ARK-3389

Embedded Box Computer

User Manual

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Product Warranty (1 year)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for one year 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

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.

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

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.

ARK-3389 Series Model

There are three sub-models in ARK-3389 series listed below:

• ARK-3389-1M0A1 ULV Celeron®M 600 MHz Embedded Box Computer, with VGA/LVDS, Fast Ethernet, 1 x RS-232, 1 x RS-232/422/485

• ARK-3389-1S1A1 LV Pentium®M 1.1 GHz Embedded Box Computer, with VGA/LVDS, Fast Ethernet, 1 x RS-232, 1 x RS-232/422/485

• ARK-3389-1S4A1 LV Pentium®M 1.4GHz, Embedded Box Computer, with VGA/LVDS, Fast Ethernet, 1 x RS-232, 1 x RS-232/422/485

Packing list

Before installing your board, make sure that the following materials have been received:

• Warranty certificate

• Software Supporting CD-ROM

• 6P-6P-6P 20cm KB and PS/2 Mouse Y cable (P/N: 1700060202)

• DIN-rail mounting accessory (P/N: 1997001110, 1997001120, 1997001130,

1997001140)

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. 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

1.4.2 CAUTION!

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. 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:

a - Netzkabel oder Netzstecker sind beschädigt.

b - Flüssigkeit ist in das Gerät eingedrungen.

c - Das Gerät war Feuchtigkeit ausgesetzt.

d - Wenn das Gerät nicht der Bedienungsanleitung entsprechend funktioniert oder Sie mit Hilfe dieser Anleitung keine Verbesserung erzielen.

e - Das Gerät ist gefallen und/oder das Gehäuse ist beschädigt.

f - 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-3389. It shows you the ARK-3389 overview and specifications.

Sections include:

- Introduction
- Hardware Specifications
- Safety Precautions
- Chassis Dimension

Chapter 1 Overview

1.1 Introduction

The ARK-3389 Fanless Embedded Box Computer is an ideal application ready system platform solution. All electronics are protected in a compact sealed housing for easy embedding in customers own housing, or as a stand-alone application, where space is limited and the environment harsh.

1.1.1 Highly robust casting construction

- Fanless operation in Aluminum sealed housing
- A special cushioned design that absorbs vibration to ensure maximum reliability under harsh conditions

1.1.2 Highly Compact Size

- With its maximum mounting height of 69 mm, the ARK-3389 can be used in limited space critical conditions

1.1.3 Highly Scalable Performance with low power consumption

- Scalable Low Voltage and Ultra Low Voltage Pentium M class processor system to bring high computing performance with low power consumption

1.1.4 Optimized Integration

- Few Parts, easy integration, easy maintenance to reduce investment
- Systems are supplied ready to run
- Long life cycle support for product continuity
- Wide range of power source
- Wide range of DC 12V~24V power source offers flexibility of power input for various automation environments

1.1.5 Wide Range of Power Source

- Wide range of DC 12V~24V power source offers flexibility of power input for various automation environments

1.2 Hardware Specification

1.2.1 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 600 MHz (for Model of ARK-3389-1M0A1)
- LV Pentium® M 1.1 GHz (for Model of ARK-3389-1S1A1)
- LV Pentium® M 1.4 GHz (for Model of ARK-3389-1S4A1)

System Chipset

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

- Intel® 852GM for model of ARK-3389-1M0A1
- Intel® 855GME for model of ARK-3389-1S1A1 and ARK-3389-1S4A1

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

• 400 MHz FSB

BIOS: 4Mbit Flash BIOS, supports Plug & Play, APM 1.2

System Memory

• One 200 pin SO-DIMM sockets

• Support DDR SDRAM Up to 1GB

1.2.2 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 32 MB

Display Interface support

• CRT Interface

• 36-bit LVDS interface, optional support up to 48-bit

1.2.3 Ethernet

• Ethernet Controller: Intel® 82551ER Ethernet Controller

• Speed: 10/100MBps, IEEE 802.3u (100 BASE-T) protocol compatible

1.2.4 Other

• Watchdog Timer: 255 levels timer interval, setup by software

• Serial Port: One RS-232 port (COM1) and One RS-232/422/485 port (COM2)

• Keyboard/Mouse: One PS/2 Port to support PS/2 Mouse and PS/2 Keyboard

• USB: One USB 2.0 compliant universal serial bus port

1.2.5 Storage

• Supports a drive bay space for 2.5" HDD

• Supports a Compact Flash socket for Type I/II Compact Flash disk

1.2.6 Mechanical

• Construction: Aluminum housing

• Mounting: DIN-rail mounting, Desk/wall mounting

• Dimension (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

1.2.7 Power Supply

• Output Rating 46 W

• Fuse Rating 7 A @ 125 V

• Input Voltage: 12 VDC ~ 24 VDC,

Typical:

12 VDC @ 4.5A,

16 VDC @ 3.4 A,

19 VDC @ 2.9 A,

24 VDC @ 2.3 A

• Output Voltage:

+5 VDC @ 7 A

+12 VDC @ 0.5 A

+5VSB @ 1 A

1.2.8 Environment Specifications

• Operating Temperature

- When System is equipped with 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:

5Grms, IEC 68-2-64, random, 5~500Hz, 1 Oct./min, 1hr/axis.

- When system is equipped with 2.5-inch hard disk:

1Grms, IEC 68-2-64, random, 5~500Hz, 1 Oct./min, 1hr/axis.

• Shock during operation

- When system is equipped with Compact Flash Disk only:

50Grms, IEC 68-2-27, half sine, 11 ms duration

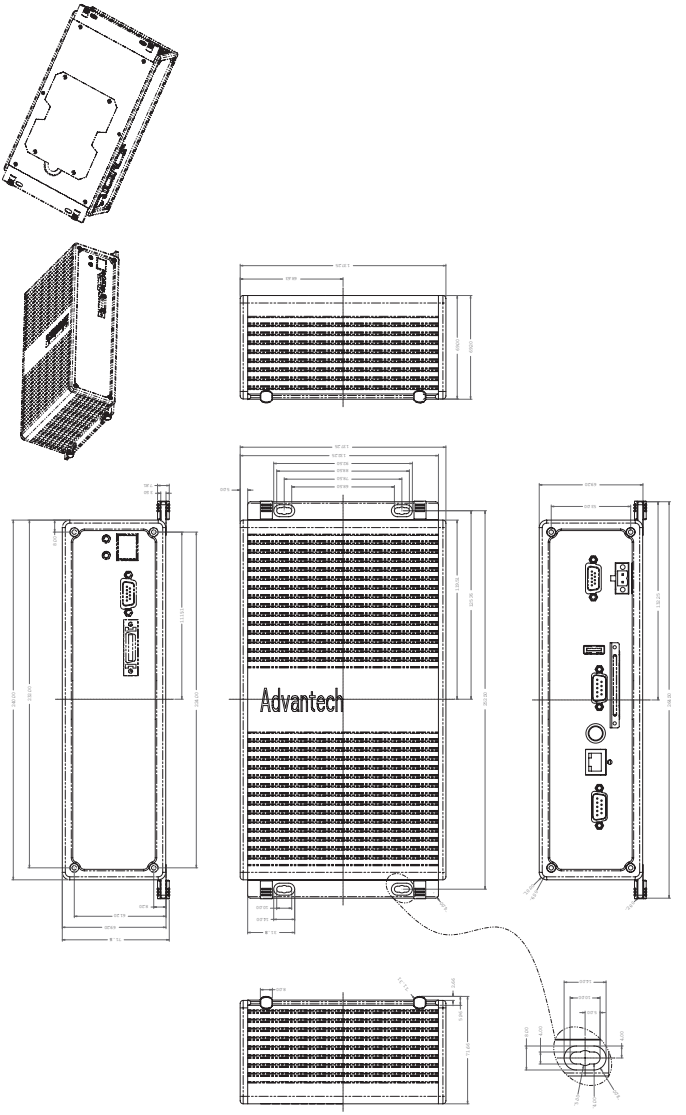
- When system is equipped with Hard Disk:

20Grms, IEC 68-2-27, half sine, 11 ms duration

• EMC Approved: CE, FCC Class A

• Safety Approved: UL

1.3 Chassis Dimensions



CHAPTER 2

Hardware Functionality

This chapter shows how to set up the ARK-3389's hardware functions, including connecting peripherals, switches and indicators.

