



ADLINK
TECHNOLOGY INC.

ReadyBoard™ 740

Dual-Core Intel® Atom™ EPIC SBC
with H.264 Hardware Video Decoder

User's Manual



Manual Rev.: 2.03 (PCB rev. B1 and later)

Revision Date: March 18, 2013

Part No: 50-1Z076-1030



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Revision History

Revision	Release Date	Description of Change(s)
2.00	2011/04/20	Initial Release
2.01	2012/02/02	Correct Panel Power Voltage jumper to JP6
2.02	2013/03/04	Correct FN1/FN2 in Board Layout Legend
2.03	2013/03/18	Update to B1 PCB: Front Panel layout (PS/2 connector, LED, Reset Button) and SSD from PATA to SATA for boards with ordering numbers ending in "xx30" and higher only

Preface

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Using this Manual

Audience and Scope

The ReadyBoard™ 740 User's Manual is intended for hardware technicians and systems operators with knowledge of installing, configuring and operating embedded single board computers.

Manual Organization

This manual is organized as follows:

Preface: Presents copyright notifications, disclaimers, trademarks, and associated information on the proper usage of this document and its associated product(s).

Chapter 1, Introduction: Introduces the ReadyBoard 740, its features, specifications and board layout.

Chapter 2, Hardware Information: Provides technical information on connectors, jumpers and pin assignments for configuring the ReadyBoard™ 740.

Chapter 3, BIOS Setup: Presents information on configuring the system BIOS.

Important Safety Instructions: Presents safety instructions all users must follow for the proper setup, installation and usage of equipment and/or software.

Getting Service: Contact information for ADLINK's worldwide offices.

Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.



NOTE:

Additional information, aids, and tips that help users perform tasks.



Information to prevent **minor** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



Information to prevent **serious** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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1 Introduction

This chapter will introduce the ReadyBoard™ 740, its features, specifications, and mechanical layout.



NOTE:

This version of the manual is for boards with PCB rev. B1 and later (ordering numbers ending in “xx30” and higher only)

1.1 Overview

The Ampro by ADLINK™ ReadyBoard™ 740 is an EPIC form factor single board computer (SBC) supporting the single- or dual-core Intel® Atom™ processor and ICH8M chipset, onboard SSD, hardware video decoder (supporting H.264), networking and robust I/O. The ReadyBoard 740 supports DDR2 667/800 MHz memory up to 2GB in one SODIMM slot, Gigabit Ethernet, USB 2.0, SATA and integrated graphics supporting dual independent display, single channel 24-bit LVDS, and DVI. The ReadyBoard 740 is suitable for transportation, self-service, digital signage, and video surveillance applications.

1.2 Features

- ▶ EPIC form factor (165.1 mm x 114.3 mm)
- ▶ Supports Intel® Atom™ N450/D410/D510 processors
- ▶ Integrated graphics supports VGA, LVDS
- ▶ 24-bit LVDS and DVI via CH7036 encoder (optional 18-bit LVDS w/o DVI)
- ▶ 10/100/1000Mbps Ethernet
- ▶ 6x USB 2.0 ports (2x front I/O, 4x onboard pin header)
- ▶ 2x SATA ports
- ▶ 4GB optional onboard SSD
- ▶ PCI-104 connector
- ▶ Watchdog Timer, Hardware Monitor
- ▶ HD audio
- ▶ RoHS compliant

1.3 Specifications

System	
CPU	<ul style="list-style-type: none"> • Intel® Atom™ D510, 1.66GHz, 13 W (2 cores/4 threads) • Intel® Atom™ D410, 1.66GHz , 10 W (1 core/2 threads) • Intel® Atom™ N450, 1.66GHz, 5.5 W (1 core/2 threads)
Cache	<ul style="list-style-type: none"> • 1GB, 8-way L2 cache for D510 dual-core processor, • 512KB, 8-way L2 cache for N450/D410 single-core processor
Chipset	<ul style="list-style-type: none"> • Intel® ICH8-M I/O Controller Hub
Memory	<ul style="list-style-type: none"> • DDR2 667/800 MHz up to 2GB in one SODIMM slot
BIOS	<ul style="list-style-type: none"> • AMI BIOS with 16 Mb SPI flash memory
Audio	<ul style="list-style-type: none"> • Realtek ALC262 codec • Supports line-in, mic-in and speaker-out
Watchdog Timer	<ul style="list-style-type: none"> • 1-255 second/minute programmable
Hardware Monitor	<ul style="list-style-type: none"> • CPU temperature and supply voltages
Operating System	<ul style="list-style-type: none"> • Linux, Windows CE 6.0 / XPe / 7, VxWorks 6.6, QNX 6.4
I/O Interfaces	
Onboard I/O	<ul style="list-style-type: none"> • 2x SATA ports with 300 MB/s data transfer • 4GB onboard SSD (SATA) • 2x USB 2.0 pin headers (4 ports) • 4x serial port pin headers (COM1-2 support RS-422/485) • LVDS, DVI pin headers
Rear I/O	<ul style="list-style-type: none"> • 1x RJ-45 LAN port • 2x USB 2.0 ports • 1x D-Sub VGA connector • PS2 keyboard/mouse port (Mini-DIN 6-pin)
LEDs/Reset	<ul style="list-style-type: none"> • Power, SATA active • Reset button
Expansion	<ul style="list-style-type: none"> • PCI-104 connector • PCIe Mini Card slot • Supports MiniModule ISA for PC/104-Plus expansion
Power Input	<ul style="list-style-type: none"> • Supports AT/ATX power

Display	
Chipset	<ul style="list-style-type: none"> • GMA 3150 integrated in CPU • BCM70015 H/W Video Decoder (H.264)
VGA	<ul style="list-style-type: none"> • Dsub-15 connector, up to 2048x1536 (QXGA)
LVDS/DVI	<ul style="list-style-type: none"> • Single channel 24-bit LVDS up to 1366 x 768 • DVI-D interface up to 1920 x 1080 • Optional 18-bit LVDS w/o DVI
Ethernet	
Controller	<ul style="list-style-type: none"> • Intel® 82574L PCIe network controller • 10/100/1000BASE-T dual-Gigabit Ethernet • Wake on LAN supported
Ports	<ul style="list-style-type: none"> • 1x RJ-45 Ethernet port
Mechanical and Environment	
Form Factor	<ul style="list-style-type: none"> • EPIC size single board computer
Dimensions	<ul style="list-style-type: none"> • 165.1 mm x 114.3 mm (L x W)
Board Thickness	<ul style="list-style-type: none"> • 2.36 mm (0.093")
Operating Temp.	<ul style="list-style-type: none"> • Standard: 0°C to 60°C • Extended: -20°C to 70°C
Storage Temp.	<ul style="list-style-type: none"> • -20°C to 75°C
Rel. Humidity	<ul style="list-style-type: none"> • 90% at 60°C
Shock	<ul style="list-style-type: none"> • 50G peak-to-peak, 11ms duration, MIL-STD-202G Method 213B, non-operating
Vibration	<ul style="list-style-type: none"> • 11.95 Grms, 50-2000 Hz, each axis, MIL-STD-202G Method 214A, operating
Certifications	<ul style="list-style-type: none"> • CE, FCC Class A, EN-61373

Table 1-1: ReadyBoard 740 General Specifications

1.4 Power Consumption

Intel® Atom™ Processor D510 1.66 GHz

Test Configuration	
CPU	Intel® Atom™ Processor D510 1.66 GHz
Memory	Transcend 2GB DDR2 667 SO-DIMM CL5 ELPIDA E1108ACBG-6E-E
Graphics	GMA 3150 integrated in CPU
SATA Channel 1	Seagate Barracuda 7200.10 160GB
Power Supply	FSP FSP350-60PFG

DOS (idle)	
Power Req.	+12V
Current (A)	1.310
Watts (W)	15.72
Boot to Windows XP logon (max. value)	
Power Req.	+12V
Current (A)	2.010
Watts (W)	24.12
Windows XP CPU Stress (BurnIn Test : CPU 100%)	
Power Req.	+12V
Current (A)	1.224
Watts (W)	14.69
Windows XP Total System Stress (BurnIn Test 100%: CPU, 2D, 3D, VGA, Memory, HDD)	
Power Req.	+12V
Current (A)	1.350
Watts (W)	16.20

1.5 Cooling Requirements

The CPU, I/O Controller Hub (Southbridge), and voltage regulators are the main sources of heat on the board. The ReadyBoard 740 is designed to operate at its maximum CPU speed of 1.66GHz using the cooling solution provided with the board (the chipset requires a heatsink, and the CPU requires a passive heatsink for the Atom N450 version, active fansink for Atom D410/510 version).

