

SI-61S-AI

Industrial AI Computer

User's Manual

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Compliance

CE

The product described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

FCC

This product has been tested and found to comply with the limits for a Class B device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with manufacturer's instructions, may cause harmful interference to radio communications.

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This product must not be disposed of as normal household waste, in accordance with the EU directive of for waste electrical and electronic equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

Green IBASE



This product complies with the current RoHS directives restricting the use of the following substances in concentrations not to exceed 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr6+)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

Important Safety Information

Carefully read the following safety information before using this device.0

Setting up your system:

- Put the device horizontally on a stable and solid surface.
- Do not use this product near water or any heated source.
- Leave plenty of space around the device and do not block the ventilation openings. Never drop or insert any objects of any kind into the openings.
- Use this product in environments with ambient temperatures between 0°C and 45°C.

Care during use:

- Do not place heavy objects on the top of the device.
- Make sure to connect the correct voltage to the device. Failure to supply the correct voltage could damage the unit.
- Do not walk on the power cord or allow anything to rest on it.
- If you use an extension cord, make sure the total ampere rating of all devices plugged into the extension cord does not exceed the cord's ampere rating.
- Do not spill water or any other liquids on your device.
- Always unplug the power cord from the wall outlet before cleaning the device.
- Only use neutral cleaning agents to clean the device.
- Vacuum dust and particles from the vents by using a computer vacuum cleaner.

Product Disassembly

Do not try to repair, disassemble, or make modifications to the device. Doing so will void the warranty and may result in damage to the product or personal injury.



CAUTION

There is a danger of explosion if the lithium-ion battery is replaced with an incorrect battery. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries by observing local regulations.

Warranty Policy

- **IBASE standard products:**

24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

12-month (1-year) warranty from delivery for 3rd-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adaptor, display panel and touch screen.

* PRODUCTS, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED FOR REPAIR AND SHIPPING CHARGES.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you encounter any technical problems and require assistance from your distributor or sales representative, please prepare and send the following information:
 - Product model name
 - Product serial number
 - Detailed description of the problem
 - Error messages in text or screenshots if any
 - The arrangement of the peripherals
 - Software used (such as OS and application software)
3. If repair service is required, please download the RMA form at <http://www.ibase.com.tw/english/Supports/RMAService/>. Fill out the form and contact your distributor or sales representative.

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Chapter 1

General Information

The information provided in this chapter includes:

- Features
- Packing List
- Specifications
- Optional Accessories
- Overview
- Dimensions

1.1 Introduction

The SI-61S-AI is designed for industrial artificial intelligence (AI) application and machine intelligence. It is powered by Intel® 7th / 6th Gen. desktop processors and supports three display outputs for HDMI, DVI-D and DisplayPort high definition video playback as well as iSmart energy-saving features such as power on/off scheduling and power resume function. It comes with a standard system bracket and measures 436 x 93 x 345 mm.



1.2 Features

- Extreme performance industrial AI computer
- iSmart for auto-scheduling and EuP/ErP power saving and power resume
- Intel® 7th / 6th Gen. Core™ desktop processor
- 2 x DDR4-2133 SO-DIMM, dual channel, expandable to 32GB
- 3 x display outputs through HDMI, DVI-D, and DisplayPort
- Gigabit Ethernet, RS232/422/482 and RS-232 serial ports
- 1 x Mini-PCle (full-size) for Wi-Fi, Bluetooth, 4G LTE or capture card options
- 1 x Mini-PCle (half-size) for Wi-Fi, Bluetooth or 4G LTE options
- 2 x 2.5" SATA SSD with RAID 1 support
- 1 x PCIe (x16) or 2 x PCIe (x8) based on the selection of add-on graphics card (Matrox / AMD / NVIDIA GPU cards)

1.3 Packing List

If you buy a barebone SI-61S-AI, your product package should include the items listed below. If any of the items below is missing, contact the distributor or the dealer from whom you have purchased the product.

Drivers and this user manual are downloadable from our website.

- SI-61S-AI x 1
- Power Cord x 1
- 2-Pin Terminal Block for Power Button x 1
- Screws for Graphics Card (M2.5 x 6 mm) x 4
- Mini-HDMI Holder x 1
- Screws for Mini-HDMI Cable Holder (M3 x 6 mm) x 2
- Wall Mount Kit x 1
- Screws for Wall Mount Kit (M3 x 12 mm) x 8

1.4 Specifications

Product	SI-61S-AI
System	
Mainboard	MI991AF
Operating System	<ul style="list-style-type: none"> • Windows 10 Enterprise (64-bit) • Windows 8.1 (64-bit) for Intel Skylake solution series only • Windows 7 (64-bit)
CPU	Intel® 7 th / 6 th Gen. Core™ desktop processor with up to 8 MB cache, socket LGA1151
Chipset	Intel® Q170
Memory	2 x DDR4 SO-DIMM 2133 MHz, dual channel, expandable to 32 GB
Graphics	Intel® processor HD Graphics 530
Network	Intel® I219LM GbE LAN & Intel® I211AT (2 nd GbE LAN) controllers
Super I/O	Fintek F81846D
Storage	2 x 2.5" SATA SSD with RAID 1 support
Power Requirement	AC 110 ~ 240V
Power Supply	Internal 400W PSU

Watchdog	Watchdog Timer 256 segments, 0, 1, 2...255 sec/min
iSmart	Yes
Chassis	Aluminum and SGCC, black & white
Mounting	Standard system bracket
Dimensions (W x H x D)	436 x 93 x 345 mm (17.16" x 3.66" x 13.58")
Net Weight	8 kg (17.64 lb)
Compliance	CE, FCC class B
I/O Ports	
Display	<ul style="list-style-type: none"> • 1 x HDMI • 1 x HDMI-In for capture card option • 1 x DVI-D • 1 x Display Port
LAN	2 x GbE RJ45 LAN port
Serial	2 COM ports: <ul style="list-style-type: none"> • COM1 RS-232/422/485, jumperless selectable and configurable in BIOS • COM2 RS-232 only
USB	<ul style="list-style-type: none"> • 6 x USB 3.0 • 2 x USB 2.0
Digital I/O	1 x GPIO 4-In / 4-Out
Audio Jack	<ul style="list-style-type: none"> • 1 x Line-In • 1 x Line-Out • 1 x Mic-In
Power Jack	1 x DC-in power jack
Expansion	<ul style="list-style-type: none"> • 1 x Mini-PCle (full-sized) for WiFi, BT, 4G LTE options or capture card options • 1 x Mini-PCle (half-sized) for WiFi, BT or 4G LTE • 1 x PCIe (x16) or 2 x PCIe (x8) based on the selection of add-on graphics card (Matrox / AMD / NVIDIA graphics cards)
Environment	
Temperature	<ul style="list-style-type: none"> • Operating: 0°C ~ 45°C (32°F ~ 113°F) • Storage: -20°C ~ 80°C (-4°F ~ 176°F)
Relative Humidity	10 ~ 90% (non-condensing)
Vibration Protection	mSATA: 5 grms, 5 ~ 500 Hz, random operation

All specifications are subject to change without prior notice.

1.5 Overview

Top View



Front View



No.	Name	No.	Name
1	Power Button	4	GPIO 4-In & 4-Out Port
2	LED Indicators for Power & HDD	5	DC-In 12V Connector
3	USB 2.0 Ports	6	Reset Button

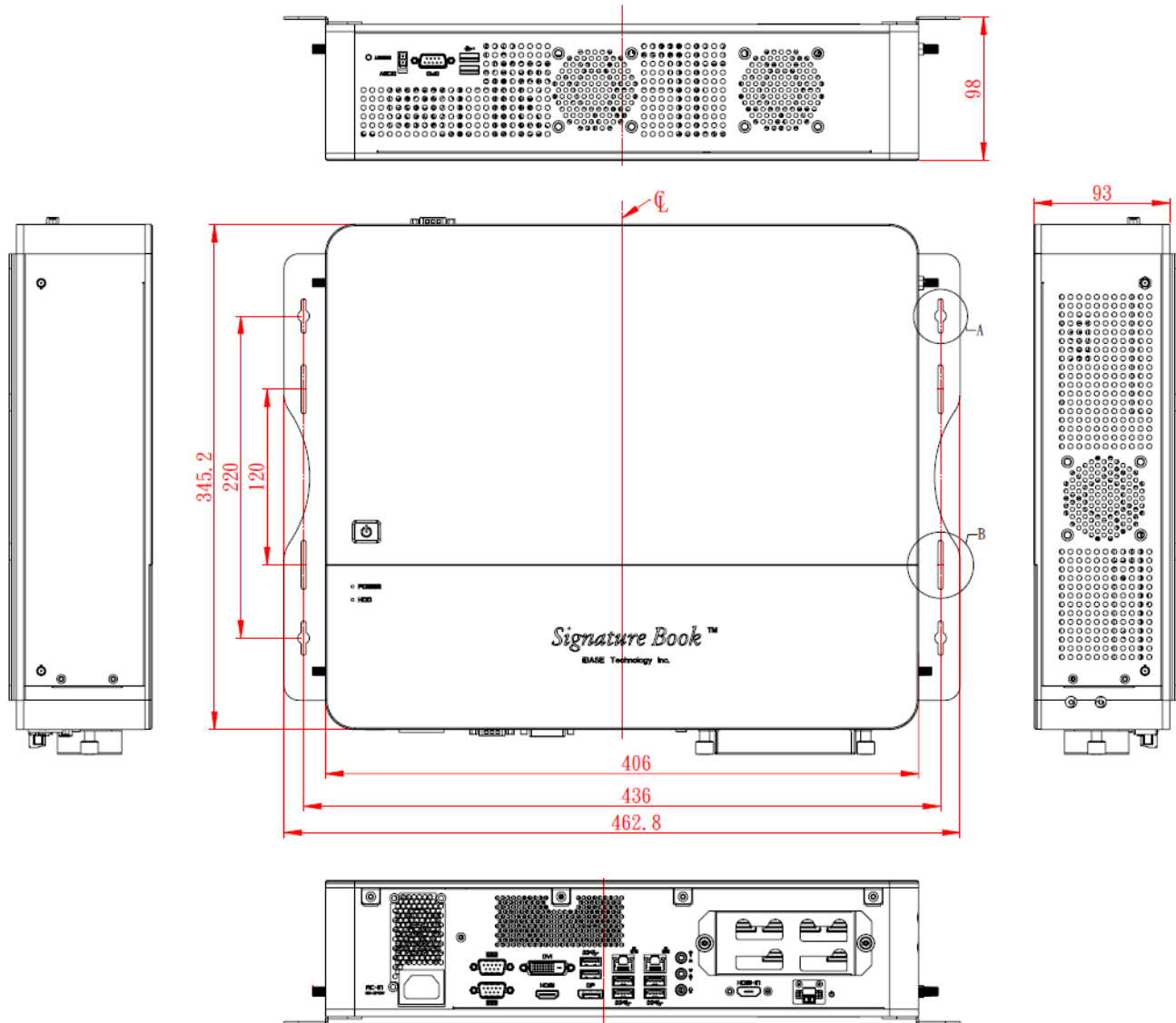
Rear View



No.	Name	No.	Name
7	AC Power Input	14	LAN Ports
8	COM1 & COM2 Ports	15	HDMI Input
9	DVI-D Port	16	2-Pin Terminal Block (For remote power button)
10	HDMI Output	17	Expansion Slots for PCIe (x16) or PCIe (x8)
11	DisplayPort	18	Antenna Holes
12	USB 3.0 Ports	19	Mounting Kit
13	Audio Jacks (From top to bottom: Line- In, Line-Out, Mic-In)		

1.6 Dimensions

Unit: mm



Chapter 2

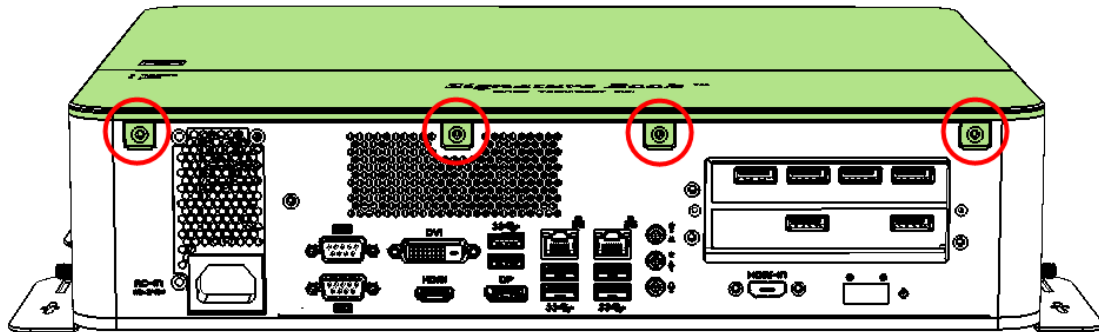
Hardware Installation & Motherboard Information

This section contains general information about:

- Installations
- Jumper and connectors

2.1 Installations

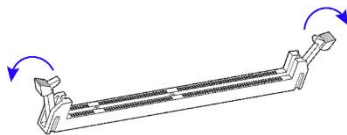
Before installing any card or module into the device, remove the screws shown in the picture below to pull out and remove the cover.