Sections include:

- Introduction of External I/O Connectors
- Front metal face plate external I/O connectors
- Power Connector
- LED Indicators
- LVDS Connector
- LCD Backlight On/Off control Connector
- Rear metal face plate external I/O connectors
- COM1 Connector
- COM2 Connector
- Ethernet Connector
- Reset Button
- PS2 Keyboard/Mouse Connector
- VGA Connector
- USB Connector

Chapter 2 Hardware Functionality

2.1 Introduction of ARK-3389 External I/O Connectors

The following two figures show the external I/O connectors on ARK-3389. The following sections give you detailed information about the function of each I/O connector.

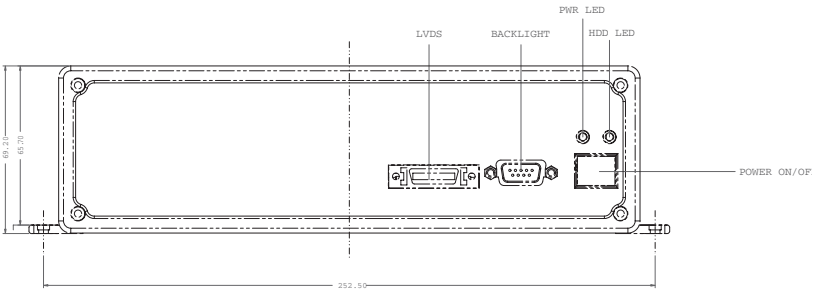


Figure 2.1: ARK-3389 front metal face plate external I/O connectors

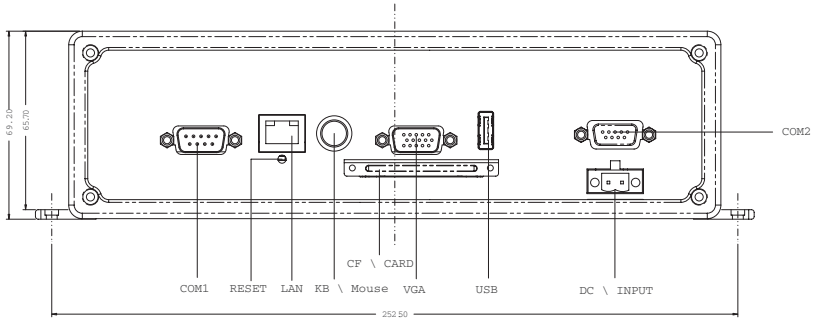


Figure 2.2: ARK-3389 rear metal face plate I/O connectors

2.2 ARK-3389 front metal face plate external I/O connectors

2.2.1 Power ON/OFF Button

The ARK-3389 comes with a Power On/Off button, that Support dual function Soft Power -On/Off (Instant off or Delay 4 Second), and Suspend.

2.2.2 LED Indicators

There are two LEDs on the ARK-3389 front face plate for indicating system status: PWR LED is for power status and flash in red color; and HDD LED is for hard disk and compact flash disk status, which flash in green color.

2.2.3 LVDS Connector

The ARK-3389 comes with a D-Sub 26-pin connector that carries LVDS signal output, and can direct connect to LVDS LCD display via external cable.

The system also provides a jumper for JP6 on internal PCM-9380 or PCM-9386 motherboard for selecting the LCD signal power of 5V or 3.3V, please refer to section 3.4 of Chapter 3 for the jumper table of JP6, and Chapter 6 of "Full Disassembly Procedure" to set it up. The default setting of JP6 is 5V.

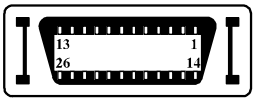


Table 2.1: LVDS Connector

Pin	Pin name	Pin	Pin 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-3389 comes with a D-Sub 9-pin connector which provides a BKLTEN signal as well as +12V, +5V and Ground Pin signals that allows system integrators to connect these signals to an LCD Inverter to implement the LCD On/Off control.

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

The additional VBR signal pin can be connected to the LCD's Inverter which allows integrators to implement brightness adjustment through customer's software utility.

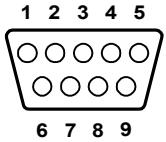


Table 2.2: LCD Backlight On/Off control Connector

Pin	Pin name
1	+12V
2	GND
3	BKLTEN
4	VBR
5	+5V
6	LVDS_DCLK
7	LVDS_DDAT
8	Reserved
9	Reserved

2.3 ARK-3389 rear metal face plate external I/O connectors

2.3.1 Power Input Connector

The ARK-3389 comes with a Phoenix connector that carries 12~24 VDC external power input.

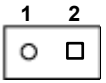


Table 2.3: Power connector pin assignments	
Pin	Signal Name
1	Ground
2	+12~24VDC

2.3.2 COM1 Connector

The ARK-3389 provides a D-sub 9-pin connector, which offers one standard RS-232 serial communication interface port of COM1.

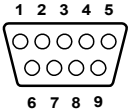


Table 2.4: COM1 standard serial port pin assignments	
Pin	Signal Name
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

2.3.3 COM2 Connector

The ARK-3389 provides a D-sub 9-pin connector, which offers one RS-232/422/485 serial communication interface port for COM2. The default setting of COM1 is RS-232. Please refer to section 3.3 “Jumper Settings” and Chapter 6 “Full Disassemblly Procedure” to set up RS-422 or RS-485.

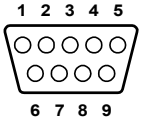


Table 2.5: COM1 standard serial port pin assignments

	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 = “No Connection”

2.3.4 Ethernet Connector (LAN)

The ARK-3389 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).

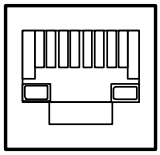


Table 2.6: RJ-45 Connector pin assignments

Pin	10/100BaseT Signal Name
1	XMT+
2	XMT-
3	RCV+
4	NC
5	NC
6	RCV-
7	NC
8	NC

2.3.5 Reset Button

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

2.3.6 PS2 Keyboard/Mouse Connector

The ARK-3389 provides a PS/2 keyboard/mouse connector. A 6-pin mini-DIN connector is located on the rear face plate of the ARK-3389. The ARK-3389 comes with an external Y cable to convert from the 6-pin mini-DIN connector to PS/2 keyboard and PS/2 mouse connection.

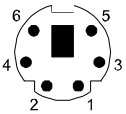


Table 2.7: PS2 Keyboard/Mouse Connector	
Pin	Pin name
1.	PS2_KBDAT
2.	PS2_MSDAT
3.	GND
4.	VCC
5.	PS2_KBCLK
6.	PS2_MSCLK

2.3.7 VGA Connector

The ARK-3389 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.