1.6 Block Diagram

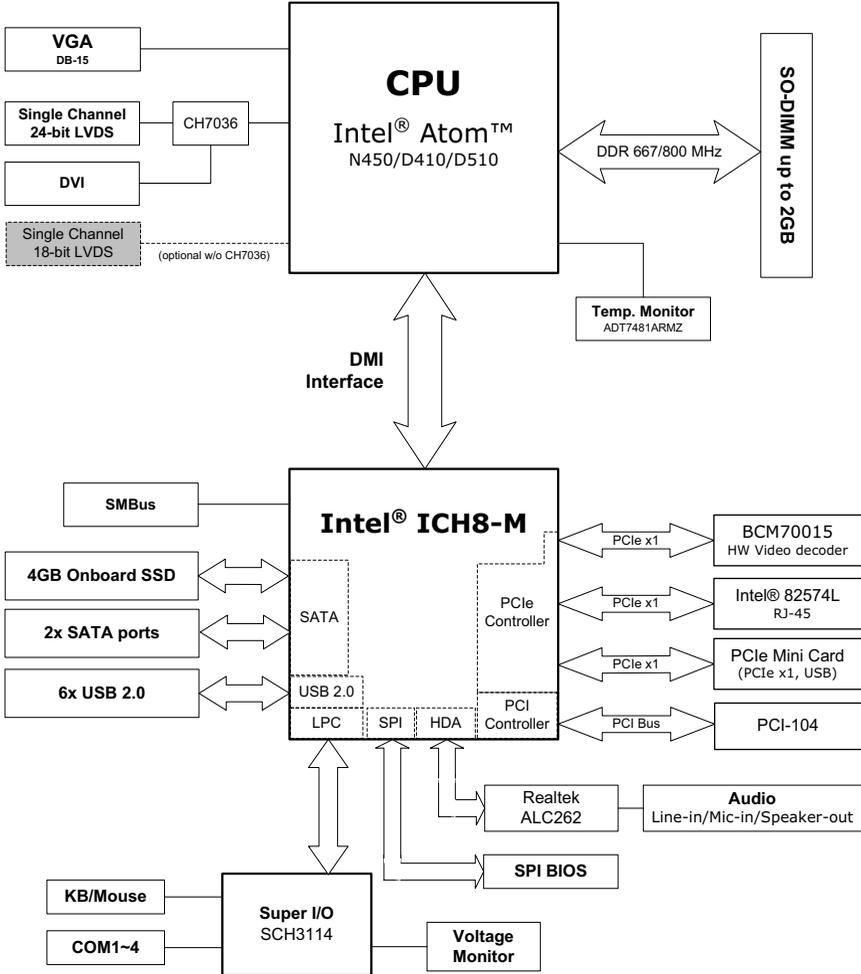
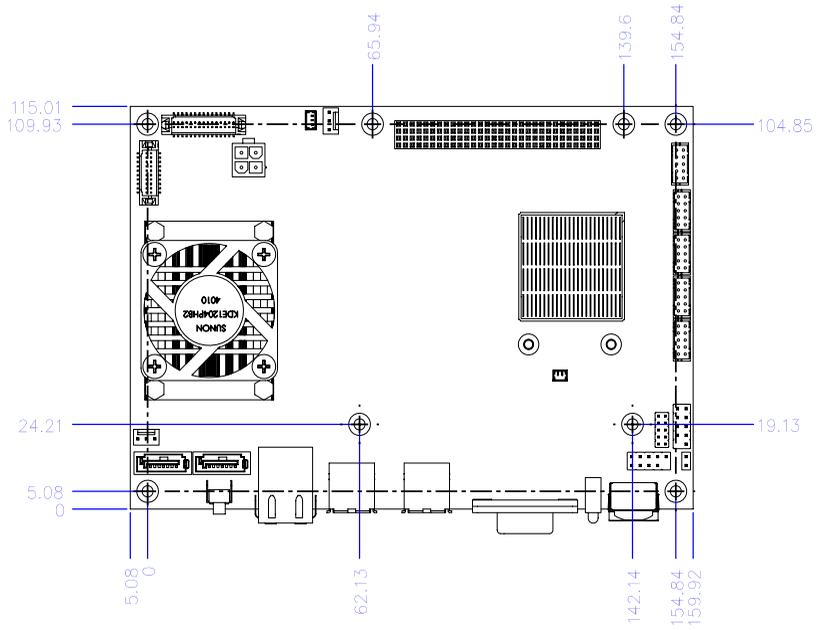
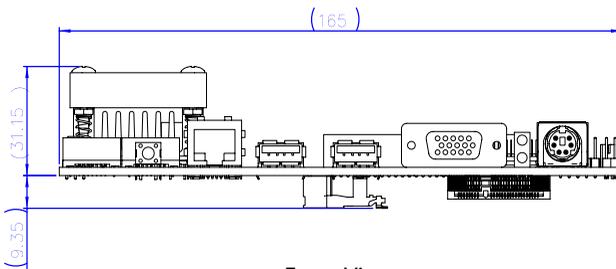


Figure 1-1: ReadyBoard 740 Block Diagram

1.7 Mechanical Drawing



Top View



Front View

Dimensions in mm

Figure 1-2: ReadyBoard 740 Dimensions

1.8 Package Contents

Please check that your package contains the items below. If you discover damaged or missing items, please contact your vendor.

- ▶ ReadyBoard 740 EPIC SBC
- ▶ Passive heatsink for Atom N450 version
- ▶ Active fansink for Atom D410/510 version

Optional Cable Kit:

- ▶ 2x SATA cable
- ▶ 1x two-port SATA power cable
- ▶ 2x two-port USB cable
- ▶ 4x serial port cable
- ▶ 1x DVI cable
- ▶ 1x LVDS cable
- ▶ 1x audio cable
- ▶ 1x ATX power cable
- ▶ 1x buzzer cable

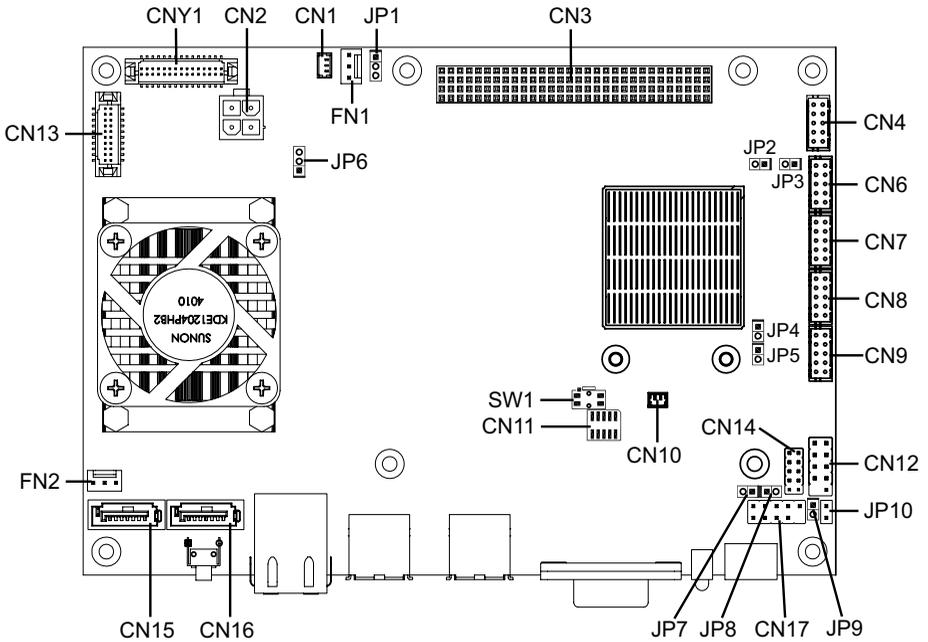


WARNING:

DO NOT install or apply power to equipment that is damaged or if there is missing/incomplete equipment. Retain the shipping carton and packing materials for inspection. Please contact your ADLINK dealer/vendor immediately for assistance. Obtain authorization from your dealer before returning any product to ADLINK.