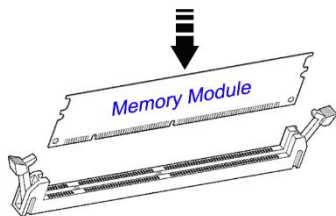
2.1.1 Memory Module Installation

To install the modules, locate the memory slot on the motherboard and perform the following steps:

1. Press the ejector tab of the memory slot down and outwards with your fingertips.



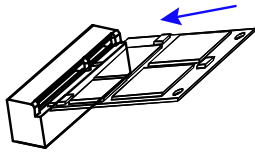
2. Hold the memory module and align the key of the module with that on the memory slot.
3. Gently push the module in an upright position until the ejector tabs of the memory slot close to hold the module in place when the module touches the bottom of the slot.



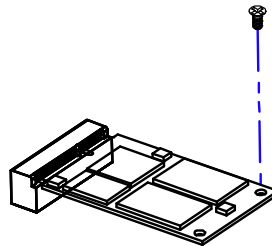
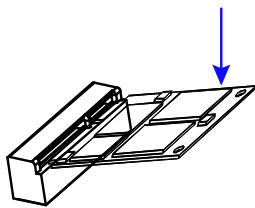
To remove the module, press the ejector tabs outwards with your fingertips to eject the module.

2.1.2 Mini-PCle Card Installation

1. Align the mini-PCle card's bus connector with the mini-PCle slot, and insert the card slantwise.



2. Push the mini PCIe card downwards as shown in the picture, and fix it with a screw.

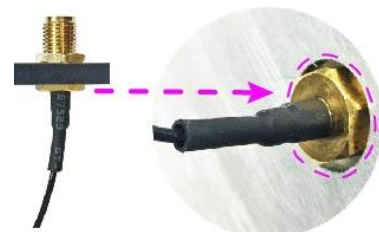
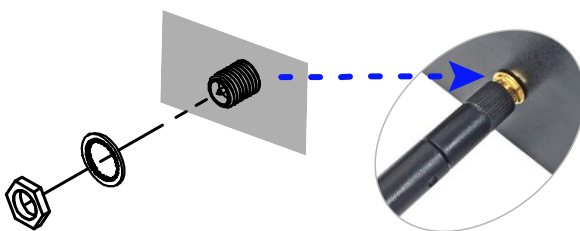


2.1.3 WiFi / 3G / 4G Antenna Installation

Insert the WiFi / 3G / 4G antenna extension cable through the antenna hole of the front I/O cover and fasten the antenna as shown below. Then apply adhesive around the hex nut behind the front I/O cover to prevent the extension cable from falling off if the cable becomes loose.

1. Fasten the hex nut and the washer. Then install the antenna.

2. Apply adhesive around here.



Info: The diameter of the nut is around 6.35 mm (0.25"-36UNC).

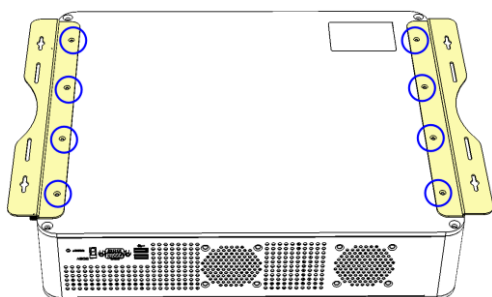
2.1.4 Mounting Installation

Requirements

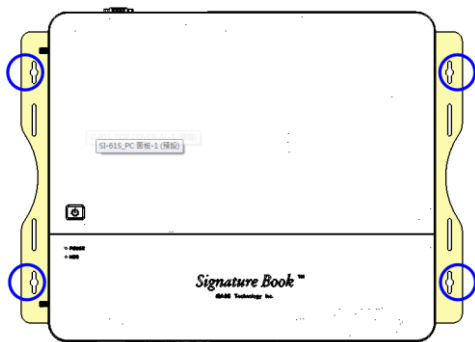
Before mounting the system, ensure that you have enough room for the power adaptor and signal cable routing, and have good ventilation for the power adaptor. The method of mounting must be able to support weight of the SI-61S-AI plus the weight of the suspending cables attached to the system. Use the following methods for mounting your system:

Wall Mounting Installation

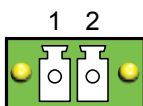
1. Turn your device upside down. Attach the wall-mount kit to the device and secure with the supplied 8 screws.



2. Prepare at least 4 screws (M3) to install the device on the wall as shown.



2.1.5 Pin Assignment for Power Input Connector



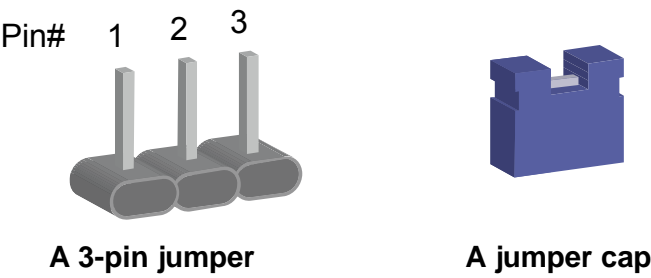
Pin	Signal	Pin	Signal
1	Ground	2	PWR_SW

2.2 Setting the Jumpers

Configure your SI-61S-AI by using jumpers to enable the features that you need based on your applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a base mounted on the circuit board. Jumper caps are placed (or removed) on the pins to enable or disable functions or features. If a jumper has 3 pins, you can connect Pin 1 with Pin 2 or Pin 2 with Pin 3 by shorting the jumper.



Refer to the illustration below to set jumpers.

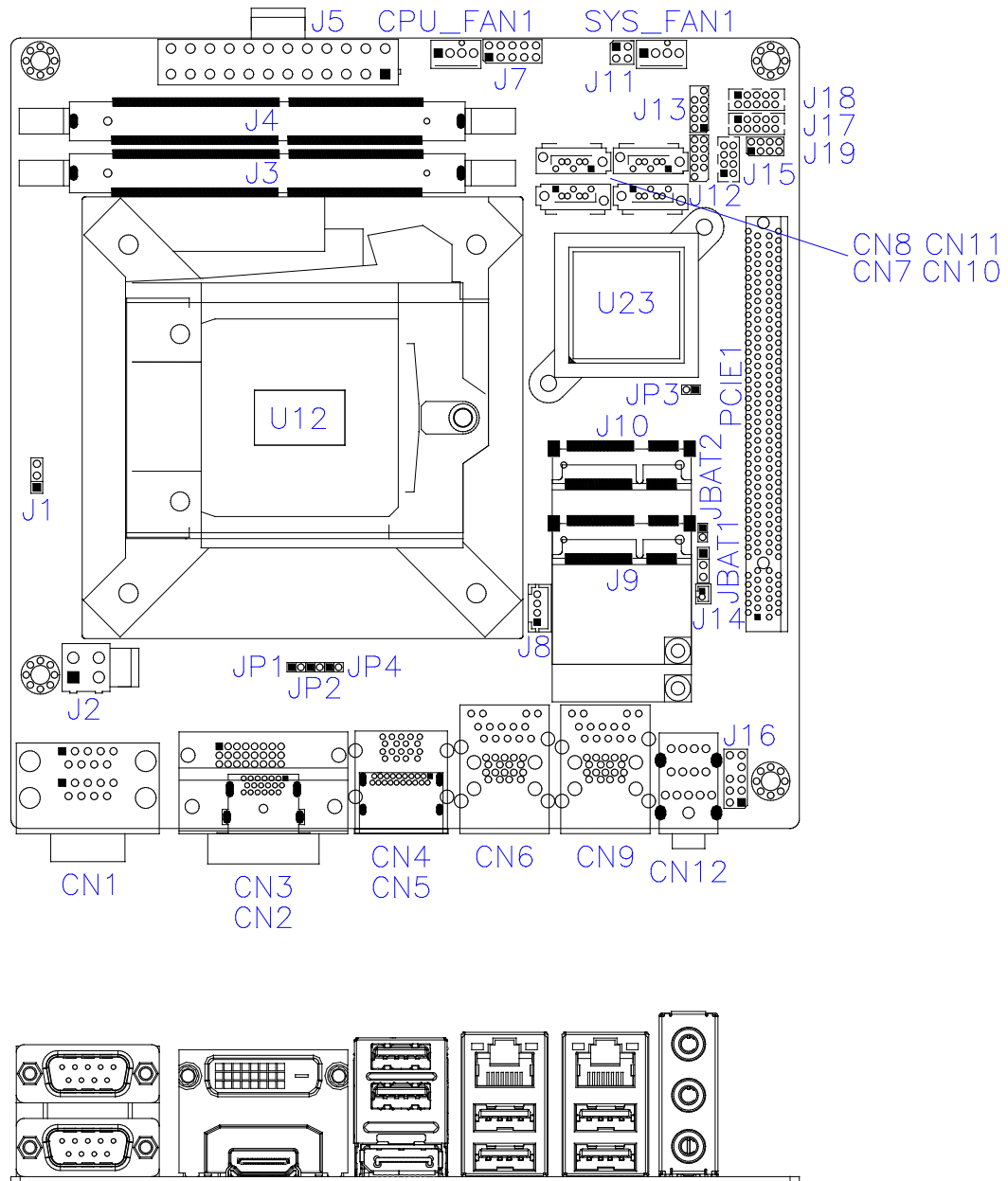
Pin closed	Oblique view	Illustration in the manual
Open		
1-2		
2-3		

When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e. turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e. turned **Off**.

2.3 Jumper & Connector Locations on Motherboard

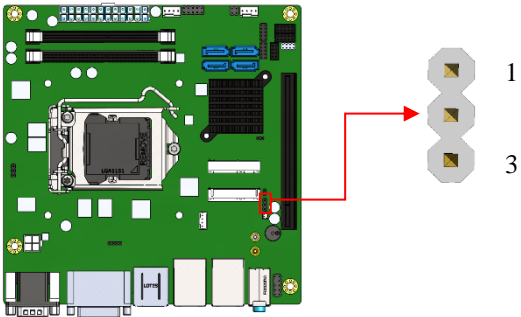
Motherboard: MI991AF



2.4 Jumpers Quick Reference

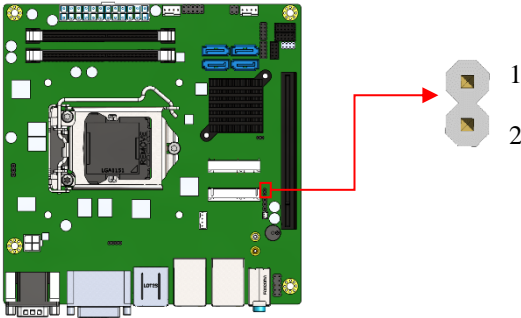
Function	Connector Name	Page
Clearing CMOS Data	JBAT1	14
Clearing RTC Content	JBAT2	14
PCIe (x16) Mode Selection	JP1, JP2	15
Factory Use Only	JP3	--

2.4.1 Clearing CMOS Data (JBAT1)



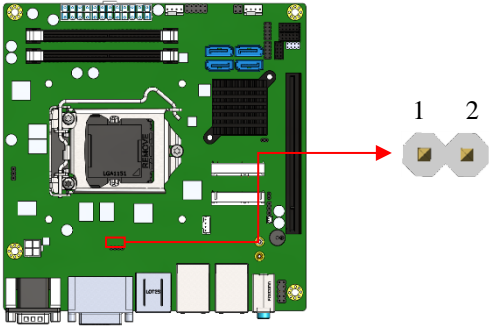
Function	Pin closed	Illustration
Normal (default)	1-2	1
Clear CMOS	2-3	1

2.4.2 Clearing RTC Content (JBAT2)



Function	Pin closed	Illustration
Normal (default)	Open	1
Clear RTC	Close	1

2.4.3 PCIe (x16) Mode Selection (JP1, JP2)

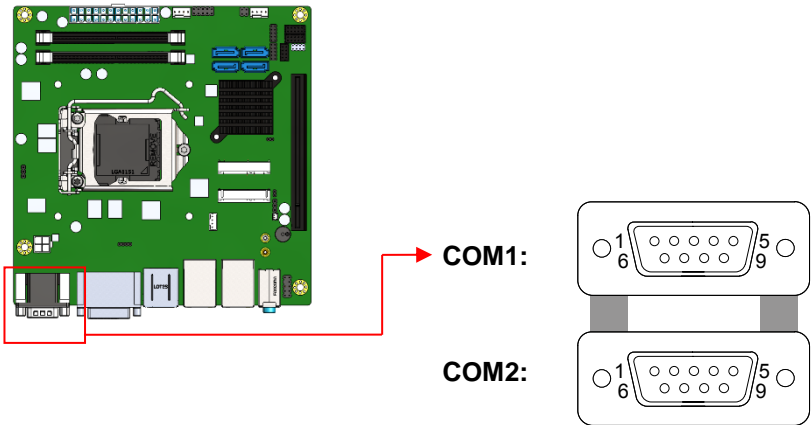


Function	Pin closed	Illustration
1 x 16 (default)	JP1: Open JP2: Open	1
		1
2 x 8	JP1: Open JP2: Close	1
		1
1 x 8, 2 x 4	JP1: Close JP2: Close	1
		1

