ARK-3384

Wireless Enabled, Audio and Three USB Port Fanless Embedded Box Computer

User Manual

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http://support.advantech.com

This manual is for the ARK-3384-1S0A2E, and ARK-3384-1S4A2E.

Part No. 2006338400 Edition 1

Printed in Taiwan April 2007

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 merchandize 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

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

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

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Packing List

ARK-3384 Series Model

There are two sub-models in ARK-3384 series listed below:

Model Number	Description
ARK-3384-1S0A2E	ULV Celeron M 1.0 GHz Embedded Box Computer, with one VGA, one LVDS, three USB 2.0, two COM, AC97 Audio, one Fast Ethernet, one 802.11b/g Wireless LAN
ARK-3384-1S4A2E	ULV Pentium M 1.4 GHz Embedded Box Computer, with one VGA, one LVDS, three USB 2.0, two COM, AC97 Audio, one

Table 1.1 ARK-3384 Model List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

Packing list

- 1 x ARK-3384 Unit
- 1 x DIN-Rail Mounting Kit
- 1 x PS2 Keyboard/Mouse Cable (P/N: 1700060202)
- 1 x Driver and Utility CD (P/N: 2066338400)
- 1 x Flat Cable Supports RS-485/RS-422 Mode for COM2 Serial Port (P/N: 1700001967)
- 1 x 2-P Phoenix to DC-Jack Power Cable (P/N: 1700001394)
- 1 x 2.4GHz External Antenna (P/N: 1750000318)

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

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 60ºC 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.*

Wichtige Sicherheishinweise

1. Bitte lesen sie Sich diese Hinweise sorgfältig durch.
2. Heben Sie diese Anleitung für den späteren Gebrauch auf.
3. Vor jedem Reinigen ist das Gerät vom Stromnetz zu trennen. Verwenden Sie Keine Flüssig-oder Aerosolreiniger. Am besten dient ein angefeuchtetes Tuch zur Reinigung.
4. Die NetzanschluBsteckdose soll nahe dem Gerät angebracht und leicht zugänglich sein.
5. Das Gerät ist vor Feuchtigkeit zu schützen.
6. Bei der Aufstellung des Gerätes ist auf sicheren Stand zu achten. Ein Kippen oder Fallen könnte Verletzungen hervorrufen.
7. Die Belüftungsöffnungen dienen zur Luftzirkulation die das Gerät vor überhitzung schützt. Sorgen Sie dafür, daB diese Öffnungen nicht abgedeckt werden.
8. Beachten Sie beim. AnschluB an das Stromnetz die AnschluBwerte.
9. Verlegen Sie die NetzanschluBleitung so, daB niemand darüber fallen kann. Es sollte auch nichts auf der Leitung abgestellt werden.
10. Alle Hinweise und Warnungen die sich am Geräten befinden sind zu beachten.
11. Wird das Gerät über einen längeren Zeitraum nicht benutzt, sollten Sie es vom Stromnetz trennen. Somit wird im Falle einer Überspannung eine Beschädigung vermieden.

12. Durch die Lüftungsöffnungen dürfen niemals Gegenstände oder Flüssigkeiten in das Gerät gelangen. Dies könnte einen Brand bzw. elektrischen Schlag auslösen.
13. Öffnen Sie niemals das Gerät. Das Gerät darf aus Gründen der elektrischen Sicherheit nur von authorisiertem Servicepersonal geöffnet werden.
14. Wenn folgende Situationen auftreten ist das Gerät vom Stromnetz zu trennen und von einer qualifizierten Servicestelle zu überprüfen:
    - Netzkabel oder Netzstecker sind beschädigt.
    - Flüssigkeit ist in das Gerät eingedrungen.
    - Das Gerät war Feuchtigkeit ausgesetzt.
    - Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.
    - Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.
    - Wenn das Gerät deutliche Anzeichen eines Defektes aufweist.
15. VOSICHT: Explisionsgefahr bei unsachgemaben Austausch der Batterie.Ersatz nur durch densellben order einem vom Hersteller empfohlene-mahnlichen Typ. Entsorgung gebrauchter Batterien navh Angaben des Herstellers.
16. ACHTUNG: Es besteht die Explosionsgefahr, falls die Batterie auf nicht fach-männische Weise gewechselt wird. Verfangen Sie die Batterie nur gleicher oder entsprechender Type, wie vom Hersteller empfohlen. Entsorgen Sie Batterien nach Anweisung des Herstellers.

Der arbeitsplatzbezogene Schalldruckpegel nach DIN 45 635 Teil 1000 beträgt 70dB(A) oder weiger.

Haftungsausschluss: Die Bedienungsanleitungen wurden entsprechend der IEC-704-1 erstellt. Advantech lehnt jegliche Verantwortung für die Richtigkeit der in diesem Zusammenhang getätigten Aussagen ab.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

1. To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
2. Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

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CHAPTER 1

Overview

This chapter gives background information on the ARK-3384. It shows you the ARK-3384 overview and specifications.

- Introduction
- Hardware Specifications
- Chassis Dimensions

Chapter 1 Overview

1.1 Introduction

The ARK-3384 is a wireless fanless embedded box computer that combines wireless LAN, one 10/100Base-T Fast Ethernet, three USB 2.0 ports, two serial ports, digital LVDS & analog VGA/CRT display interfaces. The ARK-3384 is supplied with AC'97 dual output 6W stereo audio in a rugged, compact chassis for multimedia intensive and data communication based applications. The fanless operation provides noise protection to the platform when deployed in external environments. The ARK-3384 Embedded Box computer is ideally suited for embedded PC applications. All electronics are conveniently protected in a compact sealed housing, ideal for applications in which space and environmental demands are critical.