2 Hardware Information

2.1 Board Layout



SODIMM, PCIe Mini Card sockets on rear of board

Figure 2-1: ReadyBoard 740 Layout

CN1	ATX Power connector	CNY1	LVDS connector
CN2	12V Power connector	FN1	Fan connector (12V)
CN3	PCI-104 connector	FN2	Fan connector (5V)
CN4	Audio connector	JP1	Suspend Mode jumper
CN6	COM3 pin header	JP2-3	Reserved
CN7	COM4 pin header	JP4	COM2 RS-485 termination jumper
CN8	COM2 pin header	JP5	COM1 RS-485 termination jumper
CN9	COM1 pin header	JP6	Panel Power jumper
CN10	Battery connector	JP7	SMB_DAT pin header
CN11	Reserved	JP8	SMB_CLK pin header
CN12/17	USB pin header	JP9	Buzzer pin header
CN13	DVI connector	JP10	Power Button pin header
CN14	GPIO pin header	SW1	Clear CMOS button
CN15/16	SATA connector		

Table 2-1: ReadyBoard 740 Board Layout Legend

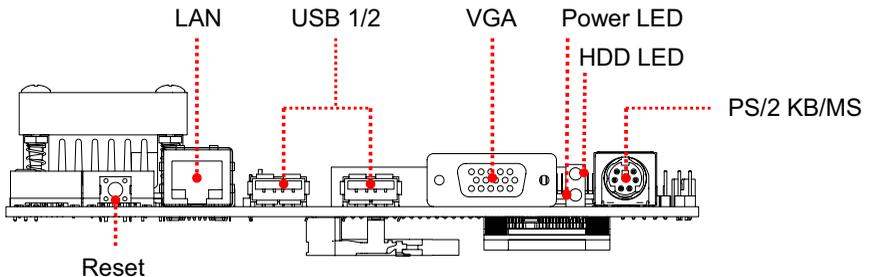


Figure 2-2: ReadyBoard 740 Rear I/O Layout

2.2 Rear I/O Connectors

LAN (RJ-45) Ports

Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	BI_DA+
2	TX-	BI_DA-
3	RX+	BI_DB+
4	--	BI_DC+
5	--	BI_DC-
6	RX-	BI_DB-
7	--	BI_DD+
8	--	BI_DD-

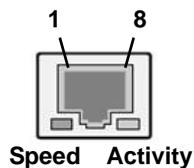


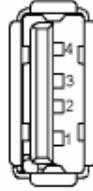
Table 2-2: LAN Connector Pin Definitions

Status (CN4, CN5)		Speed LED (Green/Amber)	Activity LED (Amber)
Network link is not established or system powered off		OFF	OFF
10/100 Mbps	Link	OFF	ON
	Active	OFF	Blinking
1000 Mbps	Link	Green	ON
	Active	Green	Blinking

Table 2-3: LAN LED Definitions

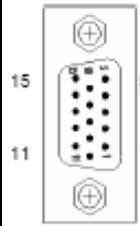
USB Connectors

Pin #	Signal Name
1	Vcc
2	USB-
3	USB+
4	GND



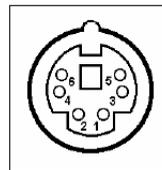
VGA Connector.

Signal Name	Pin #	Pin #	Signal Name
RED	1	9	P5V_VGA1
GREEN	2	10	GROUND
BLUE	3	11	VGA_P11
P5V_VGA2	4	12	DDCDAT
GROUND	5	13	HSYNC
GROUND	6	14	VSYNC
GROUND	7	15	DDCCLK
GROUND	8		



PS/2 Keyboard/Mouse Port

Pin #	Signal	Function
1	KBDAT	Keyboard Data
2	MSDAT	Mouse Data
3	GND	Ground
4	VCC5	Power
5	KBCLK	Keyboard Clock
6	MSCLK	Mouse Clock

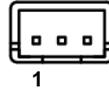


2.3 Onboard Connectors

ATX Power Connector (CN1))

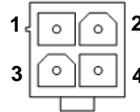
Connect ATX power supply using adapter cable provided.

Pin #	Signal
1	5Vsb
2	GND
3	PS_ON#



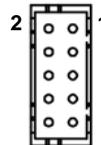
ATX 12V Power Connector (CN2)

Pin #	Signal
1	GND
2	GND
3	+12V
4	+12V



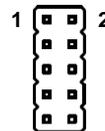
Audio Connector (CN4)

Pin #	Signal	Pin #	Signal
1	AGND_AU	2	LINEOUT-L
3	LINEOUT-R	4	AGND_AU
5	AGND_AU	6	LINEIN-L
7	LINEIN-R	8	AGND_AU
9	AGND_AU	10	MIC



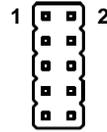
COM3/4 Pin Header (CN6/7)

Pin #	RS-232	Pin #	RS-232
1	DCD	2	DSR
3	RX	4	RTS
5	TX	6	CTS
7	DTR	8	RI
9	GND	10	N/C



COM1/2 Pin Header (CN9/8)

Pin #	RS-232	RS-422/485	Pin #	RS-232	RS-422/485
1	DCD	--	2	DSR	--
3	RX	RX- (485: NC)	4	RTS	TX+
5	TX	TX-	6	CTS	RX+ (485: NC)
7	DTR	--	8	RI	--
9	GND	--	10	N/C	--



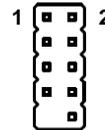
Battery Connector (CN10)

Pin #	Signal
1	PVBAT
2	GND



USB Pin Header (CN12/17)

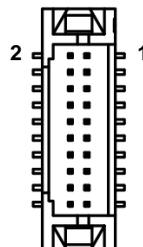
Pin #	Signal	Pin #	Signal
1	+5V	2	+5V
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	NC	10	NC



DVI Connector (CN13)

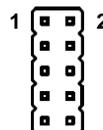
Hirose, DF13-20DP

Pin #	Signal	Pin #	Signal
1	GND	2	NC
3	TMDS_N0	4	VDD_PANEL
5	TMDS_P0	6	GND
7	GND	8	TMDS_P1
9	TMDS_P2	10	TMDS_N1
11	TMDS_N2	12	GND
13	GND	14	TMDS_CLK_P
15	DDC_SC	16	TMDS_CLK_N
17	DDC_SD	18	GND
19	DVI_HPDET	20	GND



GPIO Pin Header (CN14)

Pin #	Signal	Pin #	Signal
1	GPI0	2	GPO0
3	GPI1	4	GPO1
5	GPI2	6	GPO2
7	GPI3	8	GPO3
9	NC	10	NC



SATA Connectors (CN15/16)

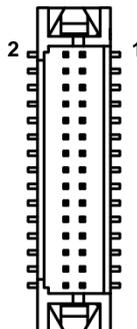
Pin #	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



LVDS Connector (CNY1)

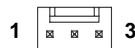
Hirose, DF13-30DP

Pin #	Signal	Pin #	Signal
1	GND	2	VDD_PANEL
3	LCD_18_24_P0	4	VDD_PANEL
5	LCD_18_24_N0	6	GND
7	GND	8	LCD_18_24_P1
9	LCD_18_24_P2	10	LCD_18_24_N1
11	LCD_18_24_N2	12	GND
13	GND	14	LCD_18_24_P3
15	LCD_BLON	16	LCD_18_24_N3
17	GND	18	GND
19	GND	20	GND
21	LCD_BLCTL	22	LCD_18_24_CLK-P
23	NC	24	LCD_18_24_CLK-N
25	NC	26	GND
27	NC	28	NC
29	NC	30	P12V



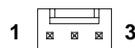
5V Fan Connector (FN1)

Pin #	Signal
1	Fan Speed Detect
2	Fan Power (+5V)
3	GND



12V Fan Connector (FN2)

Pin #	Signal
1	Fan Speed Detect
2	Fan Power (+12V)
3	GND



SMB_DAT Pin Header (JP7)

Pin #	Description
1	SMB_DAT
2	P3V3

**SMB_CLK Pin Header (JP8)**

Pin #	Description
1	SMB_CLK
2	GND

**Buzzer Pin Header (JP9)**

Pin #	Description
1	BUZ_BEEP
2	P5V

**Power Button Pin Header (JP10)**

Pin #	Description
1	PWRBTN-L
2	GND



2.4 Jumpers

Suspend Mode (JP1)

Setting	Description
1-2 Short	S3 (default)
2-3 Short	S5



COM1 RS-485 Termination (JP5)

Setting	Description
Short	Terminated
Open	Not Terminated (default)



COM2 RS-485 Termination (JP4)

Setting	Description
Short	Terminated
Open	Not Terminated (default)



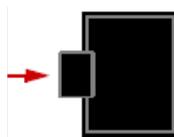
Panel Power Voltage (JP6)

Setting	Description
1-2 Short	3.3V (default)
2-3 Short	5V



Clear CMOS Switch (SW1)

Press the SW1 switch to clear the CMOS.



3 BIOS Setup

The following chapter describes basic navigation for the AMIBIOS®8 BIOS setup utility.

3.1 Starting the BIOS

To enter the setup screen, follow these steps:

1. Power on the motherboard
2. Press the < Delete > key on your keyboard when you see the following text prompt:
< Press DEL to run Setup >
3. After you press the < Delete > key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as Chipset and Power menus.