2.5 Connectors Quick Reference

Function	Connector Name	Page
COM1 and COM2 Serial Ports	CN1	17
ATX 12V Power Connector	J2	18
ATX Power Supply Connector	J5	18
Digital I/O Connector	J7	19
ACPI Status LED	J11	19
Battery Connector	J14	20
USB 2.0 Connector	J15	20
Audio Pin Header for Chassis Front Panel	J16	21
COM3 & COM4 RS-232 Serial Ports	J17 (COM3), J18 (COM4)	21
Front Panel Function Connector	J19	22
CPU Fan Power Connector	CPU_FAN1	22
System Fan Power Connector	SYS_FAN1	23
DVI-D and HDMI Connector	CN2, CN3	--
Display Port + USB3.0 Ports	CN4, CN5	--
GbE LAN & Two USB3.0 Ports	CN6, CN9	--
SATA III Connectors	CN7, CN8, CN10, CN11	--
HD Audio Connector	CN12	--
PCIe (x16) Slot	PCIE1	--
DDR4 SO-DIMM Slot	J3, J4	--
Mini-PCIe Slot	J9, J10	--
Factory Use Only	J12, J13	--

2.5.1 COM1 and COM2 Serial Ports (CN1)



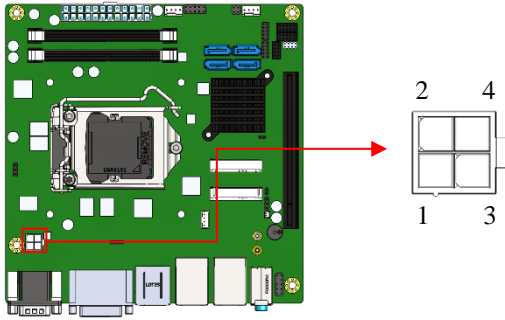
COM1 RS-232/422/485 port:

Pin	Signal Name		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

COM2 RS-232 port:

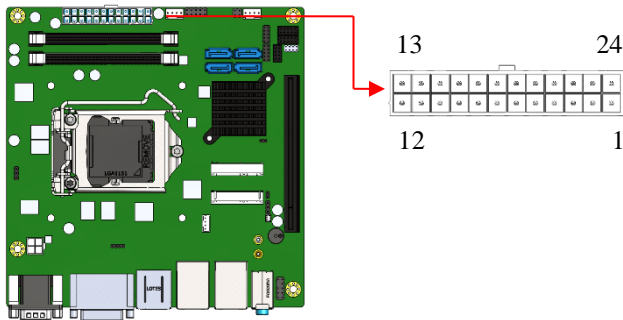
Pin	Signal Name	Pin	Signal Name
1	DCD, Data carrier detect	6	DSR, Data set ready
2	RXD, Receive data	7	RTS, Request to send
3	TXD, Transmit data	8	CTS, Clear to send
4	DTR, Data terminal ready	9	RI, Ring indicator
5	Ground		

2.5.2 ATX 12V Power Connector (J2)



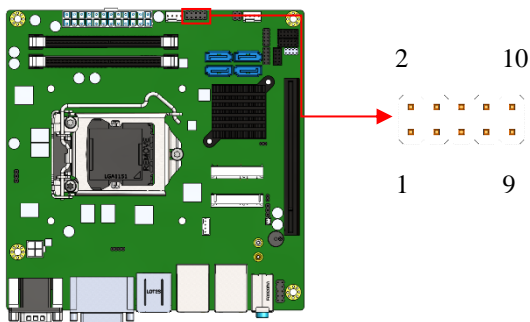
Pin	Signal	Pin	Signal
1	Ground	3	+12V
2	Ground	4	+12V

2.5.3 ATX Power Supply Connector (J5)



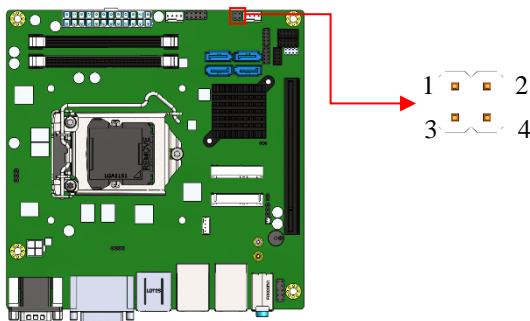
Pin	Signal	Pin	Signal
1	3.3V	13	3.3V
2	3.3V	14	-12V
3	Ground	15	Ground
4	+5V	16	PS-ON
5	Ground	17	Ground
6	+5V	18	Ground
7	Ground	19	Ground
8	Power good	20	-5V
9	5VSB	21	+5V
10	+12V	22	+5V
11	+12V	23	+5V
12	+3.3V	24	Ground

2.5.4 Digital I/O Connector (J7)



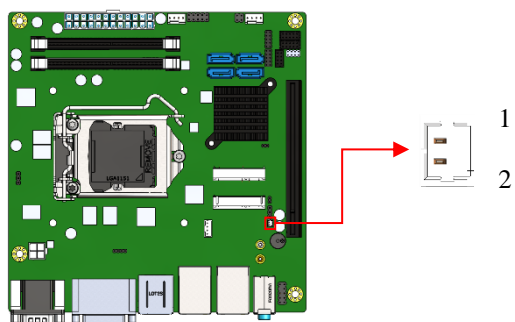
Pin	Signal	Pin	Signal
1	Ground	2	VCC
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	IN0

2.5.5 ACPI Status LED (J11)



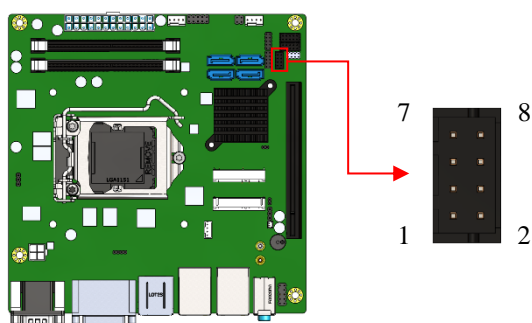
Pin	Signal	Pin	Signal
1	+3VDUAL	2	Ground
3	+VCC3	4	Ground

2.5.6 Battery Connector (J14)



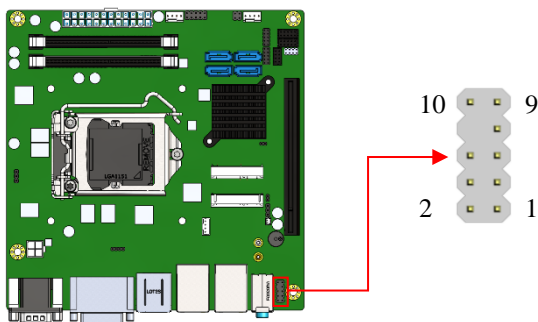
Pin	Signal	Pin	Signal
1	Battery+	2	Ground

2.5.7 USB 2.0 Connectors (J15)



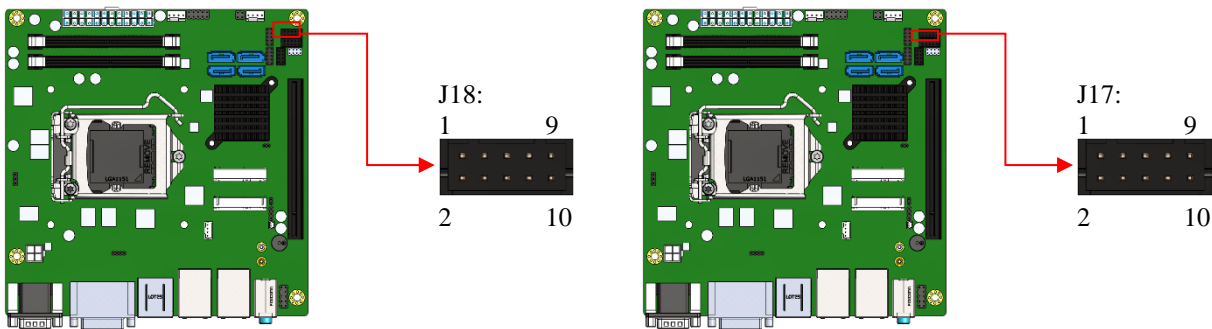
Pin	Signal	Pin	Signal
1	VCC	2	Ground
3	D0-	4	D1+
5	D0+	6	D1-
7	Ground	8	VCC

2.5.8 Audio Pin Header for Chassis Front Panel (J16)



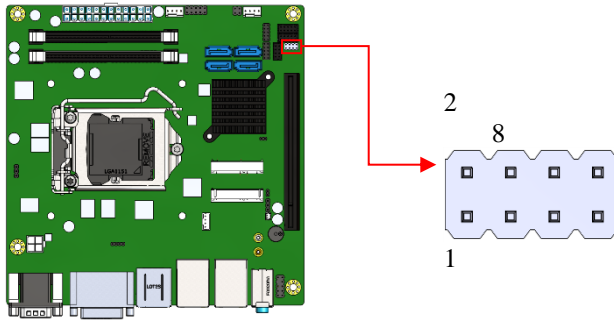
Pin	Signal	Pin	Signal
1	MIC IN_L	2	Ground
3	MIC IN_R	4	DET
5	LINE_R	6	Sense Ground
7	Sense	8	Key
9	LINE_L	10	Sense Ground

2.5.9 COM3 & COM4 RS-232 Serial Ports (J17, J18)



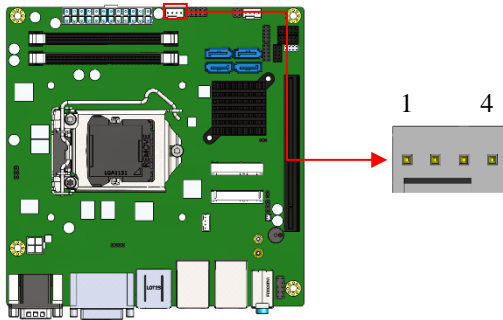
Pin	Signal	Pin	Signal
1	DCD#	2	SIN
3	SOUT	4	DTR#
5	Ground	6	DSR#
7	RTS#	8	CTS#
9	RI#	10	KEY

2.5.10 Front Panel Function Connector (J19)



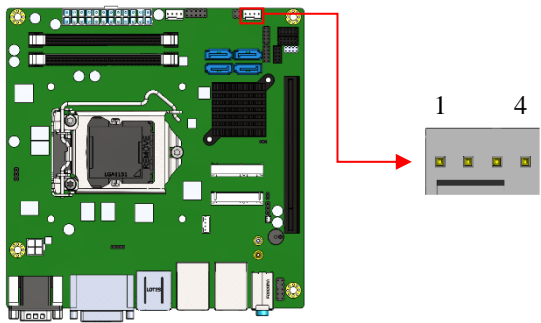
Pin	Signal	Pin	Signal
1	Ground	2	PWR_SW
3	PWR_LED+	4	PWR_LED- (Ground)
5	HDD_LED+	6	HDD_LED-
7	Ground	8	Reset

2.5.11 CPU Fan Power Connector (CPU_FAN1)



Pin	Signal	Pin	Signal
1	Ground	3	Rotation detection
2	+12V	4	Control

2.5.12 System Fan1 Power Connector (SYS_FAN1)



Pin	Signal	Pin	Signal
1	Ground	3	Rotation detection
2	+12V	4	Control

Chapter 3

Driver Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility
- Intel® HD Graphics Drivers
- HD Audio Drivers
- LAN Network Drivers
- Intel® Management Engine Components Drivers
- ASMedia USB 3.1 Driver
- Fintek 8150x Serial Port Drivers

3.1 Introduction

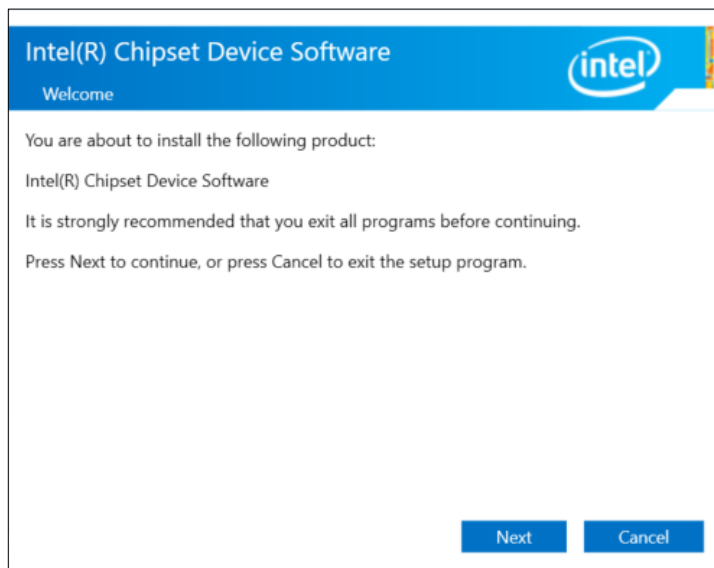
This section describes the installation procedures for software drivers. The software drivers are available on IBASE website www.ibase.com.tw. Register as a member on our website to download all the necessary drivers.