1.2 Features

1.2.1 Wireless Enabled, IEEE 802.11b/g Compliant

- The built-in IEEE 802.11b/g compliant wireless LAN interface, and IEEE 802.3u compliant 10/100Base-T Fast Ethernet interface, plus the low power consumption Pentium® M / Celeron® M processor make the ARK-3384 an ideal communication gateway that allows users to perform remote and local processing for many diversified embedded applications such as:

  - Machine to Machine (M2M) communications between remote measurement systems, control facilities, service & supervising control systems

  - Sensor data transmission to a central unit

1.2.2 Dual Display, Dual Output 6W Stereo AC97 Audio

- Analog VGA and digital LVDS interfaces that support dual independent displays and AC97 audio with stereo 6 W outputs suit diverse embedded multimedia applications such as:

  - Building Automation

  - Wireless Embedded Server

  - Elevator Infotainment Platform

  - Wireless Kiosk/POS/POI/Gaming system platform

1.2.3 Highly Scalable Performance with Low Power Consumption

- Scalable Low Voltage and Ultra Low Voltage Pentium M class processor system delivers high computing performance with low power consumption
- Fanless operation with low power consumption in aluminum sealed construction. that accepts a wide input voltage range from 12 ~ 24 V DC
- Accepts a wide range of ATX-supported DC power inputs for maximum flexibility

1.2.4 Highly Compact, Robust Casting Construction with Optimized Integration

- A special cushioned design that absorbs vibration to ensure maximum reliability under harsh conditions
- With its maximum mounting height of 69 mm, the ARK-3384 can be used in space critical installation conditions
- Few parts, easy integration and easy maintenance for reduced investment
- Systems are supplied “Ready-to-Run”
- Long life cycle support for product continuity

1.3 Hardware Specification

1.3.1 Processor Core Logic System

- **CPU**

  Intel® Ultra Low Voltage Celeron® M or Intel® Pentium® M Low Voltage Processor, µFC-BGA 479 Package:

  - ULV Celeron® M 1.0 GHz (for Model of ARK-3384-1S0A2E)

  - LV Pentium® M 1.4 GHz (for Model of ARK-3384-1S4A2E)

- **System Chipset**

  Intel® 852GM or Intel® 855GME Memory Controller Hub (GMCH) Chipset:

  - Intel® 852GM for model of ARK-3384-1S0A2E

  - Intel® 855GME for model of ARK-3384-1S4A2E

  - Intel® FW82801DB I/O Controller Hub 4 (ICH4) Chipset

  - 400 MHz FSB

- **BIOS:** 4 Mbit Flash BIOS, supports Plug & Play
- **Power Management:** Supports ATX, APM Rev 1.2 and ACPI
- **System Memory**
  - One 200 pin SO-DIMM socket
  - Support DDR SDRAM Up to 1 GB

1.3.2 Display

- **Chipset**

Integrated graphics built-in Intel® 852GM GMCH, or Intel® 855GME GMCH, utilizing Intel® Extreme Graphics 2 technology

- **Display Memory**
  - Dynamic video memory allocation up to 64 MB
- **Display Interface support**
  - CRT Interface
  - 36-bit LVDS interface

1.3.3 Audio

- **Audio Interface**

- Audio controller on the ICH4 chip

- AC97 3D surround stereo sound, Dual 6 W Amplifier

- Support Line_In, Line_Out, and Microphone_In

1.3.4 Ethernet

- **Ethernet Controller:** Intel® 82551QM Ethernet Controller
- **Speed:** 10/100MBps, IEEE 802.3u (100 BASE-T) protocol compatible

1.3.5 Wireless LAN

- **802.11b/g Wireless LAN**:

- Built-in integrated MAC/baseband processor, supports IEEE 802.11b and 802.11g standard protocol and operates in the 2.4 GHz frequency bands Support data

speed up to 54 Mbps

- Built-in system antenna support

1.3.6 Serial

- **USB Interface**

- Integrated USB 2.0 controller built-in Intel® FW82801DB I/O Controller Hub 4 (ICH4) Chipset

- **COM Interface**

  - Supports three USB 2.0 Ports

1.3.7 Other

- **Watchdog Timer**: 255 levels timer interval, setup by software
- **Keyboard/Mouse**: One PS/2 Port to support PS/2 Mouse and PS/2 Keyboard

1.3.8 Storage

- Supports a drive bay space for 2.5'' HDD
- Supports a CompactFlash socket for Type I/II CompactFlash disk

1.3.9 Mechanical

- **Construction**: Aluminum housing
- **Mounting**: DIN-rail mounting, Desk/wall mounting
- **Dimensions** (W x H x D): 264.5 mm x 69.2 mm x 137.25 mm (10.41"x 2.72"x 4.4")
- **Weight**: 2 KG

1.3.10 Power Supply

- **Output Rating** 46 W
- **Fuse Rating** 7 A @ 125 V
- **Input Voltage**: 12 VDC ~ 24 VDC,

  - Typical:

    12 VDC @ 4.5 A,

    16 VDC @ 3.4 A,

    19 VDC @ 2.9 A,

    24 VDC @ 2.3 A

1.3.11 Environmental Specifications

- **Operating Temperature**

  - When System is equipped with Industrial Grade Compact Flash Disk only: -20 to 60° C

  - When System is equipped with 2.5-inch Hard Disk: 0 to 45° C

- **Relative humidity** 95 % @ 40 ° C (non-condensing)
- **Vibration loading during operation**

- When system is equipped with Compact Flash Disk only:
5G, IEC 68-2-64, random, 5~500Hz, 1 Oct./min, 1hr/axis.
- When system is equipped with 2.5-inch hard disk:
1G, IEC 68-2-64, random, 5~500Hz, 1 Oct./min, 1hr/axis.

- **Shock during operation**
- When system is equipped with Compact Flash Disk only:
50G, IEC 68-2-27, half sine, 11 ms duration
- When system is equipped with Hard Disk:
20G, IEC 68-2-27, half sine, 11 ms duration
- **EMC Approved**: CE, FCC Class A
- **Safety Approved**: UL