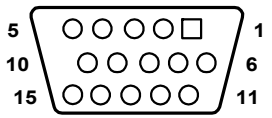


Table 2.8: VGA connector	
Pin	Signal Name
1	Red
2	Green
3	Blue
4	NC
5	GND
6	GND
7	GND
8	GND
9	NC
10	GND
11	NC
12	NC
13	H-SYNC

14	V-SYNC
15	NC

2.3.8 USB Connector

The ARK-3389 provides one connector for USB interface, which gives 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.



The USB connector is used for connecting any device that conforms to the USB interface. Many recent digital devices conform to this standard. The USB interface supports Plug and Play, which enables you to connect or disconnect a device whenever you want, without turning off the computer.

Table 2.9: USB Connector

Pin	Pin name		
1	VCC	2	VCC
3	USB_P0-	4	USB_P1-
5	USB_P0+	6	USB_P1+
7	GND	8	GND
9	GND	10	NC

CHAPTER 3

Hardware Installation and Upgrade

This chapter introduces how to initialize the ARK-3389.

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

Chapter 3 Hardware Installation and Upgrade

3.1 Jumpers and Connectors

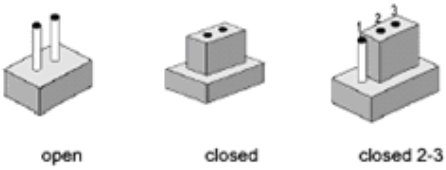
The ARK-3389 Embedded Box Computer consists of a PC-based computer that is housed in a aluminum top cover, a metal bottom case with accessed bottom cover and Front with Rear Metal Face plate. Your HDD, SDRAM, are all readily accessible by removing the accessed bottom cover. Any maintenance or hardware upgrades can be easily completed after removing the top cover, and Front with Rear Metal Face plate. 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 6.



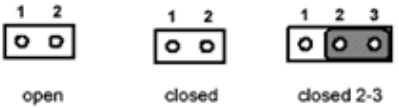
Warning! Do not remove any mechanical parts, such as the top cover, bottom cover and front with rear face plate until you have verified that no power is flowing within the embedded box computer. Power must be switched off and the power cord must be unplugged. Every time you service the embedded box computer, you should be aware of this.

3.2 Setting jumpers

You can configure your ARK-3389 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)

The COM2 port located on front metal face plate of ARK-3389 unit which 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-3389 unit.

Table 3.1: J3/J4/J5: COM2 RS-232/422/485 select

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

Please also refer to Chapter 6 “Full Disassembly Procedure” of ARK-3389 Embedded Box Computer”.

3.4 LCD Power Jumper Setting (JP6)

The ARK-3389 series of embedded box computers provide a jumper - JP6 located on internal PCM-9380 or PCM-9386 motherboard for selecting the LCD signal power of either 5V or 3.3V. When you connect your

LVDS LCD Panel display, you need to set the JP6 LCD power setting selection for your LVDS Panel display.

Table 3.2: LCD Power Setting (JP6)	
Setting	Function
1-2	+5V
2-3	+3.3V

Please also refer to Chapter 6 of "Full Disassembly Procedure" to set it up. The default setting of JP6 is 5V.

3.5 Installing the DDR SDRAM Memory Module

The ARK-3389 provides one 200-pin SODIMM (Small Outline Dual Inline Memory Module) socket and supports 2.5V DDR SDRAM. You can install from 64 MB to 1 GB of DDR SDRAM memory.

The procedure of installing a DDR SDRAM SODIMM into the ARK-3389 is detailed below, please follow these steps carefully.

1. Remove the power cord.
2. Unscrew the four screws from the bottom cover of the ARK-3389.
3. Remove the bottom cover.
4. Plug a DDR SDRAM SODIMM with your OS or application program into a DDR SODIMM socket on board.
5. Screw back the bottom cover with four screws.

3.6 Inserting a Compact Flash Card

The procedure of installing a CompactFlash card into the ARK-3389 is detailed below, please follow these steps carefully.

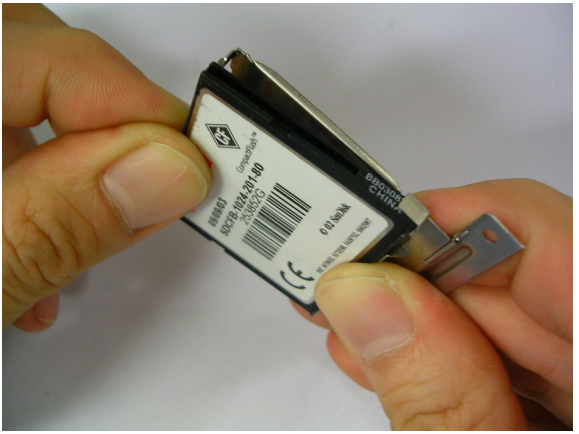
1. Remove the power cord.
2. Unscrew the two screws from the CF Door located on rear face plate of the ARK-3389 embedded box computer.



3. Remove the CF carrier.

4. Placing a CompactFlash card with your OS or application program into a CF carrier.





5. Inserting the CF Carrier back and assembling with 2 screws to the CF Door located on rear face plate of the ARK-3389



Note: The CompactFlash 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-3389'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:

1. Remove the power cord.
2. Unscrew the four screws from bottom cover of the ARK-3389.
3. Remove the bottom cover of the ARK-3389.
4. Connect the IDE flat cable to the connector on the hard disk.
5. Fixing your HDD to bottom cover by using the 4 scews stored in accessories box.
6. Screw back the bottom cover with the four screws.

3.8 Connecting Power

Connect the ARK-3389 to a 12~24 VDC power source. The power source can either be from a power adapter or an in-house power source.

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 environments causes a soft error, 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, pressing <Del> to allow you to enter the setup

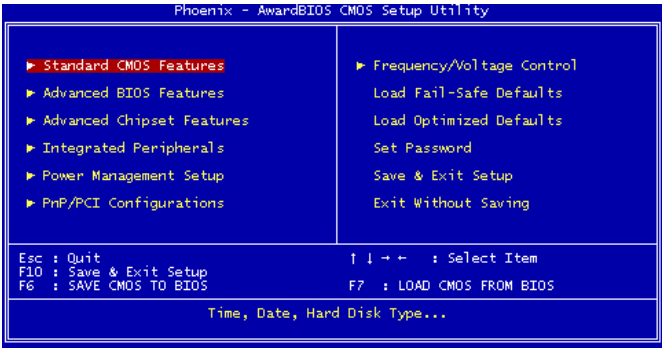


Figure 4.1: Award BIOS Setup initial screen

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, floppy drive, display, and memory.