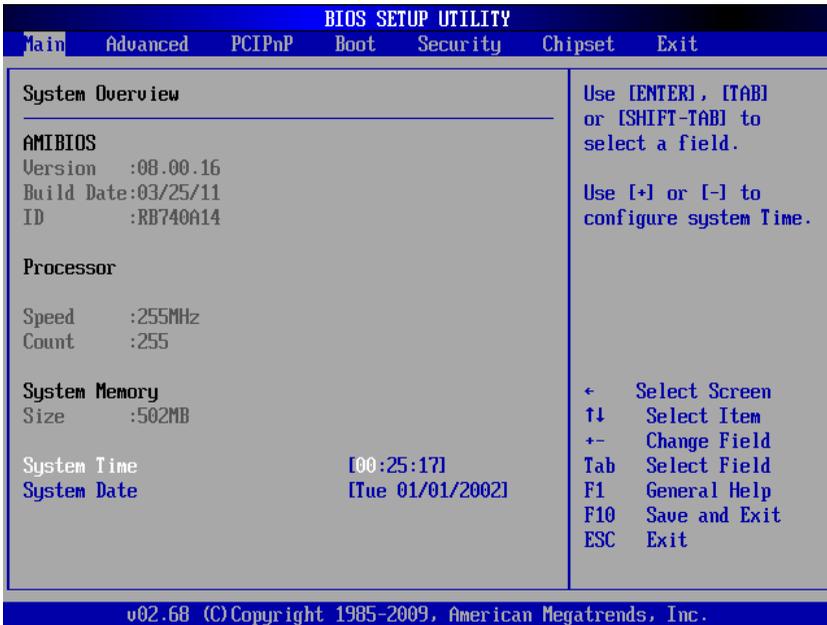
Note: In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

Setup Menu

The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

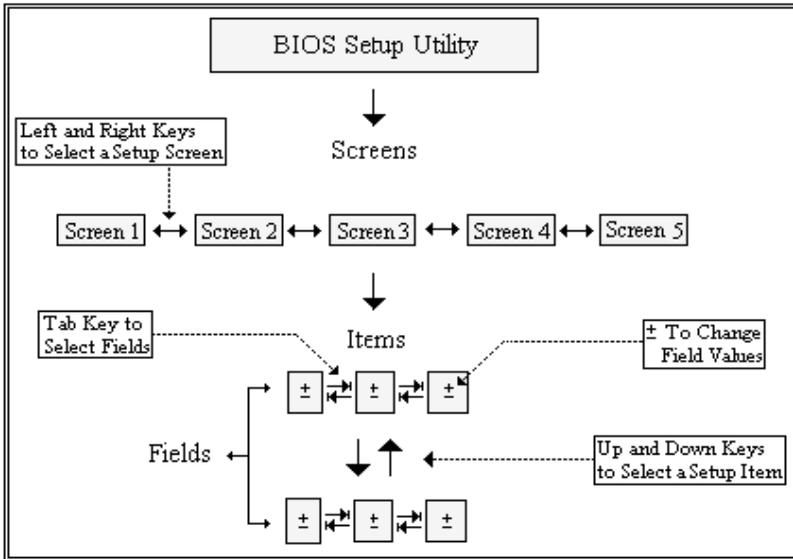
The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.



Navigation

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.

These keys include < F1 >, < F10 >, < Enter >, < ESC >, < Arrow > keys, and so on. .



Note: There is a hot key legend located in the right frame on most setup screens.

The < F8 > key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the < F8 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot up with the least amount of options set. This can lessen the probability of conflicting settings.

Hotkey Descriptions

F1 The < F1 > key allows you to display the General Help screen.

Press the < F1 > key to open the General Help screen.

General Help			
↔	Select Screen	↓↑	Select Item
+ -	Change Screen	Enter	Go to Sub Screen
PGDN	Next Page	PGUP	Previous Page
Home	Go to Top of the Screen	End	Go to Bottom of Screen
F2/F3	Change Colors	F7	Discard Changes
F8	Load Failsafe Defaults	F9	Load Optimal Defaults
F10	Save and Exit	ESC	Exit
[Ok]			

- F10** The < F10 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:

Save configuration changes and exit now?	
[Ok]	[Cancel]

Press the < Enter > key to save the configuration and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

- ESC** The < Esc > key allows you to discard any changes you have made and exit the Setup. Press the < Esc > key to exit the setup without saving your changes. The following screen will appear:

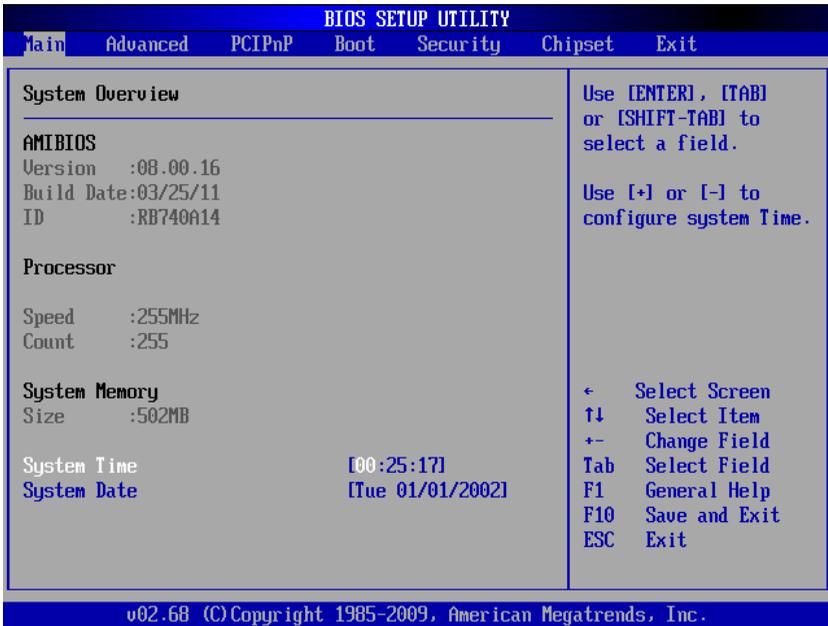
Discard changes and exit setup now?	
[Ok]	[Cancel]

Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

- Enter** The < Enter > key allows you to display or change the setup option listed for a particular setup item. The < Enter > key can also allow you to display the setup sub-screens.

3.2 Main Setup

When you first enter the Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the Main tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



System Time/System Date

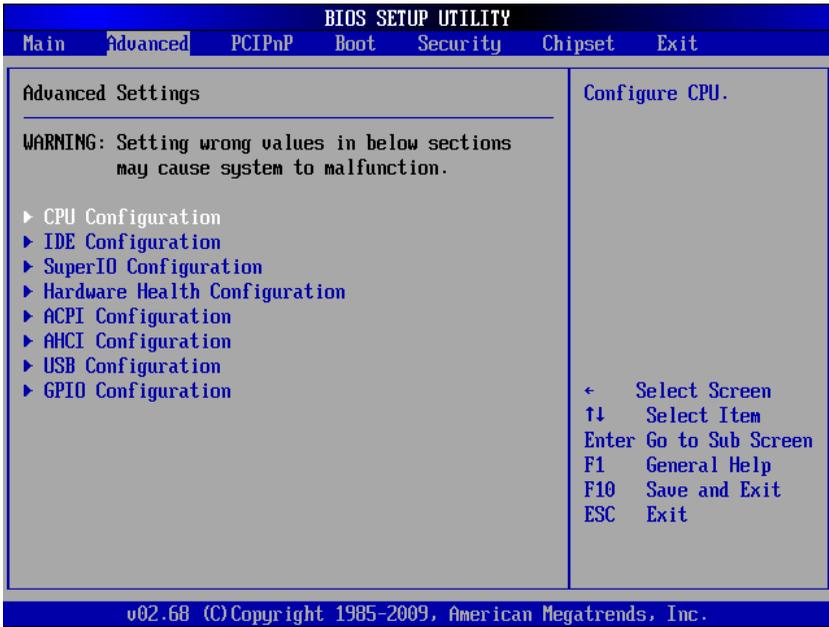
Use this option to change the system time and date. Highlight System Time or System Date using the < Arrow > keys. Enter new values using the keyboard. Press the < Tab > key or the < Arrow > keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

3.3 Advanced BIOS Setup

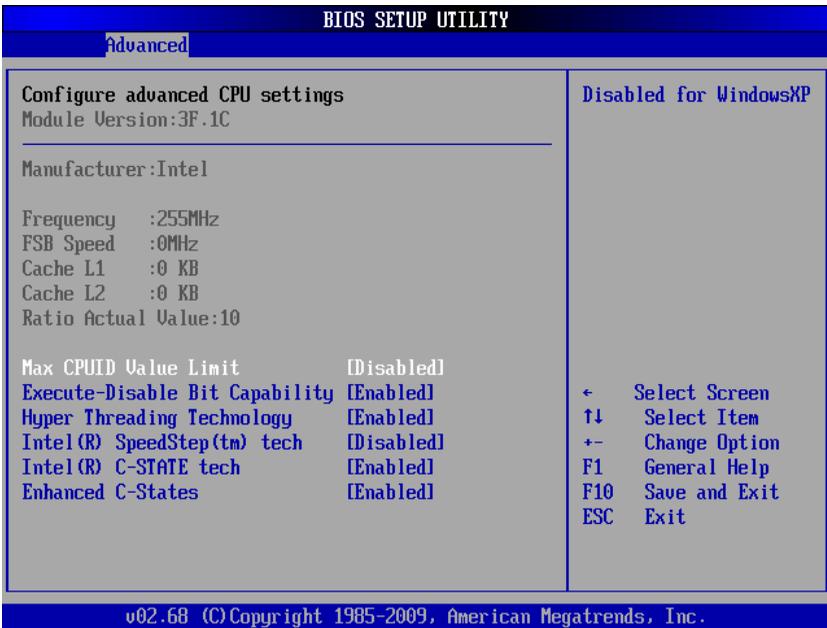
Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the < Arrow > keys. The Advanced BIOS Setup screen is shown below.