1.4 Chassis Dimensions

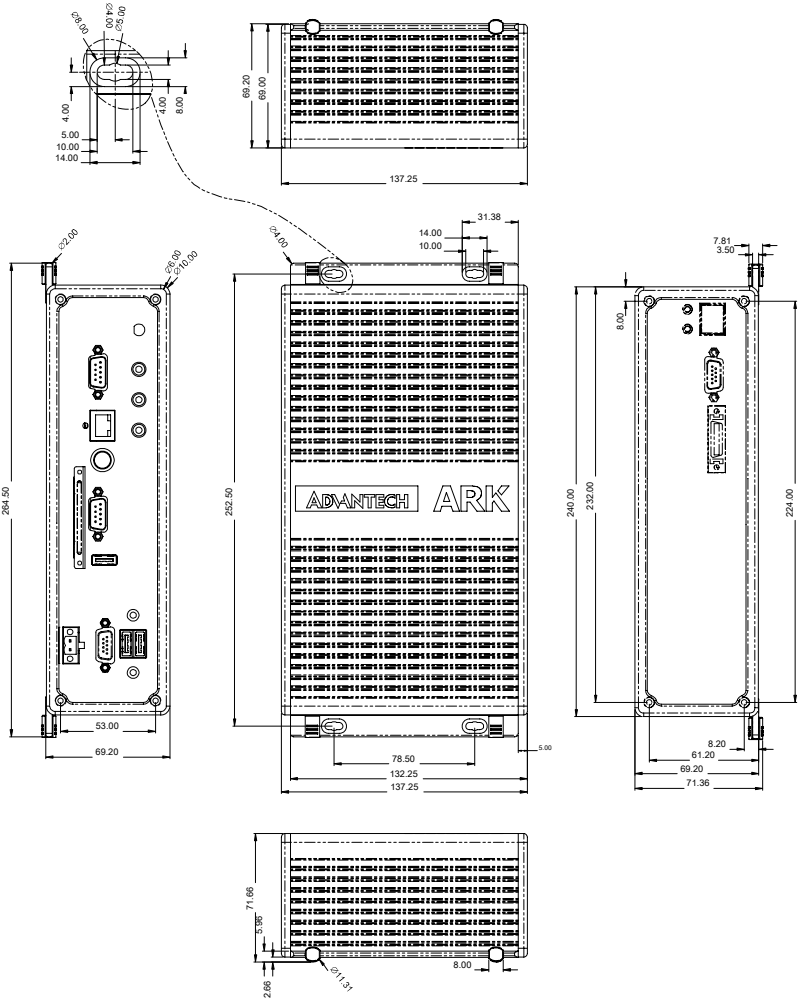


Figure 1.1: Chassis Dimensions

CHAPTER 2

Hardware Functionality

This chapter shows how to set up the ARK-3384's hardware functions, including connecting peripherals, switches and indicators.

Sections include:

- Introduction of ARK-3384 External I/O Connectors
- ARK-3384 front metal face plate external I/O connectors
- Power On/Off button
- LED Indicators
- LVDS Connector
- LCD Backlight On/Off control Connector
- ARK-3384 rear metal face plate external I/O Connectors
- Power Input Connector
- COM2 Connector
- USB Connectors
- VGA Connector
- PS2 Keyboard/Mouse Connector
- Reset Button
- Ethernet Connector
- COM1 Connector
- LINE IN Connector
- MIC. IN Connector
- LINE OUT Connector

Chapter 2 Hardware Functionality

2.1 Introduction of ARK-3384 External I/O Connectors

The following two figures show the external I/O connectors on ARK-3384. The following sections give you detailed information about the functions of each I/O connector.

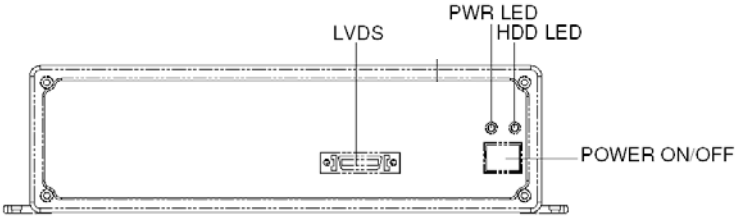


Figure 2.1: ARK-3384 front metal face plate external I/O connectors

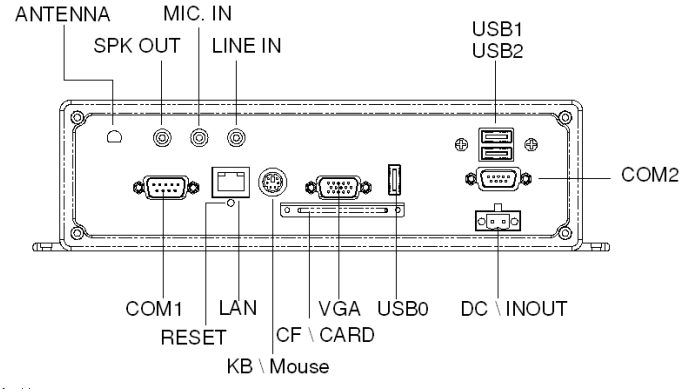


Figure 2.2: ARK-3384 rear metal face plate I/O connectors

2.2 ARK-3384 front metal face plate external I/O connectors

2.2.1 Power ON/OFF Button

The ARK-3384 comes with a Power On/Off button, that supports the dual functions of Soft Power -On/Off (Instant off or Delay 4 Second), and Suspend.

2.2.2 LED Indicators

There are two LEDs on the ARK-3384 front metal face plate for indicating system status: PWR LED is for power status and flashes in red color; and HDD LED is for hard disk and compact flash disk status, which flashes in green color.

2.2.3 LVDS Connector

The ARK-3384 comes with a D-Sub 26-pin connector that carries LVDS signal output, and can directly connect to LVDS LCD display via external cable. The system also provides a jumper of JP6 on internal PCM-9380 or PCM-9386 motherboard for selecting the LCD signal power of 5 V or 3.3V.

Please refer to section 3.4 of Chapter 3 for the jumper table of J6, and Chapter 9 for "Full Disassembly Procedure" to set it up. The default setting of J6 is 5V.

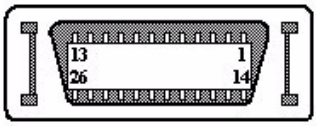


Figure 2.3: LVDS Connector

Table 2.1: LVDS Connector Pin Assignment			
Pin	Signal Name	Pin	Signal name
1	LVDS_CLKBP	14	LVDS_CLKBM
2	GND	15	LVDS_YAM0
3	LVDS_YAP0	16	LVDS_YAM1
4	LVDS_YAP1	17	LVDS_YAM2
5	LVDS_YAP2	18	LVDS_CLKAM
6	LVDS_CLKAP	19	GND
7	+3.3 or +5V	20	+3.3 or +5V
8	GND	21	LVDS_YAM3
9	LVDS_YAP3	22	LVDS_YBM0
10	LVDS_YBP0	23	LVDS_YBM1
11	LVDS_YBP1	24	LVDS_YBM2
12	LVDS_YBP2	25	LVDS_YBM3
13	LVDS_YBP3	26	GND

2.2.4 LCD Backlight On/Off control Connector

The ARK-3384 comes with a D-Sub 9-pin connector which provides BKLTEN signal as well as +12V, +5V and Ground Pin signals that allow users to connect these signals to the LCD Inverter to implement the LCD On/Off control.