Note: After installing your Windows operating system, you must install the Intel® Chipset Software Installation Utility first before proceeding with the drivers installation.

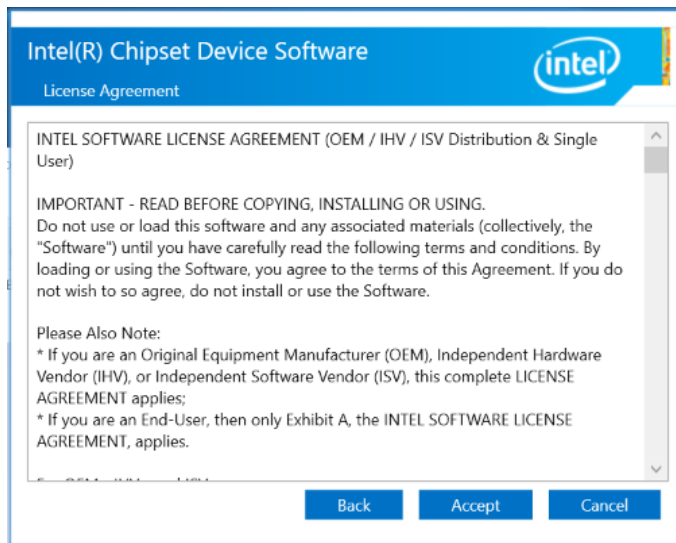
3.2 Intel® Chipset Software Installation Utility

The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for the chipset components. Follow the instructions below to complete the installation.

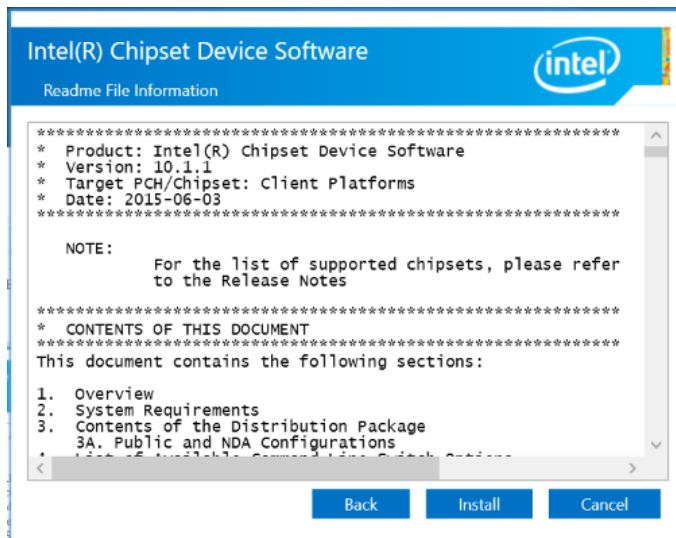
1. Run the **Setup.exe** file.
2. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next** to continue.



3. Accept the license agreement and proceed with the installation process.



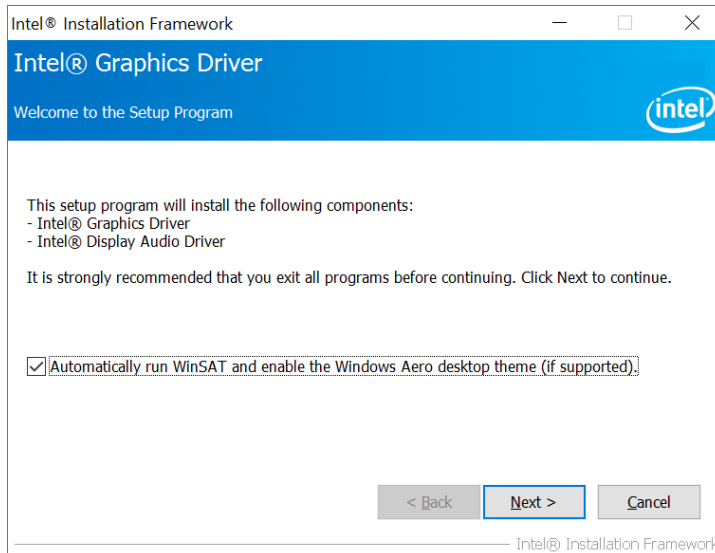
4. On the *Readme File Information* screen, click **Install**.



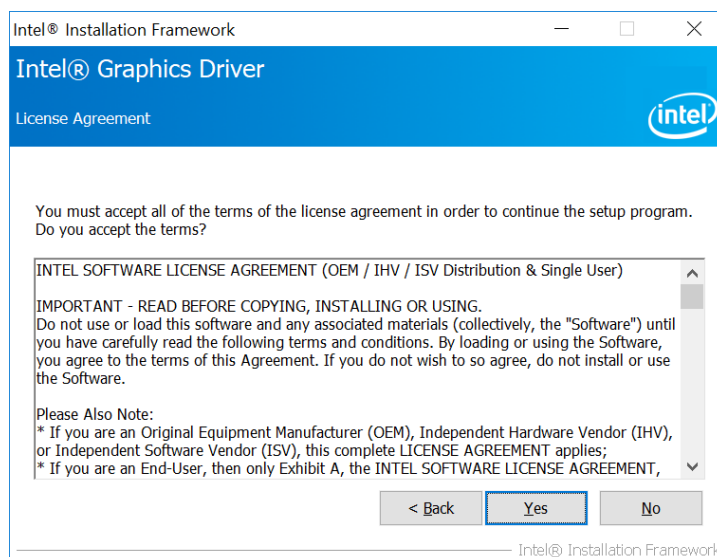
5. Installation is now complete. Restart the system for changes to take effect.

3.3 Intel® HD Graphics Driver Installation

1. Run the **Setup.exe** file.
2. When the *Welcome* screen appears, click **Next** to continue.



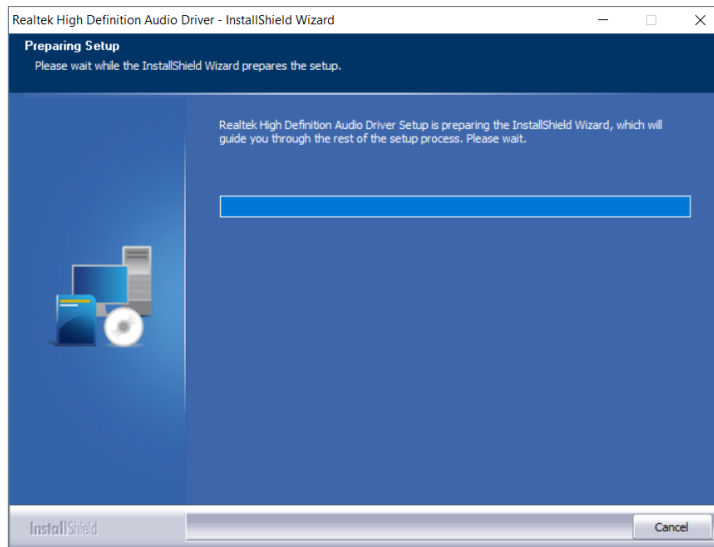
3. Click **Yes** to agree with the license agreement and continue the installation.



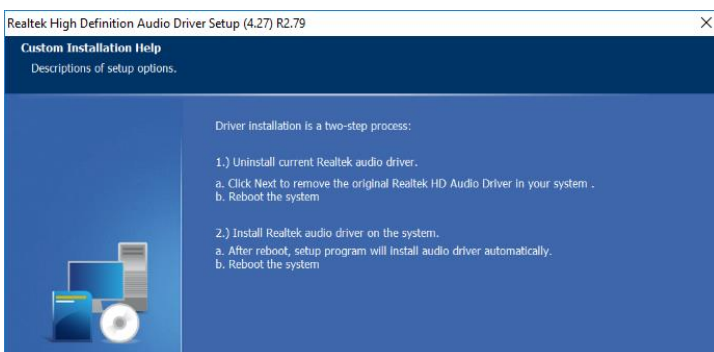
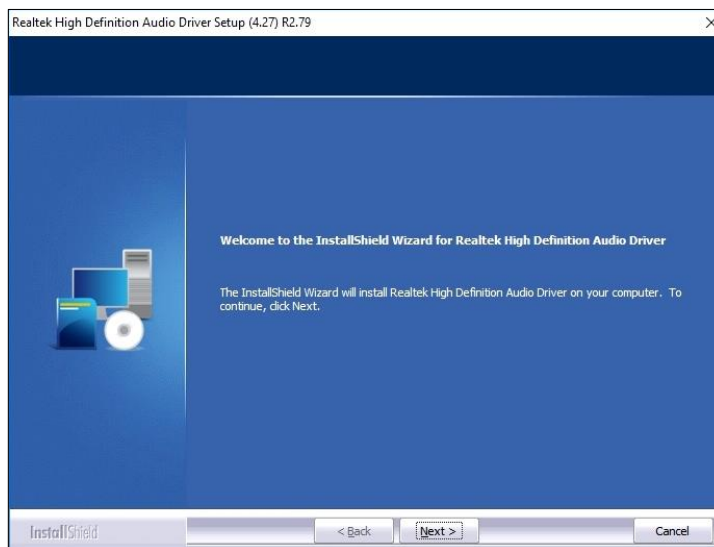
4. On the *Readme File Information* and *Setup Progress* screen, click **Next** and then **Install**.
5. Installation is now complete. Restart the system for changes to take effect.

3.4 HD Audio Driver Installation

1. Run the **Setup.exe** file and the wizard starts.



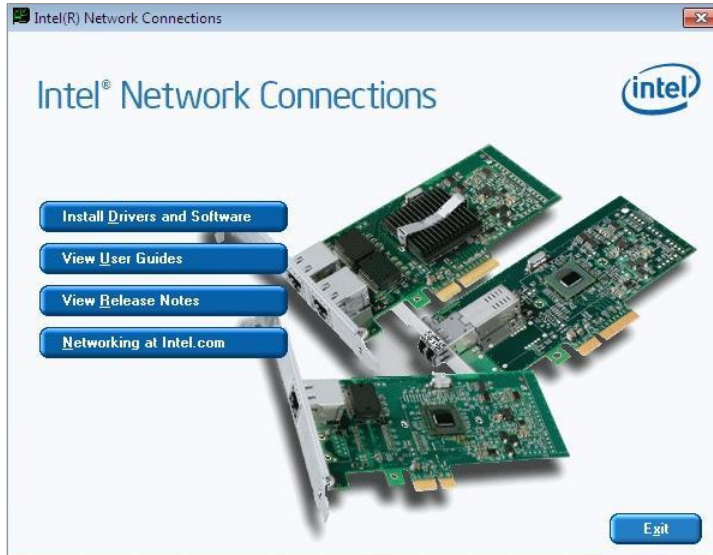
2. On the *Welcome* screen of the InstallShield Wizard, click **Next** to start installing the audio driver on your system.



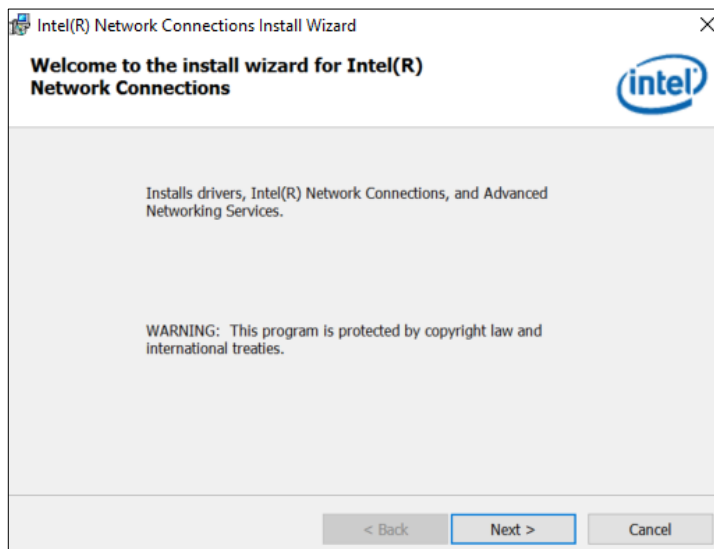
3. Installation is now complete. Restart the system for changes to take effect.

