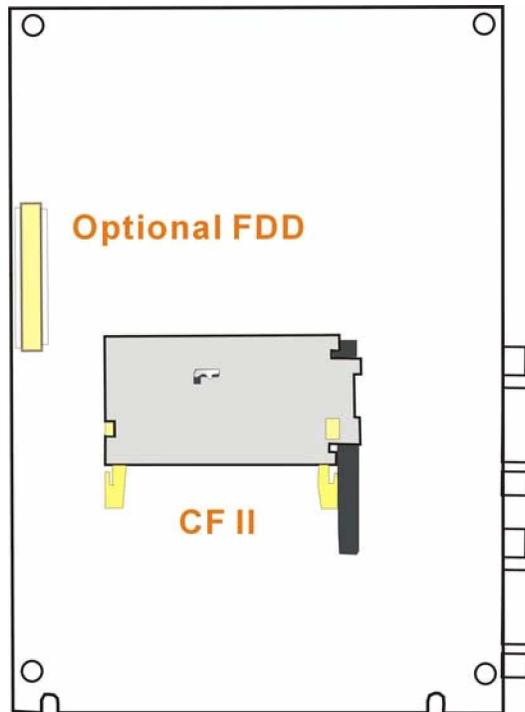


Figure 3-5 Soldering Side Sockets

IDE Disk Drive and CDROM Connector

The 3301770 provides 1 IDE channel which allows the connection to two Enhanced Integrated Device Electronics hard disk drives or CD/DVD-ROM. The IDE controller is attached to a PCI interface. The advanced IDE controller supports PIO mode 3, mode 4 and up to UDMA/100 in transfer speed.

Connecting Hard Disk Drives

IDE bus devices are daisy-chained using standard a 144-pin IDE cable. Connection is made by connecting one end of the cable to the CN30 IDE connector. The connector has a keyed pin which prevents you from inserting the connector in a wrong direction. The read wire corresponds to pin 1 on the connector.

Plug the other end of the cable into the Enhanced IDE hard drive, with pin 1 on the cable corresponding to pin 1 on the hard drive.

Note that when connecting two IDE disk drives you will have to configure one as the master and the other the slave. The configuration is done by setting the jumpers on the disk drives.

Optional Floppy Drive Connector (FDD1)

This connector provides access to one (1) externally mounted floppy drive (3.5"-profile, 720 KB, 1.44 MB, and 2.88 MB types floppy drive).

A 26-pin FPC connector cable is required for the connection to floppy drives. The cable should come with a 26-pin FPC-cable connector and floppy disk drive connector on the other end.

Connecting the Floppy Drive

1. Plug the 26-pin FPC-cable connector into CN31. Make sure that the red wire corresponds to pin one on the connector.
2. Attach the appropriate connector on the other end of the cable to the floppy drive. You can use only one connector in the set.

Compact Flash Disk

When appropriately formatted, a compact Flash disk can serve as a bootable hard drive in applications where installation space is limited. The Compact Flash card occupies a secondary IDE channel. Configuration options can be found through the BIOS configuration utility.

Parallel Port Connector (CN15)

Parallel port connects to a printer. The 3301770 comes with a multi-mode (ECP/EPP/SPP) parallel port. The CN15 parallel port interface features a 26-pin flat-cable connector that requires an adapter cable if a traditional DB-25 connector is preferred. The parallel interface can be re-assigned to LPT2 or LPT3 through the BIOS configuration utility.

The default interrupt channel is IRQ7. Select ECP or EPP DMA mode using the BIOS configuration utility.

Audio Interface

Audio Connector

AC'97 Audio signals are interfaced through a 10-pin flat-cable connector. These signals include Microphone line-in, line-in stereo, and line-out stereo. An audio 10-pin-to-phone-jack adapter kit is required.

COM Port Connectors [COM1(CN22), COM2(CN16)]

The 3301770 provides two serial ports (COM1: RS-232; COM2: RS-232/422/485) interfaced through one DB-9 connector (COM1) and one 14-pin male header. These serial ports facilitate the connection to serial devices or a communication network, e.g., terminal console.

LCD Panel Connection (CN26, CN28, and CN29)

The PCI SVGA interface on the 3301770 connects conventional CRT displays and flat panel displays including passive LCD and active LCD displays. There are three (3) connectors onboard for the connection to the three (3) display types:

1. CRT VGA monitors
2. TFT flat panel displays
3. LVDS type LCD panels

One CRT display connector (CN26) is provided as a 15-pin, female D-SUB to connect conventional CRT displays. Pin assignments can be found in ***Chapter 2 Functional Description***.

Flat Panel Display Connector (CN28):

CN28 is a 40-pin connector, Hirose DF13A-40DP-1.25V, which can support a 24-bit LCD panel. A bias control signal, ENVEE, active high on CN28, controls the LCD bias voltage. The LCD bias voltage shall not be applied until the +5V or +3.3V logical supply and panel video signals become stable. When powered on, the control signal remains low until receiving the flat panel signals. CN28 connects up to 24-bit TFT LCD.

LVDS Connector (CN29):

CN29 is a 20-pin connector, Hirose DF13A-20DP-1.25V. The CN29 connects an 18-bit LCD panel.

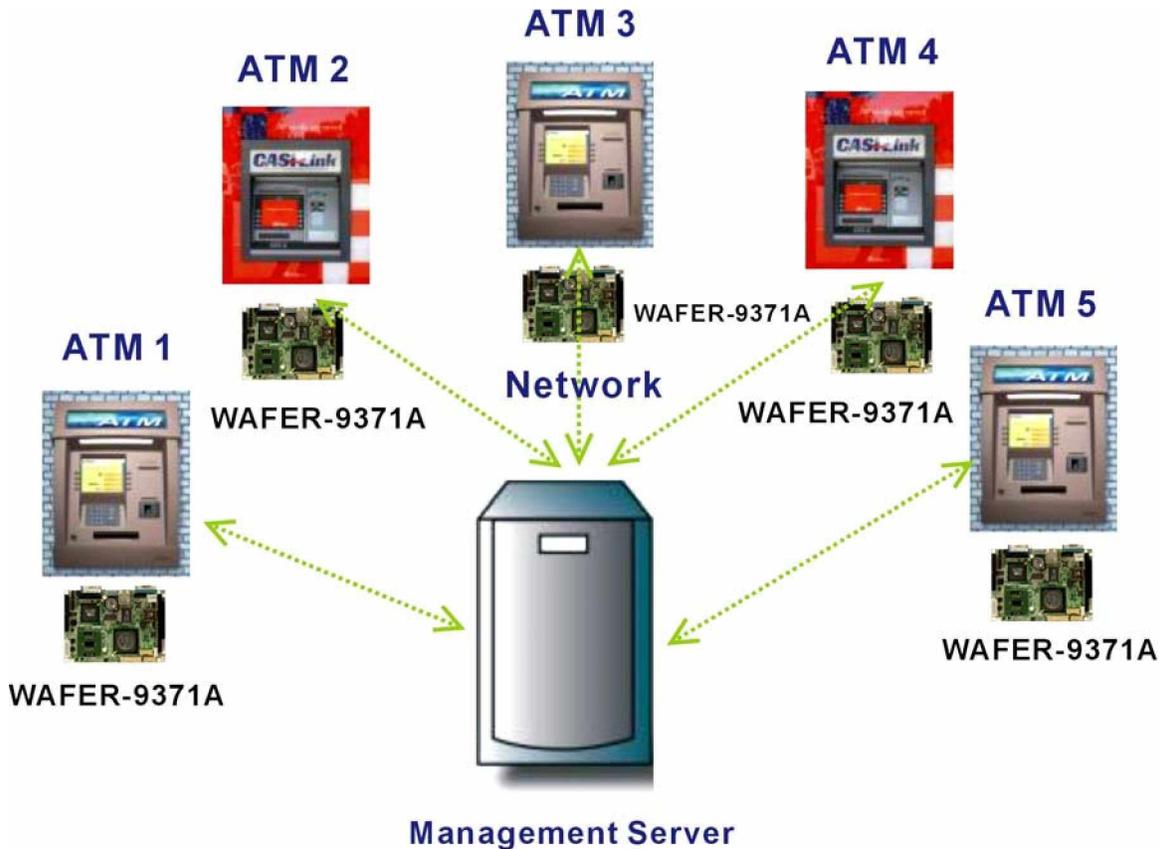
Adapter cables are required for connecting the display connectors.

Ethernet Connection (CN20 & CN21)

The onboard 32-bit PCI-bus Ethernet interface is fully compliant with IEEE 802.3U 10/100Mbps CSMA/CD standards. The 10/100BaseT connector connections are made via standard RJ-45 connectors on the front edge.

PXE: Pre-Boot Execution Environment

PXE is an open industry standard developed by a number of software and hardware vendors. BIOS PXE feature allows a workstation to boot from a server on a network by receiving a pre-OS agent prior to booting the operating system on the local hard drive.



PXE for Remote and Central Management

Figure -6 PXE Central Management

USB Connection (CN24 and CN19)

The combo USB header (CN24) provides the connectivity of up to two (2) USB (Universal Serial Bus) ports. The USB interface features complete Plug and Play, and hot attach/detach for up to 127 external devices, compliance with USB specification Rev. 1.1. An adapter 10-pin-to-USB cable is required for connecting to CN24. The USB interface is accessed through two 5 x 2-pin connectors, USB01. The adapter cable has one (1) 5x2-pin connector on one end and a standard USB connector on the other.