- Provides BKLTEN signals that the inverter module requires for controlling the on/off
- Provides 12V, 5V as the Inverter Power Source.

The additional VBR signal pin could be connected to LCD's Inverter that allows users to implement brightness adjustments through the customer's software utility.

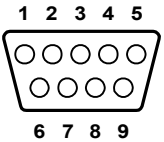


Figure 2.4: LCD Backlight connector

Table 2.2: LCD Backlight Connector Pin Assignment	
Pin	Signal name
1	+12V
2	GND
3	BKLTEN
4	VBR
5	+5V
6	LVDS_DCLK
7	LVDS_DDAT
8	Reserved
9	Reserved

2.3 ARK-3384 rear metal face plate external I/O connectors

2.3.1 Power Input Connector

The ARK-3384 comes with a Phoenix connector that carries 12~24 VDC external power input.

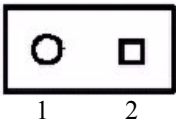


Figure 2.5: Power Input Connector

Table 2.3: Power connector pin assignments	
Pin	Signal Name
1	GND
2	+12~24VDC

2.3.2 COM1 Connector

The ARK-3384 provides a D-sub 9-pin connector, which offers one standard RS-232 serial communication interface port of COM1.

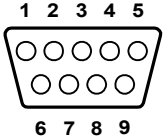


Figure 2.6: COM 1 connector

Table 2.4: COM1 standard serial port pin assignments	
Pin	Signal Name
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

2.3.3 COM2 Connector

The ARK-3384 provides a D-sub 9-pin connector, which offers one RS-232/422/485 serial communication interface port of COM2. The default setting of COM1 is RS-232. The RS-422/485 mode of COM2 can be configured via replacing the system internal cable of P/N of 1700001967, and adjust the jumper pins (J3/J4/J5) inside of system motherboard. The cable of P/N of 1700001967 can be found from the accessory box of product carton.

Please refer to section 3.3 "Jumper Settings" and Chapter 9 "Full Disassembly Procedure" to set up RS-422 or RS-485.

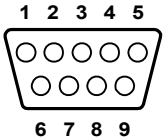


Figure 2.7: COM 2 connector

Table 2.5: COM2 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”

2.3.4 Audio Connector

The ARK-3384 offers AC97 stereo Audio ports by three phone jack connectors: Speaker_Out, Mic_In and Line_In,

Table 2.6: Line_In connector	
Line-In Connector	
Footprint	Phone Jack 3.5f5P, 90 Degree, Female, BLUE color, with SHIELDED

Table 2.7: Speaker_Out connector	
Speaker-Out Connector	
Footprint	Phone Jack 3.5f5P, 90 Degree, Female, LIME color, with SHIELDED

Table 2.8: Mic_In connector	
Mic-In Connector	
Footprint	Phone Jack 3.5f5P, 90 Degree, Female, PINK color, with SHIELDED

2.3.5 Ethernet Connector (LAN)

The ARK-3384 is equipped with an Intel 82551ER Ethernet controller that is fully compliant with IEEE 802.3u 10/100Base-T 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 (white LED).

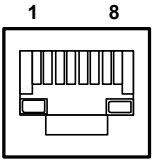


Figure 2.8: Ethernet connector

Table 2.9: RJ-45 Connector pin assignments	
Pin	10/100BaseT Signal Name
1	XMT+
2	XMT-
3	RCV+
4	NC
5	NC
6	RCV-
7	NC
8	NC

2.3.6 Reset Button

Press the "Reset" button to activate the reset function.

2.3.7 PS2 Keyboard/Mouse Connector

The ARK-3384 provides a PS/2 keyboard/mouse connector. A 6-pin mini-DIN connector is located on the rear metal face plate of the ARK-3384. The ARK-3384 comes with an adapter to convert from the 6-pin mini-DIN connector to two 6-pin mini-DIN connectors for PS/2 keyboard and PS/2 mouse connection. Please refer to Appendix A. for its pin assignments.

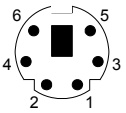


Figure 2.9: PS/2 connector

Table 2.10: PS/2 Keyboard/Mouse connector pin assignments	
Pin	Signal name
1.	PS2_KBDAT
2.	PS2_MSDAT
3.	GND

Table 2.10: PS/2 Keyboard/Mouse connector pin assignments	
4.	VCC
5.	PS2_KBCLK
6.	PS2_MSCLK

2.3.8 VGA Connector

The ARK-3384 provides a high resolution VGA interface by a D-sub 15-pin connector to support a VGA CRT monitor. It supports VGA and VESA, up to 1600 x 1200 @85-Hz resolution and up to 32 MB shared memory. Pin assignments for the VGA display are detailed below.

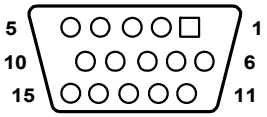


Figure 2.10: VGA connector

Table 2.11: VGA connector pin assignment	
Pin	Signal name
1	Red
2	Green
3	Blue
4	NC
5	GND
6	GND
7	GND
8	GND
9	NC
10	GND
11	NC
12	NC
13	H-SYNC
14	V-SYNC
15	NC

2.3.9 USB Connector

The ARK-3384 provides three connectors for USB, which give complete Plug & Play and hot swapping capability for up to 127 external devices. The USB interface complies with USB UHCI, Rev. 2.0. The USB interface can be disabled in the system BIOS setup. Please refer to Table 2.12 for pin assignments. The USB connectors are universal connectors used for connecting many different digital devices. The USB interface supports Plug and Play, which enables you to connect or disconnect a device whenever you want, without turning off the computer.

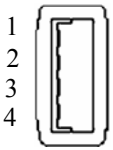


Figure 2.11: USB0 connector

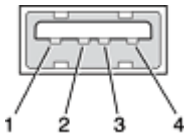


Figure 2.12: USB1 and USB2 connector

Table 2.12: USB Connector

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

CHAPTER 3

Hardware Installation and Upgrade

This chapter introduces how to initialize the ARK-3384.

