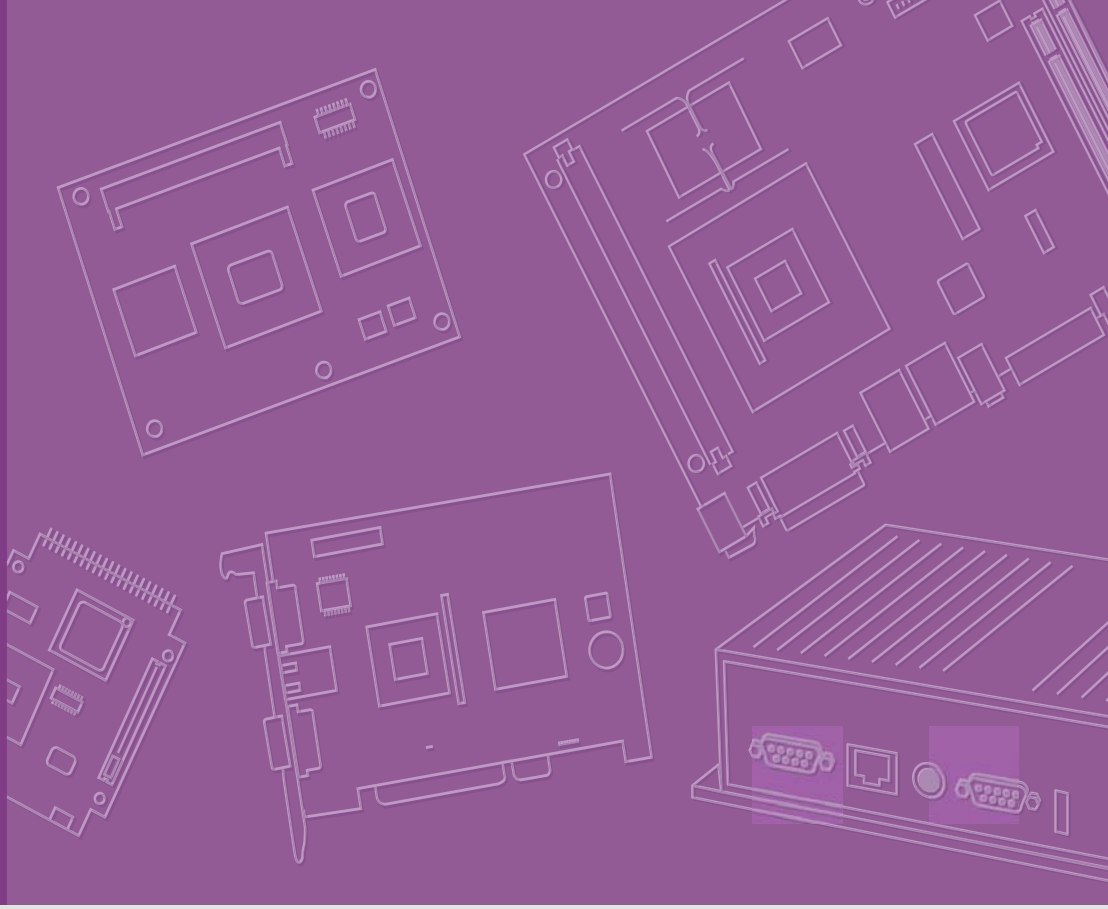

User Manual

ARK-3390

Compact Embedded Computer

Trusted ePlatform Services

ADVANTECH

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Part No. 2006339000 Edition 1

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Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Declaration of Conformity

FCC Class A

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Packing List

Before installation, please ensure the following items have been shipped:

Item	Part Number
■ 1 x ARK-3390 unit	
■ 1 x DB9 flat cable for RS 485	1700001967
■ 1 x 2-Pole Phoenix to DC-Jack Power cable	1700009001
■ 1 x PS/2 Y cable for KB/MS	1700060202
■ 1 x Utility CD	
■ 1 x Registration and 2 years Warranty card	

Ordering Information

Model Number Description

ARK-3390-1S1A1E	ARK-3390, Core 2 Duo-1.06G+VGA+DVI+2GLAN+6COM+5USB+DIO
ARK-3390-1S6A1E	ARK-3390, Core Duo-1.66G+VGA+DVI+2GLAN+6COM+5USB+DIO

Optional Accessories

1757000222 AC-to-DC Adapter DC19 V/3.42 A 65 W, with Phoenix Power Plug, 0 ~ 40°C for Home and Office Use

1700001947 Power Cable 2-pin 180 cm, USA type

1700001948 Power Cable 2-pin 180 cm, Europe Type

1700001949 Power Cable 2-pin 180 cm, UK Type

Safety Instructions

1. Please read these safety instructions carefully.
2. Please keep this User's Manual for later reference.
3. Please disconnect this equipment from AC outlet before cleaning. Use a damp cloth. Don't use liquid or sprayed detergent for cleaning. Use moisture sheet or clothe for cleaning.
4. For pluggable equipment, the socket-outlet shall near the equipment and shall be easily accessible.
5. Please keep this equipment from humidity.
6. Lay this equipment on a reliable surface when install. A drop or fall could cause injury.
7. Do not leave this equipment in an uncontrolled environment; storage temperatures above 60°C may damage the equipment.
8. The openings on the enclosure are for air convection hence protecting the equipment from overheating. DO NOT COVER THE OPENINGS.
9. Make sure the voltage of the power source when connecting the equipment to the power outlet.
10. Place the power cord such a way that people cannot step on it. Do not place anything over the power cord. The power cord must be rated for the product and for the voltage and current marked on the product's electrical ratings label. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for long time, disconnect the equipment from mains to avoid being damaged by transient over-voltage.
13. Never pour any liquid into ventilation openings; this could cause fire or electrical shock.
14. Never open the equipment. For safety reasons, only qualified service personnel should open the equipment.
15. If one of the following situations arise, get the equipment checked by service personnel:
    a. The Power cord or plug is damaged.
    b. Liquid has penetrated the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment has not worked well or you can not get it work according to user's manual.
    e. The equipment has been dropped and damaged.
    f. The equipment has obvious signs of breakage

Warning! *THIS COMPUTER IS PROVIDED WITH A BATTERY-POWERED REAL-TIME CLOCK CIRCUIT. THERE IS A DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH SAME OR EQUIVLENT TYPE RECOMMENDED BY THE MANUFACTURE. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.*

Contents

Chapter 1

General Introduction

This chapter gives background information on ARK-3390 series.

1.1 Introduction

ARK-3390 fanless Embedded Box Computer is an ideal application ready system platform solution. All electronics are protected in a compact, sealed, aluminum case for easy embedding in the customer's own housing, or as a stand-alone application where space is limited and the environment harsh.

A solid sealed aluminum case provides vibration and dust resistance while also providing a passive cooling solution. The ARK-3390 provides system integrators with a turn-key solution and versatile application development path without breaking the bank or missing time to market deadlines.

The ARK-3390 can be used as a standalone system, wall- or DIN-rail- mounted. The system accepts a wide range of power supplies (DC power in) and comes in a footprint of only 264.5 x 69.2 x 137.25 mm (10.41" x 2.72" x 5.4"). The rugged cast aluminum case not only provides great protection from EMI, shock/vibration, cold and heat, but, as we mentioned before, passive cooling for quiet fanless operation.

The ARK-3390 answers demands by offering 1 x VGA and 1 x DVI interface for dual display, 5 x USB 2.0 ports, 2 x Giga LAN port and 6 x COM ports; packed into a small rugged unit and powered by an Intel Core Duo processor. It also supports a wide range of input voltages from 9 V_{DC} to 34 V_{DC}. The ARK-3390 Compact Embedded Computer supports both 2.5" SATA HDD and Compact Flash card for storage options and it provides for diversified application fields.

1.2 Product Feature

General

- **CPU:** Intel® Core Duo LV L2400, 1.66 GHz/Core2 Duo ULV U7500, 1.06 GHz
- **System Chipset:** Intel® 945GME + ICH7M
- **BIOS:** AWARD® 4 Mbit Flash BIOS
- **System Memory:** 200-pin SODIMM socket, Support DDR2 400/533/667 MHz, up to 2 GB
- **Power Management:** APM1.2, ACPI support
- **SSD:** Supports CF Card TYPE I/II, USB memory
- **HDD:** Supports industrial extend temperature grade 2.5" SATA HDD
- **Watchdog Timer:** Single chip Watchdog 255-level interval timer, setup by software
- **Battery:** Lithium 3V/210mAH
- **I/O Interface:** 1 x KB/mouse, 1 x RS232, 2 x RS232/422/485, 2 x RS-422/485
- **USB:** 5 x USB 2.0 compliant Ports
- **Audio:** Supports High Definition Audio (HD); Line -in, Line-out, Microphone-in
- **GPIO:** 8-bit general purpose input/output
- **Ethernet Chipset:** Intel 82541PI (Gigabit LAN)
- **Speed:** 10/100/1000 Mbps
- **Interface:** 2 x RJ45
- **Standard:** IEEE 802.3z/ab (1000 Mbps) or IEEE 802.3u 100 Mbps compliant
- **Expansion:** 1 x Mini PCI expansion slot

Display

- **Chipset:** Integrated graphics built in to Intel® 954GME, Intel® 3.5 Generation Integrated Graphics Engines
- **Memory Size:** Optimized shared memory Architecture up to 224 MB system memory
- **Resolution**
  - **CRT:** Up to 2048x1536 resolution, 400MHz RAMDAC
  - **DVI interface:** Support up to 2048 x 1536
- **Dual Independent:** CRT + DVI

1.3 Chipset

1.3.1 Functional Specification

1.3.1.1 Processor

Processor	CPU supports: ■ Supports 533/667 MHz Source-Synchronous Processor System Bus. ■ Supports Intel® Core Duo LV L2400 at 1.66 GHz / Intel® Core2 Duo ULV U7500 at 1.06 GHz / Intel® Celeron-M ULV 423 at 1.06 GHz 35mm * 35mm Micro-FCBGA Package.