Accessories Included in Kit

GAI provides the following cables to facilitate connections to your peripheral devices. For more information on the locations of the connectors, please refer to Chapter 2. Cables not included in kit are the user supplied items and should be separately purchased.

Table -4 Cables and Accessories Included in Kit

No.	Type
1	IDE flat cable 44p/44p
1	COM2 serial port cable (RS-232/422/485 compatible)
1	Audio adapter cable
1	Keyboard/ PS2 mouse Y cable
5	Mini jumper (2.0 pitch)

Chapter

4

AMI BIOS Setup

Introduction

This chapter discusses AMI's Setup program built into the ROM BIOS. The Setup program allows users to modify the basic system configuration. This special information is then stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

Starting Setup

The AMI BIOS is immediately activated when you first power on the computer. The BIOS reads the system information contained in the CMOS and begins the process of checking out the system configuration. When it finishes, the BIOS will seek an operating system on one of the disks and then launch and turn control over to the operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing immediately after switching the system on, or
2. By pressing the key when the following message appears briefly at the bottom of the screen during the POST.

Press DEL to enter SETUP.

If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the "RESET" button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides more detail about how to navigate in the Setup program using the keyboard.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
Page Up key	Increase the numeric value or make changes
Page Dn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 4-1 BIOS Function Keys

Getting Help

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc> or the **F1** key again.

If, after making and saving system changes with Setup, you discover that your computer no longer is able to boot, the AMI BIOS supports an override to the CMOS settings which resets your system to its defaults.

The best advice is to only alter settings which you thoroughly understand. To this end, we strongly recommend that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your systems manufacturer to provide the absolute maximum performance and reliability. Even a seemingly small change to the chipset setup has the potential for causing you to use the override.

**NOTE:**

Your BIOS setup screen may slightly differ from the screenshots shown in this chapter. This may result from the modification changes made during BIOS update.

4.1 Setup Summary

„ **Standard CMOS Setup:**

Standard CMOS Setup: Change time, date, hard disk type, etc.

„ **Advanced CMOS Setup:**

Advanced CMOS Setup: Configure system options.

„ **Advanced Chipset Setup:**

Advanced Chipset Setup: Configure chipset features.

„ **Power Management Setup:**

Power Management Setup: Configure power management features.

„ **PCI / Plug and Play Setup:**

Configures PCI / Plug and Play features.

„ **Peripheral Setup:**

Configure peripheral features.

„ **Hardware Monitor Setup:**

Configure hardware monitor features.

„ **Auto-Detect Hard Disks:**

Selecting these options allow the user to configure the drive named in the option. Select Auto-Detect Hard Disks to allow AMIBIOS to automatically configure the drive. A list of drive parameters appears on the screen.

„ **Change User Password:**

Change the user password.

„ **Change Supervisor Password:**

Change the supervisor password.

„ **Auto Configuration with Optimal Settings:**

Load configuration settings that ensure the highest performance.

„ **Auto Configuration with Fail Safe Settings:**

Load fails-safe configuration settings.

„ **Save Settings and Exit:**

Write the current settings to CMOS and exit.

„ **Exit Without Saving:**

Exit without saving the current settings.

4.2 Main Menu Selections



4.3 Standard CMOS Setup Selections



„ Floppy A, B

Move the cursor to these fields and select the floppy type. Available manual setting options are: [1.2MB 5 1/4] [720KB 3 1/2] [1.44MB 3 1/2] [2.88MB 3 1/2]

„ Primary/Secondary Master/Slave LBA Mode

LBA (Logical Block Addressing) is a new IDE HDD access method developed to overcome the 528-megabyte capacity bottleneck. If your IDE hard disk capacity is greater than 528MB, AMIBIOS can enable this LBA mode feature. The option is only for Primary Master IDE LBA

mode.

„ **Primary/Secondary Master/Slave Block Mode**

If your hard disk drive supports IDE block transfer mode, enable this option for a faster IDE hard disk drive transfer rate. The option is only for Primary Master Block mode.

„ **Primary/Secondary Master/Slave PIO Mode**

This option enables Primary Master IDE PIO mode on the IDE, which can set proper cycle timings. The cycle timing between the IDE PIO mode value and IDE cycle timing is shown below:

Mode 0 -> Timing (600ns) Mode 1 -> Timing (383ns)
Mode 2 -> Timing (240ns) Mode 3 -> Timing (180ns)
Mode 4 -> Timing (120ns) Mode 5 -> Timing (60ns)

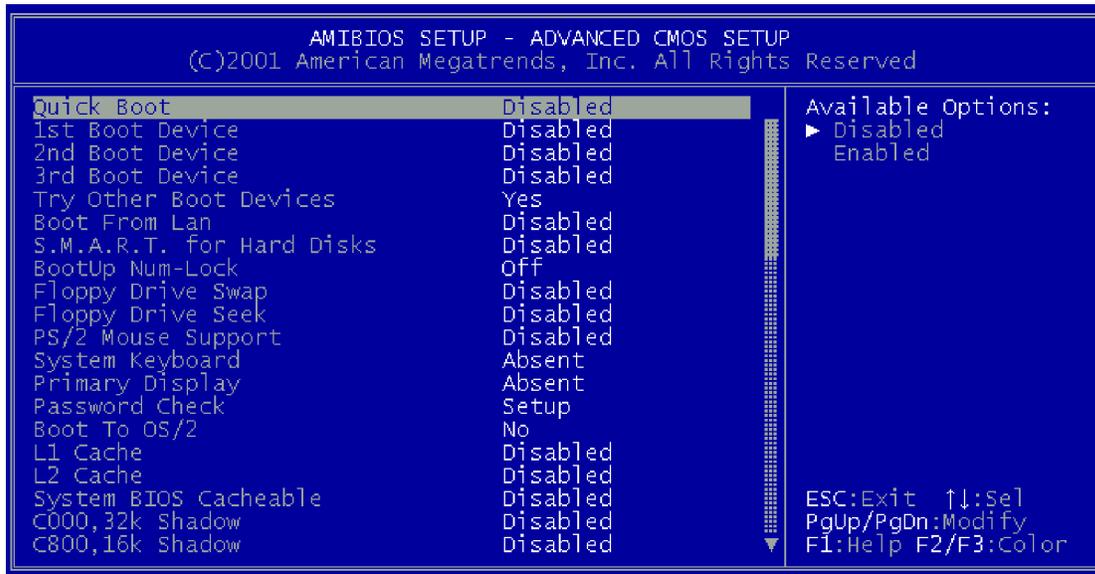
„ **Primary/Secondary Master/Slave 32Bit Mode**

This option enables Primary Master IDE 32-bit data transfers on the IDE data port. If disabled, 16-bit data transfer is used by the BIOS. 32-bit data transfers can only be enabled if IDE prefetch mode is also enabled.

„ **Boot Sector Virus Protection**

When this option is enabled, AMIBIOS issues a warning when any program or virus issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. The settings are Disabled, Enabled.

4.4 Advanced CMOS Setup Selections



„ Quick Boot

The Optimal and Fail-Safe default setting is Disabled. Set this value to Disabled to allow the BIOS to perform all POST tests. Set this value to Enabled to allow the BIOS to skip certain POST tests to boot faster.

„ 1st Boot Device

This option sets the type of device for the first boot drives that the AMIBIOS attempts to boot from after AMIBIOS POST completes. The settings are Disabled, IDE-0, IDE-1, Floppy, ARMD-FDD, ARMD-HDD, CDROM, and SCSI.

„ 2nd Boot Device

This option sets the type of device for the second boot drives that the AMIBIOS attempts to boot from after AMIBIOS POST completes.

The settings are Disabled, IDE-0, IDE-1, Floppy, ARMD-FDD, ARMD-HDD, and CDROM.

„ 3rd Boot Device

This option sets the type of device for the third boot drives that the AMIBIOS attempts to boot from after AMIBIOS POST completes.

The settings are Disabled, IDE-0, IDE-1, Floppy, ARMD-FDD, ARMD-HDD, and CDROM.

„ Floppy Drive Seek

Set this option to Enabled to specify that floppy drives will perform a Seek operation at system boot. When enabled, the BIOS tests (seeks) floppy drives to determine whether they have 40 or 80 tracks.

„ Try Other Boot Devices

Set this option to Yes to instruct AMIBIOS to attempt to boot from any other drive in the

system if it cannot find a boot drive among the drives specified in the 1st Boot Device, 2nd Boot Device, 3rd Boot Device, 4th Boot Device options. The settings are Yes or No.

„ **Boot from LAN**

This option enables you to utilize the PXE LAN control feature.

„ **S.M.A.R.T. for Hard Disks**

Self-Monitoring, Analysis and Reporting Technology. This option can help the BIOS to warn the user of a possible device failure and give the user a chance to back up the device before the failure actually happens.

The settings are Auto, Disabled, Enabled.

„ **BootUp Num-Lock**

When this option is selected, Num Lock is turned off when the system is powered on so the user can use the arrow keys on both the numeric keypad and the keyboard.

„ **Floppy Drive Swap**

This option allows you to swap the A: and B: floppy drive at the BIOS level without physically change the drives' connection.

„ **Floppy Drive Seek**

This option causes the BIOS to search floppy drives at boot time.

„ **PS/2 Mouse Support**

When this option is enabled, BIOS supports a PS/2- type mouse.