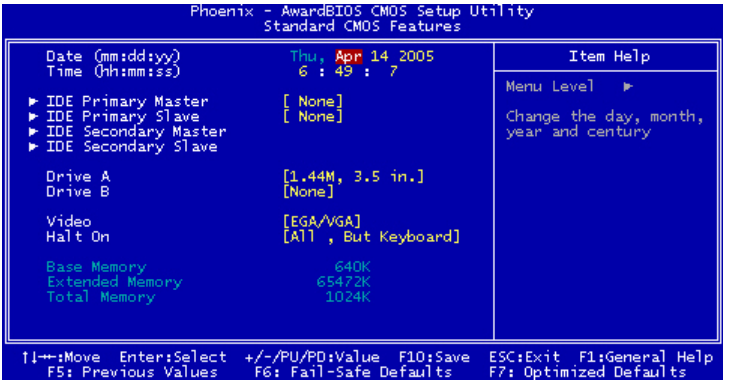


Figure 4.2: Standard CMOS features screen

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-3389 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

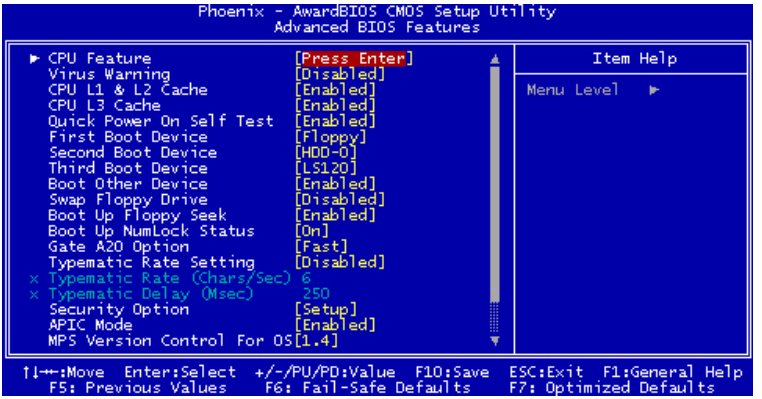


Figure 4.3: Advanced BIOS features screen

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) conducted as soon as the computer is turned on. When enabled, 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): Chipset controls GateA20

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.

4.4.10 Typematic Rate (Chars/Sec)

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

4.4.11 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).

4.4.12 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.

4.4.13 APIC Mode

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

4.4.14 MPS Version Control For OS

This option 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.

4.4.15 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.

4.4.16 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.

4.4.17 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.

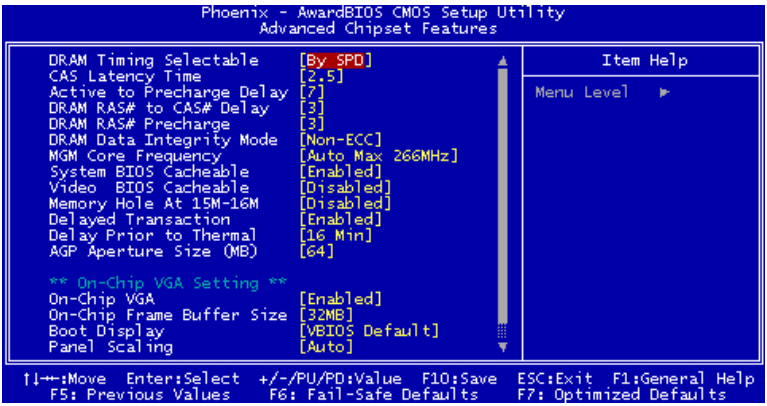


Figure 4.4: Advanced Chipset features screen

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 16Min and 64Min.

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.

4.5.15 On-Chip Frame Buffer Size

The default setting is 32MB. The options available include 1MB, 4MB, 8MB and 16MB.

4.5.16 Boot Display

The default setting is CRT+LVDS. The options available include CRT, LVDS, DVI and TV.

4.5.17 Panel Scaling

The default setting is Auto. The options available include On and Off.

4.5.18 Panel Number

These fields allow you to select the LCD Panel type. The setting values for these ports are:

640 x 480 18bit SC

800 x 600 18bit SC

1024 x 768 18bit SC

1280 x 1024 24bit SC

1400 x 1050 18bit SC

1024 x 768 24bit SC

1600 x 1200 24bit SC

4.6 Integrated Peripherals

This section sets configurations for your hard disk and other integrated peripherals. The first screen shows three main items for user to select. Once an item selected, a submenu appears. Details as follows.

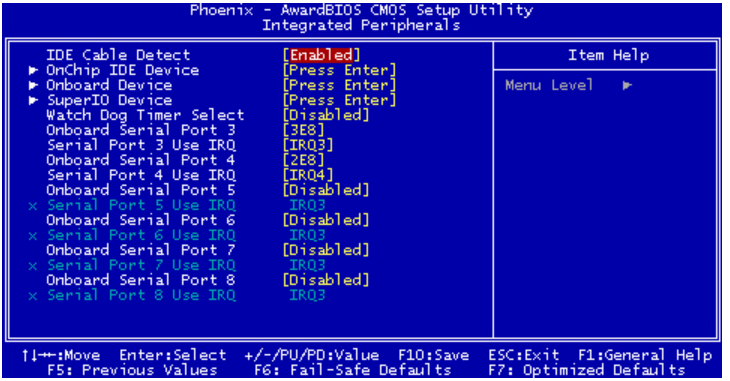


Figure 4.5: Integrated Peripherals

4.6.1 IDE Cable Detect

Some UDMA cables use a hole in the ribbon cable as a cable detect mechanism to determine if a UDMA IDE or standard IDE cable is installed. The default setting is “Enabled”.

4.6.2 IDE Master/Slave PIO/UDMA Mode,

IDE Primary (Secondary) Master/Slave PIO/UDMA Mode (Auto) Each channel (Primary and Secondary) has both a master and a slave, making four IDE devices possible. Because each IDE device may have a different Mode timing (0, 1, 2, 3, 4), it is necessary for these to be independent. The default setting “Auto” will allow auto-detection to ensure optimal performance.

4.6.3 On-Chip Secondary PCI IDE

If you enable IDE HDD Block Mode, the enhanced IDE driver will be enabled. Leave IDE HDD Block Mode on the default setting.

4.6.4 USB Controller

Select Enabled if your system contains a Universal Serial Bus (USB) controller and you have USB peripherals. The choices: Enabled, Disabled.

4.6.5 USB Keyboard/Mouse Support

Select Enabled if user plan to use an USB keyboard. The choice: Enabled, Disable.

4.6.6 AC97 Audio
Select Disable if you do not want to use AC-97 audio. Option is Auto, Disable.

4.6.7 Init Display First
This item allows you to choose which one to activate first, PCI Slot or on-chip VGA. The choices: PCI Slot, Onboard/AGP.

4.6.8 Onboard LAN Control
Option is Enable and Disable. Select Disable if user does not want to use onboard LAN controller1

4.6.9 IDE HDD Block Mode
You can enable the Primary IDE channel and/or the Secondary IDE channel. Any channel not enabled is disabled. This field is for systems with only SCSI drives.

4.6.10 Onboard FDC Controller
When enabled, this field allows you to connect your floppy disk drives to the onboard floppy disk drive connector instead of a separate controller card. If you want to use a different controller card to connect the floppy disk drives, set this field to Disabled.

4.6.11 Onboard Serial Port
For settings reference the Appendix for the serial resource allocation, and Disabled for the on-board serial connector.

4.6.12 UART Mode Select
This item allows you to select UART mode. The choices: IrDA, ASKIR, Normal.

4.6.13 RxD, TxD Active
This item allows you to determine the active of RxD, TxD. The Choices: “Hi, Hi,” “Lo, Lo,” “Lo, Hi,” “Hi, Lo.”

4.6.14 IR Transmission Delay
This item allows you to enable/disable IR transmission delay. The choices: Enabled, Disabled.