The sub menus are described on the following pages.



CPU Configuration

You can use this screen to select options for the CPU Configuration Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the CPU Configuration screen is shown below.



Max CPUID Value Limit

When enabled, allows legacy operating systems to support processors with extended CPUID functions.

Execute-Disable Bit Capability

Intel's Execute Disable Bit functionality can help prevent certain classes of malicious buffer overflow attacks when combined with a supporting operating system. Execute Disable Bit allows the processor to classify areas in memory where application code can execute and where it cannot. When a malicious worm attempts to insert code in the buffer, the processor disables code execution, preventing damage and worm propagation.

Set this value to disabled to force the XD feature flag to always return 0. Default is enabled.

Hyper-Threading Technology

This item allows you to enable or disable Hyper-Threading Technology.

Intel Virtualization Technology

Intel Virtualization Technology is a set of platform features that support virtualization of platform hardware and multiple software environments. When enabled, it offers data center managers the ability to consolidate multiple workloads on one physical server system.

Intel Speedstep Technology

Intel SpeedStep technology allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production.

Intel C-State Technology

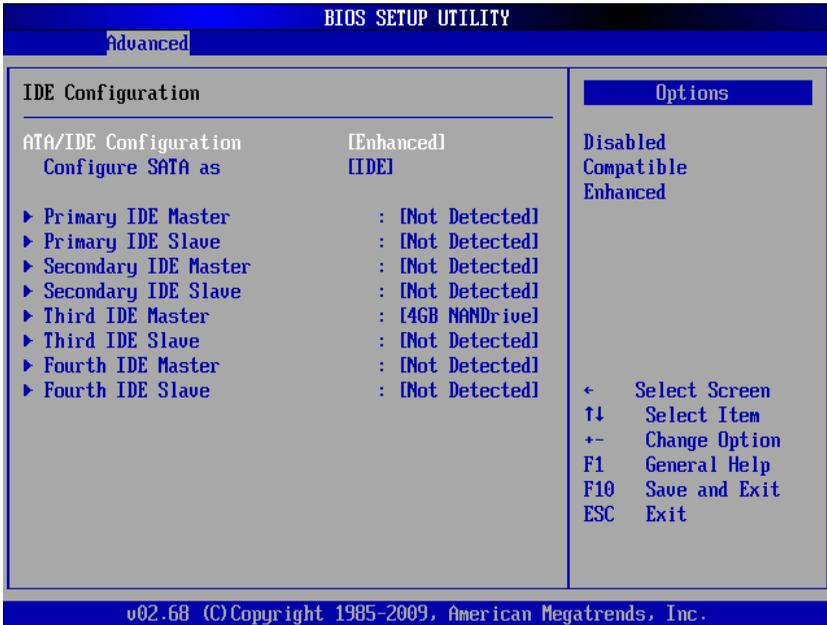
This function controls the availability of the CPU C-state power saving technology.

Enhanced C-States

This function controls the availability of the CPU Enhanced C-States.

IDE Configuration

You can use this screen to select options for the IDE Configuration Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the IDE Configuration screen is shown below.



ATA/IDE Configuration

This item specifies whether the SATA channels are initialized in Compatible or Enhanced mode of operation. The settings are **Disabled**, **Compatible** and **Enhanced** (default: Compatible).

Configure SATA as

This item specifies whether the SATA channels support IDE or AHCI operation. The settings are IDE and AHCI (default: IDE).

IDE Master/Slave

Select one of the hard disk drives to configure it. Press < Enter > to access its sub menu.

Super IO Configuration

You can use this screen to select options for the Super IO settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.

BIOS SETUP UTILITY	
Advanced	
Configure SCH3114 Super IO Chipset	
Serial Port1 Address	[Enabled]
Serial Port1 Function	[RS232]
RS-485 Control for SP1	[Disabled]
Serial Port2 Address	[Enabled]
Serial Port2 Function	[RS232]
RS-485 Control for SP2	[Disabled]
Serial Port3 Address	[Enabled]
Serial Port3 Function	[RS232]
Serial Port4 Address	[Enabled]
Serial Port4 Function	[RS232]
Allows BIOS to Select Serial Port1 Base Addresses.	
← Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit	
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Serial Port1~4 Address

This option enables/disables serial ports1~4. The base I/O port address and Interrupt Request address are fixed as follows:
 Port 1: 3F8/IRQ4, Port 2: 3E8/IRQ3, Port 3: 2F8/IRQ10, Port 4: 2E8/IRQ11.

Serial Port1~4 Function

This option sets serial ports 1~4 to RS-422/485 or RS-232 (default).

RS-485 Control for SP1~2

Set this value to enable RS-485 control on serial ports1~2.

Hardware Health Configuration

This option displays the current status of all of the monitored hardware devices/components such as voltages and temperatures.

The screenshot displays the BIOS Setup Utility interface. At the top, a blue header bar contains the text "BIOS SETUP UTILITY". Below this, a sub-header "Advanced" is visible. The main content area is titled "Hardware Health Configuration" and lists various system metrics. On the right side of this area, there is a legend for navigation keys. At the bottom of the screen, a footer bar contains the text "v02.68 (C) Copyright 1985-2009, American Megatrends, Inc."

Hardware Health Configuration	
CPU Temperature	: 29°C/84°F
Fan1 Speed	: 5607 RPM
Fan2 Speed	: N/A
Vcore	: 1.145 V
Vccp	: 1.048 V
Vcc	: 3.265 V
+5Vin	: 4.974 V
+12Vin	: 11.875 V
VTR	: 3.048 V
VBAT	: 3.145 V

← Select Screen
↑↓ Select Item
F1 General Help
F10 Save and Exit
ESC Exit

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ACPI Configuration

You can use this screen to select options for the ACPI Configuration settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Suspend Mode

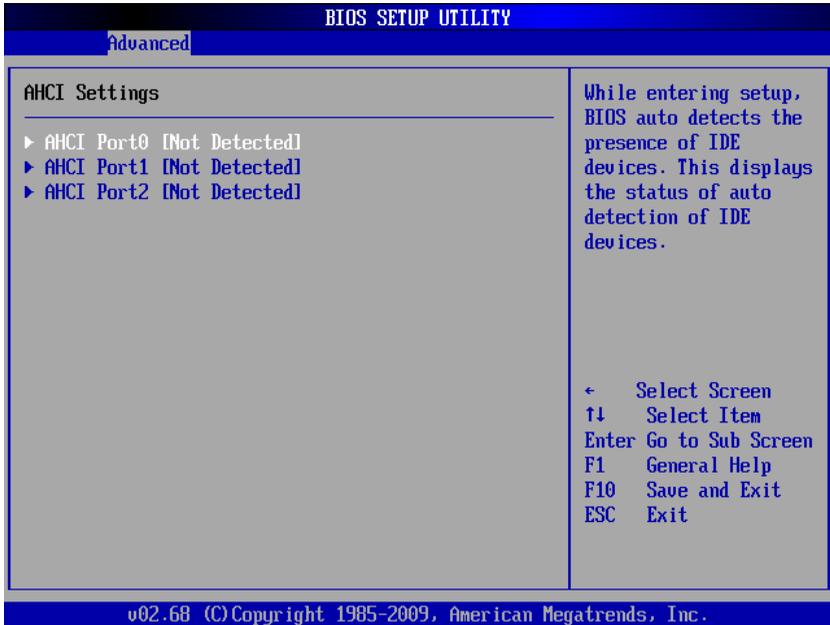
Select this value to allow ACPI state support. Auto will decide by OS. Select "S1 (POS)" to force the system to enter Power on Suspend. Select "S3 (STR)" to force the system to enter Suspend to RAM. Default setting is Auto.