1.3.1.2 Chipset

Memory	**NB: Intel® 945GME GMCH chip supports:** ■ Supports for 400/533/667 MHz DDR2 SDRAM up to 2 GB ■ SO-DIMM Socket on board: 200 pin SO-DIMM socket type x 1
Graphic and Video Controllers	**NB: Intel® 945GME GMCH chip supports:** ■ Internal Graphics Features ■ Dual display choose on board: VGA, LVDS or VGA + LVDS through OS Driver **VGA** ■ Integrated 400-MHz, Three 8-bit DACs provide the R,G and B signal to the monitor ■ Supports pixel resolution up to QXGA ■ Supports for Display Hot Plug **DVI-D** ■ Support resolution up to 2028 x 1532 ■ WinXP Extended desktop support for VGA + DVI-D ■ DVI Connector on board: Foxconn 24P 90D(F) ■ VGA Connector on board: D-SUB 15P 90D(F) x 1
SATA & IDE Interface	**SB: Intel® NH82801GBM chip supports:** ■ Supports the Serial ATA specification Revision 1.0a ■ Supports several optional sections of Serial ATA II: Extensions to Serial ATA 1.0 Specification, Revision 1.0 ■ Supports SATA transfers to 300 Mbytes/sec. ■ Supports Compact Flash Card Type II Socket ■ CF Socket on board: CF Type II 50P 90D(M) external connector x 1

Audio Link	**SB: Intel® NH82801GBM chip supports:** ■ Supports HD Codec ■ Supports Link for Audio and Telephony CODECS ■ Ear Phone Jack
USB Interface	**SB: Intel® NH82801GBM chip supports:** ■ USB host interface with support for 5 USB 2.0 ports ■ All ports are High-Speed, Full-Speed, and Low-Speed capable ■ Supports legacy keyboard/mouse software ■ USB connector on board: USB conn 4P 180D(M) DIP x 1 ■ USB dual connector on board: USB conn 8P 90D(M) DIP x 2
Power Management	**SB: Intel® NH82801GBM chip supports:** ■ Supports ACPI 3.0 ■ ACPI Power Management Logic Support ■ Power connector: Plug-In block 2P DIP x 1
BIOS	**SB: Intel® NH82801GBM chip supports:** ■ Low Pin Count (LPC) interface support ■ Firmware Hub (FWH) interface support ■ Phoenix 4M bit Flash BIOS, supports Plug & Play, APM 1.2/ACPI 1.1. ■ Socket: 32 pin PLCC socket x 1

1.3.1.3 Others

Serial ports	**Super I/O: SMSC SCH3114supports:** ■ 3 full function serial ports by SMSC SCH3114. ■ Support IRQ Sharing among serial ports on XPE COM1: Supports to RS-232 ■ COM2 ~ COM4: Supports to RS-232/422/485 and setting by Jumper COM connector: D-SUB CON. 9P 90D(M)DIP x 2 COM5/COM6: Support RS-422/485 with isolation (7.5 kV) ** COM2 ~ COM6 RS-485 support Auto flow control.
LAN	**LAN Chip: Intel® 82541PI supports:** ■ Supports PCI 2.3 ■ Integrated 10/100/1000 transceiver ■ Fully compliant with IEEE 802.3 compliant ■ Supports Wake on LAN and remote wake-up ■ Giga LAN Phone Jack on board: Phone Jack conn 8P 90D DIP x 2
Audio	**Audio Codec: Realtek ALC888-GR** ■ Compliant with HD Audio specifications ■ Supports to 16/20/24-bit DAC and 16/20/24-bit ADC resolution ■ Ear Phone Jack
DVI-D	**DVI Codec: Chrontel CH7307C-DEF** ■ DVI Connector on board: Foxconn 26P 90D(F) x 1
Battery backup	**Battery support: CR2032** ■ BATTERY 3V/210 mAh with WIRE x 1

1.4 Mechanical Specifications

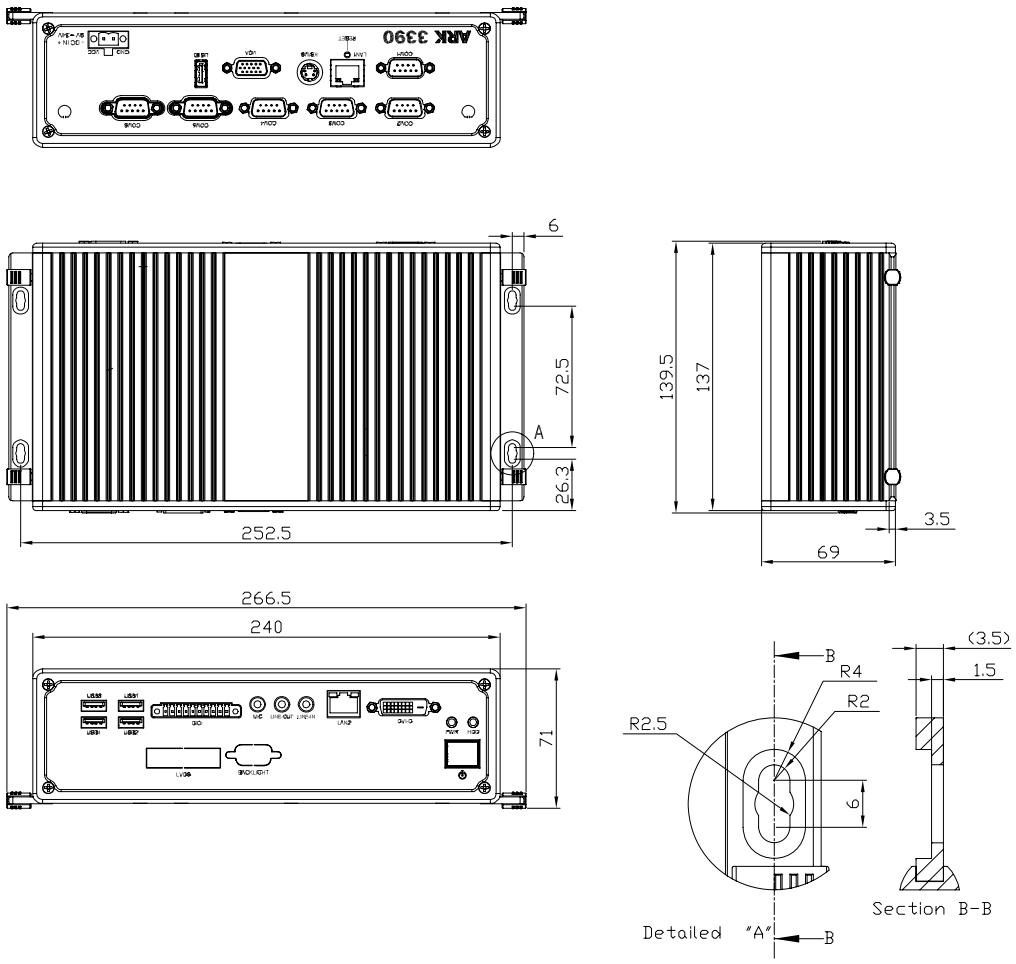


Figure 1.1 ARK-3390 Dimensions

1.4.1 Dimensions

264.5[10.41] x 69.2[2.72] x 137.25[5.4] Unit: mm [Inch]

1.4.2 Weight

2.2 kg (4.4 lb)

1.5 Electrical Specifications

1.5.1 Power supply Voltage

Voltage requirement with Adaptor:

9 V_{DC}-8 A ~ 34 V_{DC}-2.2 A Adaptor

1.5.2 Power supply Current

Supply Current (Maximum), system only, without external device

CPU: Intel® Core Duo L2400 1.66 G, RAM:533MHz 512GB DDR2 SDRAM

Adaptor	19 V
BIOS	1.2 A
WINXP Idle	1.25 A
WINXP BURN IN TEST	1.42 A
Suspend	0.7 A

1.5.3 RTC Battery

Nominal Voltage: 3.0 V

Nominal discharge capacity: 210 mAh

1.6 Environmental Specifications

1.6.1 Operating temperature

System operating temperature

Operating temperature: 0 ~ 55°C (32~131°F) with 0.7m/sec airflow

Note! *Industrial-grade Storage devices supporting at least 75 degree must be adopted.*

1.6.2 Relative Humidity

Relative Humidity: At 40°C, 95% Relative Humidity, non-condensing

1.6.3 Vibration During Operation

- When system is equipped with Compact Flash card only: 5Grms, IEC 60068-2-64, random, 5~500 Hz, 1 Oct/min., 1hr/axis, x,y,z 3 axes.
- When system is equipped with 2.5-inch HDD: 1Grms, IEC 60068-2-64, random, 5~500 Hz, 1 Oct/min., 1hr/axis, x,y,z 3 axes.

1.6.4 Shock During Operation

- When system is equipped with Compact Flash card only: 50G, IEC 60068-2-27, half sine, 11 ms duration.
- When system is equipped with 2.5-inch: 20G, IEC 60068-2-27, half sine, 11 ms duration.

Chapter 2

H/W Installation

This chapter explains the setup procedures for the ARK-3390 hardware.

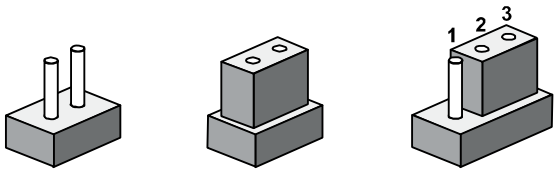
2.1 Introduction

The following sections show the internal jumpers setting and the external connectors pin assignment for application.

2.2 Jumpers

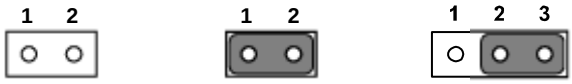
2.2.1 Jumper Description

You may configure the ARK-3390 to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric 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 a jumper, you connect the pins with the clip. To open a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



open **closed** **closed 2-3**

The jumper settings are schematically depicted in this manual as follows.



open **closed** **closed 2-3**

A pair of needle-nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

2.2.2 Jumper and Connector Location

At Mother Board

J1	CLEAR CMOS
Part Number	1653003101
Footprint	JH3X1V-2M
Description	PIN HEADER 3*1P 180D(M) 2.0mm DIP SQUARE W/O Pb
Setting	Function
(1-2)	NORMAL (Default)
(2-3)	CLEAR CMOS

J3	COM2 Mode Setting (This setting must collocation with MIO Board JP9 & JP10)
Part Number	1653003260
Footprint	JH3X2S-2M
Description	PIN HEADER 3*2P 180D(M) 2.0mm SMD SOUARE PIN
Setting	Function
(1-2)	RS-232 (Default)
(3-4)	RS-485
(5-6)	RS422

At MIO Board

JP1, JP2, JP3	COM3 Mode Setting
Part Number	1653003260
Footprint	JH3X2V
Description	PIN HEADER 3*2P 180D(M) 2.54mm DIP W/O Pb
Setting	Function
JP1 (1-3, 2-4) JP2 (1-3, 2-4) JP3 (5-6)	RS-232 (Default)
JP1 (3-5, 4-6) JP2 (3-5, 4-6) JP10 (3-4)	RS-422
JP1 (3-5, 4-6) JP2 (3-5, 4-6) JP10 (1-2)	RS-485

JP4, JP5, JP6	COM4 Mode Setting
Part Number	1653003260
Footprint	JH3X2V
Description	PIN HEADER 3*2P 180D(M) 2.54mm DIP W/O Pb
Setting	Function
JP4 (1-3, 2-4) JP5 (1-3, 2-4) JP6 (5-6)	RS-232 (Default)

JP4 (3-5, 4-6) JP5 (3-5, 4-6) JP6 (3-4)	RS-422
JP4 (3-5, 4-6) JP5 (3-5, 4-6) JP6 (1-2)	RS-485

JP7	**COM5 Mode Setting**
Part Number	1653002200
Footprint	JH2X2P-2.54
Description	PIN HEADER 2*2P 180D MALE SQUARE PIN
Setting	Function
(1-2)	RS-485 (Default)
(2-3)	RS422

JP8	**COM6 Mode Setting**
Part Number	1653002200
Footprint	JH2X2P-2.54
Description	PIN HEADER 2*2P 180D MALE SQUARE PIN
Setting	Function
(1-2)	RS-485 (Default)
(2-3)	RS422

JP9, JP10	**COM2 Mode Setting (This setting must collocation with Mother Board J3)**
Part Number	1653003260
Footprint	JH3X2V
Description	PIN HEADER 3*2P 180D(M) 2.54mm DIP W/O Pb
Setting	Function
JP9 (1-3, 2-4) JP10 (1-3, 2-4)	RS-232 (Default)
JP9 (3-5, 4-6) JP10 (3-5, 4-6)	RS422 & RS-485

JP28, JP29	**COM3 RS-485 Terminator**
Part Number	1653002200
Footprint	HD_2x2P_100_D
Description	PIN HEADER 2*2P 180D(M) 2.54mm DIP WO/Pb
Setting	Function
JP28 (1-2)(3-4)	Tx set up Terminator
JP29 (1-2)(3-4)	Rx set up Terminator
JP28 (Open)	Tx Non Terminator
JP29 (Open)	Rx Non Terminator

JP30, JP31	COM4 RS-485 Terminator
Part Number	1653002200
Footprint	HD_2x2P_100_D
Description	PIN HEADER 2*2P 180D(M) 2.54mm DIP WO/Pb
Setting	Function
JP30 (1-2)(3-4)	Tx set up Terminator
JP31 (1-2)(3-4)	Rx set up Terminator
JP30 (Open)	Tx Non Terminator
JP31 (Open)	Rx Non Terminator