„ **System Keyboard**

This option does not specify if a keyboard is attached to the computer. Rather, it specifies if error messages are displayed if a keyboard is not attached. This option permits you to configure workstation with no keyboard. The settings are Absent, Present.

„ **Primary Display**

Select this option to configure the type of monitor attached to the computer. The settings are Monochrome, Color 40x25, Color 80x25, VGA/PGA/EGA, or Not Install.

„ **Password Check**

To set the system to ask for a password every time it boots.

„ **Boot To OS/2**

Set this option to Enabled if running OS/2 operating system and using more than 64MB of system memory on the motherboard. The settings are Disabled or Enabled.

„ **L1 Cache**

This option can be used to enable or disable the CPU's L1 cache. The default is Enabled.

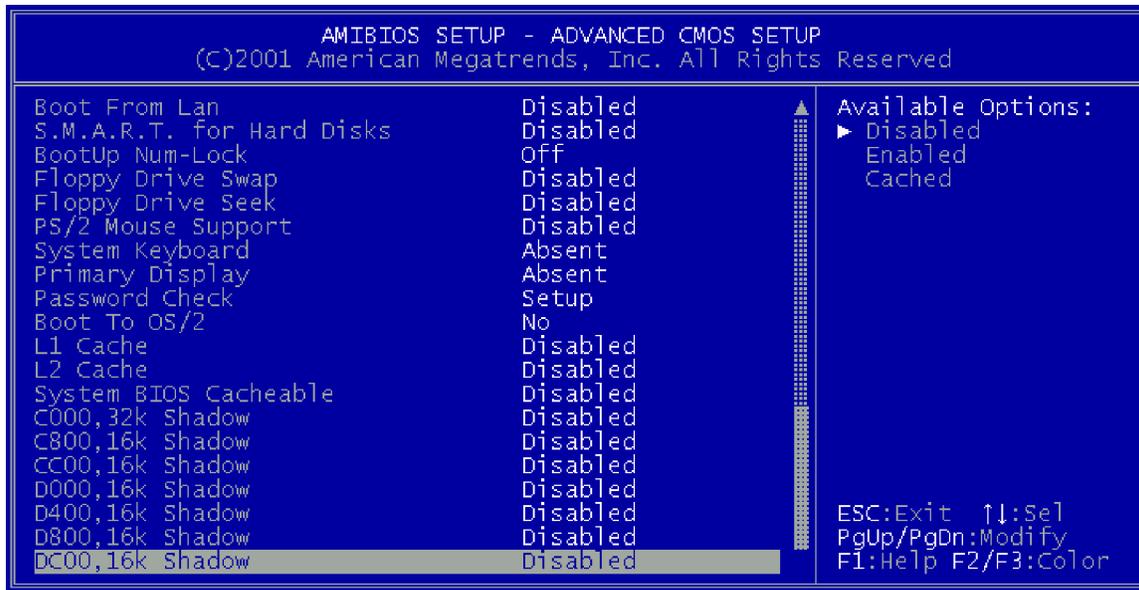
L2 Cache

This option can be used to enable or disable the CPU's L2 cache. The default is Enabled.

System BIOS Cacheable

When this option is set to enable, the System ROM area from F0000-FFFFF is copied (shadowed) to the RAM for faster execution.

Shadowing the BIOS code from ROM to the much faster system RAM increases performance. Enabling this setting will also allow the system to cache the RAID where BIOS resides, and hence more performance is gained.



C00,32k Shadow

When this option is set to enable, the Video ROM area from C0000-C7FFF is copied (shadowed) to the RAM for faster execution.

Disabled: The contents of the video ROM are not copied to the RAM.

Cached: The contents of the video ROM area from C0000h - C7FFFh are copied from the ROM to the RAM and can be written to or read from the cache memory.

Enabled: The contents of the video ROM area from C0000h - C7FFFh are copied (shadowed) from the ROM to the RAM for faster execution.

C800, 16k Shadow

These options enable shadowing of the contents of the ROM area named in the option title. The settings are Enable Disable, Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.

CC00, 16k Shadow

These options enable shadowing of the contents of the ROM area named in the option title. The settings are Enable Disable, Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.

” **D000, 16k Shadow**

These options enable shadowing of the contents of the ROM area named in the option title. The settings are Enable Disable, Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.

” **D400, 16k Shadow**

These options enable shadowing of the contents of the ROM area named in the option title. The settings are Enable Disable, Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.

” **D800, 16k Shadow**

These options enable shadowing of the contents of the ROM area named in the option title. The settings are Enable Disable, Cached.

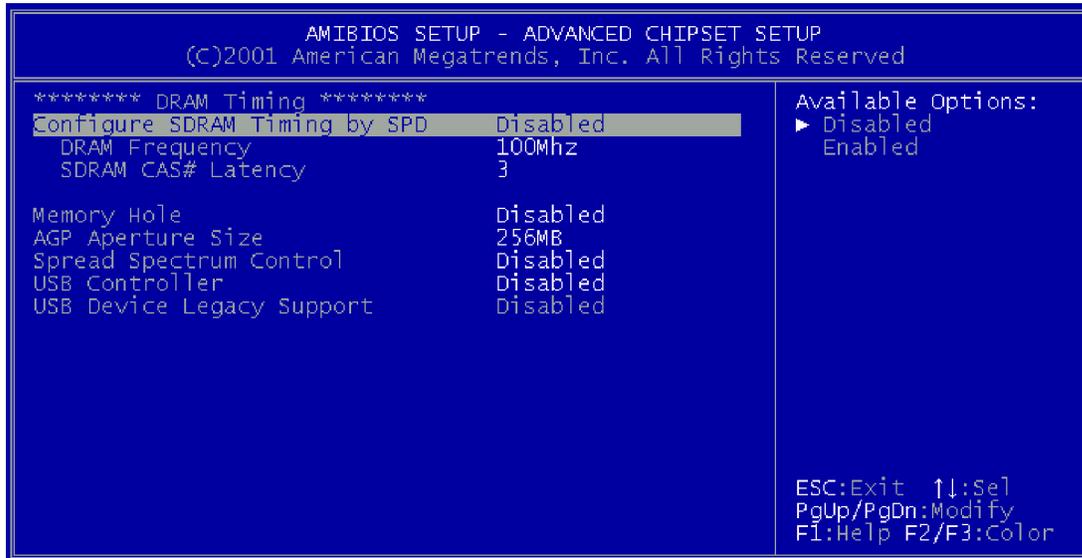
The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.

” **DC00, 16k Shadow**

These options enable shadowing of the contents of the ROM area named in the option title. The settings are Enable Disable, Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.

4.5 Advanced Chipset Setup Selections



Configure SDRAM Timing by SPD

When set to Enabled, bios will use the data from DIMM's SPD to setup the DRAM timing. If set to Disabled, bios will use default setting.



NOTE:

Default memory setting is 133MHz.

DRAM Frequency

This setting is setting Memory working frequency, 66/100/133 MHz.

Memory Hole

Some (unusual) expansion cards require access to particular memory addresses in order to function properly. This parameter allows you to configure the appropriate area of memory exclusively for use by these cards. The typical memory areas set for this purpose can be "512-640KB" (the upper 128K sector of conventional memory) and "15-16MB".

Memory hole is created to prevent other devices to utilize this space.

Spread Spectrum Control

This option allows you to turn Spread Spectrum clocking on and off.

SDRAM CAS# Latency

This setting is setting Memory CAS latency

AGP Aperture Size

This is about the size of AGP aperture. The aperture is a portion of the PCI

Memory addresses space. Host cycles that hit the aperture range are forwarded to the AGP without any translation

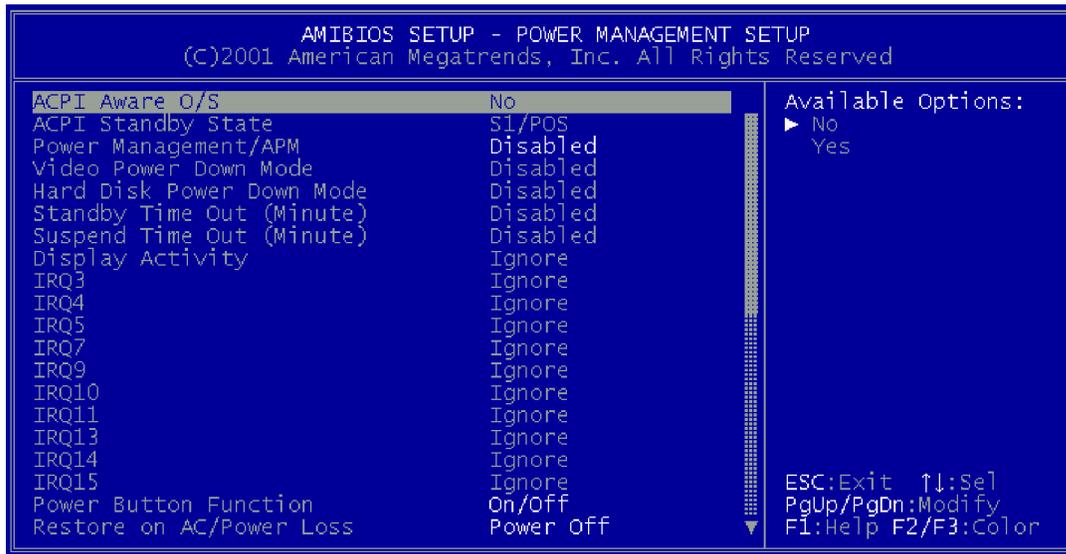
” **USB Controller**

Select enable if your system contains a USB controller and you have USB Peripherals. Otherwise, select disable.