ACPI OS Shutdown Mode

Set this value to allow OS shutdown in "AT" or "ATX" mode. The default setting is "ATX".

AHCI Configuration

You can use this screen to select options for the AHCI Configuration settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.

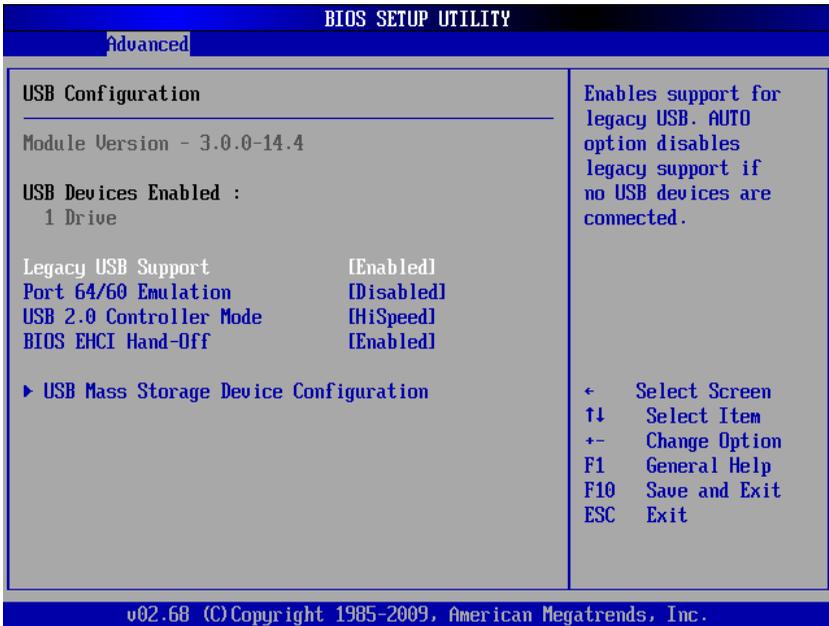


AHCI Port 0/1/2

Displays the SATA drives installed on AHCI channels. Shows "Not Detected" if no drive installed.

USB Configuration

You can use this screen to select options for the USB Configuration. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Legacy USB Support

Legacy USB Support refers to USB mouse and keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there are no USB drivers loaded on the system. Set this value to enable or disable the Legacy USB Support.

- ▶ **Disabled:** Set this value to prevent the use of any USB device in DOS or during system boot.
- ▶ **Enabled:** Set this value to allow the use of USB devices during boot and while using DOS.
- ▶ **Auto:** This option auto detects USB Keyboards or Mice and if found, allows them to be utilized during boot and while using DOS.

Port 64/60 Emulation

This option uses USB to receive the IO port 64/60 trap to emulate the legacy keyboard controller.

USB 2.0 Controller Mode

The USB 2.0 Controller Mode configures the data rate of the USB port. The options are FullSpeed (12 Mbps) and HiSpeed (480 Mbps).

BIOS EHCI hand-off

This option provides a workaround for operating systems without ECHI hand-off support. The EHCI ownership change should claim by EHCI driver.

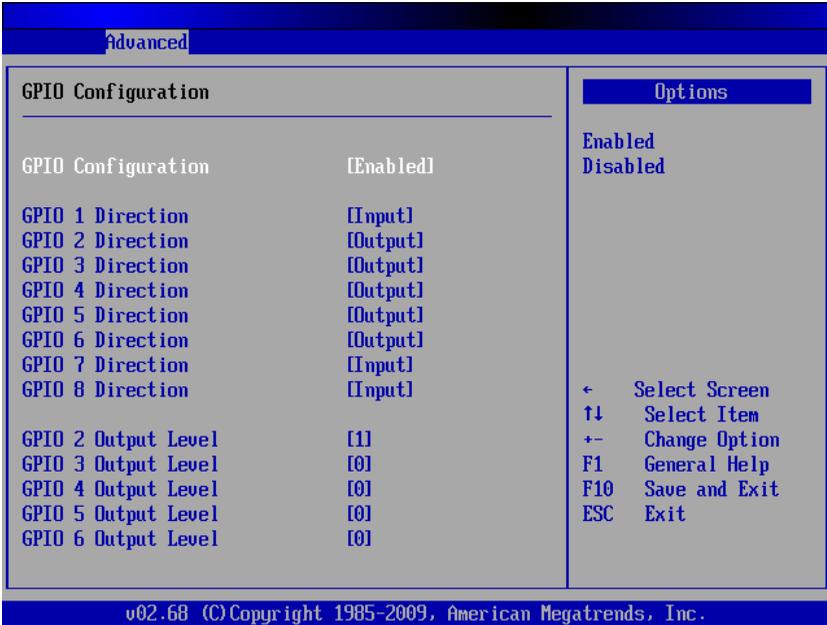
USB Mass Storage Device Configuration

This is a submenu for configuring the USB Mass Storage Class Devices when BIOS finds they are in use on the USB ports. Emulation Type can be set according to the type of attached USB mass storage device(s). If set to Auto, USB devices less than 530MB will be emulated as Floppy and those greater than 530MB will remain as hard drive. The Forced FDD option can be used to force a hard disk type drive (such as a Zip drive) to boot as FDD.

BIOS SETUP UTILITY	
Advanced	
USB Mass Storage Device Configuration	
USB Mass Storage Reset Delay	[20 Sec]
Device #1	Generic- Multi-Card M*
Emulation Type	[Auto]
Number of seconds POST waits for the USB mass storage device after start unit command.	
← Select Screen ↑↓ Select Item +- Change Option F1 General Help F10 Save and Exit ESC Exit	
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GPIO Configuration

You can use this screen to select options for the GPIO Configuration. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



GPIO Configuration

Set this value to configure GPIO configuration as “Enabled” or “Disabled”. The default setting is “Enabled”.

GPIO 1~8 Direction

Set this value to allow GPIO to “Input” or “Output” mode.

GPIO 1~8 Output Level

Set this value to set the initial GPIO Output Level at system boot to “0” or “1”. Only GPIOs set to “Output” mode will appear on screen.

3.4 Advanced PCI/PnP Settings

Select the PCI/PnP tab from the setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the < Arrow > keys. The Plug and Play BIOS Setup screen is shown below.



IRQ/DMA Channel

Set this value to allow the IRQ/DMA channel settings to be modified.

- ▶ **Available:** This setting allows the specified IRQ/DMA channel to be used by a PCI/PnP device.
- ▶ **Reserved:** This setting allows the specified IRQ/DMA channel to be used by a legacy ISA device.

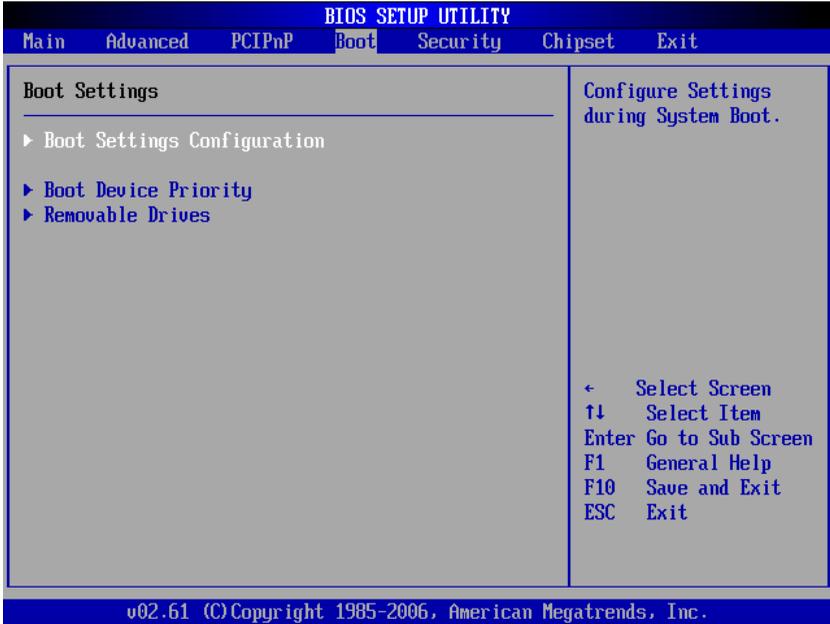
Reserved Memory Size

Set this value to allow the system to reserve memory that is used by ISA devices. The default setting is Disabled.

3.5 Boot Settings

Select the Boot tab from the setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device Priority, to go to the sub menu for that item. You can display a Boot BIOS Setup option by highlighting it using the < Arrow > keys.

The Boot Settings screen is shown below:



Boot Settings Configuration

Use this screen to select options for the Boot Settings Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Quick Boot

Enabling this setting will cause the BIOS Power-On Self Test routine to skip some of its tests during bootup for faster system boot.