2.3 Connectors

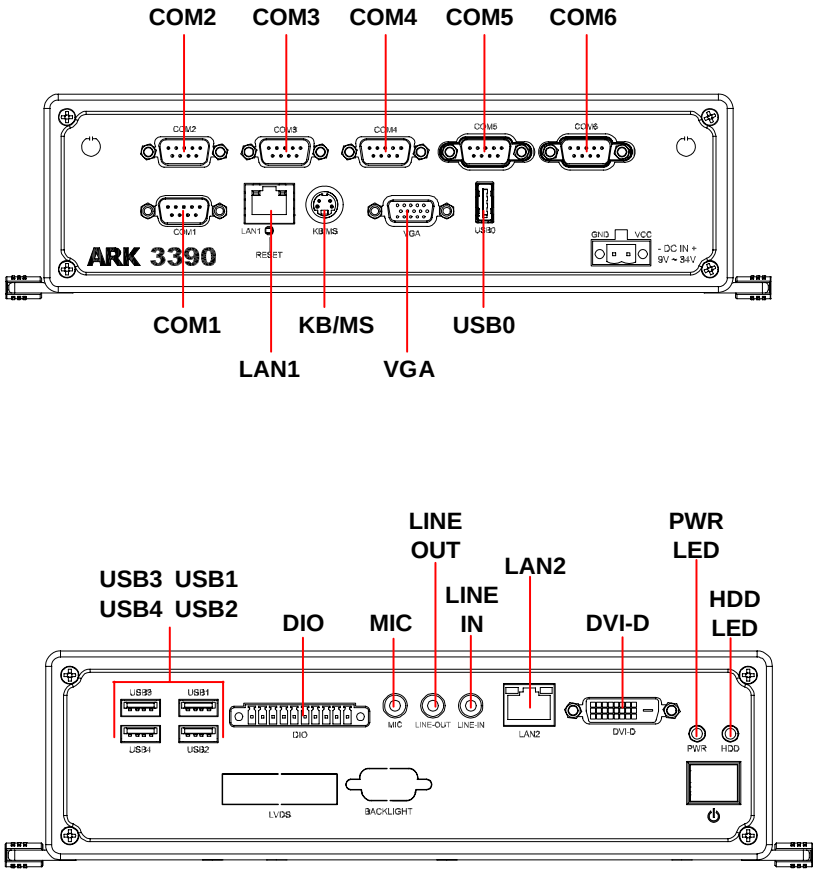


Figure 2.1 ARK-3389 IO connectors drawing

2.3.1 ARK-3390 External I/O Connectors

2.3.1.1 COM Connector

ARK-3390 provides six D-sub 9-pin connectors, which offers RS-232/422/485 serial communication interface ports. Default setting is RS-232, if you want to use RS-422/485, you can find the jumper installation in Appendix.

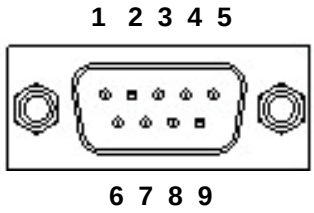


Figure 2.2 COM connector

Table 2.1: COM Standard Serial Port Pin Assignments

	RS-232	RS-422	RS-485
Pin	**Signal Name**	**Signal Name**	**Signal Name**
1	DCD	Tx-	DATA-
2	RxD	Tx+	DATA+
3	TxD	Rx+	NC
4	DTR	Rx-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

Note! *NC represents "No Connection".*

2.3.1.2 Digital Visual Interface Connector (DVI-D)

ARK-3390 offers a Digital Visual Interface connector by a D-sub 24-pin female DVI-D connector; it's only for digital video signal. This interface supports high-speed, high-resolution digital displays.

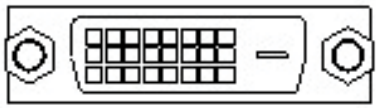


Figure 2.3 DIO connector

Table 2.2: Table 2.2: DVI-D Connector Pin Assignments

Pin	Signal Name	Pin	Signal Name
1	TMDS Data 2-	2	TMDS Data 2+
3	TMDS Data 2/4 shield	4	TMDS Data 4-
5	TMDS Data 4+	6	DDC clock
7	DDC data	8	Analog vertical sync
9	TMDS Data 1-	10	TMDS Data 1+
11	TMDS Data 1/3 shield	12	TMDS Data 3-
13	TMDS Data 3+	14	+5 V
15	Ground	16	Hot plug detect
17	TMDS data 0-	18	TMDS data 0+
19	TMDS data 0/5 shield	20	TMDS data 5-
21	TMDS data 5+	22	TMDS clock shield
23	TMDS clock+	24	TMDS clock-

2.3.1.3 Ethernet Connector (LAN)

ARK-3390 is equipped with two Intel 82541PI Ethernet controller that is fully compliant with IEEE 802.3u 10/100/1000 Mbps CSMA/CD standards. The Ethernet port provides a standard RJ-45 jack connector with LED indicators on the front side to show its Active/Link status (Green LED) and Speed status (Yellow LED).

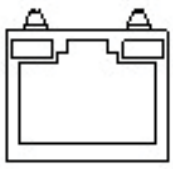


Figure 2.4 Ethernet connector

Table 2.3: RJ-45 Connector Pin Assignments

Pin	10/100/1000BaseT Signal Name
1	TX+
2	TX-
3	RX+
4	MDI2+
5	MDI2-
6	RX-
7	MDI3+
8	MDI3-

2.3.1.4 Audio Connector

ARK-3390 offers stereo audio ports by three phone jack connectors of Line_Out, Line_In, Mic_In. The audio chip is controlled by ALC888, and it's compliant with Azalea standard.

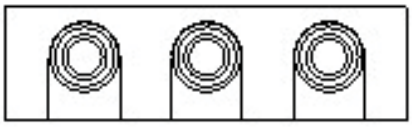


Figure 2.5 Audio connector

Table 2.4: Audio Connector Pin Assignments

Pin	Audio Signal Name
1	Mic_In
2	Line_Out
3	Line_In

2.3.1.5 DIO Connector

ARK-3390 provides one phoenix 10-pin male connectors, which offers Digital Input/ Output communication interface. If client want to use DIO, please find the Pin assignment as following.

Figure 2.6 DIO connector

Table 2.5: DIO Connector Pin Assignments

Pin	Signal Name
1	+V5
2	DIO0
3	DIO1
4	DIO2
5	DIO3
6	DIO4
7	DIO5
8	DIO6
9	DIO7
10	GND

2.3.1.6 USB Connector

ARK-3390 provides five USB interface connectors, which give complete Plug & Play and hot swapping for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 2.0 compliant. The USB interface can be disabled in the system BIOS setup. Please refer to Table. 2.6 for its pin assignments.

The USB connectors are used to connect any device that conforms to the USB interface. Most digital devices conform to this standard. The USB interface supports Plug and Play without turning off computers.

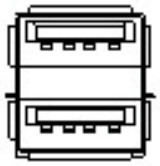


Figure 2.7 USB connector

Table 2.6: USB Connector

Pin	Signal name	Pin	Signal name
1	VCC	2	USB_data-
3	USB_data+	4	GND

2.3.1.7 Compact Flash Card

ARK-3390 is equipped with an external CF card inside the chassis.

2.3.1.8 Power ON/OFF Button

ARK-3390 comes with a Power On/Off button, that support dual function of Soft Power -On/Off (Instant off or Delay 4 Second), and Suspend.

Figure 2.8 Power Button

2.3.1.9 LED Indicators

There are two LEDs on ARK-3390 front metal face plate for indicating system status: PWR LED is for power status; and HDD LED is for HDD & compact flash disk status.

Figure 2.9 LED Indicators

2.3.1.10 Power Input Connector

ARK-3390 comes with a two pins header that carries 9~34 VDC external power input.

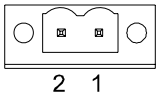


Figure 2.10 Power Input Connector

Table 2.7: Power connector Pin Assignments	
Pin	**Signal Name**
1	GND
2	+9~34 V_{DC}