” **USB Device Legacy Support**

Enable or Disable the USB device legacy support.

4.6 Power Management Setup Selections



„ **ACPI Aware O/S**

Set this value to allow the system to utilize the Intel ACPI (Advanced Configuration and Power Interface) specification. The Optimal and Fail-Safe default setting is Yes.

„ **ACPI Standby State**

This option allows you to select the S1 ACPI states: S1.
 The S1 state is the default setting.

„ **Power Management/APM**

Set this option to Enabled to run APM (Advanced Power Management).

„ **Video Power Down Mode**

Set this option to Enabled to allow the BIOS to power down the Video adapter and Monitor.

„ **Hard Disk Power Down Mode**

Set this option to Enabled to allow the BIOS to power down the Hard Disk.

„ **Standby/Suspend Time Out (Minutes)**

This option specifies the amount of system inactivity (in minutes) before the system will enter Standby/Suspend state.

„ **Display Activity**

This option specifies if BIOS is to monitor activity on the display monitor in order to reduce power consumption. When this option is set to “Monitor” and there is no display activity for the length of time specified in the value in the **Full-On to Standby Timeout (Min)** option, the computer enters a power saving state. The settings are “Monitor or Ignore”. The default setting is “Ignore.”

” **IRQ#**

These options allow IRQ settings to be modified.

” **Power Button Function**

Allows the system to go into On/Off mode or suspend mode when the power button is pressed. Configuration options: [On/Off] [Suspend].

” **Restore on AC/Power Loss**

When set to Power Off, the system goes into off state after an AC power loss. When set to Power On, the system goes on after an AC power loss. When set to Last State, the system goes into either off or on state Whatever was the system state before the AC power loss. Configuration options: [Power Off] [Power On] [Last State]

” **Resume on Ring**

Allows you to enable or disable RI to generate a wake event. Configuration options: [Disabled] [Enabled]

” **Resume on PME#**

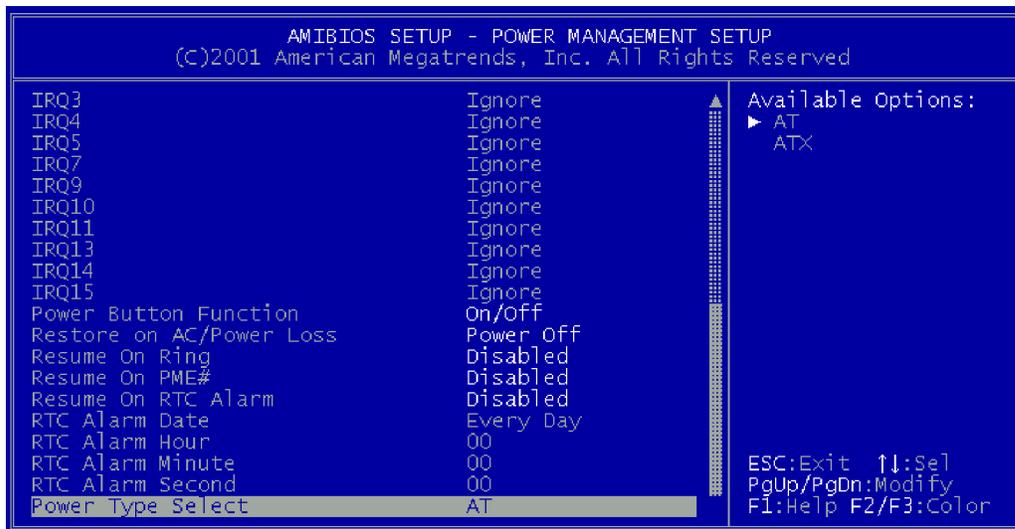
Allows you to enable or disable PCI PME# to generate a wake event. Configuration options: [Disabled] [Enabled]

” **Resume on RTC Alarm**

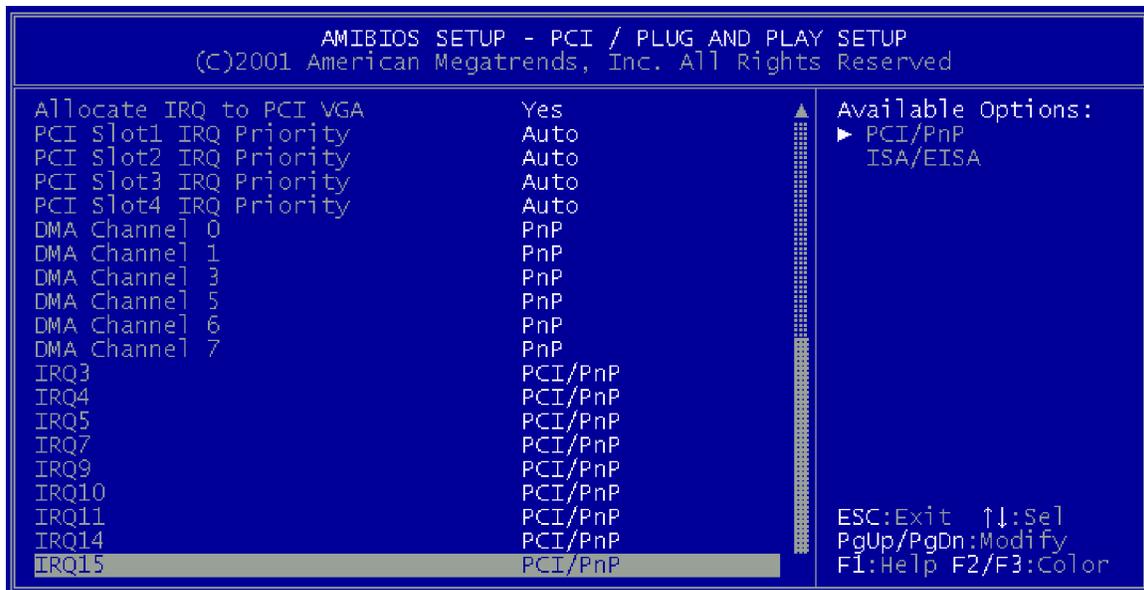
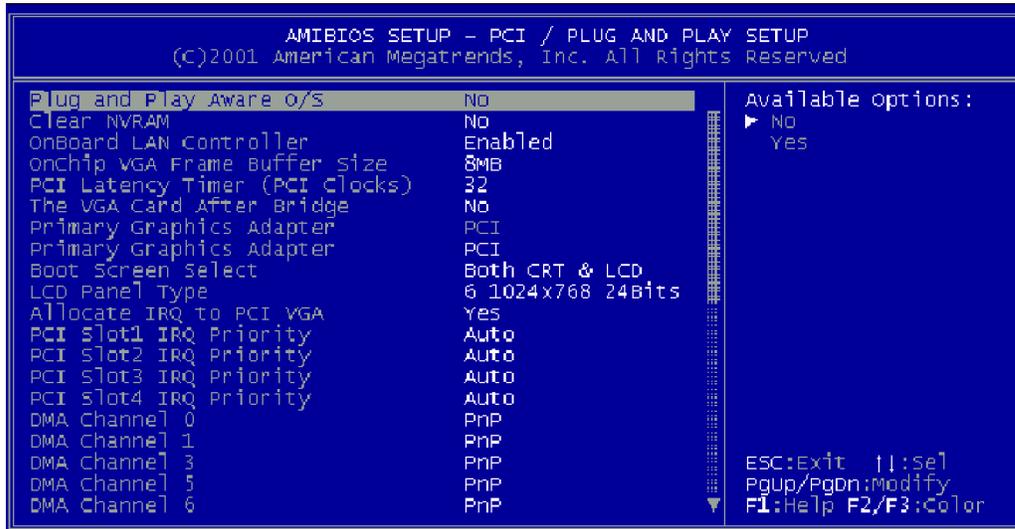
Allows you to enable or disable RTC to generate a wake event. When this item is set to Enabled, the items RTC Alarm Date, RTC Alarm Hour, RTC Alarm Minute, and RTC Alarm Second appear with set values. Configuration options: [Disabled] [Enabled].

” **Power Type Select**

This feature is switch of Power Type function. Configuration options: [AT] [ATX].



4.7 PCI / Plug and Play Setup Selections



Plug and Play Aware O/S

If enabled, BIOS will configure only PnP ISA boot devices (i.e. all PnP ISA cards which have boot flag set). And PnP aware OS will configure all other devices. If disabled, BIOS will configure all devices.

Clear NVRAM

Clear NVRAM during system bootup.

Onboard LAN Controller

Allows you to enable/disable the onboard LAN function.

„ **Onchip VGA Frame Buffer Size**

This setting instructs the BIOS to reserve the specified amount of memory for the internal video controller.

„ **PCI Latency Timer**

Value in units of PCI clocks for PCI device latency timer register
 PCI Latency Timer [64]
 Configuration options: [32] [64] [96] [128] [160] [192] [224] [248]

„ **VGA Card After Bridge**

Factory preserved function. Leave this option unchanged.

„ **Primary Graphics Adapter**

Allows you to select a primary adapter in the situation when both AGP and PCI graphics controllers are used. It decides which controller gets priority when booting.

„ **Boot Screen Select**

This item provides two options with display connection. You may let the BIOS to determine the connected display(s) or manually assign Both CRT & LCD displays.