3.5 LAN Network Driver Installation

1. Run the **Setup.exe** file.
2. Click **Install Drivers and Software**.

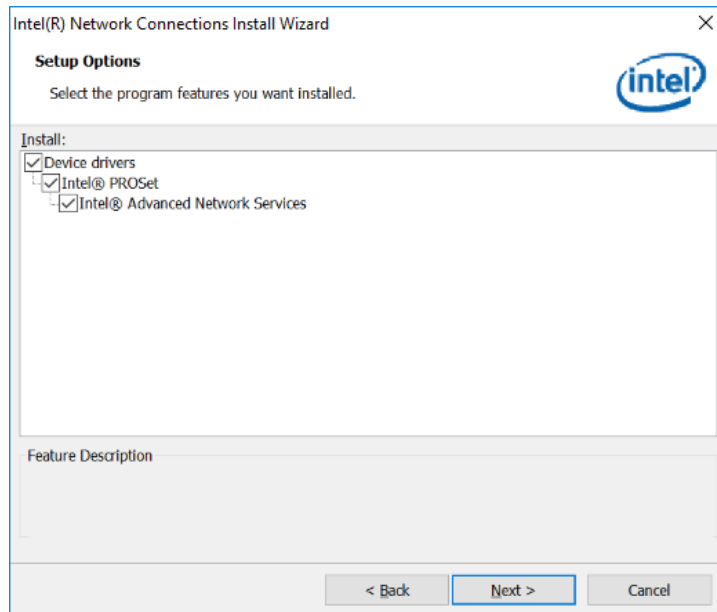


3. On the *Welcome* screen of the InstallShield Wizard, click **Next** to continue.



4. Accept the license agreement and click **Next**.

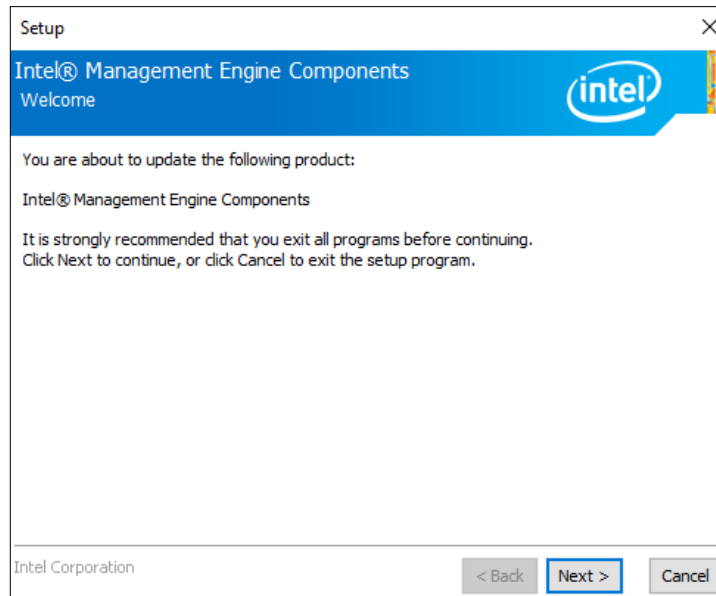
5. On the *Setup Options* screen, tick the checkbox to select the desired driver(s) and click **Next**.



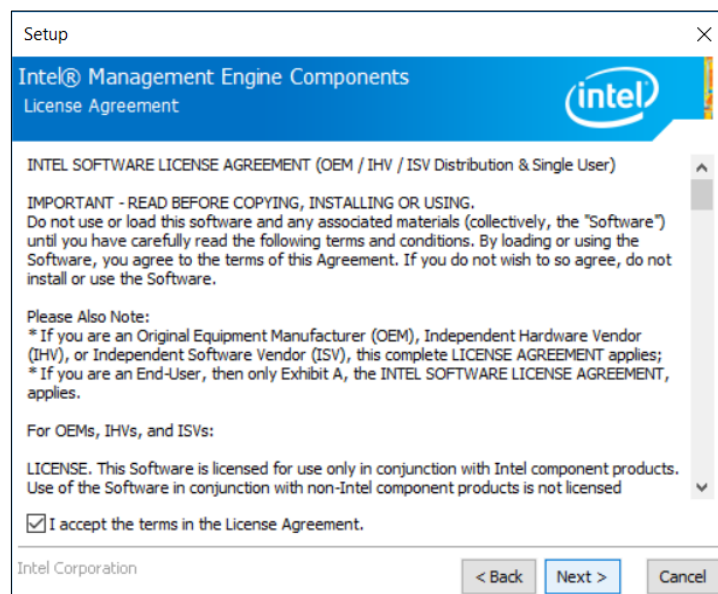
6. Click **Install**.
7. Installation is now complete. Restart the system for changes to take effect.

3.6 Intel® Management Engine Components Drivers Installation

1. Run the **Setup.exe** file.
2. When the *Welcome* screen appears, click **Next**.



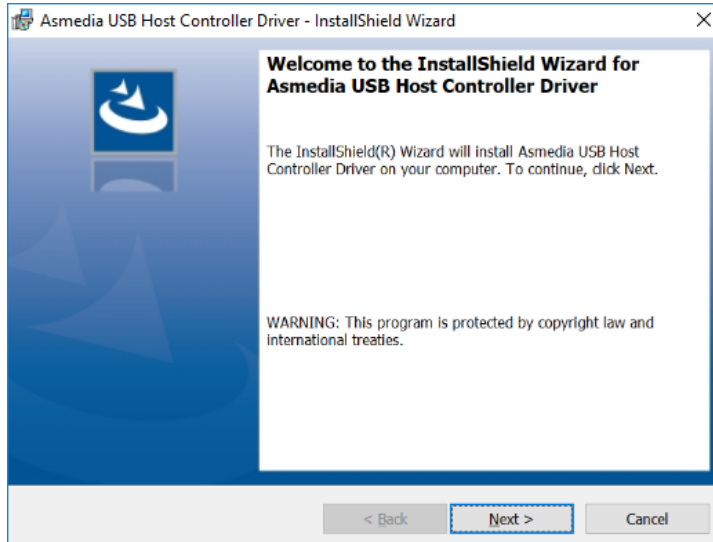
3. Accept the license agreement and click **Next** for installation.



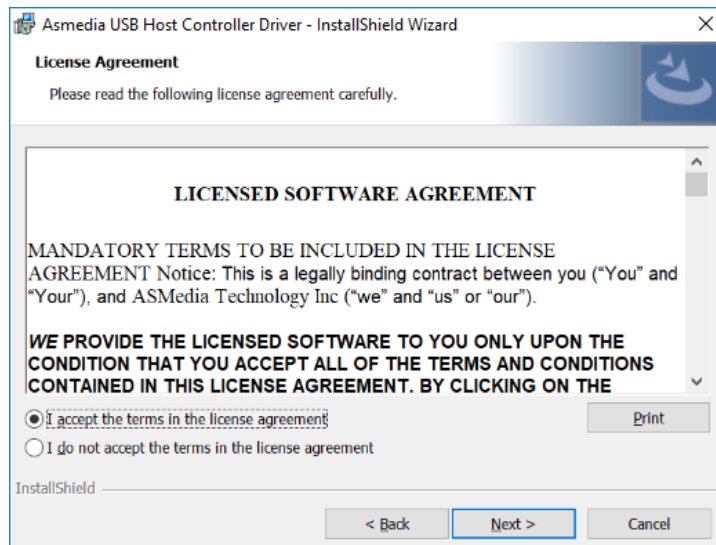
4. Installation is now complete. Restart the system for changes to take effect.

3.7 ASMedia USB 3.1 Drivers Installation

1. Run the **Setup.exe** file.
2. On the *Welcome* screen of the InstallShield Wizard, click **Next** to continue.



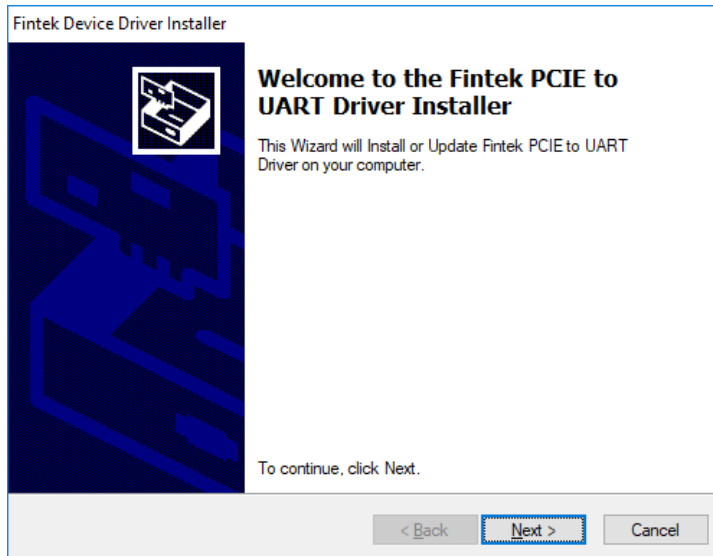
3. Accept the license agreement and click **Next**.



4. Click **Install**.
5. Installation is now complete. Restart the system for changes to take effect.

3.8 Fintek 8150x Serial Port Drivers Installation

1. Run the **Setup.exe** file.
2. On the *Welcome* screen of the installer, click **Next** to continue.



3. Click **Install**.
4. Installation is now complete. Restart the system for changes to take effect.

Chapter 4

BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Boot Settings
- Save & Exit

4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices such as disk drives, serial ports and parallel ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

4.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Press the key immediately allows you to enter the Setup utility. If you are a little bit late pressing the key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

When you enter the BIOS Setup utility, the *Main Menu* screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: It is strongly recommended that you avoid making any changes to the chipset defaults.

These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could make the system unstable and crash in some cases.

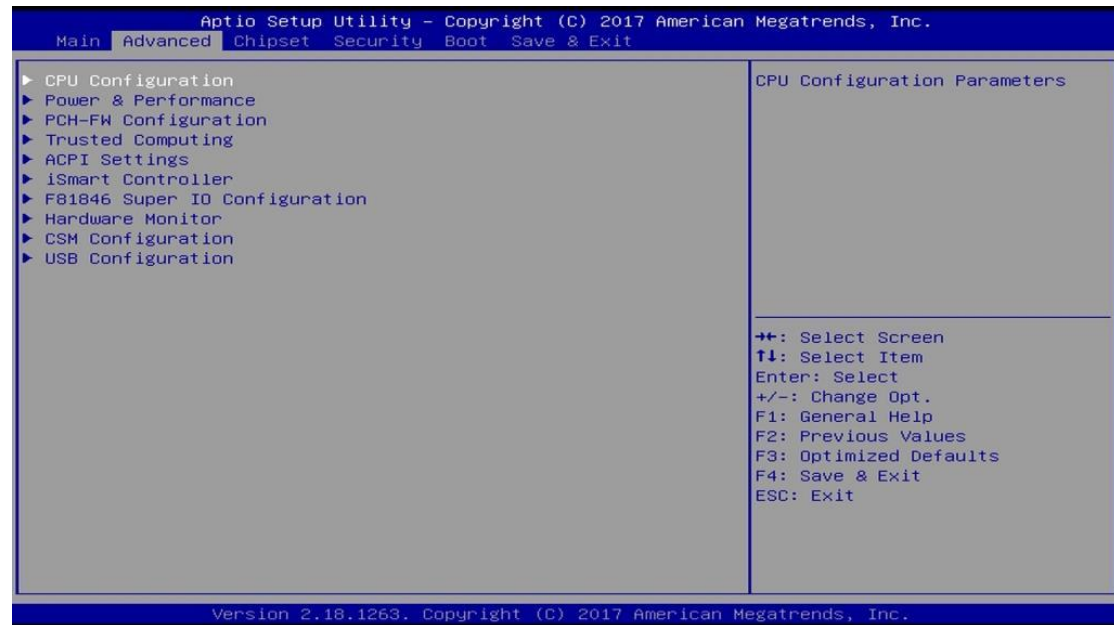
4.3 Main Settings



BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the data elements.
System Time	Set the time. Use the <Tab> key to switch between the data elements.

4.4 Advanced Settings

This section allows you to configure, improve your system and allows you to set up some system features according to your preference.



4.4.1 CPU Configuration



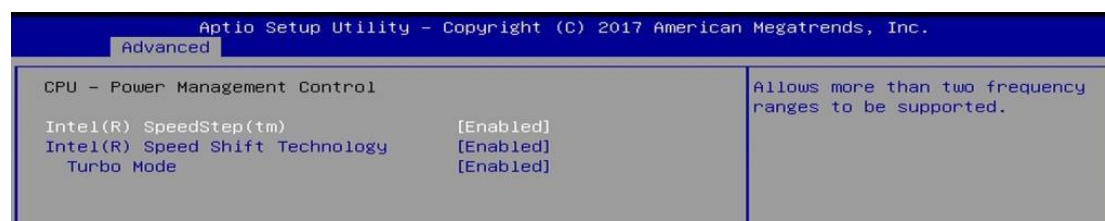
BIOS Setting	Description
Intel Virtualization Technology	When the function is enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	Number of cores to enable in each processor package. Options: A11, 1, 2, 3
AES	Enables / Disables Advanced Encryption Standard).
Intel Trusted Execution Technology	Enables utilization of additional hardware capabilities provided by Intel(R) Trusted Execution Technology. Changes require a full power cycle to take effect.