2.4 Installation

2.4.1 HDD Installation

1. Unscrew the HDD door screws.

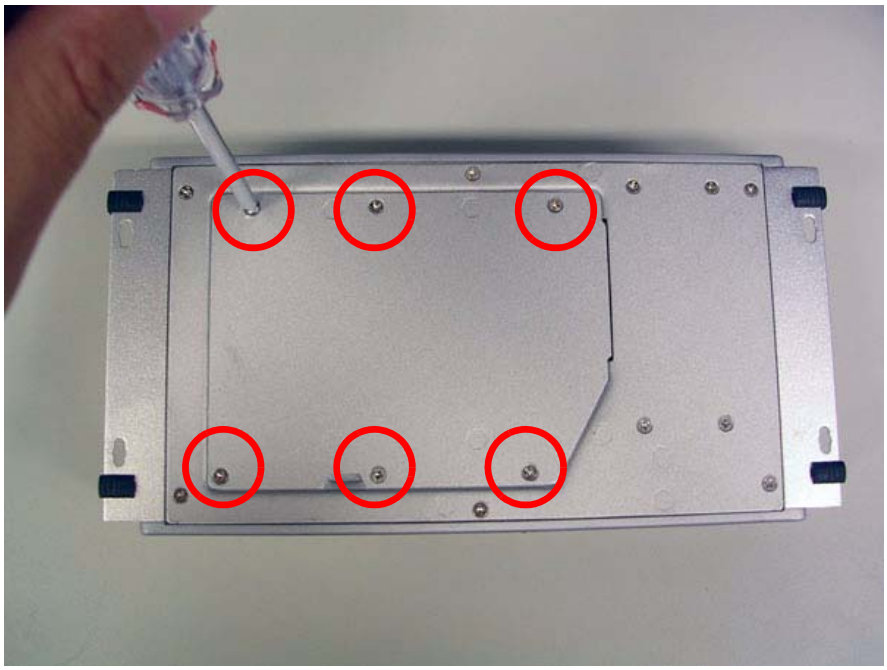


Figure 2.11 Unscrew the HDD door screws

2. Assemble HDD and HDD frame with four screws.

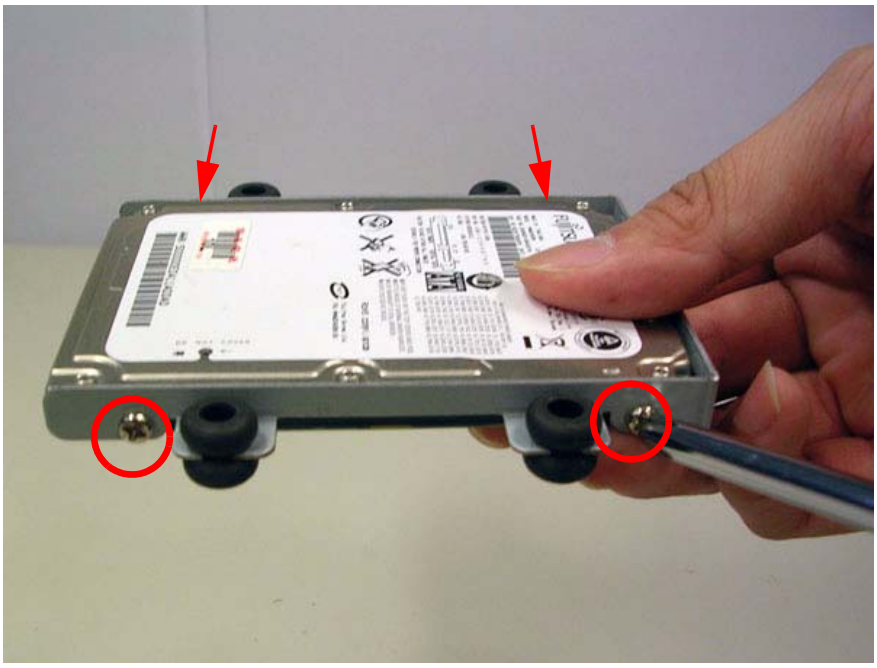


Figure 2.12 Assemble HDD and HDD frame by 4 Screws

3. Screw on the HDD damper screws to assemble the HDD door and HDD frame.

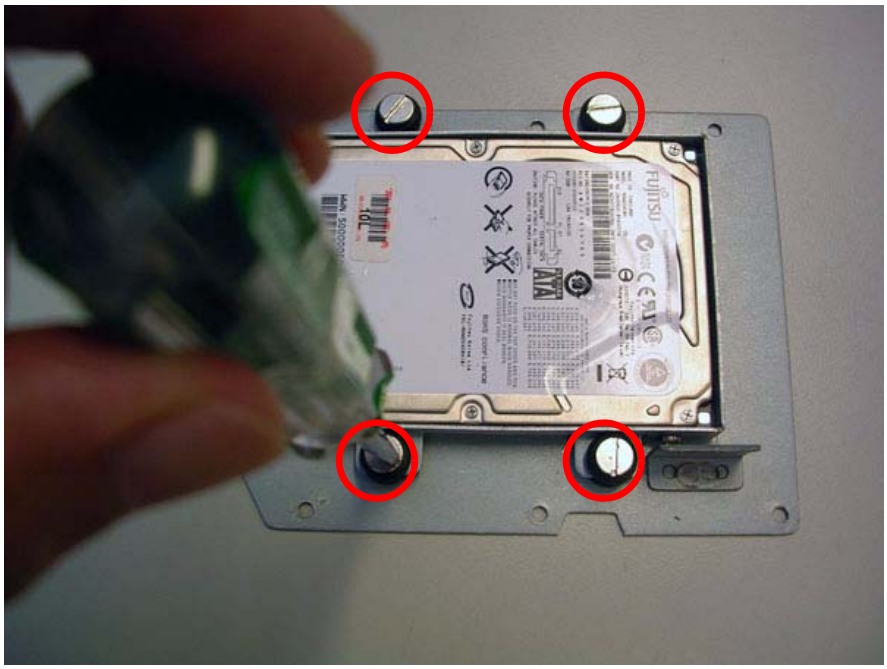


Figure 2.13 Screw on the HDD damper screws to assemble the HDD door and HDD frame

4. Connect the HDD cables.

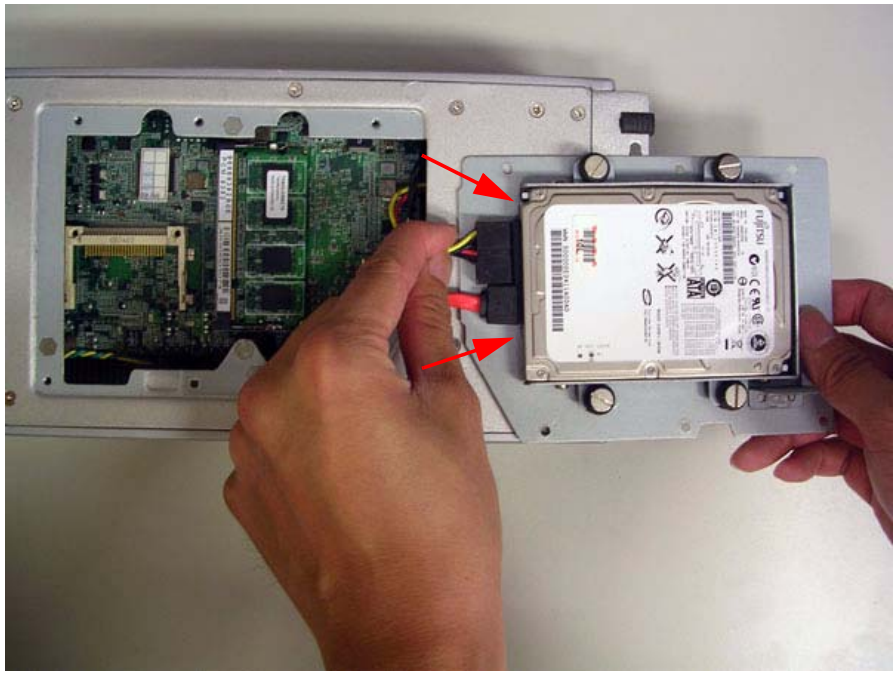


Figure 2.14 Connect the HDD cables

5. Replace HDD door and secure with screws.

2.4.2 Memory Installation

1. Refer 2.4.1-1 to open the HDD door.
2. Install the memory module into the SO-DIMM socket at the bottom of the Main board.

Figure 2.15 Install the memory module into the SO-DIMM socket at the bottom of the Main board

3. Replace HDD door and secure with screws.

2.4.3 CF card Installation

1. Refer 2.4.1-1 to open the HDD door.
2. Install the CF card into the CF slot at the bottom of the Main board.

Figure 2.16 Install the CF card into the CF slot at the bottom of the Main board

3. Replace HDD door and secure with screws.

2.4.4 RS-232/422/485 Jumper Setting

1. Refer to 2.4.1-1 open HDD door
2. Remove frame cover, front/rear bezels, and top cover
3. Refer to 2.2.2 MIO jumper setting to select RS-232/422/485 among COM2 (Jumper on MB), COM3, COM4, COM5, and COM6.

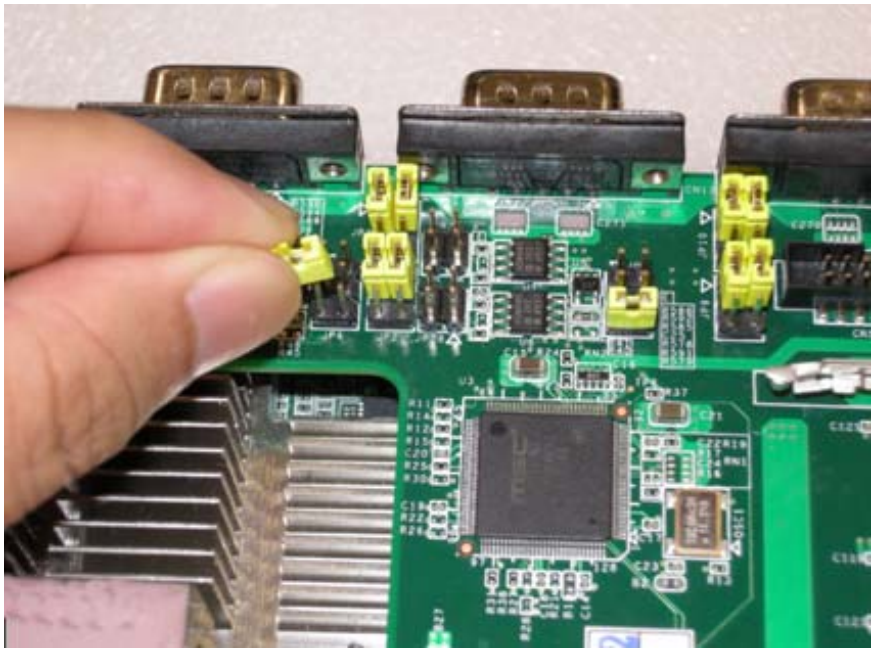


Figure 2.17 RS-232/422/485 jumper setting

Chapter 3

BIOS Operation

This chapter describes how to set BIOS configuration data.

3.1 BIOS Introduction

AwardBIOS 6.0 is a full-featured BIOS provided by Advantech to deliver superior performance, compatibility, and functionality to industrial PCs and embedded boards. Its many options and extensions let you customize your products to a wide range of designs and target markets.

The modular, adaptable AwardBIOS 6.0 supports the broadest range of third-party peripherals and all popular chipsets, plus Intel, AMD, nVidia, VIA, and compatible CPUs from 386 through Pentium, AMD Geode, K7 and K8 (including multiple processor platforms), and VIA Eden C3 and C7 CPUs.

You can use Advantech's utilities to select and install features that suit your needs and your customers' needs.

3.2 BIOS Setup

ARK-3390 system has AwardBIOS 6.0 built-in, which includes a CMOS SETUP utility that allows users to configure settings as required or to activate certain system features.

The CMOS SETUP saves configuration settings in the CMOS RAM of the motherboard. When the system power is turned off, the onboard battery supplies the necessary power to the CMOS RAM so that settings are retained.

To access the CMOS SETUP screen, press the <Del> button during the power-on BIOS POST (Power-On Self Test).

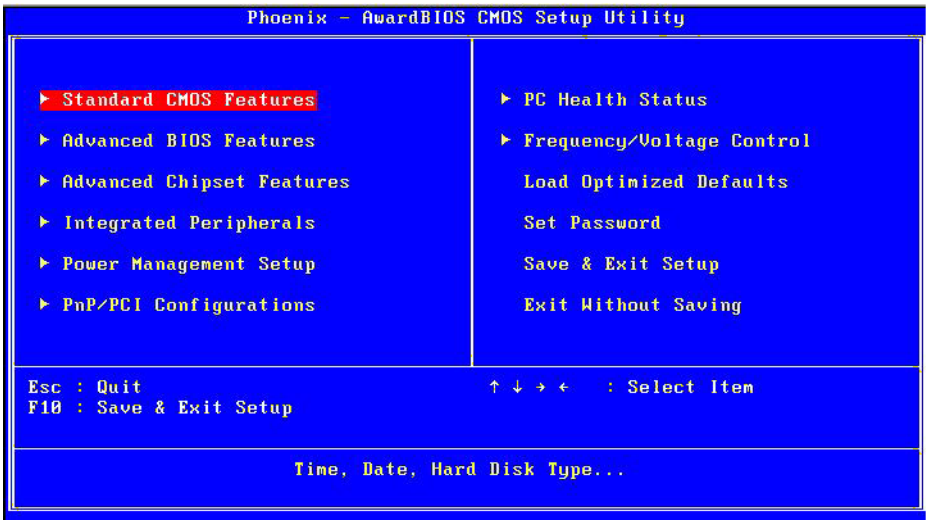
CMOS SETUP Navigation and Control Keys

Table 3.1: CONTROL KEYS

< ↑ >< ↓ >< ← >< → >	Move to highlight item
<Enter>	Select Item
<Esc>	Main Menu - Quit and not save changes into CMOS Sub Menu - Exit current page and return to Main Menu
<Page Up/+>	Increase the numeric value or make changes
<Page Down/->	Decrease the numeric value or make changes
<F1>	General help, for Setup Sub Menu
<F2>	Item Help
<F5>	Load Previous Values
<F7>	Load Setup Default
<F10>	Save all CMOS changes

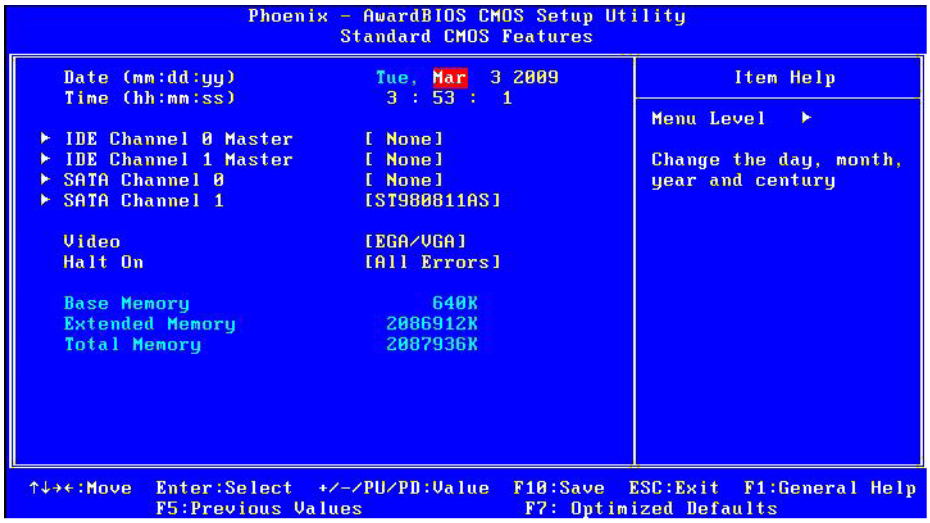
3.2.1 Main Menu

Press the <Del> key during startup to enter the BIOS CMOS Setup Utility; the Main Menu will appear on the screen. Use arrow keys to highlight the desired item, and press <Enter> to accept, or enter the sub-menu.