4.6.15 UR2 Duplex Mode
This item allows you to select the IR half/full duplex function. The choices: Half, Full.

4.6.16 Onboard Parallel Port
This field sets the address of the on-board parallel port connector. You can select either 3BCH/IRQ7, 378H/IRQ7, 278H/IRQ5 or Disabled. If you install an I/O card with a parallel port, make sure there is no conflict

in the address assignments. The CPU card can support up to three parallel ports, as long as there are no conflicts for each port.

4.6.17 Parallel Port Mode

This field allows you to set the operation mode of the parallel port. The setting “Normal” allows normal speed operation, but in one direction only. “EPP” allows bi-directional parallel port operation at maximum speed. “ECP” allows the parallel port to operate in bi-directional mode and at a speed faster than the maximum data transfer rate. “ECP + EPP” allows normal speed operation in a two-way mode.

4.6.18 EPP Mode Select

This field allows you to select EPP port type 1.7 or 1.9. The choices: EPP1.7, 1.9.

4.6.19 ECP Mode Use DMA

This selection is available only if you select “ECP” or “ECP + EPP” in the Parallel Port Mode field. In ECP Mode Use DMA, you can select DMA channel 1, DMA channel 3, or Disable. Leave this field on the default setting.

4.7 Power Management Setup

The power management setup controls the CPU card’s “green” features to save power. The following screen shows the manufacturer’s defaults:

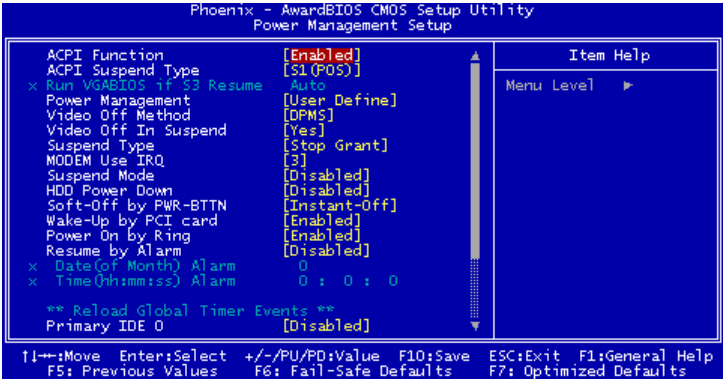


Figure 4.6: Power management setup screen

4.7.1 Power-Supply Type
Choose AT or ATX power supply

4.7.2 ACPI function
The choice: Enabled, Disabled.

4.7.3 Power Management
This category allows you to select the type (or degree) of power saving and is directly related to the following modes:

1. HDD Power Down

2. Suspend Mode

There are four selections for Power Management, three of which have fixed mode settings

Min. Power Saving	Minimum power management., Suspend Mode = 1 hr., and HDD Power Down = 15 min.
Max. Power Saving	Maximum power management., Suspend Mode = 1 min., and HDD Power Down = 1 min.
User Defined (Default)	Allows you to set each mode individually. When not disabled, each of the ranges are from 1 min. to 1 hr. except for HDD Power Down which ranges from 1 min. to 15 min. and disable.

4.7.4 Video Off In Suspend
When system is in suspend, video will turn off.

4.7.5 Modem Use IRQ
This determines the IRQ in which the MODEM can use.The choices: 3, 4, 5, 7, 9, 10, 11, NA.

4.7.6 HDD Power Down
You can choose to turn the HDD off after one of the time intervals listed, or when the system is in “suspend” mode. If the HDD is in a power saving mode, any access to it will wake it up.

4.7.7 Soft-Off by PWR-BTTN
If you choose “Instant-Off”, then pushing the ATX soft power switch button once will switch the system to “system off” power mode. You can choose “Delay 4 sec.” If you do, then pushing the button for more than 4 seconds will turn off the system, whereas pushing the button momentarily (for less than 4 seconds) will switch the system to “suspend” mode.

4.7.8 CPU THRM-Throttling
This field allows you to select the CPU THRM-Throttling rate. The choices: 12.5%, 24.0%, 37.5%, 50.0%, 62.5%, 74.0%, 87.5%.

4.7.9 PowerOn By LAN
This item allows you to wake up the system via LAN from the remote-host. The choices: Enabled, Disabled.

4.7.10 PowerOn By Modem
When Enabled an input signal on the serial Ring Indicator (RI) line (in other words, an incoming call on the modem) awakens the system from a soft off state. The choices: Enabled, Disabled.

4.7.11 PowerOn By Alarm
When Enabled, your can set the date and time at which the RTC (real time clock) alarm awakens the system from Suspend mode. The choices: Enabled, Disabled.

4.7.12 Primary IDE 0 (1) and Secondary IDE 0 (1)
When Enabled, the system will resume from suspend mode if Primary IDE 0 (1) or Secondary IDE 0 (1) is active. The choice: Enabled, Disabled.

4.7.13 FDD, COM, LPT PORT
When Enabled, the system will resume from suspend mode if FDD, COM port, or LPT port is active. The choice: Enabled, Disabled.

4.7.14 PCI PIRQ [A-D]#
When Enabled, the system will resume from suspend mode if interrupt occurs. The choice: Enabled, Disabled.

4.8 PnP/PCI Configurations

4.8.1 PnP OS Installed

Select “Yes” if you are using a plug and play capable operating system. Select No if you need the BIOS to configure non-boot device

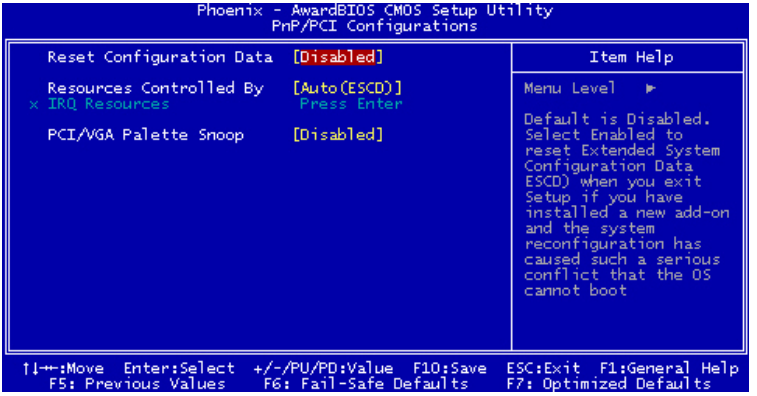


Figure 4.7: PnP/PCI configurations screen

4.8.2 Reset Configuration Data

Default is Disable. Select Enable to reset Extended System Configuration Data (ESCD) if you have installed a new add-on and system configuration has caused such a conflict that OS cannot boot.

4.8.3 Resources controlled by:

The commands here are “Auto” or “Manual.” Choosing “manual” requires you to choose resources from each following sub-menu. “Auto” automatically configures all of the boot and Plug and Play devices but you must be using Windows 95 or above.

4.8.4 PCI/VGA Palette Snoop

This is left at “Disabled.”

4.9 Password Setting

To change the password:

1. Choose the “Set Password” option from the “Initial Setup Screen” menu and press <Enter>.

The screen will display the following message:

Please Enter Your Password

Press <Enter>.

2. If the CMOS is good or if this option has been used to change the default password, the user is asked for the password stored in the CMOS.

The screen will display the following message:

Please Confirm Your Password

Enter the current password and press <Enter>.

3. After pressing <Enter> (ROM password) or the current password (user-defined), you can change the password stored in the CMOS. The password must be no longer than eight (8) characters.

Remember, to enable the password setting feature, you must first select either “Setup” or “System” from the “Advanced BIOS Features” menu.