4.4.2 Power & Performance



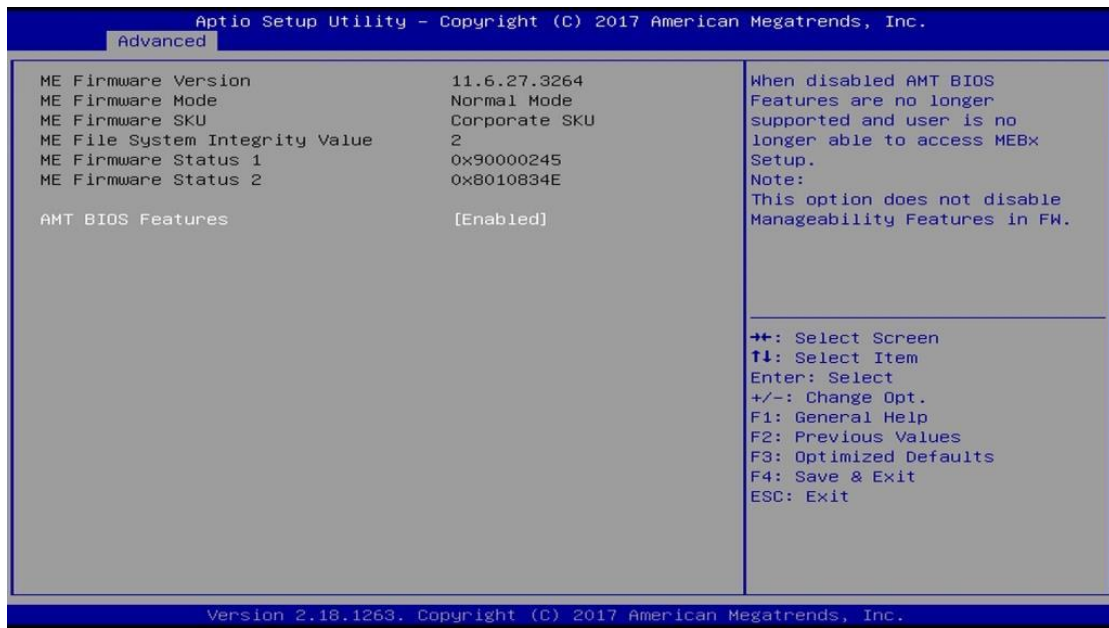
BIOS Setting	Description
CPU – Power Management Control	CPU power management control options.

4.4.2.1. CPU – Power Management Control



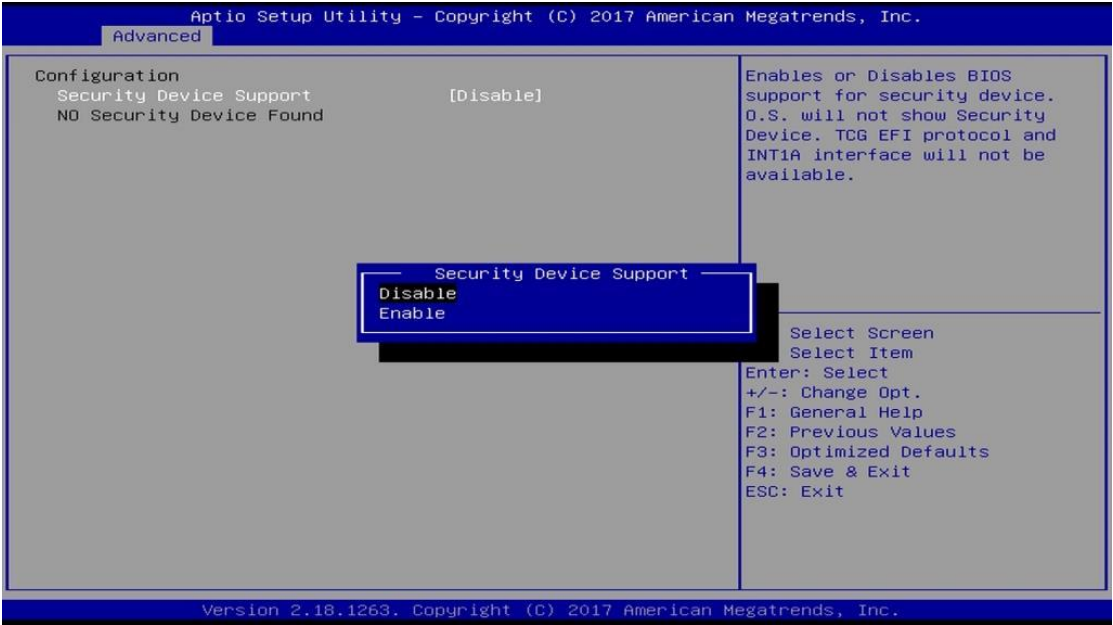
BIOS Setting	Description
Intel(R) SpeedStep(tm)	Allows more than two frequency ranges to be supported.
Intel(R) Speed Shift Technology	Enables / Disables Intel(R) Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enables / Disables processor Turbo Mode (requires EMTTM enabled too). “Auto” means enabled, unless max. turbo ratio is bigger than 16 – SKL A0 W/A.

4.4.3 PCH-FW Configuration



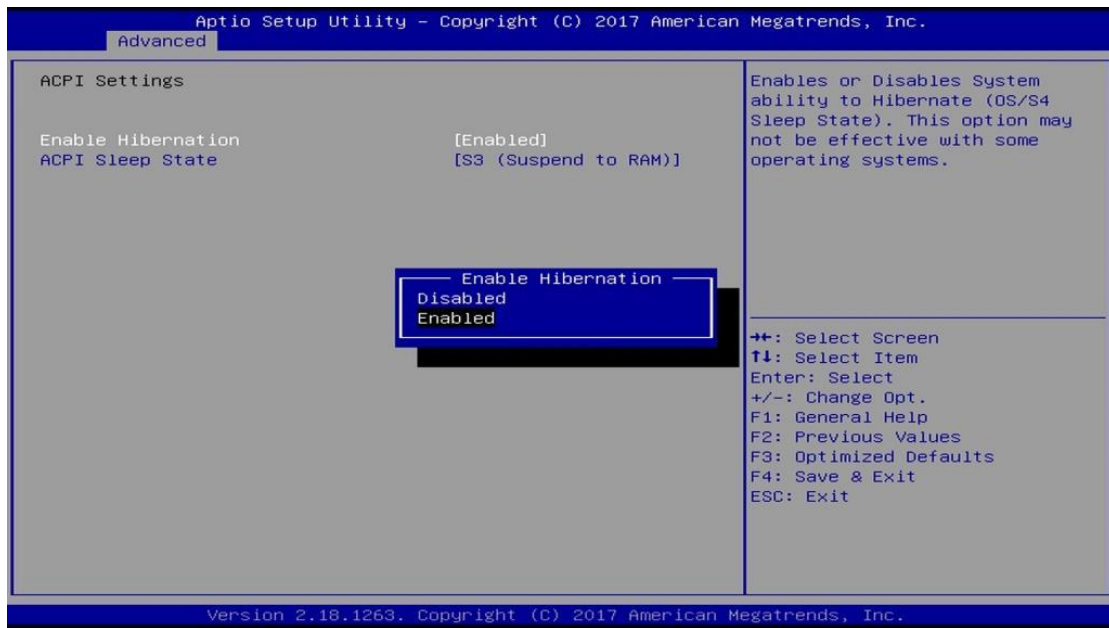
BIOS Setting	Description
AMT BIOS Features	<p>When disabled AMT BIOS features are no longer supported and user is no longer able to access MEBx Setup.</p> <p>Note: This option does not disable manageability feature in FW.</p>

4.4.4 Trusted Computing



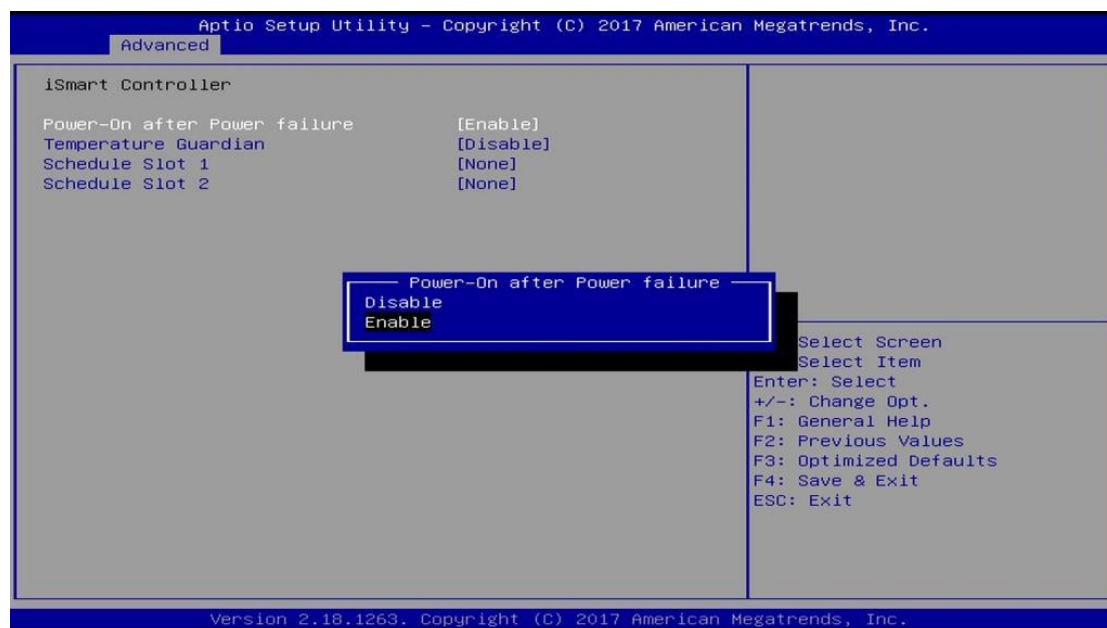
BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. O.S. will not show the security device. TCG EFI protocol and INT1A interface will not be available.

4.4.5 ACPI Settings



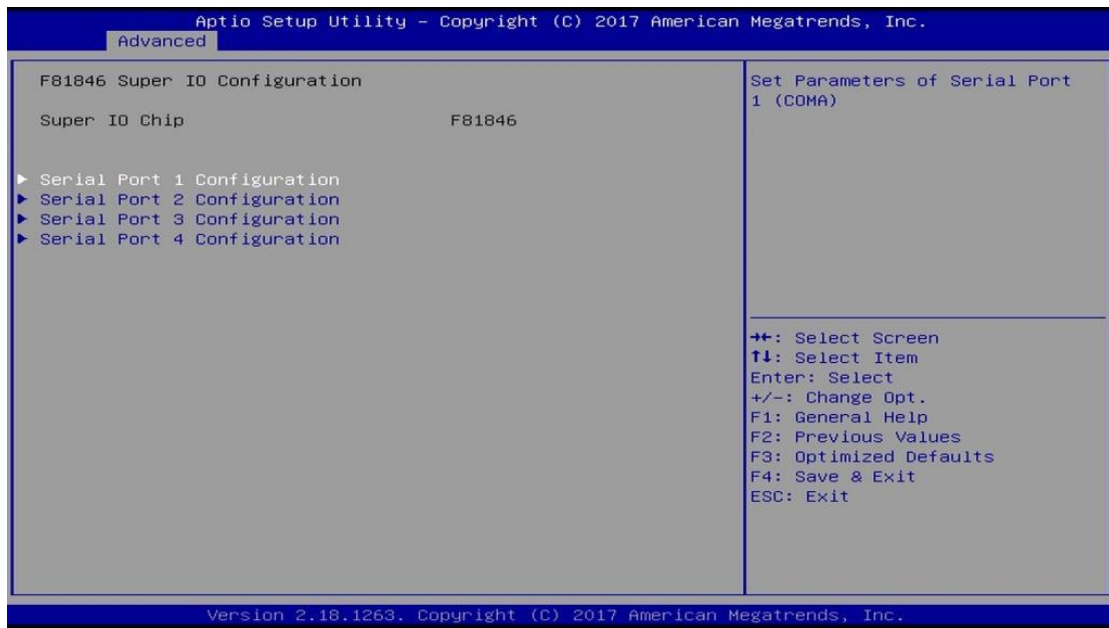
BIOS Setting	Description
Enable Hibernation	Enables / Disables system ability to hibernate (OS/S4 sleep state). This option may not be effective with some operating systems.
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed. Options: Suspend Disabled, S3 (Suspend to RAM)

4.4.6 iSmart Controller



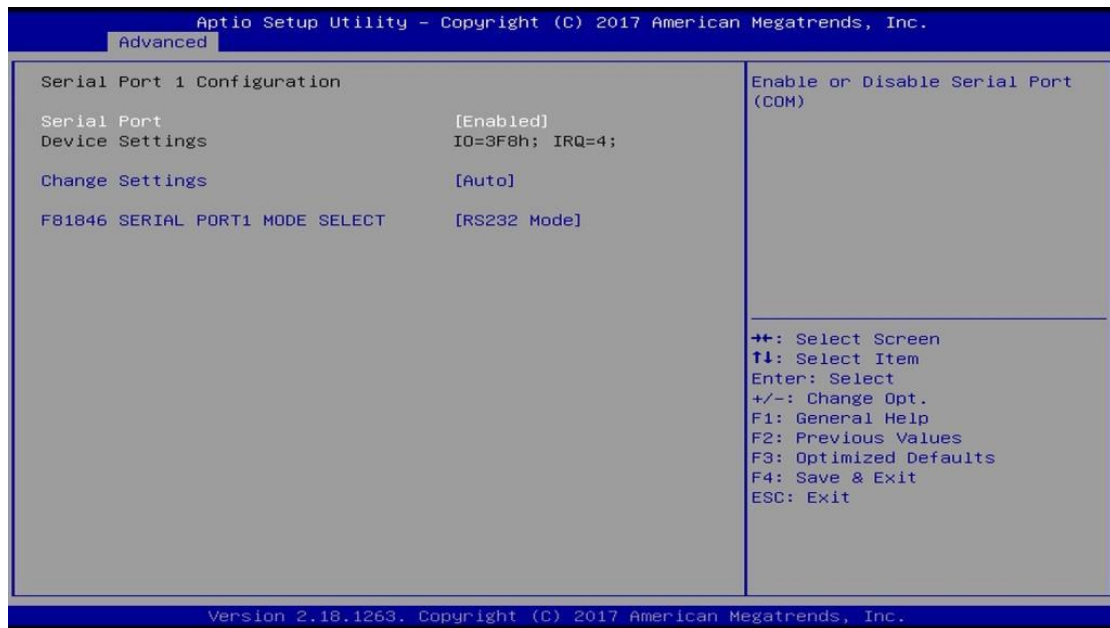
BIOS Setting	Description
Power-On after Power failure	Enables / Disables the system to be turned on automatically after a power failure.
Temperature Guardian	Generate the reset signal when system hands up on POST.
Schedule Slot 1 / 2	<p>Sets up the hour / minute for system powe-on.</p> <p>Important: If you would like to set up a schedule between adjacent days, configure two schedule slots.</p> <p>For example, if setting up a schedule from Wednesday 5 p.m. to Thursday 2 a.m., configure two schedule slots. But if setting up a schedule from 3 p.m to 5 p.m. on Wednesday, configure only a schedule slot.</p>