„ **DMA Channel 0, 1, 3, 5, 6, 7**

The option allows the user to specify the bus type used by each DMA channel. The settings are PnP or ISA/EISA.

„ **IRQ3, 4, 5, 7, 9, 10, 11, 14, 15**

The option specifies the bus that the specified IRQ line is used on. The user can reserve IRQs for legacy ISA adapter cards whilst determining if AMIBIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs need to be removed from the pool, the user can optionally reserve the IRQ by assigning an ISA setting to it. Onboard I/O is configured by AMIBIOS. All IRQs used by onboard I/O are configured as PCI/PnP.

„ **Allocate IRQ to PCI VGA**

NO: Does not assign IRQ to PCI VGA card even if card requests an IRQ
 YES: Assigns IRQ to PCI VGA card if card requests IRQ
 Allocate IRQ to PCI VGA [Yes]
 Configuration options: [No] [Yes]

„ **PCI Slot# IRQ Priority**

This option allows you to manually configure a fixed interrupt request value for a specific PCI slot. This setting may apply when problems occur with PCI card driver or interrupt conflicts.

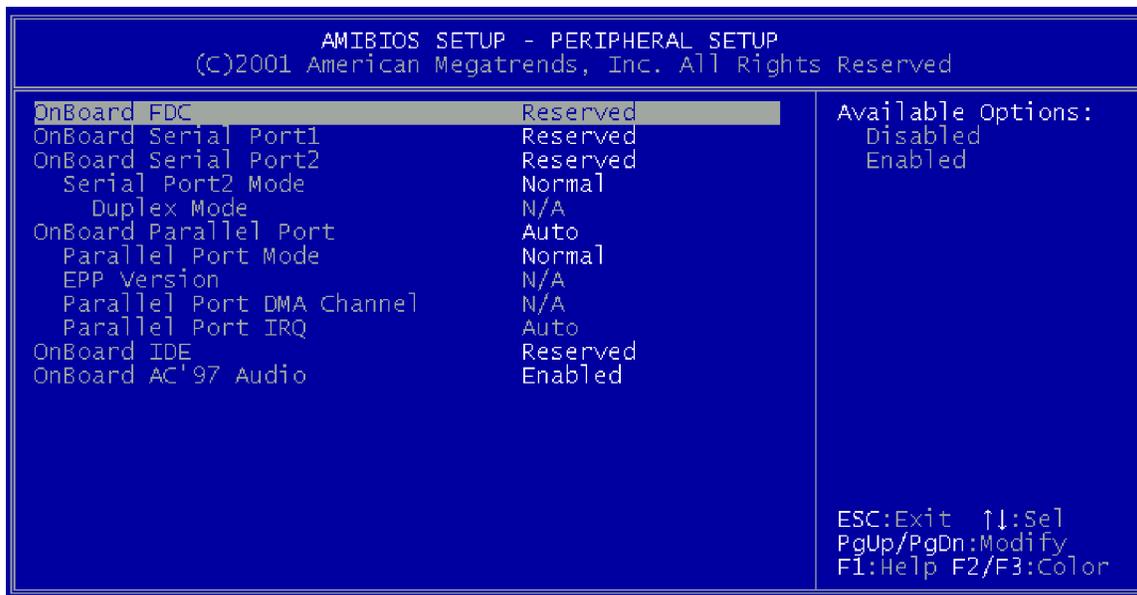
„ **LCD Panel Type**

System BIOS and custom drivers are kept in a Flash ROM device. Because the system is highly integrated, the Flash chip holds system BIOS, VGA BIOS, and network ROM image. This BIOS configuration option provides direct access to the display panel setting.

**NOTE:**

It is recommended not to change the rest of the BIOS menu options under this category. The default setting will work properly for the majority of applications.

4.8 Peripheral Setup Selections



„ **OnBoard FDC**

This option allows you to enable/disable the onboard floppy disk controller.

„ **OnBoard Serial Port#**

This feature allows you to disable the onboard serial port or to manually select the I/O address and IRQ for it.

„ **Serial Port2 Mode**

This feature allows you to assign serial port2 to function as the IrDA device connector.

„ **On-Board Parallel Port**

This option specifies the base I/O port address of the parallel port on the motherboard. The settings are Disabled, 378h, 278h, or 3BCh.

„ **Parallel Port Mode**

This option specifies the parallel port mode. The settings are Normal, Bi-Dir, ECP, and EPP.

Normal:

The normal parallel port mode is used.

Bi-Dir:

Use this setting to support bi-directional transfers on the parallel port.

EPP:

The parallel port can be used with devices that adhere to Enhanced Parallel Port (EPP) specifications. EPP uses the existing parallel port signals to provide asymmetric bi-directional data transfer driven by the host device.

ECP:

The parallel port can be used with devices that adhere to Extended Capabilities Port (ECP) specifications. ECP uses the DMA protocol to achieve data transfer rates of up to 2.5 Megabits per second, and provides symmetric bi-directional communication.

„ **Parallel Port IRQ**

This option specifies the IRQ used by the parallel port. The settings are (IRQ) 5, (IRQ) 7.

„ **Parallel Port DMA Channel**

This option is only available if the setting for the Parallel Port Mode option is set to ECP. It sets the DMA channel used by the parallel port. The available settings are DMA Channel 0, 1, or 3.

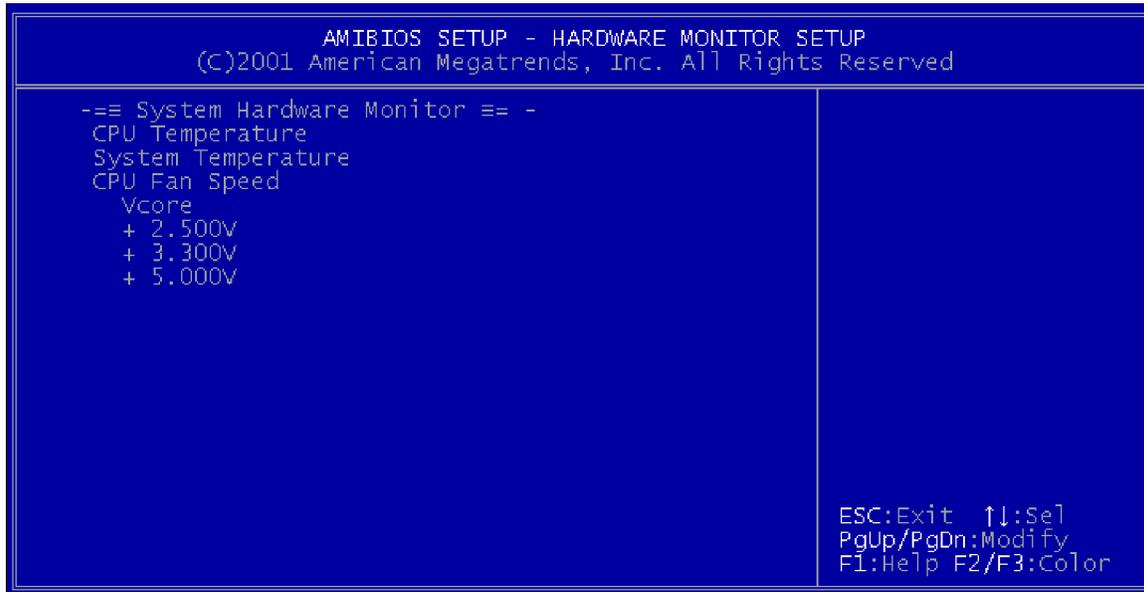
„ **OnBoard IDE**

This option is factory reserved. Do not change its value.

„ **OnBoard AC'97 Audio**

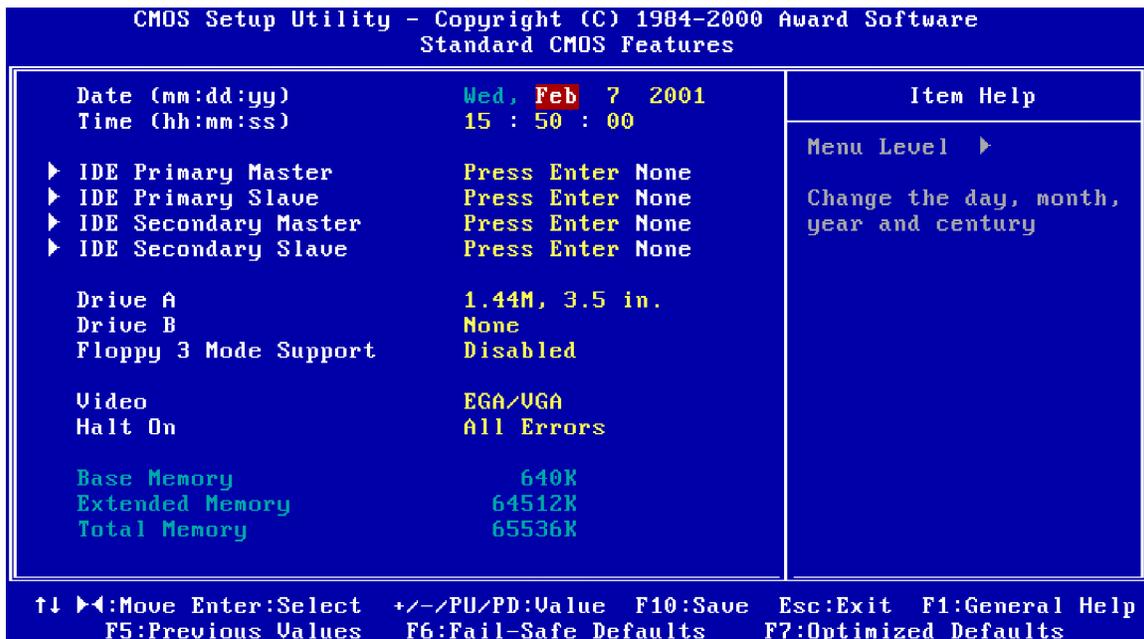
This option allows you to enable or disable the onboard audio functionality.