- **Standard CMOS Features**
  This setup page includes all the items in standard compatible BIOS.
- **Advanced BIOS Features**
  This setup page includes all the items of Award BIOS enhanced features.
- **Advanced Chipset Features**
  This setup page includes all the items of Chipset configuration features.
- **Integrated Peripherals**
  This setup page includes all onboard peripheral devices.
- **Power Management Setup**
  This setup page includes all the items of Power Management features.
- **PnP/PCI Configurations**
  This setup page includes PnP OS and PCI device configuration.
- **PC Health Status**
  This setup page includes the system auto detect CPU and system temperature, voltage, fan speed.
- **Frequency/Voltage Control**
  This setup page includes CPU host clock control, frequency ratio and voltage.
- **Load Optimized Defaults**
  This selection loads optimized values for best system performance configuration.
- **Set Password**
  Establish, change or disable password.

3.2.2 Standard CMOS Features



- **Date**

  The date format is <weekday>, <month>, <day>, <year>.

Weekday	From Sun to Sat, determined and displayed by BIOS only
Month	From Jan. to Dec.
Day	From 1 to 31
Year	From 1999 through 2098

- **Time**

  The time format is <hour> <minute> <second>, based on 24-hour time.

- **IDE Channel 0 Master**

  IDE HDD Auto-Detection Press "Enter" for automatic device detection.

- **SATA Channel 0/1**

  SATA HDD Auto-Detection Press "Enter" for automatic device detection.

- **Halt on**

  The item determines whether the computer will stop if an error is detected during power up.

No Errors	The system boot will not stop for any error.
All Errors	Whenever the BIOS detects a non-fatal error the system will be stopped.
All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors. (Default value)

- **Base Memory**

  The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system.

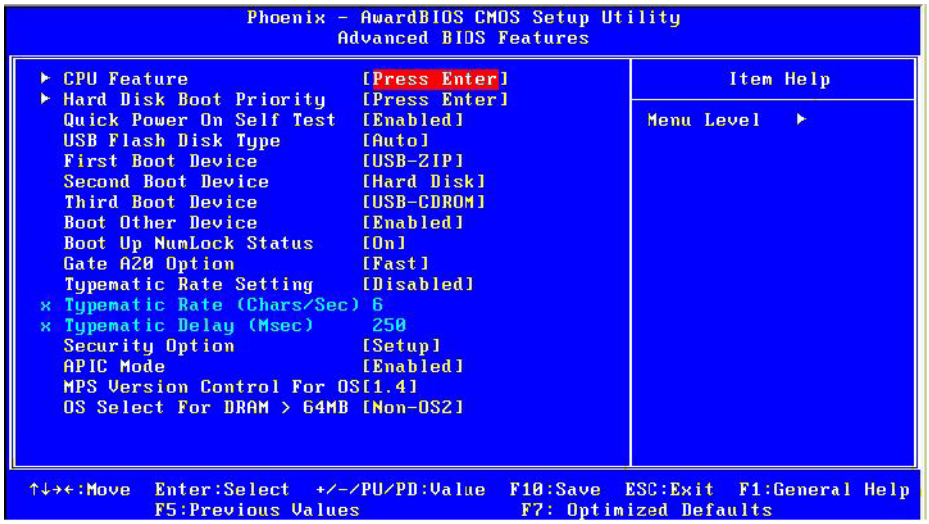
- **Extended Memory**

  The BIOS POST will determine the amount of extended memory (above 1 MB in CPU's memory address map) installed in the system.

- **Total Memory**

  This item displays the total system memory size.

3.2.3 Advanced BIOS Features



- **CPU Feature**

  This item allows user to adjust CPU features.

- **Hard Disk Boot Priority**

  This item allows user to select boot sequence for system device HDD, USB-HDD, SCSI, RAID.

- **Quick Power On Self Test[Enabled]**

  This field speeds up the Power-On Self Test (POST) routine by skipping retesting a second, third and forth time. Setup setting default is enabled.

- **First / Second / Third / Other Boot Drive**

Hard Disk	Select boot device priority by Hard Disk.
CDROM	Select boot device priority by CDROM.
USB-FDD	Select boot device priority by USB-FDD.
USB-ZIP	Select boot device priority by USB-ZIP.
USB-CDROM	Select boot device priority by USB-CDROM.
LAN	Select boot device priority by LAN.
Disabled	Disable this boot function.

- **Boot Up NumLock Status [Enabled]**

  This item allows the user to activate the Number Lock key at system boot.

- **Gate A20 Option [Fast]**

  This item enables users to switch A20 control by port 92 or not.

- **Typematic Rate Setting**

  This item enables users to set the two typematic controls items.

  – Typematic Rate (Chars/Sec)

  This item controls the speed at which the system registers auto-repeated keystrokes. The eight settings are 6, 8, 10, 12, 15, 20, 24 and 30.

  – Typematic Delay (Msec)

  This item sets the keypress time delay before autorepeat begins.

  Four delay rate options are 250, 500, 750 and 1000.

- **Security Option [Setup]**

System	System will not boot and refuses access to Setup page if the correct password is not entered at the prompt.
Setup	System will boot, but access to Setup requires password (default value).

- **APIC Mode [Enabled]**

  This item allows user to enabled of disabled “Advanced Programmable Interrupt Controller”. APIC is implemented in the motherboard and must be supported by the operating system, and it extends the number of IRQ's available.

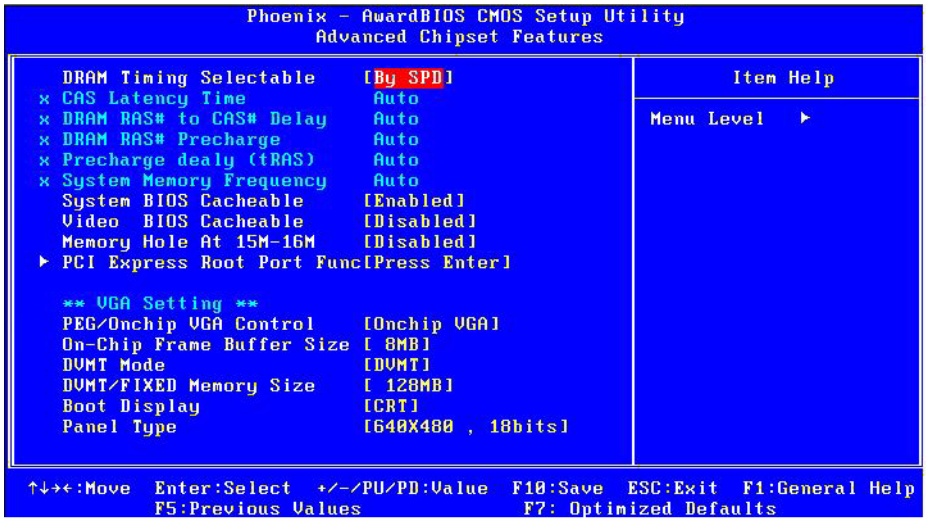
- **MPS Version Control for OS [1.4]**

  This item sets the operating system multiprocessor support version.

- **OS Select For DRAM > 64 MB [Non-OS2]**

  Select OS2 only if the system is running the OS/2 operating system with greater than 64 MB of RAM on the system.

3.2.4 Advanced Chipset Features



Note! *This “Advanced Chipset Features” page controls configuration of the board’s chipset. This page is chipset dependent; screens may differ somewhat depending on the chipset. It is strongly recommended that only technical users make changes to the default settings.*

- **DRAM Timing Selectable [By SPD]**

  This item enables users to set the optimal timings for items 2 through 5; system default setting “By SPD” follows the SPD information and ensures the system runs stably with optimal performance.

- **CAS Latency Time [Auto]**

  This item enables users to set the timing delay in clock cycles before SDRAM starts a read command after receiving it.

- **DRAM RAS# to CAS# Delay [Auto]**

  This item enables users to set the timing of the transition from RAS (row address strobe) to CAS (column address strobe) as both rows and column are separately addressed shortly after DRAM is refreshed.

- **DRAM RAS# Precharge [Auto]**

  This item enables users to set the DRAM RAS# precharge timing, system default is setting to “Auto” to reference the data from SPD ROM.

- **Precharge Delay (tRAS) [Auto]**

  This item allows user to adjust memory precharge time.

- **System Memory Frequency [Auto]**

  This item allows user to adjust memory frequency to improvement performance.

- **System BIOS Cacheable[Enabled]**

  This item allows the system BIOS to be cached to allow faster execution and better performance.

- **Video BIOS Cacheable[Disabled]**

  This item allows the video BIOS to be cached to allow faster execution and better performance.

- **Memory Hole At 15M-16M[Disabled]**

  This item reserves 15 - 16 MB of memory address space for ISA expansion cards that specifically require the setting. Memory from 15 - 16 MB will be unavailable to the system because only the expansion cards can access memory in this area.

- **PCI Express Root port Func [Press Enter]**

  This item allows the user to adjust PCIE port on, off or auto.

- **PEG/Onboard VGA Control [Auto]**

  This item allows the user to select the onboard graphics processor or the PCI Express card.

- **PEG Force X1 [Disabled]**

  This item allows the user to convert a PCI Express X16 slot to PCI Express X1 slot.

- **On-Chip Frame Buffer Size[8 MB]**

  This item allows the user to adjust the on-chip frame buffer size 8 MB or 1 MB.

- **DVMT Mode [DVMT]**

  This item allows the user to adjust Intel's Dynamic Video Memory Technology (DVMT). BIOS provides three options: DVMT, FIXED, and Both.

- **DVMT/FIXED Memory Size [128MB]**

  This item allows the user to adjust DVMT/FIXED graphics memory size.

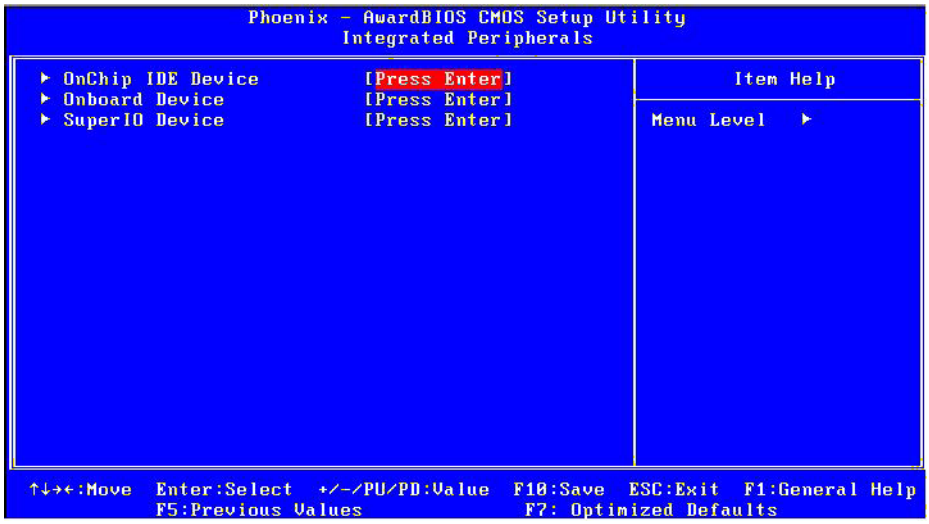
- **Boot Display**

  This item allows the user to decide that display mode.