4.10 Save & Exit Setup

If you select this and press <Enter>, the values entered in the setup utilities will be recorded in the CMOS memory of the chipset. The microprocessor will check this every time you turn your system on and compare this to what it finds as it checks the system. This record is required for the system to operate.

4.11 Exit Without Saving

Selecting this option and pressing <Enter> lets you exit the setup program without recording any new values or changing old ones.

CHAPTER 5

PCI SVGA/LCD Setup

This chapter details the software configuration information. It shows you how to configure the card to match your application requirements. The AWARD System BIOS is covered in Chapter 4.

Sections include:

- Installation of SVGA drivers

- for Windows 98/ME

- for Windows 2000

Chapter 5 PCI SVGA/LCD Setup

5.1 Introduction

The system has an onboard Intel 855GME or 852GM chipset for its AGP/SVGA controller. It supports LVDS LCD displays and conventional analog CRT monitors with 64MB frame buffer shared with system memory. The VGA controller can drive CRT displays with resolutions up to 1600 x 1200@85-Hz and 2048 x 536 @75Hz and support 2 channel LVDS display mode up to UXGA panel resolution with frequency range from 25-MHz to 112-MHz

5.1.1 CMOS setting for panel type

The ARK-3389 system BIOS and custom drivers are located in a Flash ROM device, designated U29 of system motherboard of ARK-3389. A single Flash chip holds the system BIOS, VGA BIOS and network Boot ROM image. The display can be configured via CMOS settings. This method Choice of "Boot display" selection items of Advanced Chipset Features sections of Award BIOS Setup.

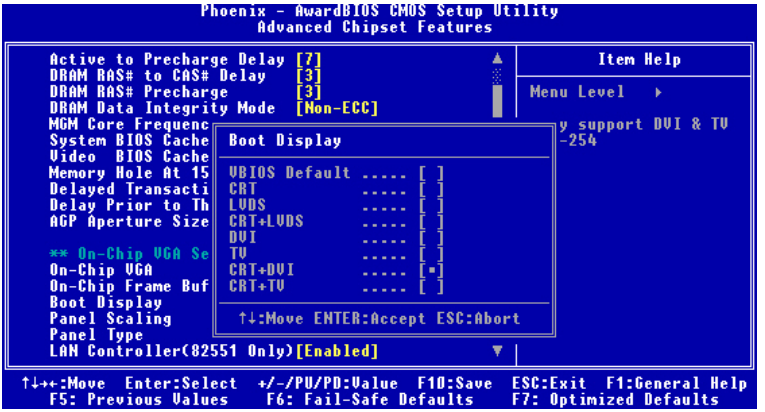


Figure 5.1: Advanced Chipset features screen

5.1.2 Display type

The ARK-3389 can be set in one of four configurations: on a CRT, on a LVDS based flat panel display, on a DVI based digital flat panel display, on a TV display, or on both dual independent displays. The system is initially set to "Auto".

5.1.3 Dual Independent Display

The ARK-3389 uses an Intel 855GME or Intel 852GM controller that is capable of providing multiple views and simultaneous display with mixed video and graphics on a flat panel and CRT. To set up dual display under Windows 98, Windows NT/2000/XP follow these steps:

1. Select “Start”, “Control panel”, "Setting", "Advanced", "Graphics Properties","Device".

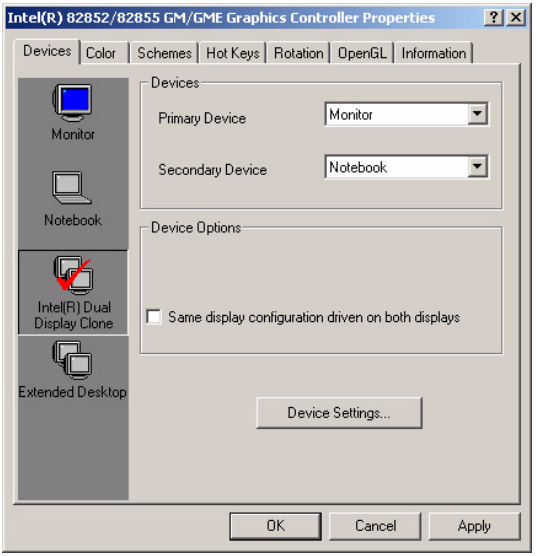


Figure 5.2: Intel® 82852GM/82855GME Graphics Controller Properties - Devices

2. Select “1” for current display, or “2” for second display.

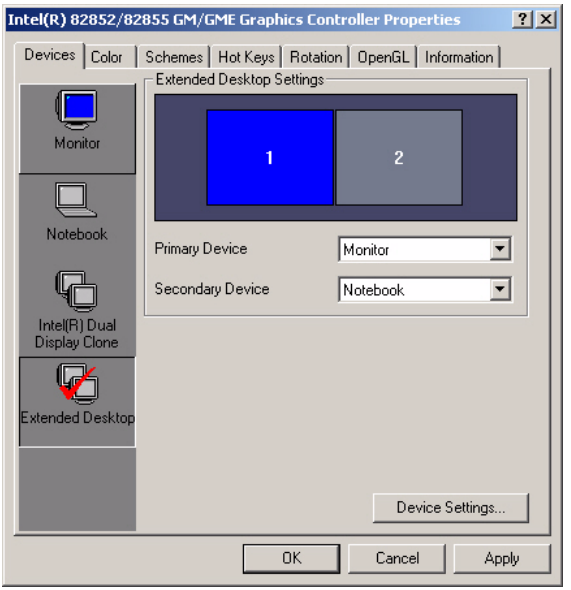


Figure 5.3: Intel® 82852/82855 GM/GME Graphics Controller Properties – Extended Desktop Settings

3. Enable “Extend my Windows desktop onto this monitor”.

4. Click “OK”.

5.2 Installation of the SVGA Driver

Complete the following steps to install the SVGA driver. Follow the procedures in the flow chart that apply to the operating system that you are using within your ARK-3389.

Installation of Windows 98/Me

1. Find Win98/Me VGA driver from CD at the directory of ARK-3389 CD, VGA\Win9x_ME\Graphics\Setup

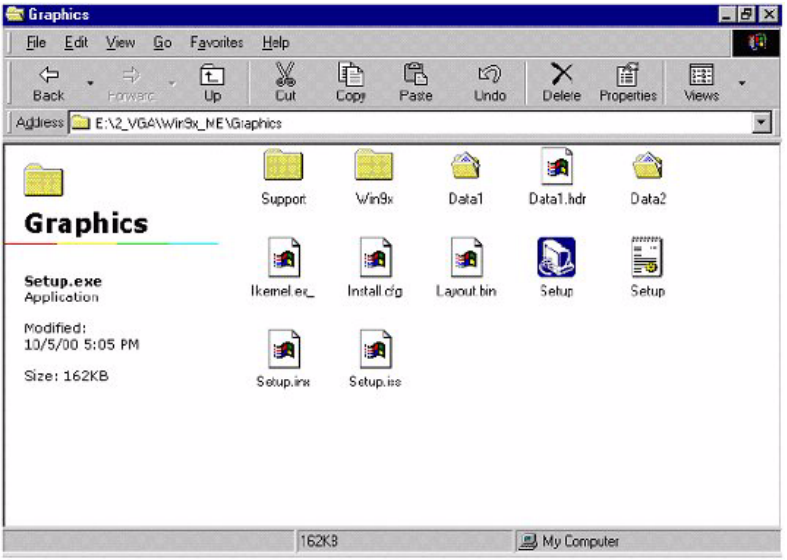


Figure 5.4: Directory "Graphics"

Notes: 1. The windows illustrations in this chapter are intended as examples only. Please follow the listed steps, and pay attention to the instructions which appear on your screen. 2. For convenience, the CD-ROM drive is designated as "D" throughout this chapter.