4.9 Hardware Monitor Setup Selections



This menu screen provides access to the readings of CPU temperature, fan speed, and voltage sensors.

4.10 Auto-Detect Hard Drives



When the Auto-detect command is executed, system BIOS will automatically detect Primary IDE bus master/slave, Secondary IDE bus master/slave, and floppy drive parameters.

CMOS Setup Utility - Copyright (C) 1984-2000 Award Software IDE Primary Master		Item Help
IDE HDD Auto-Detection	Press Enter	Menu Level >> To auto-detect the HDD's size, head... on this channel
IDE Primary Master Access Mode	Auto	
Capacity	17246 MB	
Cylinder	33416	
Head	16	
Precomp	0	
Landing Zone	33415	
Sector	63	
↑↓←→:Move Enter:Select +/-/PU/PD:Value F10:Save Esc:Exit F1:General Help F5:Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults		

Appendix

A

Watchdog Timer

**NOTE:**

The following discussion applies to DOS environment. It is recommended you contact GAI support or visit our website for specific drivers for more sophisticated operating systems, e.g., Windows and Linux.

The Watchdog Timer is a device to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by EMI or a software bug. When the CPU stops working normally, hardware on the board will perform hardware reset (cold boot) to bring the system back to a known state.

Three I/O ports control the Watchdog Timer:

443	Write	Set Watchdog time period
443 (hex)	Read	Enable the refresh to the Watchdog Timer
043/843 (hex)	Read	Disable the Watchdog Timer

Table -1 I/O Ports to Watchdog Timer

Prior to enable the Watchdog Timer, users have to define the Timer first. The output data is a value of time interval and the range of the value is from 01 (hex) to FF (hex) and the range for time interval ranges from 1 second to 255 seconds.

DATA	TIME INTERVAL
01	1 sec
02	2 sec
03	3 sec
04	4 sec
---	---
FF	255 sec

Table -2 Watchdog Timer Output Data

This will enable and activate the countdown timer which eventually time out and reset the CPU to ensure that this reset condition does not occur; the Watchdog Timer must be periodically refreshed by reading the same I/O port 043/843H and 443H. This must be done within the time

out period that is selected by software, please refer to the example program.

A tolerance of at least 5% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/Os that can be very time consuming. Therefore, if the timeout period has been set to 10 seconds, the I/O port 443H must be read within 7 seconds.



NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system will reset.

Example Assembly Program:

```
TIMER_PORT = 443H
```

```
TIMER_START = 443H
```

```
TIMER_STOP = 843H
```

```
::INITIAL TIME PERIOD COUNTER
```

```
MOV DX, TIME_PORT
```

```
MOV AL, 8: ;;8 SECONDS
```

```
OUT DX, AL
```

```
::ADD YOUR APPLICATION HERE
```

```
MOV DX, TIMER_START
```

```
IN AL, DX. ;;START COUNTER
```

```
ADD YOUR APPLICATION HERE
```

```
W_LOOP:
```

```
MOV DX, TIMER_START
```

```
IN AL, DX. ;RESTART COUNTER
```

```
;ADD YOUR APPLICATION HERE
```

```
CMP EXIT_AP, 0
```

```
JNEW_LOOP
```

```
MOV DX, TIMER_STOP
```

3301770

IN AL, DX
;;EXIT AP

Appendix

B

Connecting ATX Power Supply

The following notes show how to connect ATX Power Supply to the embedded board.

1. Using ATX Power Switch

- Step 1.** Disconnect the AC cord of the Power Supply from the AC source to prevent sudden electric surge to the board.

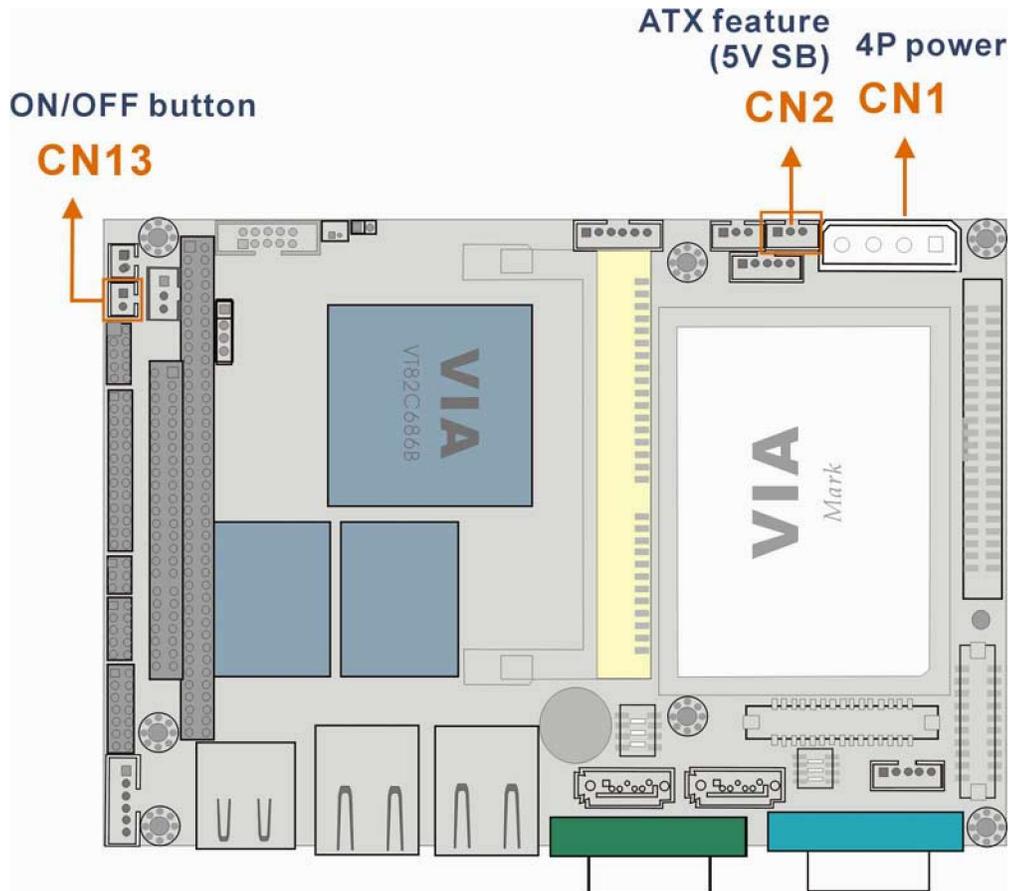


Figure -1 ATX Power Connection

- Step 2.** Connect an ATX power button switch (see the diagram above) to the ATX ON/OFF switch connector (power button). And connect the power cable from 20-pin ATX power supply to the CN1 4P and the CN2 SBVCC ATX feature connectors. The connection can be done using the adapter (ATX-to-4P) cable.

**WARNING!**

The new power adapter cable has its “Ground” pin removed from the 3-pin ATX feature connector. If you connect the power feature connector cable previously provided by GAI, you will destroy the 3301770 board.

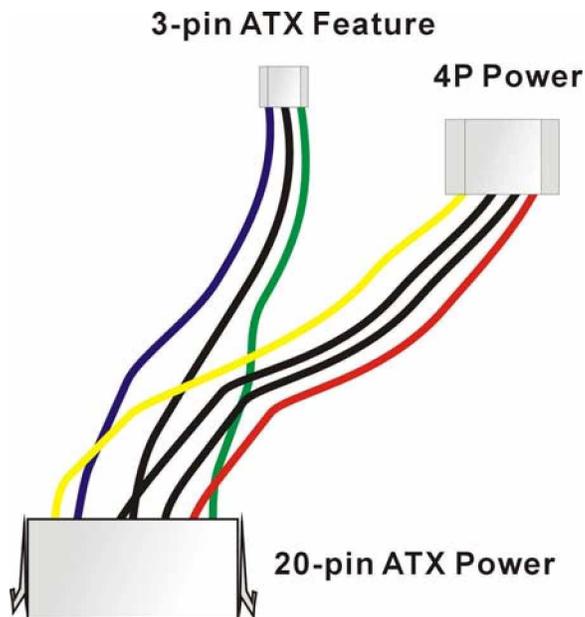


Figure BT-2 ATX Power Adapter Cable

Step 3. To turn on the system press the button once. To turn off the power supply press the ATX power switch button for about 4 seconds.

2. Using AT Power Supply

The connection to an AT power supply is as simple as connecting a 4P power connector to CN1. Power on or off is controlled by the power switch on the AT power supply.

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Appendix

C

ALi[®] RAID for SATA

1. Introduction

The ALi M5283 is a highly integrated disk drive controller that is capable of managing Parallel-ATA and Serial-ATA interface hard disk drives. The ALi controller supports PATA UDMA transfer mode up to mode 6 and SATA 1.0 disk drives. The ALi M5283 also comes with cost-effective RAID functionalities that can be used to increase data read/write speed and to provide protection to data by distributing mirrored duplicates of data onto two disk drives (RAID1).