- **Panel Type [640 x 480]**

  This item allows the user to adjust panel resolution.

3.2.5 Integrated Peripherals



Note! *This "Integrated Peripherals" page controls the configuration of the board's chipset, including IDE, ATA, SATA, USB, AC97, MC97 and Super IO and Sensor devices. This page is chipset dependent; the screen capture above is illustrative, but screens do differ depending on chipset features.*

- **OnChip IDE Device**

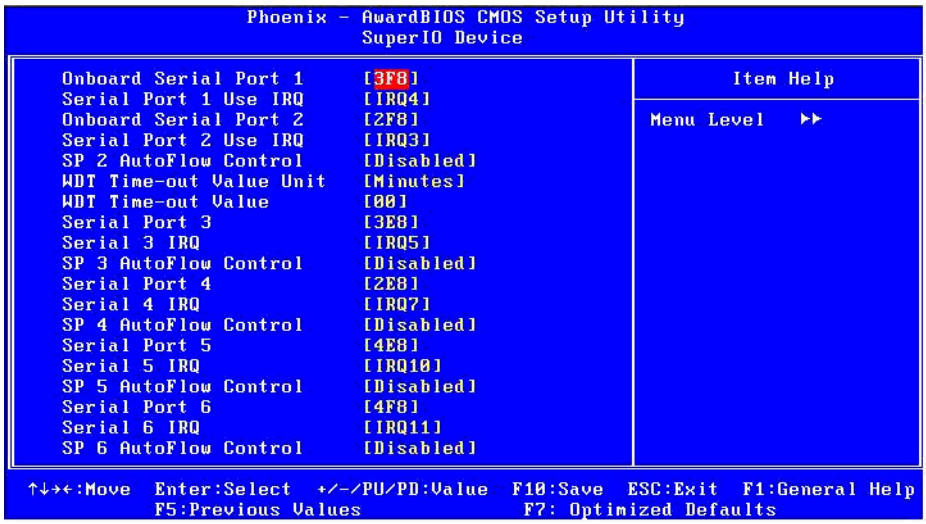
  This item enables users to set the OnChip IDE device status, including some of new chipsets also support SATA devices (Serial-ATA).

- **Onboard Device**

  This item enables users to set the Onboard device status, including enabling AC97, and LAN devices.

- **Super IO Device**

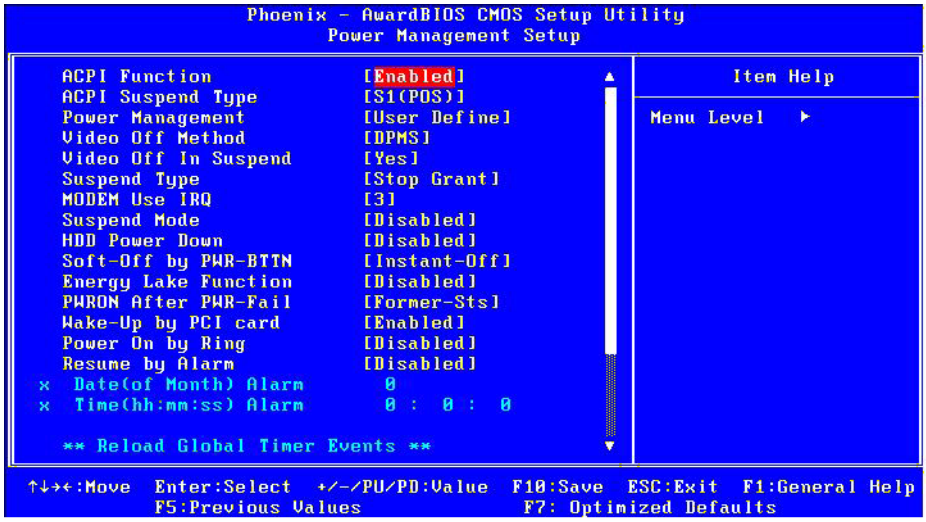
  This item enables users to set the Super IO device status, including enabling of COM, and LPT.



- **Onboard Serial port 1 [3F8]**
  This item allows user to adjust serial port 1 address.
- **Serial port 1 Use IRQ [IRQ4]**
  This item allows the user to adjust serial port 1 IRQ.
- **Onboard Serial port 2 [2F3]**
  This item allows user to adjust serial port 2 address.
- **Serial port 2 Use IRQ [IRQ3]**
  This item allows the user to adjust serial port 2 IRQ.
- **SP 2 Auto Flow Control [Disable]**
  Auto flow control is used in RS-485 and used to control the signal transmitter automatically.
  When auto flow control is checked, the device detects the local output buffer conditions, empty or not empty. If enable, the flow control will force signal to the desired polarity under the empty or not empty condition.
- **Watch Dog Timer-Out Value Unit [Minutes]**
  This item allows user to select watch dog time of value unit with minutes or seconds.
- **Watch Dog Timer-Out Value [00]**
  This item allows user to enabled watch dog time of value, Range is from 10 sec ~ 255 Min.
- **Serial port 3 [3E8]**
  This item allows the user to adjust serial port 3 address.
- **Serial 3 IRQ [IRQ5]**
  This item allows the user to adjust serial port 3 IRQ.
- **SP 3 Auto Flow Control [Disable]**
  Auto flow control is used in RS-485 and used to control the signal transmitter automatically.
  When auto flow control is checked, the device detects the local output buffer conditions, empty or not empty. If enable, the flow control will force signal to the desired polarity under the empty or not empty condition.
- **Serial port 4 [2E8]**
  This item allows the user to adjust serial port 4 address.
- **Serial 4 IRQ [IRQ7]**
  This item allows the user to adjust serial port 4 IRQ.
- **SP 4 Auto Flow Control [Disable]**
  Auto flow control is used in RS-485 and used to control the signal transmitter automatically.
  When auto flow control is checked, the device detects the local output buffer conditions, empty or not empty. If enable, the flow control will force signal to the desired polarity under the empty or not empty condition.
- **Serial port 5 [4E8]**
  This item allows the user to adjust serial port 5 address.
- **Serial 5 IRQ [IRQ10]**
  This item allows the user to adjust serial port 5 IRQ.
- **SP 5 Auto Flow Control [Disable]**
  Auto flow control is used in RS-485 and used to control the signal transmitter automatically.
  When auto flow control is checked, the device detects the local output buffer conditions, empty or not empty. If enable, the flow control will force signal to the desired polarity under the empty or not empty condition.

- **Serial port 6 [4F8]**
  This item allows the user to adjust serial port 6 address.
- **Serial 6 IRQ [IRQ11]**
  This item allows the user to adjust serial port 6 IRQ.
- **SP 6 Auto Flow Control [Disable]**
  Auto flow control is used in RS-485 and used to control the signal transmitter automatically.
  When auto flow control is checked, the device detects the local output buffer conditions, empty or not empty. If enable, the flow control will force signal to the desired polarity under the empty or not empty condition.

3.2.6 Power Management Setup



Note! *This "Power management Setup" option enable system to be the most effective energy-saving mode while operating in a manner consistent with your computer use style.*

- **ACPI Function [Enabled]**
  This item defines the ACPI (Advanced Configuration and Power Management) feature that makes hardware status information available to the operating system, and communicates to PC and system devices for improved power management.
- **Power Management [Min Saving]**
  This item allows user to select system power saving mode.

Min Saving	Minimum power management. Suspend Mode=1 hr.
Max Saving	Maximum power management. Suspend Mode=1 min.
User Define	Allows user to set each mode individually. Suspend Mode= Disabled or 1 min ~1 hr.

- **Video Off Method [DPMS]**
  This item allows user to determine the manner is which the monitor is blanked.

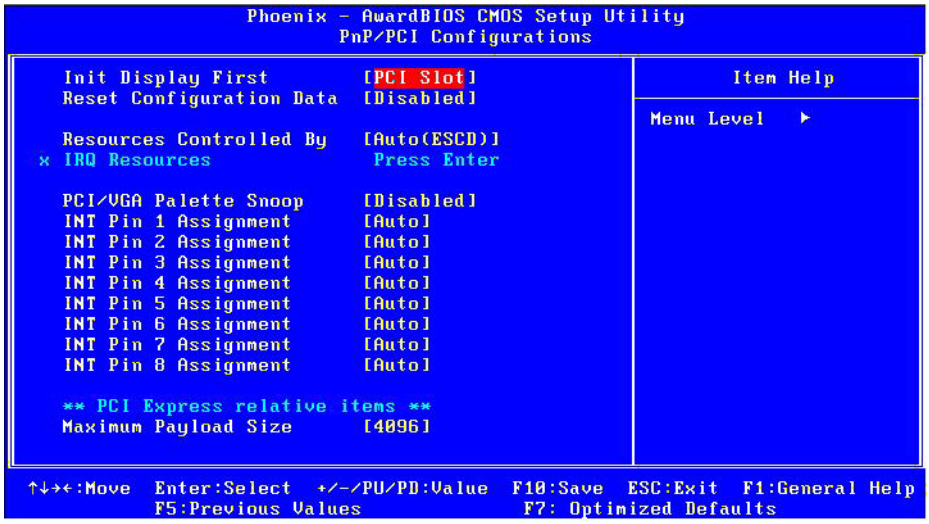
V/H SYNC+Blank	This option will cause system to turn off vertical and horizontal synchronization ports and write blanks to the video buffer.
Blank Screen	This option only writes blanks to the video buffer.
DPMS	Initial display power management signaling.

- **Video Off In Suspend [Yes]**
  This item allows user to turn off video when system is in suspend mode.
- **Suspend Type [Stop Grant]**
  This item allows user to determine the suspend type.
- **Modem use IRQ [3]**
  This item allows user to determine which IRQ the MODEM can use.
- **Suspend Mode [Disabled]**
  This item allows user to set a delay time. If system inactivity exceeds the delay time, all devices except the CPU will be shut off.
- **HDD Power Down Mode [Disabled]**
  This item allows the user to determine the system inactivity time, when the hard disk drive will be powered down.
- **Soft-Off by PWR-BTTN [Instant-Off]**
  This item allows user to define function of power button.

Instant-Off	Pressing power button initiates instant power off.
Delay 4 Sec	Press power button for four seconds to initiate power off.