Quiet Boot

When this feature is **enabled**, the BIOS will display the OEM logo during the boot-up sequence, hiding normal POST messages. When it is **disabled**, the BIOS will display the normal POST messages, instead of the OEM logo.

Add-On ROM Display Mode

Set this option to display add-on ROM (read-only memory) messages. The default setting is *Force BIOS*. An example of this is a SCSI BIOS or VGA BIOS.

Bootup Num-Lock

This option sets the Num Lock status when the system is powered on. Setting it to On will turn on the Num Lock key when the system is booted up. Setting it to Off will not enable the Num Lock key on bootup.

PS/2 Mouse Support

Set this value to allow the PS/2 mouse support to be adjusted. The default setting is Enabled.

Wait for 'F1' If Error

Set this value to allow the Wait for 'F1' Error setting to be modified. The default setting is Enabled.

Hit 'DEL' Message Display

Set this value to allow the Hit "DEL" to enter Setup Message Display to be modified. The default setting is Enabled.

Interrupt 19 Capture

Set this value to allow option ROMs such as network controllers to trap BIOS interrupt 19.

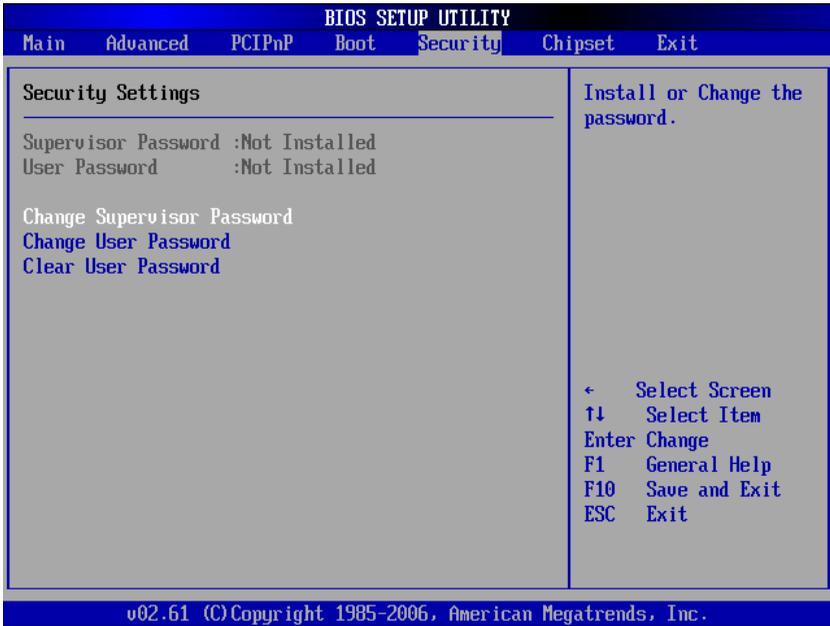
Boot Device Priority

The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system. First press <Enter> to enter the sub-menu. Then you may use the arrow keys to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

Boot Device Groups

The Boot devices are listed in groups by device type. First press <Enter> to enter the sub-menu. Then you may use the arrow keys to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list. Only the first device in each device group will be available for selection in the Boot Device Priority option.

3.6 Security Setup



Password Support

Two Levels of Password Protection

Provides both a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

The system can be configured so that all users must enter a password every time the system boots or when Setup is executed, using either or either the Supervisor password or User password.

The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a one to six character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down. If you forget it, you must drain NVRAM and re-configure.

Remember the Password

Keep a record of the new password when the password is changed. If you forget the password, you must erase the system configuration information in NVRAM.

To access the sub menu for the following items, select the item and press < Enter >:

- ▶ Change Supervisor Password
- ▶ Change User Password
- ▶ Clear User Password

Supervisor Password

Indicates whether a supervisor password has been set.

User Password

Indicates whether a user password has been set.

Change Supervisor Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to change the supervisor password.

Change User Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to change the user password.

Clear User Password

Select this option and press < Enter > to access the sub menu. You can use the sub menu to clear the user password.

Change Supervisor Password

Select Change Supervisor Password from the Security Setup menu and press < Enter >.

Enter New Password:

Type the password and press < Enter >. The screen does not display the characters entered. Retype the password as prompted

and press < Enter >. If the password confirmation is incorrect, an error message appears. The password is stored in NVRAM after completes.

Change User Password

Select Change User Password from the Security Setup menu and press < Enter >.

Enter New Password:

Type the password and press < Enter >. The screen does not display the characters entered. Retype the password as prompted and press < Enter >. If the password confirmation is incorrect, an error message appears. The password is stored in NVRAM after completes.

3.7 Chipset Setup

Select the Chipset tab from the setup screen to enter the Chipset BIOS Setup screen. You can select any of the items in the left frame of the screen to go to the sub menu for that item. The Chipset BIOS Setup screen is shown below.



Onboard LAN Control

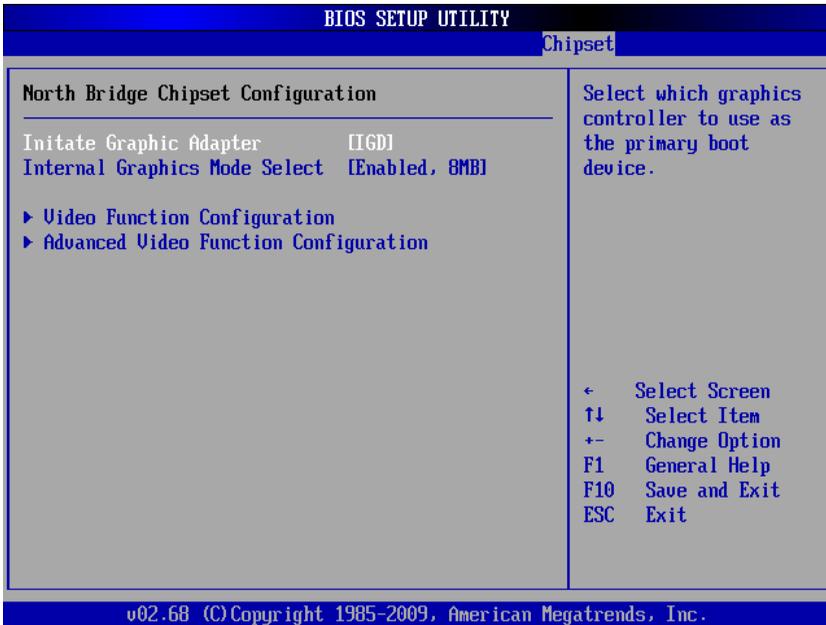
This option disables or enables onboard LAN initialization. The default value is “Enabled”.

Onboard LAN Boot

This option disables or enables LAN PXE Boot ROM initialization. The default value is “Enabled”.

Northbridge Configuration

You can use this screen to select options for the Northbridge Configuration. Use the up and down < Arrow > keys to select an item. Use the < Plus > and < Minus > keys to change the value of the selected option.



Initial Graphics Adapter

Select which graphics controller to use as the primary boot device.

- ▶ **IGD:** Integrated graphics only.
- ▶ **PCI/IGD:** Detect PCI graphics first, then integrated graphics. ("PCI" includes PCI slot and PCI Express x1/x4 slot. PCI will be first.)

IGD Graphics Mode Select

This option enables or disables the integrated graphics device. Options: Enabled, 8M; Disabled.

Video Function Configuration

BIOS SETUP UTILITY		Chipset
Video Function Configuration		Options
DVMT Mode Select	[DVMT Mode]	Fixed Mode
DVMT/FIXED Memory	[256MB]	DVMT Mode
Boot Display Device	[CRT]	
Flat Panel Type	[1024x768 1x18]	
		← Select Screen
		↑↓ Select Item
		+− Change Option
		F1 General Help
		F10 Save and Exit
		ESC Exit
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DVMT Mode Select

This item allows the user to enable or disable the DVMT function.

DVMT/FIXED Memory

This item allows the user to configure the DVMT or Fixed mode memory size.