Sections include:

- Jumpers and Connectors
- Installing the DDR SDRAM Memory Module
- Inserting a Compact Flash Card
- Installing the 2.5" Hard Disk Drive (HDD)
- Connecting Power
- Installing the DIN Rail Mounting

Chapter 3 Hardware Installation and Upgrade

3.1 Jumpers and Connectors

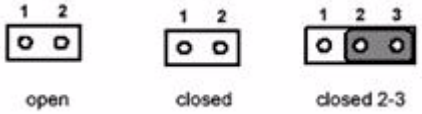
The ARK-3384 Embedded Box Computer consists of a PC-based computer that is housed in an aluminum top cover, a metal bottom case with accessible bottom cover and Front/ Rear metal Face plate. Your HDD, SDRAM DIMM, are all readily accessible by removing the bottom cover. Any maintenance or hardware upgrades can be easily completed after removing the top cover, and front with rear metal face plates. If you are a systems integrator and need to know how to completely disassemble the embedded box computer, you can find more useful information in Chapter 9.

Warning! *Warning! Do not remove any mechanical parts, such as the top cover, bottom cover and front/ rear face plate until you have verified that no power is flowing within the Embedded Box Computer. Power must be switched off and the power cord must be unplugged. Every time you service the Embedded Box Computer.*

3.2 Setting jumpers

You can configure your ARK-3384 to match the needs of your application by setting jumpers. A jumper is the simplest kind of electrical switch. 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 pins 2 and 3.

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



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.

3.3 COM2 RS-232/422/485 Jumper setting (J3/J4/J5 Located on internal motherboard)

The COM2 port located on rear face plate of ARK-3384 unit can be configured to operate in RS-232, RS-422 or RS-485 mode by setting up the Jumper Pins of J3/J4/J5 located on internal motherboard of ARK-3384 unit. The default setting of COM2 is RS-232.

Table 3.1: COM2 RS-232/422/485 Jumper setting

Function	Setting
RS-232 *	J3 (1-2 closed) (J4, J5 open)
RS-422	J4 (1-2 closed) (J3, J5 open)
RS-485	J5 (1-2 closed) (J3, J4 open)

(*): means default setting of the jumper/function

Please also refer to Chapter 9 "Full Disassembly Procedure of ARK-3384 Embedded Box Computer".

3.4 LCD Power Jumper Setting (J6)

The ARK-3384 embedded box computers provides a jumper J6 located internally on the PCM-9380 or PCM-9386 motherboard for selecting the LCD signal power of 5V or 3.3V. When you connect your LVDS LCD Panel display, you need to set up J6 for LCD power setting selection for your LVDS Panel display.

Table 3.2: LCD Power Setting (J6)	
Close pins	Function
1-2	+5V*
2-3	+3.3V

(*): means default setting of the jumper/function

Please also refer to Chapter 9 of "Full Disassembly Procedure".

The default setting of J6 is 5V.

3.5 Installing the DDR SDRAM Memory Module

The ARK-3384 provides one 200-pin SODIMM (Small Outline Dual Inline Memory Module) socket and supports 2.5 V DDR SDRAM. You can install from 64 MB up to 1 GB of DDR SDRAM memory. The procedure for installing a DDR SDRAM SODIMM into the ARK-3384 is detailed below, please follow these steps carefully.

3.5.1 Remove the power cord.

3.5.2 Unscrew the four screws from the bottom cover of the ARK-3384.

3.5.3 Remove the bottom cover.

3.5.4 Carefully insert a DDR SDRAM SODIMM into a DDR SDRAM SODIMM on board.

3.5.5 Screw back the bottom cover with the four screws.

3.6 Installing a Compact Flash Card

The procedure for installing a CompactFlash card into the ARK-3384 is detailed below, please follow these steps carefully.

3.6.1 Remove the power cord.

3.6.2 Unscrew the two screws from the CF door located on rear face plate of the ARK-3384 embedded box computer.

Figure 3.1:

3.6.3 Remove the CF carrier.

3.6.4 Place the Compact Flash card with your OS or application program into a CF carrier.

Figure 3.2:

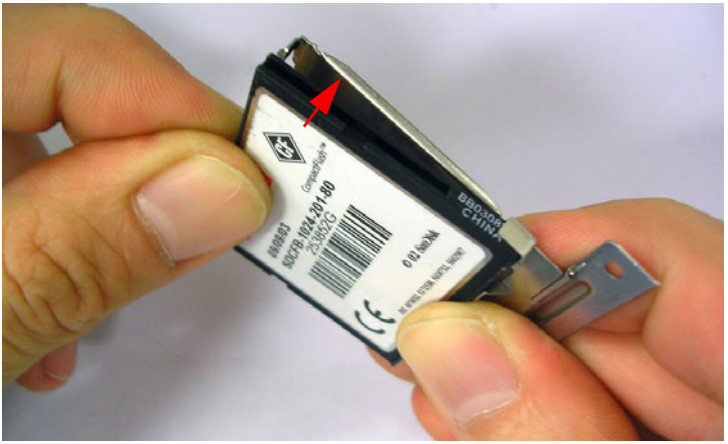


Figure 3.3:

3.6.5 Insert the CF carrier back and assemble with 2 screws to the CF Door located on rear face plate of the ARK-3384

Figure 3.4:

Note: The Compact Flash socket is allocated as Secondary IDE Master.

3.7 Installing the 2.5" Hard Disk Drive (HDD)

You can attach one enhanced Integrated Device Electronics (IDE) hard disk drive to the ARK-3384's internal controller which uses a PCI local-bus interface. The advanced IDE controller supports faster data transfer and allows the IDE hard drive to exceed 528 MB. The following are instructions for installation:

3.7.1 Remove the power cord.

3.7.2 Unscrew the four screws from bottom cover of the ARK-3384.

3.7.3 Remove the bottom cover of the ARK-3384.

3.7.4 Assembly the hard disk to the bottom cover.

3.7.5 Connect the IDE flat cable to the connector to the hard disk.

3.7.6 Screw back the bottom cover with the four screws.

3.8 Connecting Power

Connect the ARK-3384 to a 12~24 VDC power source. The power source can either be from a power adapter or an in-house power source.

3.9 Installation of Din Rail Mounting

The procedure of installing the ARK-3384 on the rail is detailed below, please follow these steps carefully.

i. Remove the rubber feet from the ARK-3384.