- **PWRON After PWR-Fail [Former-Sts]**
  This item allows the user to select recovery after power fail function; this function depends on the chipset.
- **Wake-Up by PCI card [Enabled]**
  This item allows the user to enable and define how PCI cards wake the system up from suspend mode.
- **Power On by Ring [Enabled]**
  This item allows the user to enable and define how the system will resume by activation of the modem ring.
- **Resume by Alarm [Disabled]**
  This item allows the user to enable and key in the date and time to power on the system
  - Disabled Disable this function.
  - Enabled Enable alarm function to power on system
  - Day (of month) Alarm 1-31
  - Time (HH:MM:SS) Alarm (0-23): (0-59): (0-59)

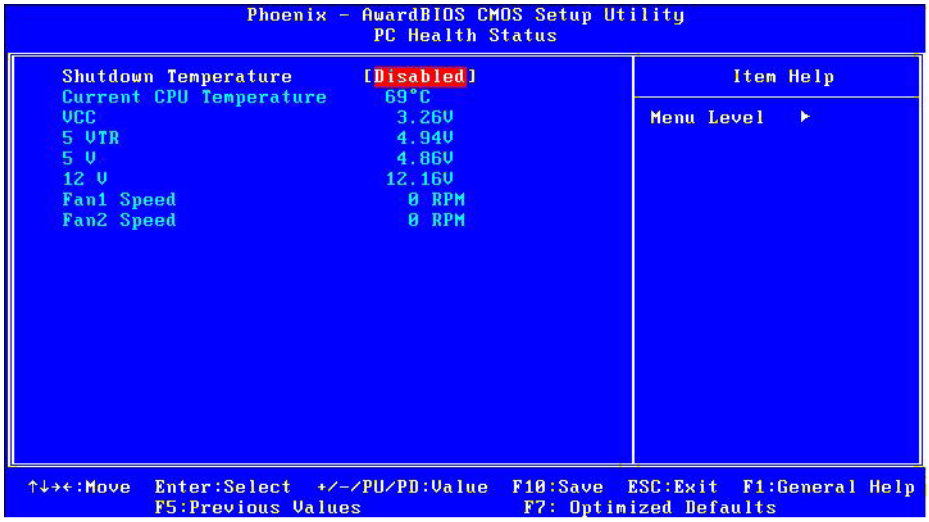
3.2.7 PnP/PCI Configurations



Note! *The "PnP/PCI Configurations" screen sets up the IRQ and DMA (both PnP and PCI bus assignments).*

- **Init Display First [PCI Slot]**
  This item is for setting start up video output from the PCI or onboard device.
- **Reset Configuration Data [Disabled]**
  This item allows the user to clear any PnP configuration data stored in the BIOS.
- **Resources Controlled By [Auto(ESCD)]**
  The commands here are “Auto(ESCD)” or “Manual”. Choosing “Manual” requires you to choose resources from the following sub-menu. “Auto(ESCD)” automatically configures all of the boot and Plug and Play devices, but you must be using Windows 95 or above.
  - **IRQ Resources**
    This item allows you respectively assign an interrupt type for IRQ-3, 4, 5, 7, 9, 10, 11, 12, 14, and 15.
  - **DMA Resources**
    This item allows you respectively assign an interrupt type for DMA-0, 1, 2, 3, 4, 5, 6, and 7.
- **PCI VGA Palette Snoop [Disabled]**
  The item is designed to solve problems caused by some non-standard
  VGA cards. A built-in VGA system does not need this function.
- **NT Pin 1~8 Assignment [Auto]**
  This item allows the user to select the interrupt request (IRQ) assigned to a device connected to the PCI interface on your system.
- **Maximum Payload Size [4096]**
  This item allows the user to adjust maximum TLP (Transaction Layer Packet) payload size.

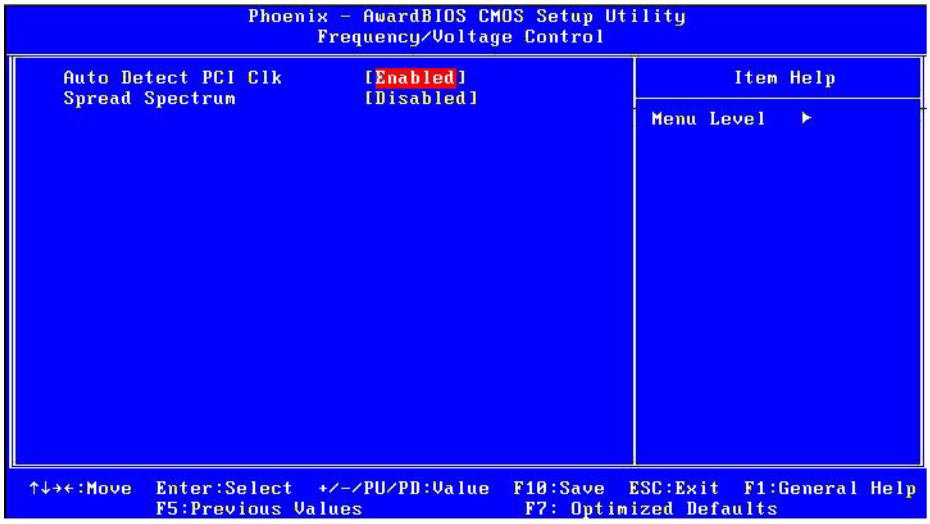
3.2.8 PC Health Status



Note! *The "PC Health Status" screen controls the thermal, fan, and voltage status of the board. The options on this page vary depending on the chipset.*

- **Shutdown Temperature [Disabled]**
  This item enables users to set the limitation of CPU temperature, the range is from 85° C through 100° C.
- **Current CPU Temperature [Show Only]**
  This item displays current CPU temperature.
- **FAN1 / FAN2 Speed [Show Only]**
  This item displays current system FAN(s) speed(s).
- **VCC/ 5 VTR/ 5V/ 12V [Show Only]**
  This item displays current CPU and system voltage.

3.2.9 Frequency/Voltage Control



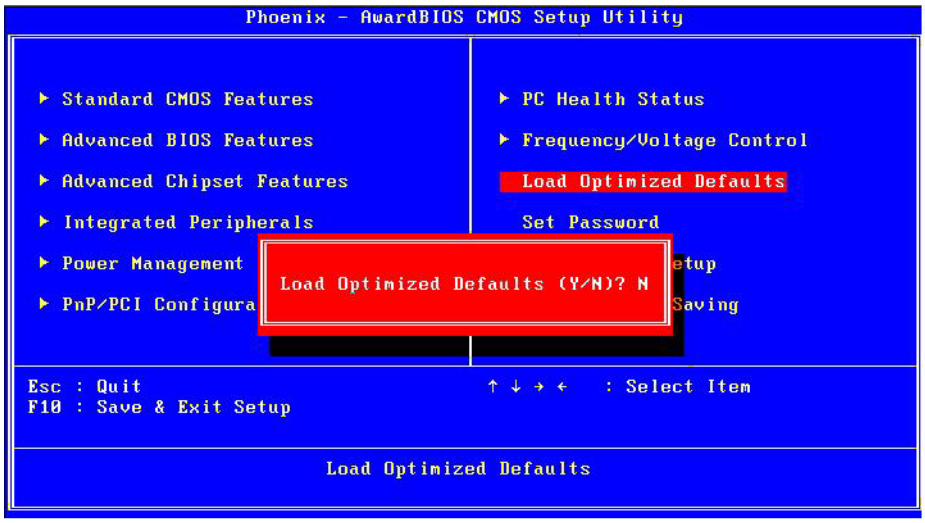
- **Auto Detect PCI Clk [Enabled]**

  This item enables users to set the PCI Clk either by automatic system detection or manually.

- **Spread Spectrum [Disabled]**

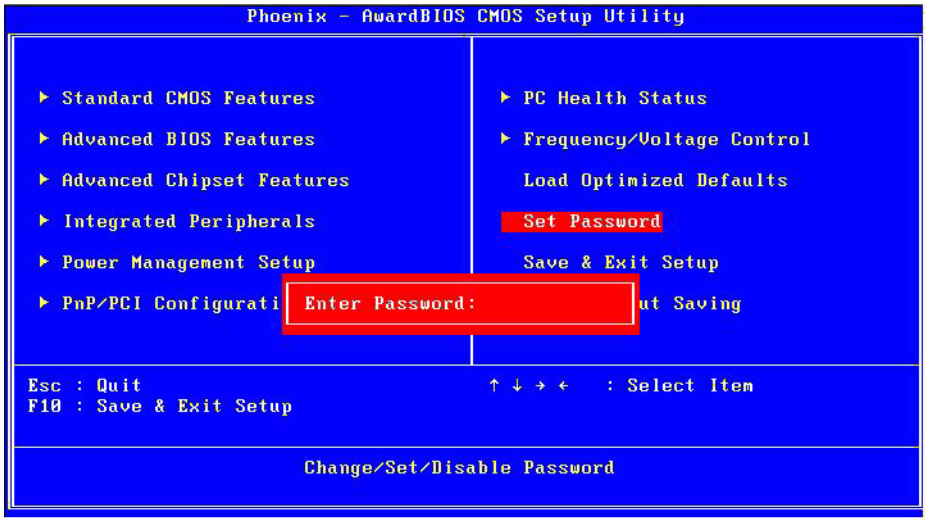
  This item enables users to set the spread spectrum modulation.

3.2.10 Load Optimized Defaults



Note! *Load Setup Defaults loads the default system values directly from ROM. Useful if the stored record created by the Setup program should ever become corrupted (and therefore unusable).*

3.2.11 Set Password



Note!

To enable this feature, you should first go to the Advanced BIOS Features menu, choose the Security Option, and select either Setup or System, depending on which aspect you want password protected. "Setup" requires a password only to enter Setup. "System" requires the password either to enter Setup or to boot the system. A password can be at most 8 characters long.

To Establish Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the desired password and press <Enter>.
3. At the “Confirm Password” prompt, retype the desired password, then press <Enter>.
4. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

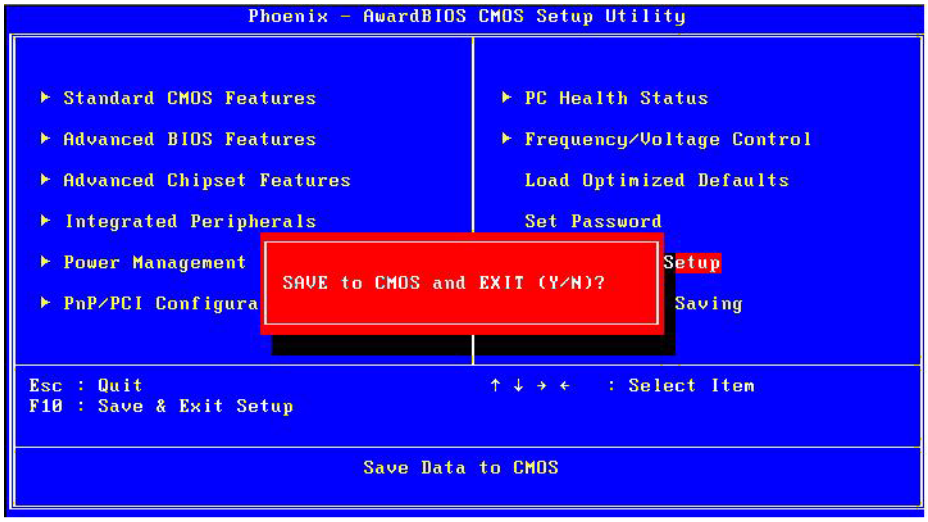
To Change Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, enter the new password and press <Enter>.
5. At the “Confirm Password” prompt, retype the new password, and press <Enter>.
6. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

To Disable Password

1. Choose the Set Password option from the CMOS Setup Utility main menu and press <Enter>.
2. When you see “Enter Password”, enter the existing password and press <Enter>.
3. You will see “Confirm Password”. Type it again, and press <Enter>.
4. Select Set Password again, and at the “Enter Password” prompt, please don’t enter anything; just press <Enter>.
5. At the”Confirm Password” prompt, again, don’t type in anything; just press <Enter>.
6. Select Save to CMOS and EXIT, type <Y>, then <Enter>.