CAUTION!

You must properly configure the associated BIOS settings before the Ctrl+A key combination can take effect. Please refer to **Chapter 4 AMI BIOS Setup**, the discussions of the associated configurations for more details. SATA disk drive support must be initiated under the following two BIOS sub-menus.

1. **Boot -> Onboard SATA ROM**
2. **Chipset -> Southbridge Chipset Configuration**

You will not be able to access the ALi configuration utility unless you have properly initiated the SATA disk drive support in the AMI BIOS configuration utility.



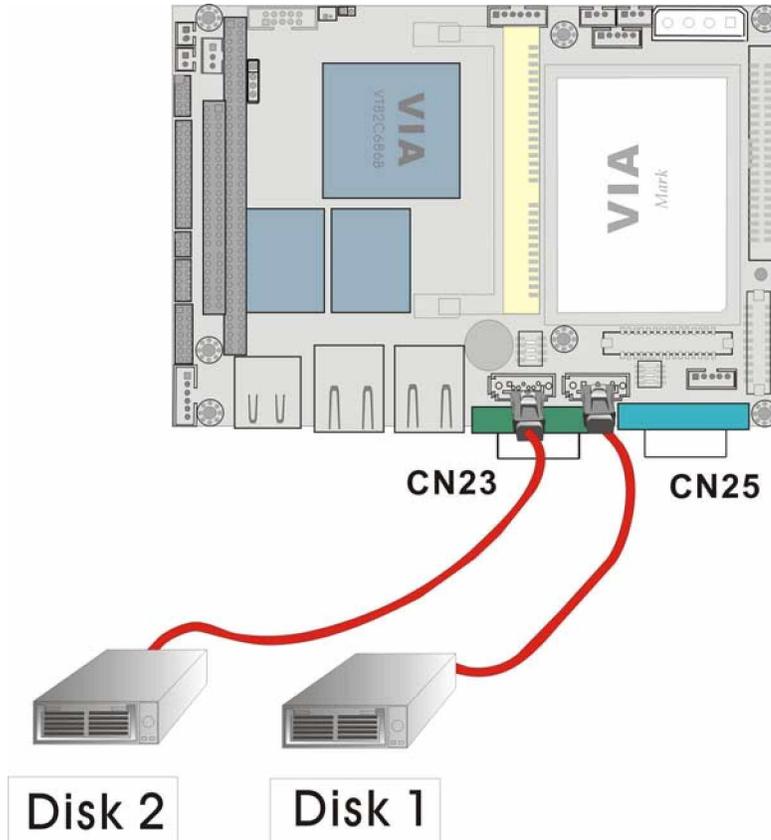
CAUTION!

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. Your operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

Precautions:

1. One key benefit a RAID configuration brings you is that a single hard drive can fail within a RAID array without damaging your data. With RAID1 array, you can replace a failed drive and restore your RAID configuration.

However, if you replace the wrong drive when you are trying to remove a failed one, irrecoverable data loss will occur! It is therefore strongly recommended to mark the physical connections of all of your SATA disk drives. If a drive member of a RAID array should fail, you will then be able to correctly locate a failed drive.



For example, you may specify the drive locations by attaching stickers to the drive bays. You need a reminder if the cabling does not match the physical locations of hard drives.

2. It is also crucial that you do not accidentally disconnect the SATA drive cables. Carefully route your cables within the chassis to avoid system down time.

2. Features and Benefits

- „ Supports RAID levels 0, 1, and JBOD
- „ Supports the connectivity to two disk drives
- „ The supported Operating Systems include: Windows 98/Me, Windows 2000, and Windows XP
- „ Windows-based software for RAID management

3. SATA-ALi RAID Driver



CAUTION!

Because of the inherent limitations by system chipset, the ALi M5283 SATA and RAID controller is implemented as a device that requires you to provide device driver during the Windows installation process. To successfully install the device driver, please carefully read the following instructions.

The ALi driver is especially required if SATA drives are the only hard disk drives in your system. Otherwise the Windows installation program may fail to locate your hard drives whether you configure your SATA disk drives into RAID volumes or use them as individual disk drives.

The system BIOS can identify SATA disk drives, but cannot control their operation. The separately installed driver therefore is necessary.

ALi SATA Controller Driver Installation Steps

- During Windows XP Installation

- Step 1.** Enable SATA ROM using the BIOS configuration utility. The SATA ROM option is provided in the Southbridge chipset menu. The process has been detailed in **Chapter 4.**
- Step 2.** Locate the ALi installation driver folder within the Utility CD that came with your motherboard.
- Step 3.** Copy files under a sub-directory named "SATA50XX" (taking Windows XP installation as the example) to the root directory of floppy diskette (labeled driver diskette). The file names are listed below:
- „ disk1
 - „ 5283096D.bin
 - „ txtsetup.oem
- Also copy the OS option directory "win98_me", "win_nt", or "win_xp", and related driver files in each directory.

- Step 4.** Boot from Windows installation CD-ROM (this requires you to set CD-ROM as the 1st Boot Device), when the Windows XP Setup blue screen appears and prompts users to Press F6 if you need to install third-party SCSI or RAID driver, please press the F6 key.
- Step 5.** The setup program will continue, later when the setup program prompts users to specify additional adapters, please press the S key.
- Step 6.** Then the setup program will prompt user to insert the driver diskette. Please insert the driver diskette your prepared previously, and then press ENTER to continue.
- Step 7.** The follow-up window will list out the installation choices, please select ALi SATA/RAID Controller for Windows XP and press ENTER to continue.
- Step 8.** The follow-up window will list out the devices to be installed, in which selected ALi controller(s) should be included.
- Step 9.** Repeat **step 5**, but select ALi ATA/RAID Controller at **step 7**. If both controllers are installed, go to next step.
- Step 10.** If users want to install other devices, please operate at this time. If all devices have been successfully installed, please go to next step.
- Step 11.** Press Enter to continue Windows XP setup.

Installation Steps under Existing Windows XP

After Windows XP is started, Windows system will automatically find the newly installed adapter and prompt user to install its driver. Please follow these steps to install the driver:

- Step1.** When the Found New Hardware Wizard windows appear(Mass Storage Controller), select Install from a list or specify location(Advanced) and click Next to continue.
- Step 2.** In the follow-up window, please select "Don't search, I will choose the driver to install", then click Next to continue.

- Step 3.** In the follow-up window, please select SCSI and RAID controllers, and then click Next to continue.
- Step 4.** In the follow-up window, click Have Disk..., then insert the driver diskette and type in the driver location: e.g., a CD-ROM, then click OK to continue.
- Step 5.** In the follow-up window, select ALi SATA/RAID Controller, then click Next to continue.
- Step 6.** Confirm the follow-up windows and click the Finish button to continue.
- Step 7.** Please "confirm" the Digital Signature Not Found window when it appears, when finished, please restart the computer.
- Step 8.** Repeat step 1, but select ALi ATA/RAID Controller at step 4.

4. Accessing the ALi RAID Utility

If the SATA ROM configuration options in system BIOS have been properly configured, the RAID BIOS version and disk drive information should appear after system POST screen.

The BIOS disk drive information should look like the following:

```
ALi RAID BIOS V1.XX  
(c) ALi Corporation 2005, All Rights Reserved.  
Identifying IDE drives...
```

```
Channel 1 Master: Maxtor xxxxxx  
Channel 2 Master: Maxtor xxxxxx
```

```
Press Ctrl-A to enter ALi RAID BIOS setup utility
```

To enter the RAID configuration utility, press 'Ctrl' and 'A' keys simultaneously.

1. RAID BIOS Setup Menu:

The Serial ATA RAID volume may be configured using the RAID Configuration utility stored within the ALi RAID controller ROM. The BIOS configuration screen is divided into three major functional areas: Main Functional Menu, Drive Selection Menu, and a list for the configured RAID arrays.

```

RAID BIOS Setup Utility (c) 2003 ALi Corporation   www.ali.com.tw

Create RAID 0 Striping for Performance
Create RAID 1 Mirroring for Reliability Select
Create JBOD for integrated Capacity
Stripe Size
Delete RAID Setting & Partition          64K
Delete All RAID Setting & Partition
Rebuild RAID Array
Select Boot Drive

SPACE : Select
↑↓    : Moving Cursor
ENTER : Select & Finish
ESC   : Exit

-----Drive Model----- Mode -----Capacity-----RAID Array/Type-----
Channel 1 Master: WDC WD360GD-00P  SATA1      37019MB
Channel 2 Master: Maxtor 6Y200M0   SATA1      203928MB

-----Capacity-----RAID Type-----Stripe Size-----RAID Name-----
RAID Array A   :
RAID Array B   :
RAID Array C   :

```

2. RAID Options:

2.1 Create RAID0 Striping for Performance

Step 1. To create a RAID0 array, use your arrow keys to highlight and press Enter to activate this item. An 'S' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be included in the RAID0 array.

Step 2. Use the Space key to select members of the RAID0 RAID configuration. The flashing cursor should change to a lower case 's' character once any of the connected disk drives has been selected. Follow the same method to select another member drive.

- Step 3.** You should then be prompted by a “Create RAID0(Y/N)” confirm box.
- Step 4.** Press Y and then some necessary information will be written to the selected disk drives.