5.2.1 Installation of Windows 2000

2. You can find Win2000 VGA driver from CD at the directory of ARK-3389 CD-ROM, VGA\win2k_xp1332.

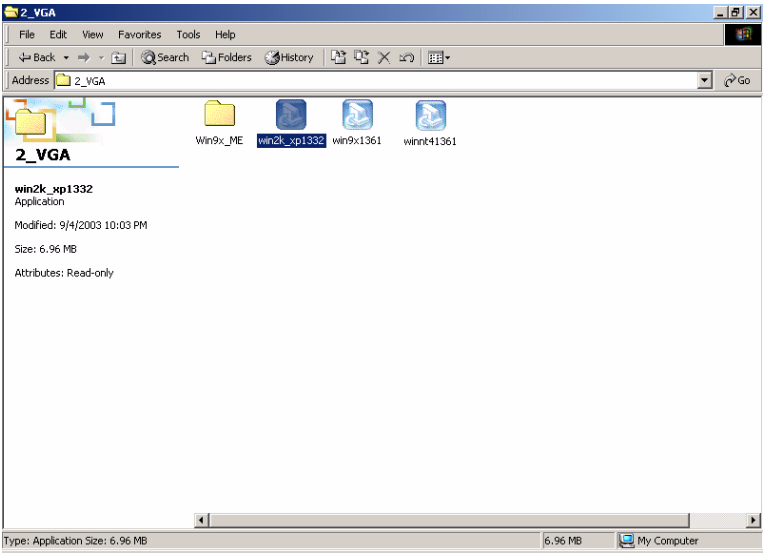


Figure 5.5: CD Directory "2.VGA"

3. Double click "setup" and "next" into setup wizard.

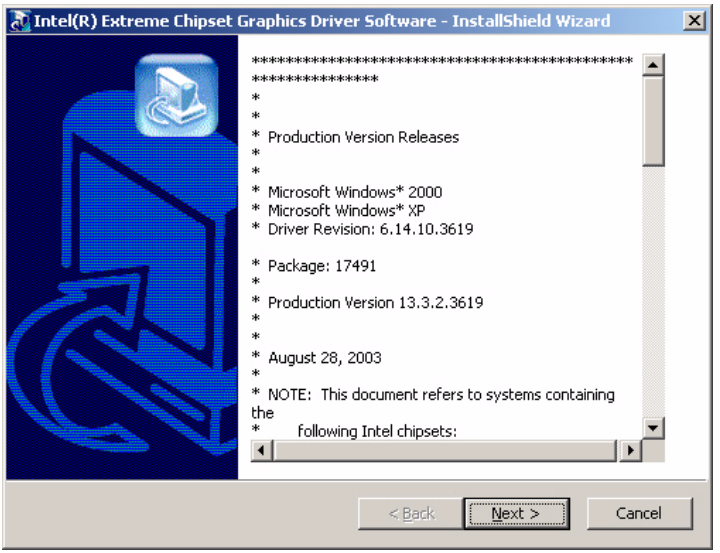


Figure 5.6: Intel® Extreme Chipset Graphics Driver Software Install Wizard

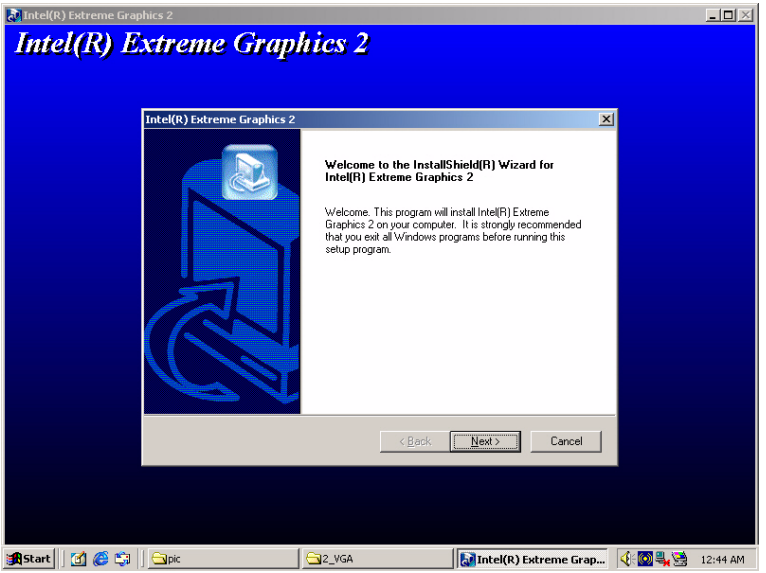


Figure 5.7: Intel® Extreme Graphics Driver Setup

4. Restart computer when installation finished.

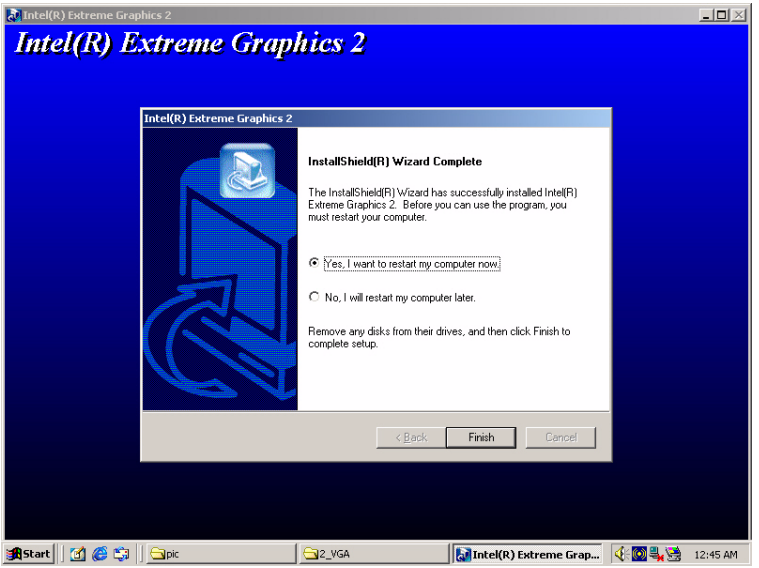


Figure 5.8: InstallShield® Wizard Complete

CHAPTER 6

Full Disassembly Procedure

This chapter details the system disassembling procedure for setting up the jumpers and for maintenance.

Chapter 6 Full Disassembly Procedure

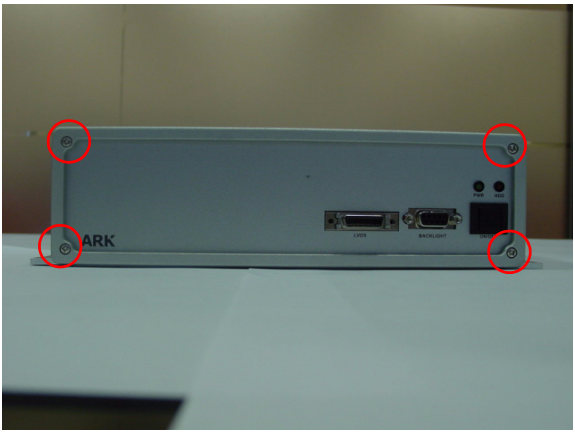
6.1 Introduction

If you want to completely disassemble the embedded box computer, 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 the user disassembly of the embedded box computer. Make sure the power cord of the embedded box computer is unplugged before you start disassembly. The following procedures do not include detailed disassembly procedures for the HDD, Compact Flash Disk and SODIMM SDRAM; all of which can be found in Chapter 3.