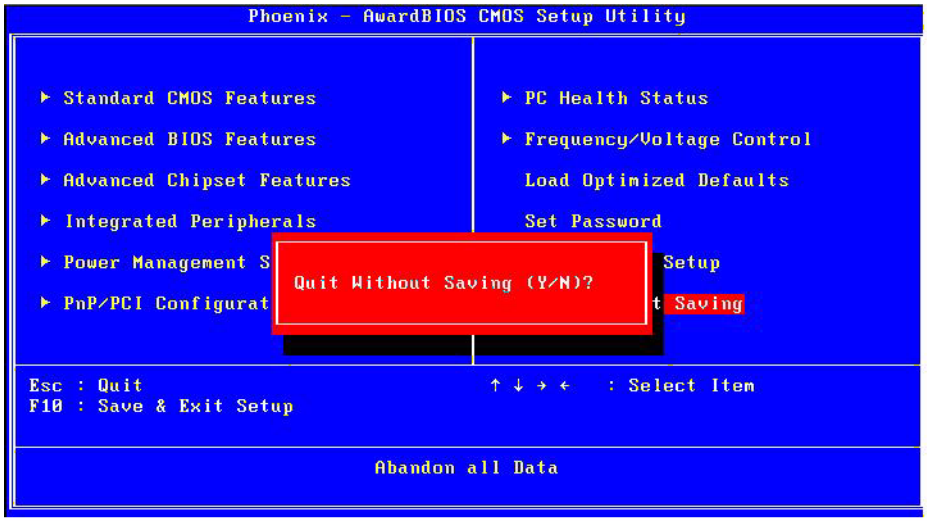
3.2.12 Save & Exit Setup



Note! *Typing "Y" will quit the BIOS Setup Utility and save user setup values to CMOS.*

Typing "N" will return to BIOS Setup Utility.

3.2.13 Quit without Saving



Note! *Typing "Y" will quit the BIOS Setup Utility without saving to CMOS.*

Typing "N" will return to BIOS Setup Utility.

Chapter 4

Full Disassembly Procedure

This chapter introduce how to disassembly the system.

4.1 Introduction

If you want to completely disassemble the ARK-3390, follow the step-by-step procedures below. Users should be aware that Advantech Co., Ltd. takes no responsibility Whatsoever for any problems or damage caused by user disassembly of the ARK-3390. Make sure the power cord of the ARK-3390 is unplugged before you start disassembly.

1. Unscrew the bottom screws.

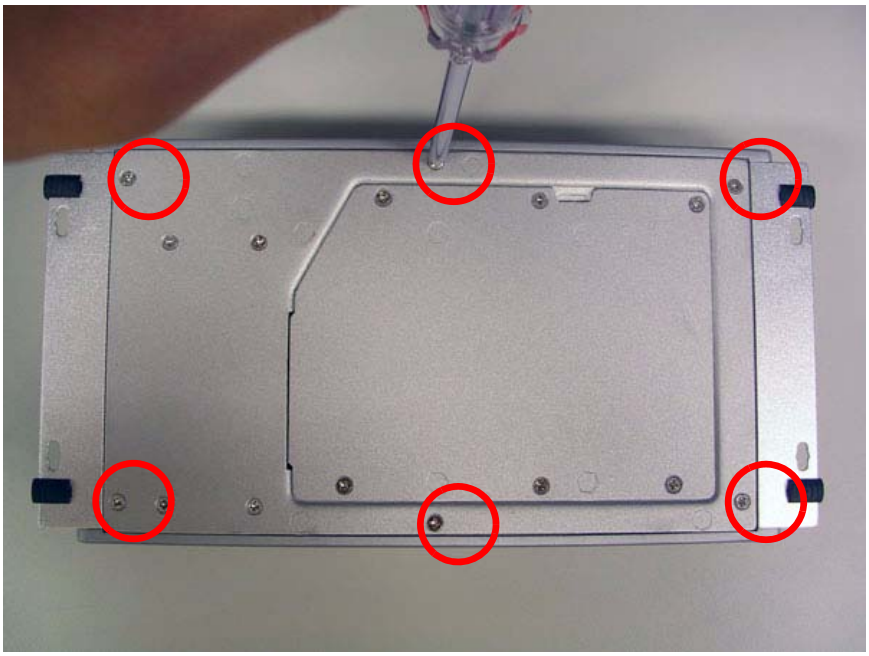


Figure 4.1 Unscrew the bottom screws

2. Unscrew the frame screws and remove the frame.

Figure 4.2 Unscrew the frame screws and remove the frame

3. Unscrew the panel screws.

Figure 4.3 Unscrew the panel screws

4. Unscrew the hex-bolts on the panel.

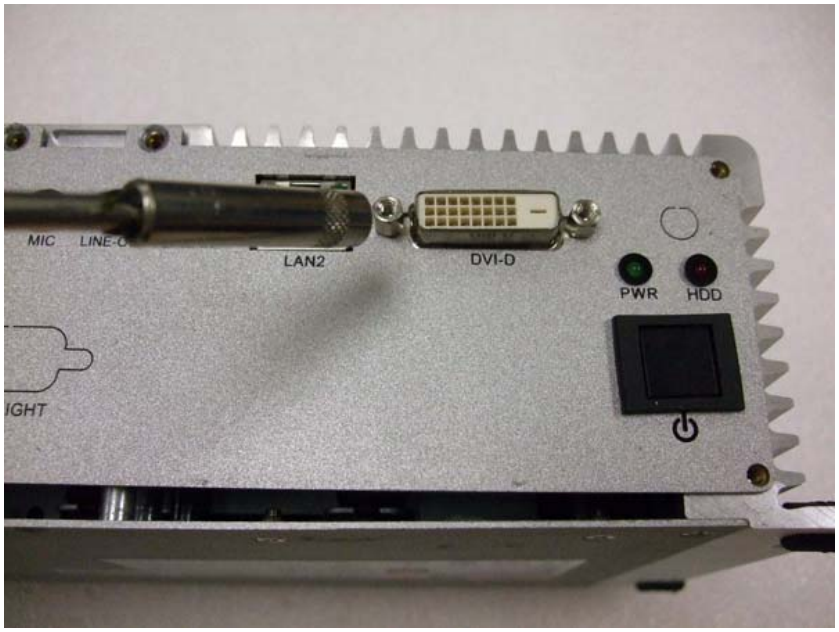


Figure 4.4 Unscrew the hex-bolts on the panel

5. Repeat the steps 2 through 4 to disassemble the opposite panel.
6. Remove the top cover.

7. Unscrew the screw fixed AMO-3000 on MB.

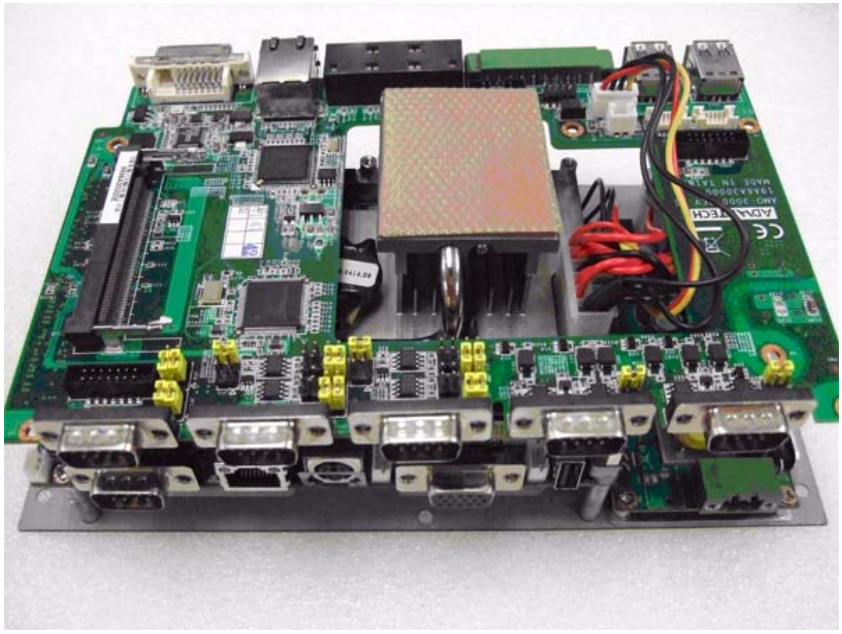


Figure 4.5 Unscrew the screw fixed AMO-3000 on MB

8. Remove AMO-3000 from MIO socket of the system board.

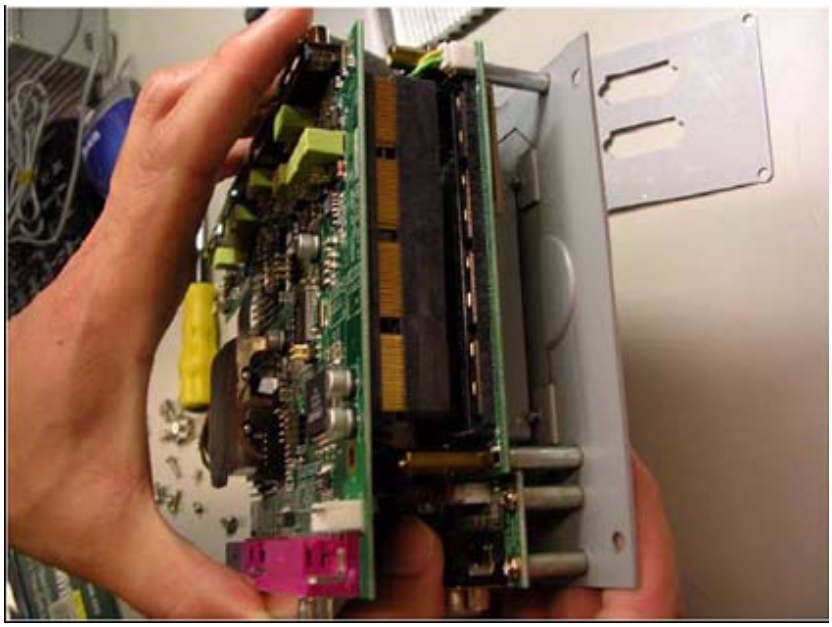


Figure 4.6 Remove AMO-3000 from MIO socket of the system board

9. Unscrew the power module screws on the bottom to disassemble the power module.

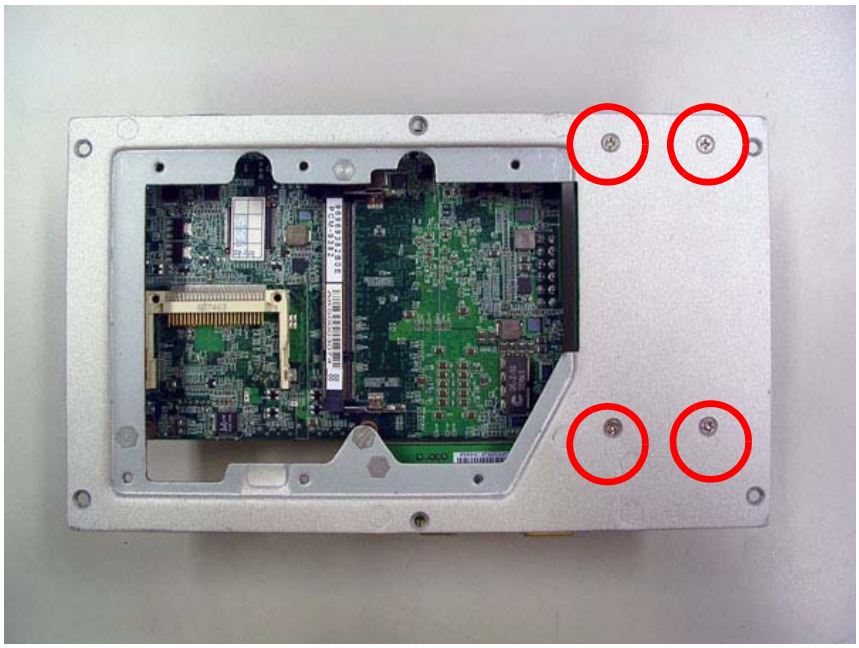


Figure 4.7 Unscrew the power module screws on the bottom to disassemble the power module

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