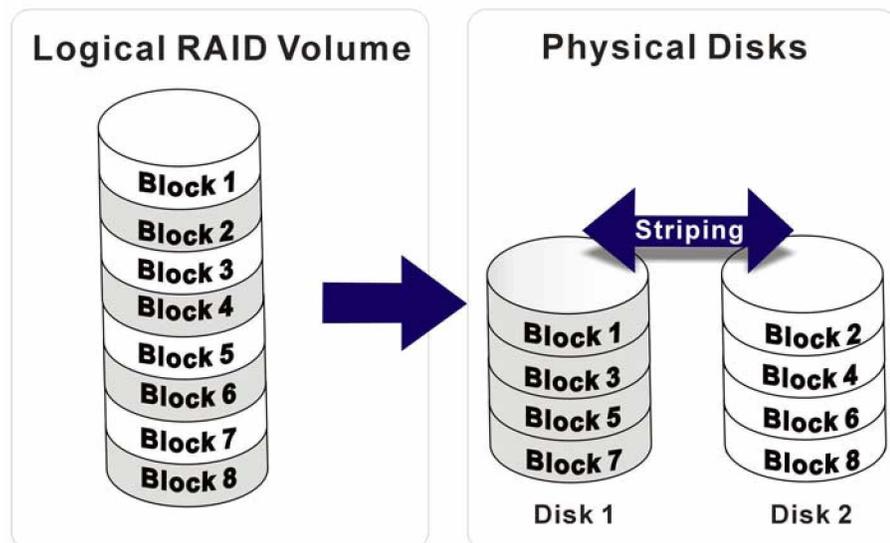
WARNING!

All data previously stored on the member drives of a RAID configuration will be destroyed during the RAID initialization process. If you use “used” drives to create a RAID array, make you have moved or backed up your data before creating a RAID array out of these disk drives.

-
- Step 5.** Next you will be prompted to enter a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.
- Step 6.** Once an array is successfully created, it will be listed in the list of the configured arrays.

**NOTE:**

1. To reduce the chance of losing data, ALi imposed certain limitations on the RAID configuration options. For example, Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID0 array. Mixing Parallel- and Serial-ATA disk drives in a RAID0 array should also be avoided.
2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data stripes are equally distributed across all members of a RAID array. The operational concept is diagrammed below.



2.2 Create RAID1 Mirroring for Reliability

- Step 1.** To create a RAID1 array, use your arrow keys to highlight and press Enter to activate this item. An 'M' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be included in the RAID1 array.
- Step 2.** Use the Space key to select members of the RAID1 RAID configuration. The flashing cursor should change to a lower case 'm' character once any of the connected disk drives has been selected. Follow the same method to select another member drive.
- Step 3.** You should then be prompted by a "Create RAID1(Y/N)" confirm box.
- Step 4.** Press Y and then some necessary information will be written to the selected disk drives.



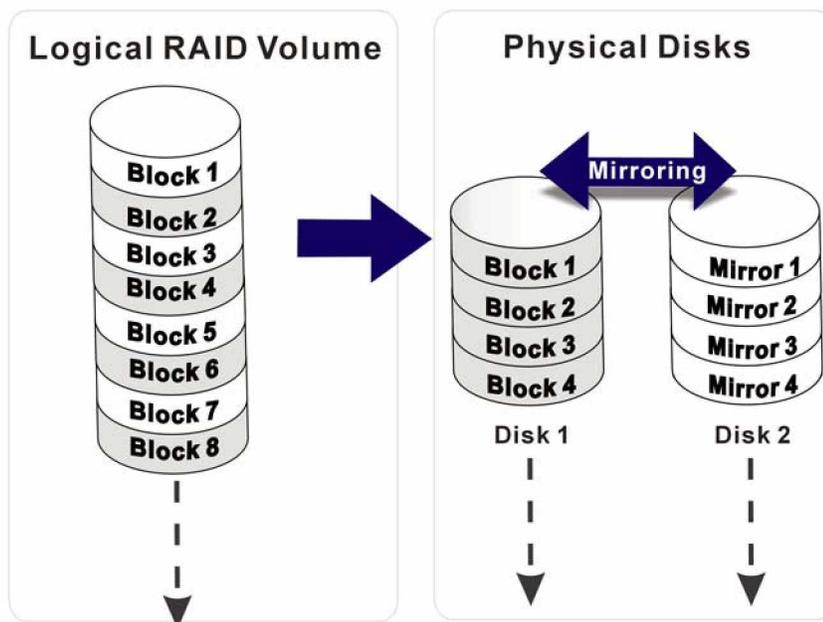
WARNING!

All data previously stored on the member drives of a RAID configuration will be destroyed during the RAID initialization process. If you use "used" drives to create a RAID array, make you have moved or backed up your data before creating a RAID array out of these disk drives.

-
- Step 5.** Next you will be prompted to provide a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.
- Step 6.** Once an array is successfully created, it will be listed in the list of the configured arrays.
- Step 7.** Lastly a prompt will require you to proceed with drive copy. The Source and Destination drives will be indicated as "M" and "m" in the Drive Selection Menu.

**NOTE:**

1. To reduce the chance of losing data, ALi imposed limitations on the RAID configuration options. For example, Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID1 array. Mixing Parallel- and Serial-ATA disk drives in a RAID1 array should also be avoided.
2. Always use disk drives of the same capacity to create a RAID array. The excessive capacity of a larger disk drive cannot be utilized because data mirrors are equally distributed across corresponding members of drive pairs within a RAID array. The operational concept is diagrammed below.



2.3 Create JBOD for Integrated Capacity

Step 1. JBOD stands for “Just a Bunch of Drives.” JBOD provides neither performance gains nor data redundancy. To create a JBOD array, use your arrow keys to highlight and press Enter to activate this item. A ‘J’

flashing character will appear at the Drive Selection Menu where you can choose the member drives to be included in the JBOD.

- Step 2.** Use the Space key to select members of the JBOD configuration. The flashing cursor should change to a lower case 'j' character once any of the connected disk drives has been selected. Follow the same method to select another member drive. The maximum number of member drives in a JBOD is four and the minimum is two.
- Step 3.** You should then be prompted by a "Create RAID1(Y/N)" confirm box.
- Step 4.** Press Y and then some necessary information will be written to the selected disk drives.



WARNING!

All data previously stored on the member drives of a RAID configuration will be destroyed during the RAID initialization process. If you use "used" drives to create a RAID array, make you have moved or backed up your data before creating a RAID array out of these disk drives.

-
- Step 5.** Next you will be prompted to provide a nickname for the created array. Upper and lower case alphabetic, numeric, space, and underscore characters are all applicable for naming an array.
- Step 6.** Once an array is successfully created, it will be listed in the list of the configured arrays.

**NOTE:**

To reduce the chance of losing data, ALi imposed limitations on the RAID configuration options. For example, Parallel-ATA drives connected on the same IDE channel cannot be selected as the members of a RAID1 array. Mixing Parallel- and Serial-ATA disk drives in a RAID1 array should also be avoided.

2.4 Stripe Size

The change to stripe size takes effect on RAID0 arrays. Configurable options are: 64K (default), 32K, 16K, 8K, and 4K. If you can be certain that your I/Os to the hard drives are small and randomly occurred, you can select a small stripe size. If your I/Os are mostly large and come in sequential orders, e.g., A/V playback and editing applications, choose a larger stripe size.

The default value, 64K, should be appropriate for most applications.

2.5 Delete RAID Setting & Partition

Step 1. To delete an existing RAID configuration, use your arrow keys to highlight and press Enter to activate this item. An 'E' flashing character will appear at the Drive Selection Menu where you can choose the member drives to be removed from an existing configuration.

Step 2. You should then be prompted by "Data on RAID drives will be erased (Y/N)?".

Step 3. Press Y and then the RAID configuration will be invalidated.

**WARNING!**

If you delete a RAID configuration, all data previously stored on the member drives of the RAID configuration will be destroyed.

2.6 Delete All RAID Setting & Partition

- Step 1.** To delete all existing RAID configurations, use your arrow keys to highlight and press Enter to activate this item.
- Step 2.** You should then be prompted by "Data on RAID drives will be erased (Y/N)?".
- Step 3.** Press Y and then all existing RAID configurations will be invalidated.

**WARNING!**

If you delete a RAID configuration, all data previously stored on the member drives of the RAID configuration will be destroyed.

2.7 Rebuild RAID Array

This function allows you to rebuild a RAID array if a member of a RAID configuration should fail. Neither RAID0 nor JBOD provides data redundancy. Therefore, this option only applies to RAID1 arrays. This item takes effect when a member of a RAID1 configuration has failed.

- Step 1.** To delete all existing RAID configurations, use your arrow keys to highlight and press Enter to activate this item.
- Step 2.** An "R" flashing character should appear at the list of existing arrays.
- Step 3.** The source and destination drives will be displayed.
- Step 4.** Press Y to begin the rebuild process.
- Step 5.** During the rebuild process, the rebuild progress will be indicated by a status bar. Rebuild consumes considerable system resources and the time required for rebuilding a RAID array may vary depending on the size of stored data, disk drive capacity, and drive performance.

2.8 Select Boot Drive

- Step 1.** To select a Boot drive, use your arrow keys to highlight and press Enter to activate this item.
- Step 2.** An "A" flashing character should appear at the Drive Selection Menu.
- Step 3.** Press Enter or the Space key to finish the configuration.

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