4.4.7 F81846 Super IO Configuration



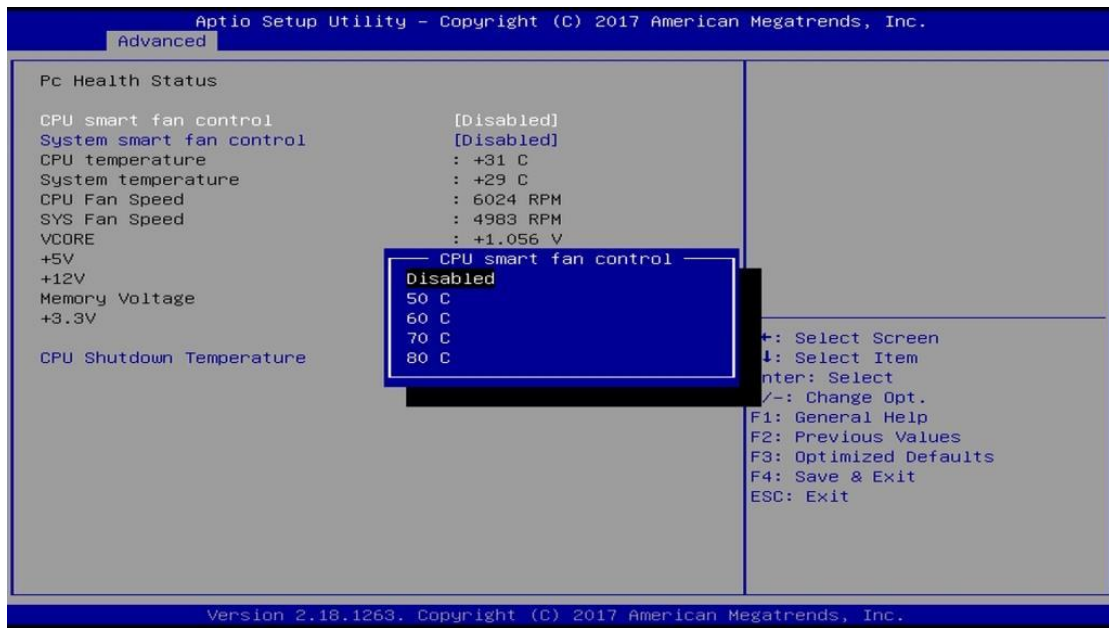
BIOS Setting	Description
Serial Port Configuration	Sets parameters of Serial Ports. Enables / Disables the serial port and select an optimal setting for the Super IO device.

4.4.7.1. Serial Port 1 Configuration



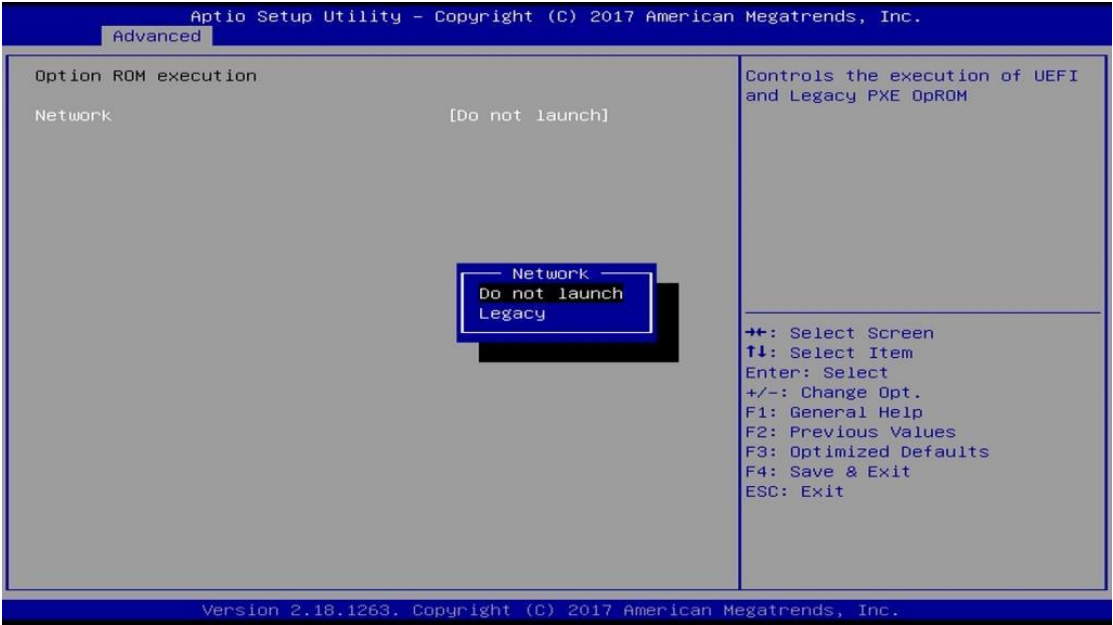
BIOS Setting	Description
Serial Port	Sets parameters of serial ports.
Change Settings	<p>Selects an optimal settings for Super I/O device.</p> <p>Options:</p> <ul style="list-style-type: none"> • Auto • IO = 3F8h; IRQ = 4 • IO = 3F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2F8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 3E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12 • IO = 2E8h; IRQ = 3, 4, 5, 6, 7, 9, 10, 11, 12
F81846 Serial Port1 Mode Selection	F81846 serial port 1 mode selection: RS232, RS422, RS485 modes.

4.4.8 Hardware Monitor



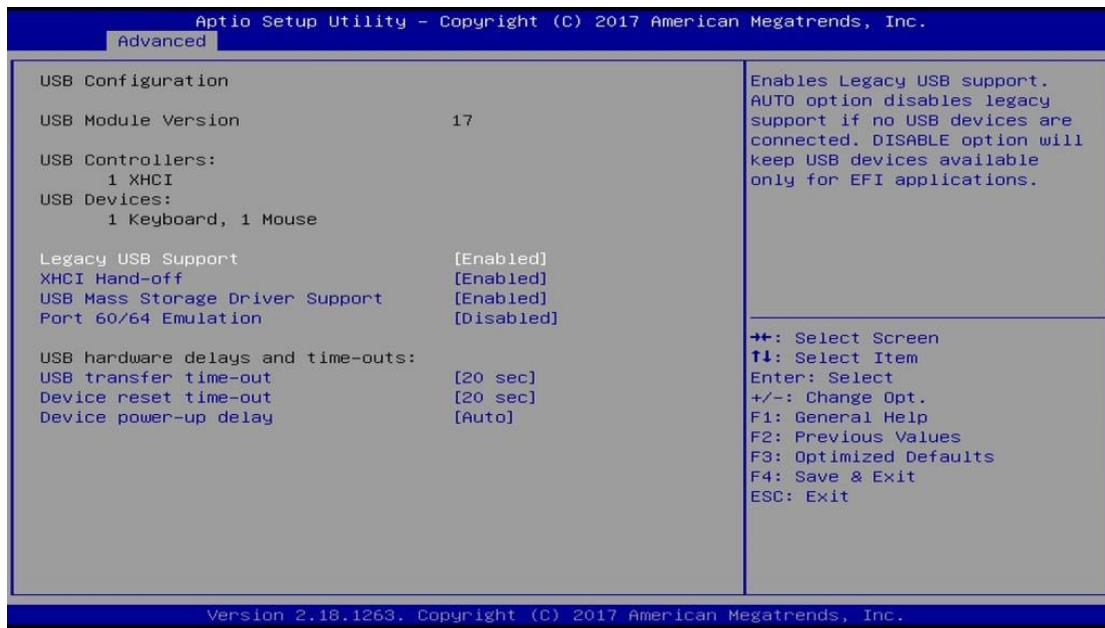
BIOS Setting	Description
CPU & System Smart Fan Control	Selects the smart fan mode. Options: Disabled, 50°C, 60°C, 70°C, 80°C
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.
CPU Shutdown Temperature	This field enables or disables the Shutdown Temperature Options: Disabled, 70°C, 75°C, 80°C, 85°C, 90°C, 95°C

4.4.9 CSM Configuration



BIOS Setting	Description
Network	Controls the execution of UEFI and Legacy PXE OpROM.

4.4.10 USB Configuration



BIOS Setting	Description
Legacy USB Support	<ul style="list-style-type: none"> Enable: Enables Legacy USB Support. Auto: Disables legacy support if no USB devices are connected. Disable: Keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI / EHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables the support for USB mass storage driver.
Port 60/64 Emulation	Enables I/O port 60h/64h emulation support. This should be enabled for the complete USB keyboard legacy support for non-USB aware OSes.
USB Transfer time-out	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	Seconds of delaying execution of start unit command to USB mass storage device.
Device power-up delay	The maximum time the device will take before it properly reports itself to the Host Controller. "Auto" uses default value for a Root port it is 100ms. But for a Hub port, the delay is taken from Hub descriptor.

4.5 Chipset Settings



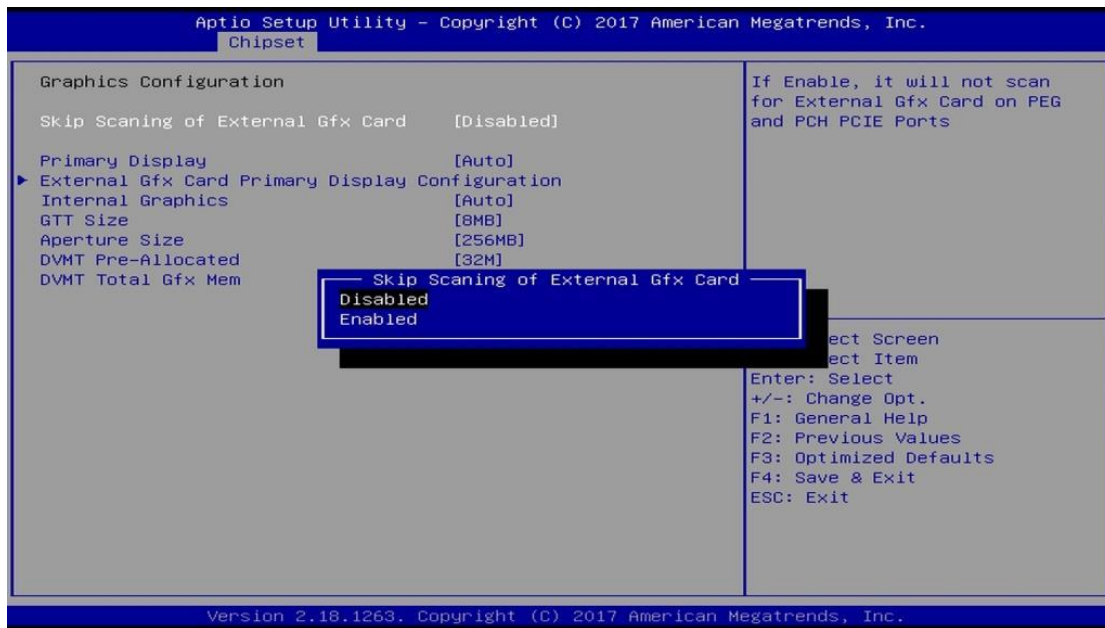
BIOS Setting	Description
System Agent (SA) Configuration	System Agent parameters
PCH-IO Configuration	PCH parameters

4.5.1 System Agent Bridge Name



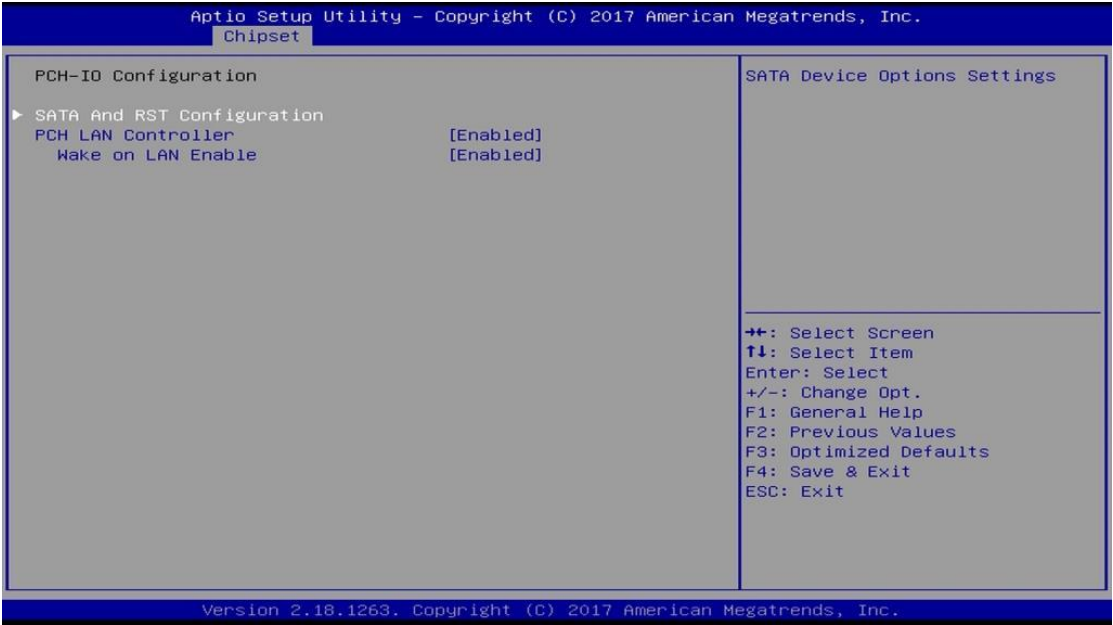
BIOS Setting	Description
Graphics Configuration	Configures the Graphics
VT-d	Enables / Disables VT-d capability.