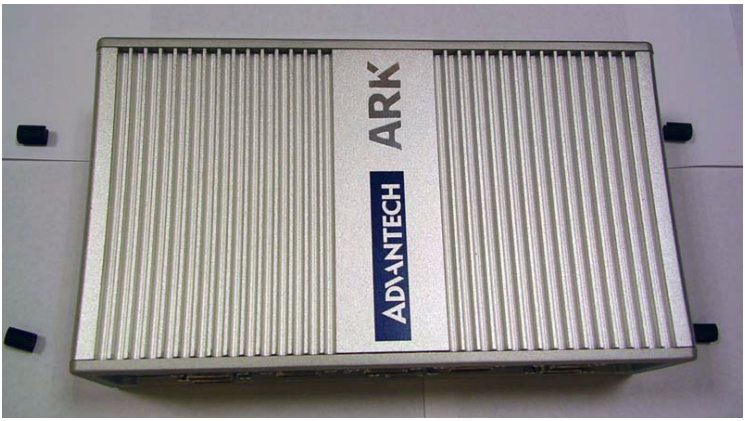


Figure 3.5:

ii. Find the DIN Rail Mounting Kit in the ARK-3384 accessory box. This kit has 2 pieces: an L DIN Rail Mounting Module (Left) and a R DIN Rail Mounting Module (Right).

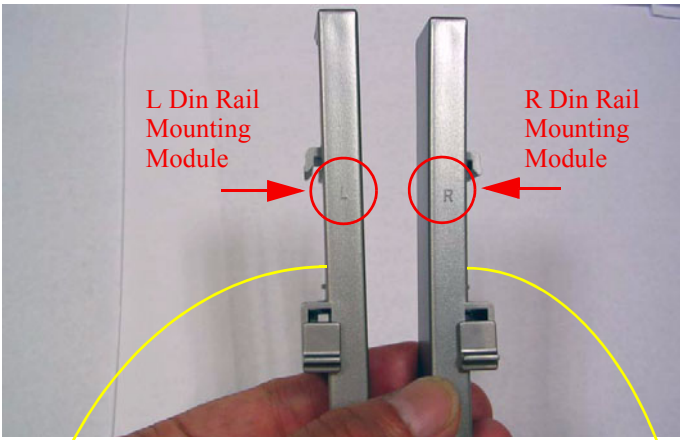


Figure 3.6:

iii. Attach the L-Din Rail Mounting module and R-Din Rail Mounting module to the ARL-3380 unit.

Figure 3.7:

Figure 3.8:

Figure 3.9:

iv. The sample DIN-Rail below

Figure 3.10:

v. Install the ARK-33383 unit to the rail, please make sure the hook of the Din-Rail mounting kit on the ARK-33383 unit will contact with the tooth of the DIN-Rail firmly.

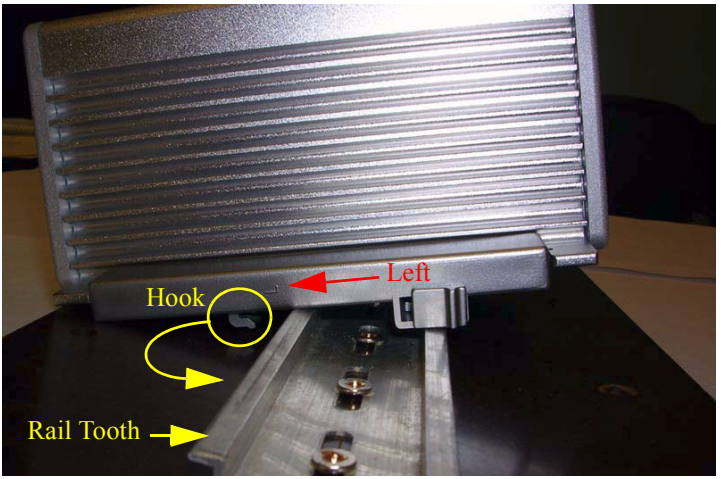


Figure 3.11:

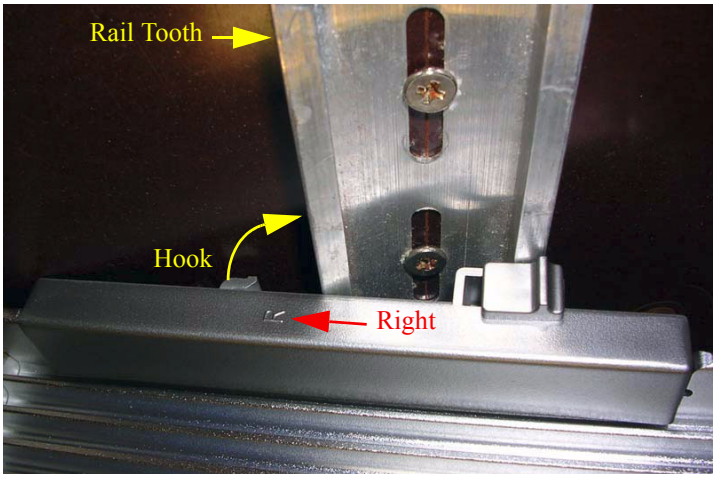


Figure 3.12:

vi. Push the Hook Switch to fix the mounting between ARK-33383 unit and DIN-Rail.