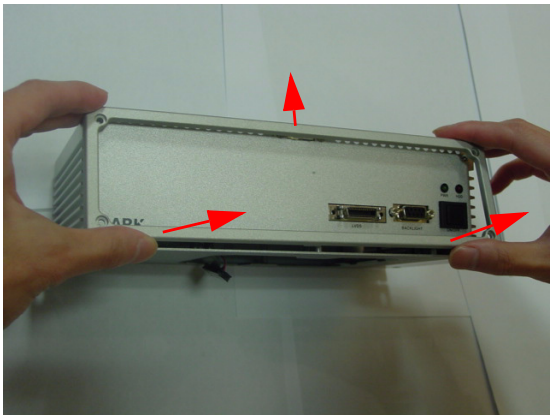
1. Unscrew the 2 screws on the bottom side



2. Unscrew the screws of the frame bracket on the front side



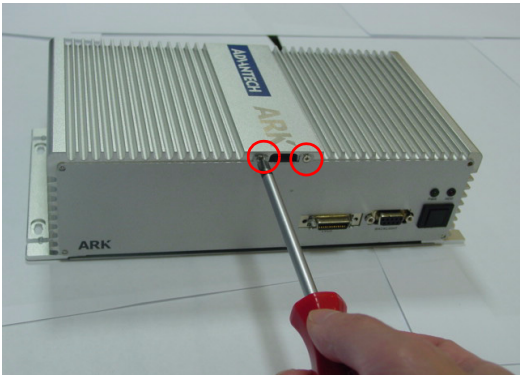
3. Remove the front frame bracket by carefully pulling and lifting the bracket in order to unlock it



4. The Front Frame Bracket removed



5. Unscrew the 2 screws which are located on the Front Metal Face plate

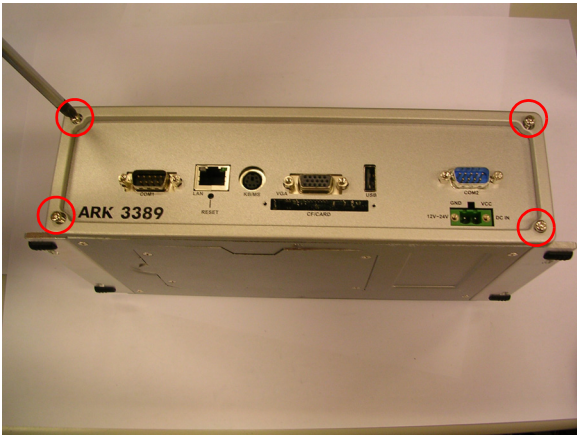


6. The Front Metal Face Plate removed

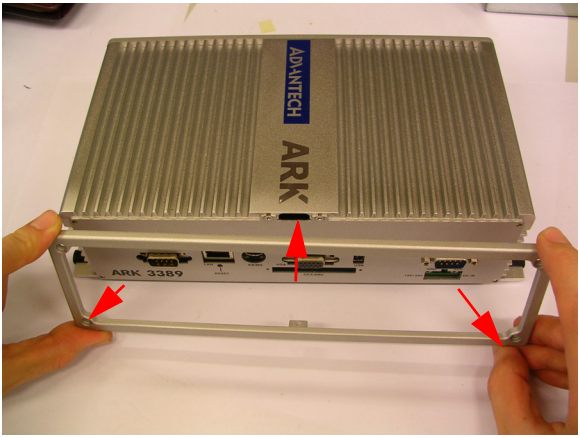


Warning: Do not use too much pressure when removing the front metal face plate as the power button cable is still attached and could be damaged.

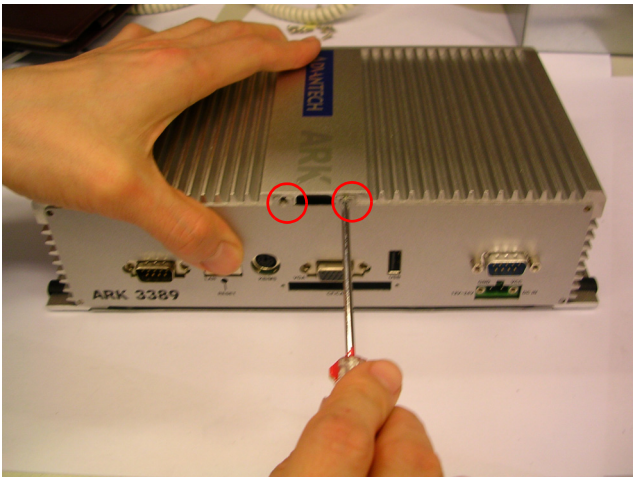
7. Unscrew the 4 screws of the frame bracket on the rear side of system



8. Remove the rear frame bracket by carefully pulling and lifting the bracket in order to unlock it

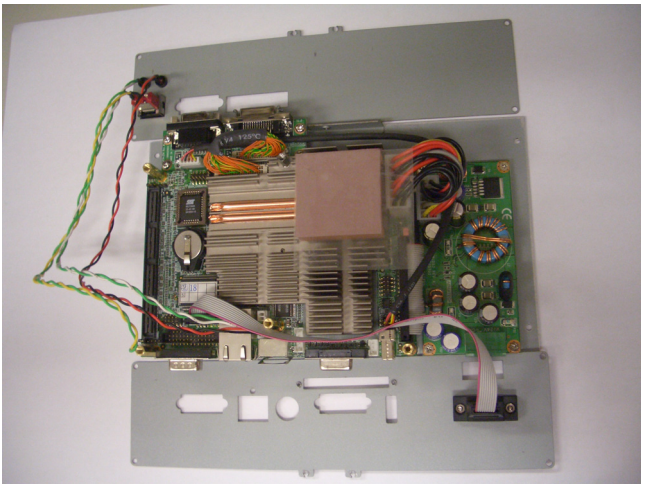


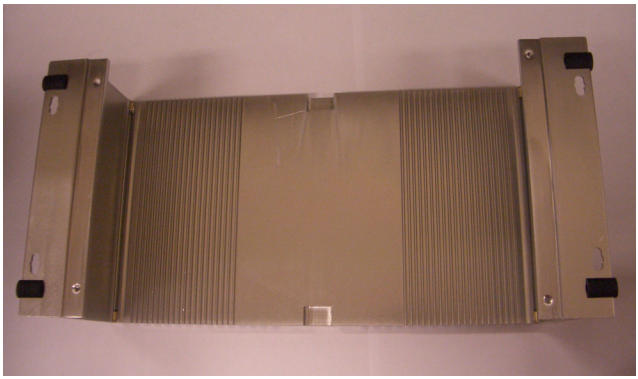
9. Unscrew the 2 screws which are located on the rear metal face plate



Warning: Do not use too much pressure when removing the front metal face plate as the COM2 connector cable is still attached and could be damaged.

10. The system after the top cover has been removed





11. Jumper Locations on PCM-9380/PCM-9386 Motherboard