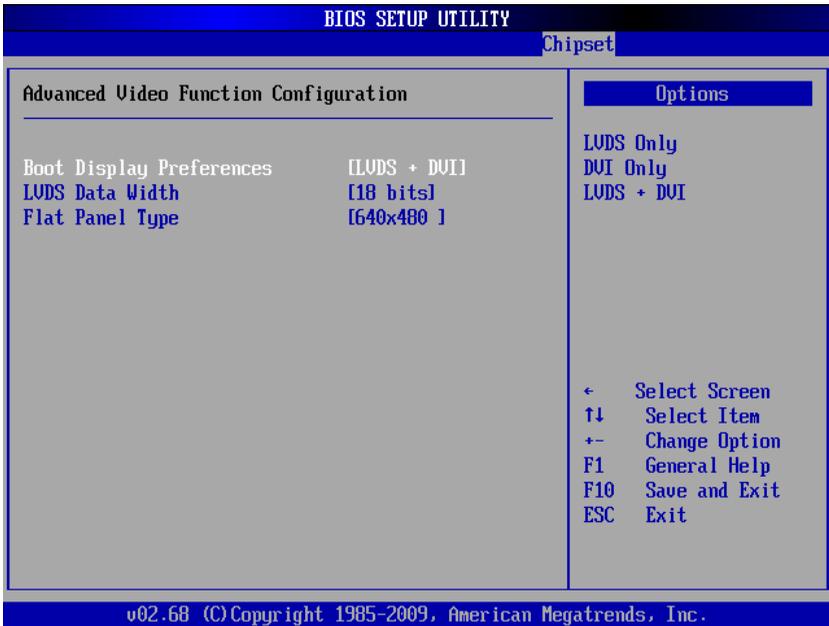
Boot Display Device

This item allows the user to configure the type of external display used. Options: CRT (default), LVDS/DVI, CRT+LVDS/DVI.

Flat Panel Type

When LVDS is selected in Boot Display Device, this option allows you to select resolution settings for the LVDS interface (only 1x 18-bit supported). The supported resolutions are: 640x480, 800x600, 1024x768, 1366x768.

Advanced Video Function Configuration



Boot Display Preferences

This item allows the user to configure the LVDS/DVI displays used. Options: LVDS Only (default), DVI Only, LVDS + DVI.

LVDS Data Width

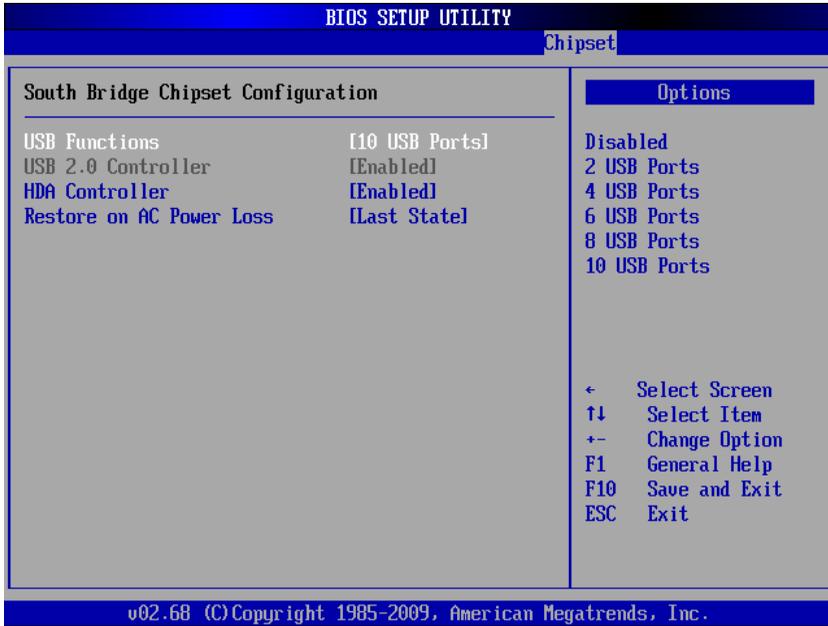
Select the LVDS Data Width used by the Chrontel encoder graphics device (18 bits, 24 bits).

Flat Panel Type (DVI Settings)

When DVI is enabled in Boot Display Preferences, this option allows you to select resolution settings for the DVI interface. The supported resolutions are: 640x480, 1024x768, 1280x600, 1366x1024, 1280x720 Overscan, 1280x720 Underscan, 1920x1080 Overscan, 1920x1080 Underscan.

South Bridge Configuration

You can use this screen to select options for the South Bridge Configuration. Use the up and down < Arrow > keys to select an item. Use the < Plus > and < Minus > keys to change the value of the selected option.



USB Functions

Set this value to allow the system to disable, enable, and select a set number of onboard USB ports.

USB 2.0 Controller

This option takes effect only when USB Functions are enabled. Enabling will allow USB 2.0 functionality to all USB ports.

HDA Controller

Set this value to enable/disable the HDA Controller.

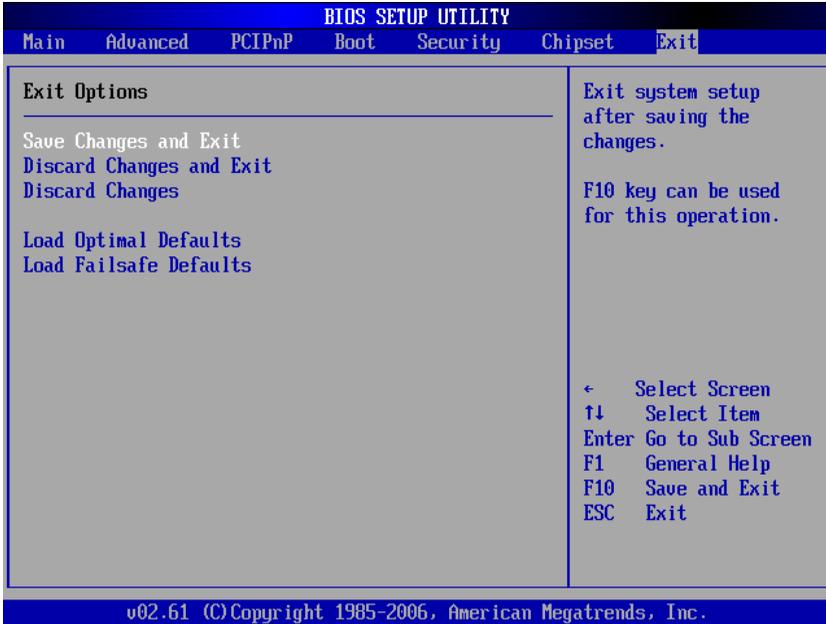
Restore on AC Power Loss

Determines which state the computer enters when AC power is restored after a power loss. The options for this value are Last State, Power On and Power Off.

- ▶ **Power Off:** Set this value to always power off the system while AC power is restored.
- ▶ **Power On:** Set this value to always power on the system while AC power is restored.
- ▶ **Last State:** Set this value to power off/on the system depending on the last system power state while AC power is restored (default).

3.8 Exit Menu

Select the Exit tab from the setup screen to enter the Exit BIOS Setup screen. You can display an Exit BIOS Setup option by highlighting it using the < Arrow > keys. The Exit BIOS Setup screen is shown below.



Save Changes and Exit

When you have completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configuration parameters can take effect.

Save Configuration Changes and Exit Now?

[Ok] [Cancel]

appears in the window. Select Ok to save changes and exit.

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

Discard Changes and Exit Setup Now?

[Ok] [Cancel]

appears in the window. Select Ok to discard changes and exit.

Discard Changes

Select Discard Changes from the Exit menu and press < Enter >.

Select Ok to discard changes.

Load Optimal Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal Setup options if your computer is experiencing system configuration problems.

Select Load Optimal Defaults from the Exit menu and press < Enter >.

Select Ok to load optimal defaults.

Load Failsafe Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option. The Failsafe settings are designed for maximum system stability, but not maximum performance. Select the FailSafe Setup options if your computer is experiencing system configuration problems.

Select Load Fail-Safe Defaults from the Exit menu and press < Enter >.

Load FailSafe Defaults?

[Ok] [Cancel]

appears in the window. Select Ok to load FailSafe defaults.

This page intentionally left blank.

Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS**, and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- ▶ Read these safety instructions carefully.
- ▶ Keep this user's manual for future reference.
- ▶ Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- ▶ When installing/mounting or uninstalling/removing equipment:
 - ▷ Turn off power and unplug any power cords/cables.
- ▶ To avoid electrical shock and/or damage to equipment:
 - ▷ Keep equipment away from water or liquid sources;
 - ▷ Keep equipment away from high heat or high humidity;
 - ▷ Keep equipment properly ventilated (do not block or cover ventilation openings);
 - ▷ Make sure to use recommended voltage and power source settings;
 - ▷ Always install and operate equipment near an easily accessible electrical socket-outlet;
 - ▷ Secure the power cord (do not place any object on/over the power cord);
 - ▷ Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
 - ▷ If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

- ▶ Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- ▶ Equipment must be serviced by authorized technicians when:
 - ▷ The power cord or plug is damaged;
 - ▷ Liquid has penetrated the equipment;
 - ▷ It has been exposed to high humidity/moisture;
 - ▷ It is not functioning or does not function according to the user's manual;
 - ▷ It has been dropped and/or damaged; and/or,
 - ▷ It has an obvious sign of breakage.

Getting Service

Contact us should you require any service or assistance.

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