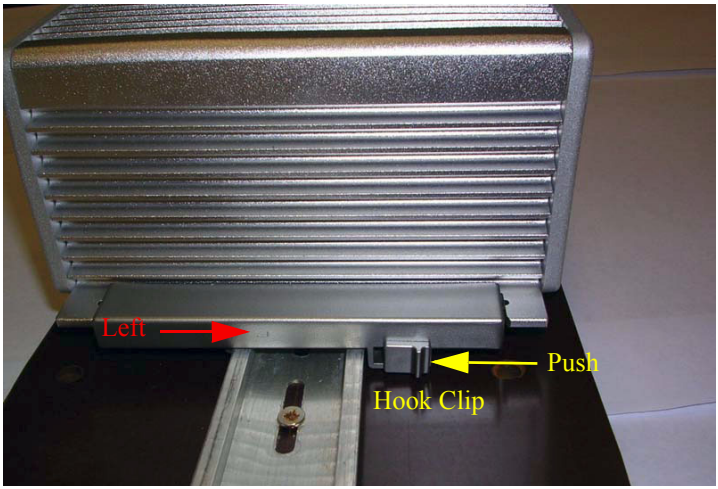


Figure 3.13: Left Side View

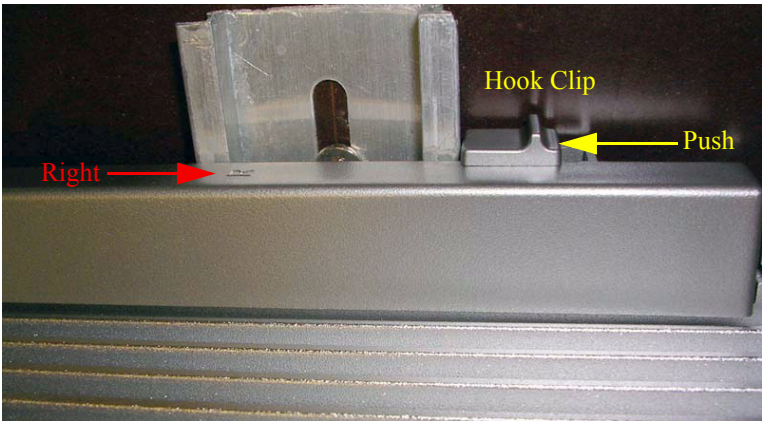


Figure 3.14: Right Side View

vii. Below, the ARK-33383 unit mounted on the rail with DIN-Rail mounting kit

Figure 3.15:

CHAPTER 4

Award BIOS Setup

Chapter 4 Award BIOS Setup

4.1 Introduction

Award's BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed memory (CMOS RAM) so that it retains the setup information when the power is turned off.

4.1.1 CMOS RAM Auto-backup and Restore

The CMOS RAM is powered by an onboard button cell battery. When you finish BIOS setup, the data in CMOS RAM will be automatically backed up to Flash ROM. If operation in harsh industrial environment causes a soft error, the BIOS will recheck the data in CMOS RAM and automatically restore the original data in Flash ROM to CMOS RAM for booting.

Note: If you intend to change the CMOS setting without restoring the previous backup, you have to click on "DEL" within two seconds of the "CMOS checksum error..." display screen message appearing. Then enter the "Setup" screen to modify the data. If the "CMOS checksum error..."message appears again and again, please check to see if you need to replace the battery in your system.

4.2 Entering Setup

Turn on the computer and check for the "patch code". If there is a number assigned to the patch code, it means that the BIOS supports your CPU. If there is no number assigned to the patch code, please contact Advantech's applications engineer to obtain an up-to-date patch code file. This will ensure that your CPU's system status is valid. After ensuring that you have a number assigned to the patch code, press <Del> to enter setup.

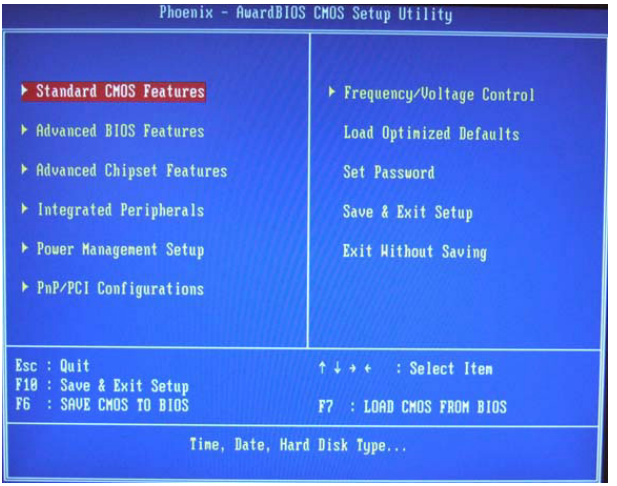


Figure 4.1: Award BIOS Setup initial screen

4.3 Standard CMOS Setup

Choose the "Standard CMOS Features" option from the "Initial Setup Screen" menu, and the screen below will be displayed. This menu allows users to configure system components such as date, time, hard disk drive, display, and memory.

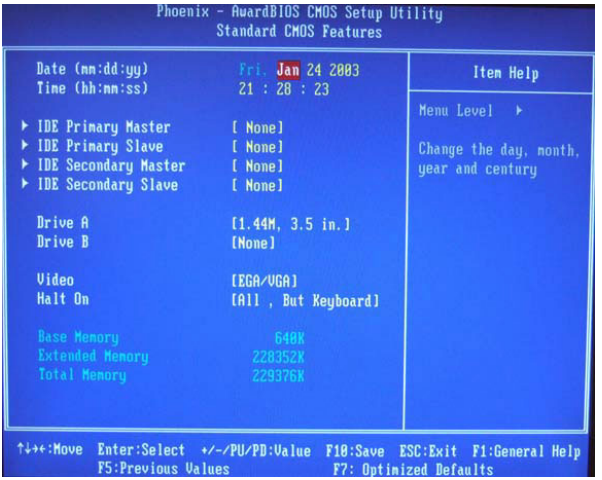


Figure 4.2: Standard CMOS features screen

4.4 Advanced BIOS Features

The “Advanced BIOS Features” screen appears when choosing the “Advanced BIOS Features” item from the “Initial Setup Screen” menu. It allows the user to configure the ARK-3384 according to his particular requirements. Below are some major items that are provided in the Advanced BIOS Features screen. A quick booting function is provided for your convenience. Simply enable the Quick Booting item to save yourself valuable time

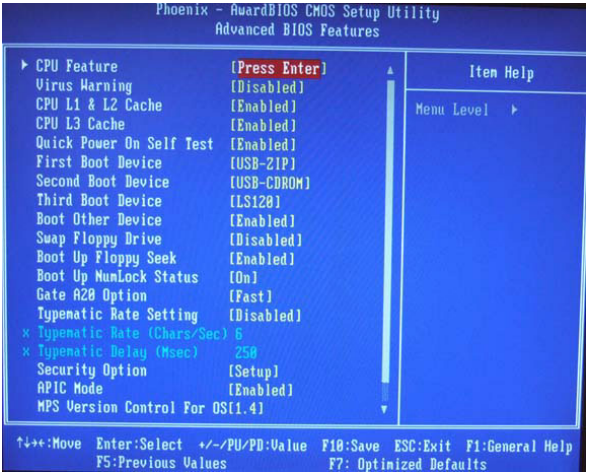


Figure 4.3: Advanced BIOS features screen

4.4.1 CPU Feature

Press Enter to configure the settings relevant to CPU Feature.

4.4.2 Virus Warning

If enabled, a warning message and alarm beep activates if someone attempts to write here. The commands are “Enabled” or “Disabled.”

4.4.3 CPU L1 & L2 Cache

Enabling this feature speeds up memory access. The commands are “Enabled” or “Disabled.”

4.4.4 Quick Power On Self Test

This option speeds up the Power-On Self Test (POST) as soon as the computer is turned on. When enabled, the BIOS shortens or skips some of the items during the test. When disabled, the computer conducts normal

POST procedures.

4.4.5 First/Second/Third/ Boot Other Device

The BIOS tries to load the OS with the devices in the sequence selected. Choices are: Floppy, LS/ZIP, HDD, SCSI, CDROM, LAN, Disabled.

4.4.6 Swap Floppy Drive

Logical name assignments of floppy drives can be swapped if there is more than one floppy drive. The commands are “Enabled” or “Disabled.”

4.4.7 Boot UP Floppy Seek

Selection of the command “Disabled” will speed the boot up. Selection of “Enabled” searches disk drives during boot up.

4.4.8 Boot Up NumLock Status

This feature selects the “power on” state for NumLock. The commands are “Enabled” or “Disabled.”

4.4.9 Gate A20 Option

Normal: A pin in keyboard controller controls GateA20 Fast (Default): Chipest controls GateA20.

4.4.10 Typematic Rate Setting

The typematic rate is the rate key strokes repeat as determined by the keyboard controller. The commands are “Enabled” or “Disabled.” Enabling allows the typematic rate and delay to be selected.

4.4.11 Typematic Rate (Chars/Sec)

BIOS accepts the following input values (characters/second) for typematic rate: 6, 8, 10, 12, 15, 20, 24, 30.

4.4.12 Typematic Delay (msec)

Typematic delay is the time interval between the appearance of two consecutive characters, when holding down a key. The input values for this category are: 250, 500, 750, 1000 (msec).

4.4.13 Security Option

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

4.4.14 APIC Mode

APIC stands for Advanced Programmable Interrupt Controller. The default setting is Enabled.

4.4.15 MPS Version Control For OS

This option is specifies the MPS (Multiprocessor Specification) version for your operating system. MPS version 1.4 added extended configuration tables to improve support for multiple PCI bus configurations and improve future expandability. The default setting is 1.4.

4.4.16 OS Select for DRAM > 64MB

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

4.4.17 Report No FDD For WIN 95

If you are using Windows 95/98 without a floppy disk drive, select Enabled to release IRQ6. This is required to pass Windows 95/98's SCT test. You should also disable the Onboard FDC Controller in the Integrated Peripherals screen when there's no floppy drive in the system. If you set this feature to Disabled, the BIOS will not report the missing floppy drive to Win95/98.

4.4.18 Small Logo (EPA) Show

The EPA logo appears at the right side of the monitor screen when the system is boot up. The default setting is Enabled.

4.5 Advanced Chipset Features

The “Advanced Chipset Features” screen appears when choosing the “Advanced Chipset Features” item from the “Initial Setup Screen” menu. It allows the user to configure the system chipset according to his particular requirements. Below are some major items that are provided in the Advanced Chipset Features screen.

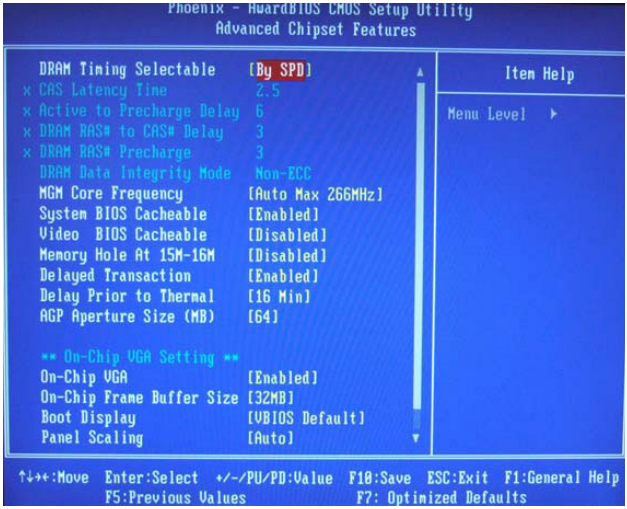


Figure 4.4: Advanced Chipset features screen

4.5.1 DRAM Timing Selectable

This option refers to the method by which the DRAM timing is selected. The default is By SPD.

4.5.2 CAS Latency Time

You can configure CAS latency time in HCLKs as 2 or 2.5 or 3. The system board designer should set the values in this field, depending on the DRAM installed. Do not change the values in this field unless you change specifications of the installed DRAM or the installed CPU.

4.5.3 Active to Precharge Delay

The default setting for the Active to Precharge Delay is 7.

4.5.4 DRAM RAS# to CAS# Delay

This option allows you to insert a delay between the RAS (Row Address Strobe) and CAS (Column Address Strobe) signals. This delay occurs when the SDRAM is written to, read from or refreshed. Reducing the delay improves the performance of the SDRAM.

4.5.5 DRAM RAS# Precharge

This option sets the number of cycles required for the RAS to accumulate its charge before the SDRAM refreshes. The default setting for the Active to Precharge Delay is 3.

4.5.6 DRAM Data Integrity Mode

Select ECC if your memory module supports it. The memory controller will detect and correct single-bit soft memory errors. The memory controller will also be able to detect double-bit errors though it will not be able to correct them. This provides increased data integrity and system stability.

4.5.7 MGM Core Frequency

This field sets the frequency of the DRAM memory installed. The default setting is Auto Max 266MHz.

4.5.8 System BIOS Cacheable

The setting of Enabled allows caching of the system BIOS ROM at F000h-FFFFFh, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

4.5.9 Video BIOS Cacheable

The Setting Enabled allows caching of the video BIOS ROM at C0000h-F7FFFh, resulting in better video performance. However, if any program writes to this memory area, a system error may result.

4.5.10 Memory Hole At 15M-16M

In order to improve performance, certain space in memory can be reserved for ISA cards. This memory must be mapped into the memory space below 16 MB. The choices are Enabled and Disabled.

4.5.11 Delayed Transaction

The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select Enabled to support compliance with PCI specification version 2.1.

4.5.12 Delay Prior to Thermal

This field activates the CPU thermal function after the systems boots for the set number of minutes. The options are 16 Min and 64 Min.

4.5.13 AGP Aperture Size (MB)

The field sets aperture size of the graphics. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. The default setting is 64M.

4.5.14 On-Chip VGA

The default setting is Enabled.