4.5.1.1. Graphics Configuration



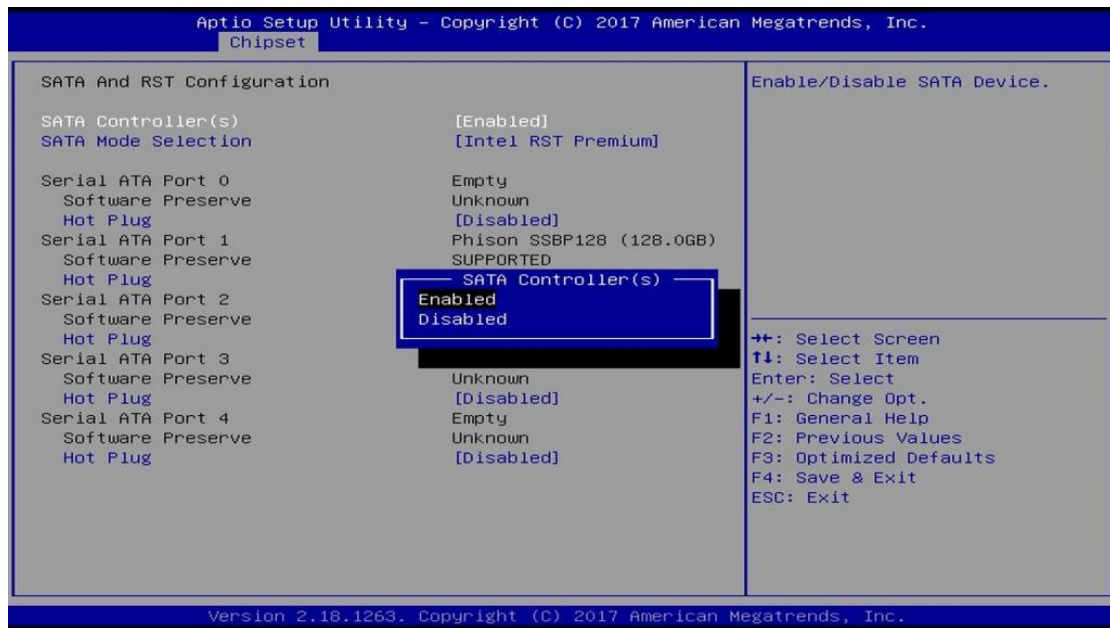
BIOS Setting	Description
Skip Scanning of External Gfx Card	If enabled, it will not scan for external Gfx card on PEG and PCM PCIe ports.
Primary Display	Select which of IGFX/PEG/PCI graphics device should be primary display or select SG for switchable Gfx.
External Gfx Card Primary Display Configuration	External Gfx card primary display configuration.
Internal Graphics	Kepp IGFX enabled based on the setup options.
GTT Size	Selects the GTT size as 2, 4 or 8 MB.
Aperture Size	Selects the Aperture size as 128, 256, 512, 1024, 2048 MB. Note: Above 4 GB MMIO BIOS assignment is automatically enabled when selecting 2048 MB aperture. To use this feature, please disable CSM Support.
DVMT Pre-Allocated	Selects DVMT 5.0 pre-allocated (fixed) graphics memory size (0M, 4M, 8M, 12M, 16M, 20M, 24M, 28M, 32M, 32M/F7, 36M, 40M, 44M, 48M, 52M, 56M, 60M) used by the internal graphics device
DVMT Total Gfx Mem	Selects DVMT5.0 total graphics memory size (256M, 128M, Max) used by the internal graphics device.

4.5.2 PCH-IO Configuration



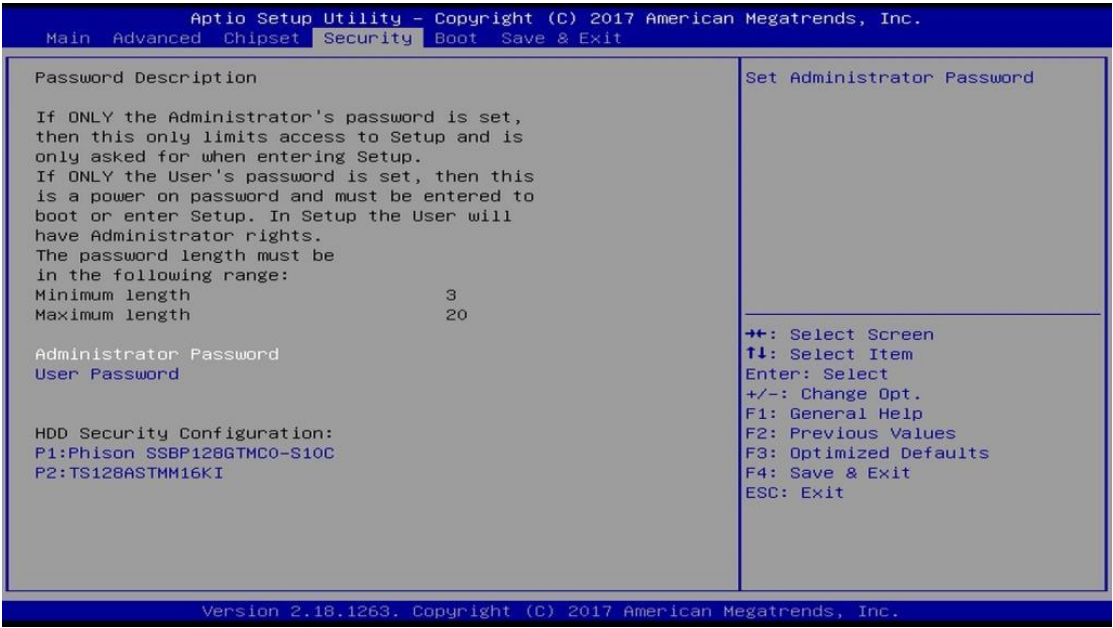
BIOS Setting	Description
SATA and RST Configuration	SATA device options settings.
PCM LAN Controller	Enables / Disables onboard NIC.
Wake on LAN Enable	Enables / Disables integrated LAN to wake the system.

4.5.2.1. SATA and RST Configuration



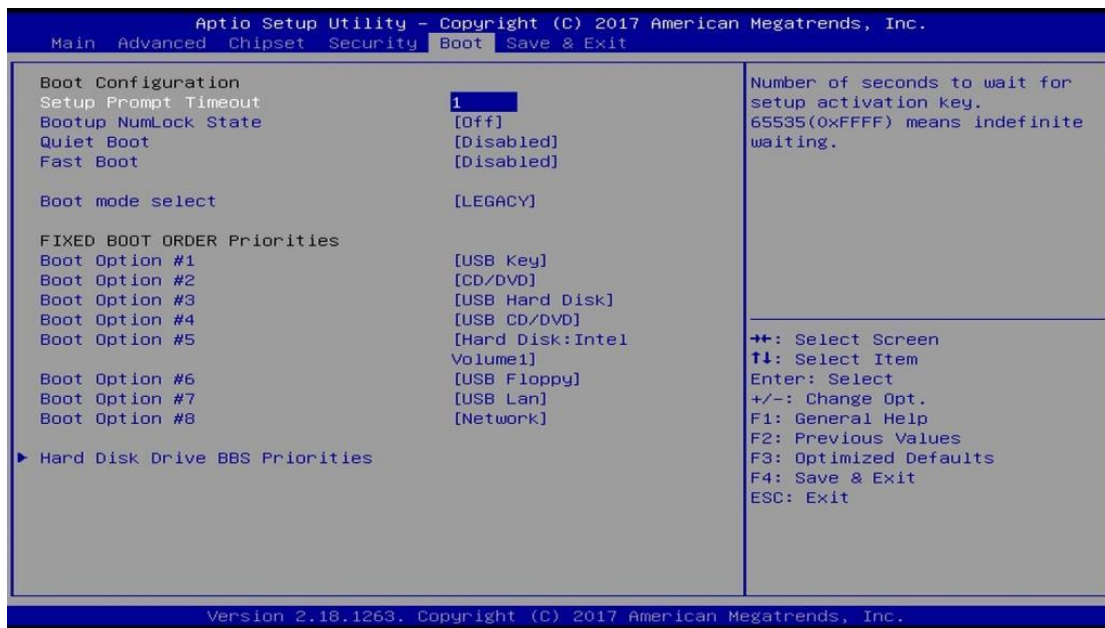
BIOS Setting	Description
SATA Controller(s)	Enables / Disables SATA device.
SATA Mode Selection	Determines how SATA controller(s) operate. Options: AHCI, Intel RST Premium
Serial ATA Ports	Enables / Disables serial ports.
Hot Plug	Designates this port as hot pluggable.

4.6 Security Settings



BIOS Setting	Description
Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.

4.7 Boot Settings



BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enables / Disables Quiet Boot option.
Fast Boot	Enables / Disables boot with initialization of a minimal set of devices required to launch the active boot option. There no effect for BBS boot options.
Boot Mode Select	Selects a Boot mode.
Boot Option Priorities	Sets the system boot order priorities for hard disk, CD/DVD, USB, Network.
Hard Disk Drive BBS Priorities	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.

4.8 Save & Exit Settings



BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Discard Changes and Exit	Exits system setup without saving any changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Save Changes	Saves changes done so far to any of the setup options.
Discard Changes	Discards changes done so far to any of the setup options.
Restore Defaults	Restores / Loads defaults values for all the setup options.
Save as User Defaults	Saves the changes done so far as user defaults.
Restore User Defaults	Restores the user defaults to all the setup options.

Appendix

This section provides the mapping addresses of peripheral devices and the sample code of watchdog timer configuration.

- AMD Eyefinity Multiple Displays
- Matrox C900 Graphics Card Installation
- Video Walls Configuration for Matrox C900 Graphics Card
- I/O Port Address Map
- Interrupt Request Lines (IRQ)
- Watchdog Timer Configuration

A. AMD Eyefinity Multiple Displays Configuration

AMD Eyefinity is applicable to SI-61S-AI; it is a technology that allows two or more displays to be grouped together to form a single large desktop. Once AMD Eyefinity is configured, the final resolution is the horizontal and/or vertical sum of the individual monitors.

The following AMD embedded configurations are used for the demonstration of AMD Eyefinity configuration in this section.

Platform: AMD Embedded V1000 Reference Platform

APU: AMD Embedded V1000 Processor with AMD Radeon Vega Graphics

AMD Driver: 17.40.3775.1003.180508a-328988C-AES

A.1 Setting Up AMD Eyefinity Using Quick Setup

A.1.1 AMD Eyefinity Quick Setup with All Displays

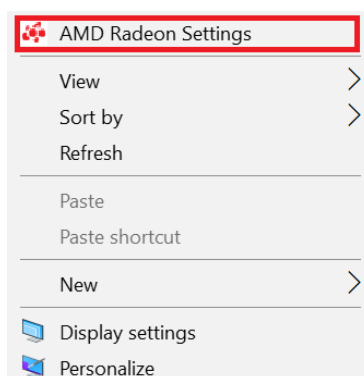
This section describes how to set up AMD Eyefinity with the Quick Setup option, where all the connected displays will be part of the AMD Eyefinity Display Group created.

As AMD Eyefinity Quick Setup creates an Eyefinity Display Group based on the current (default) display configuration, ensure that the displays are arranged in the desired supported order first under extended desktop in the Operating System's display settings.

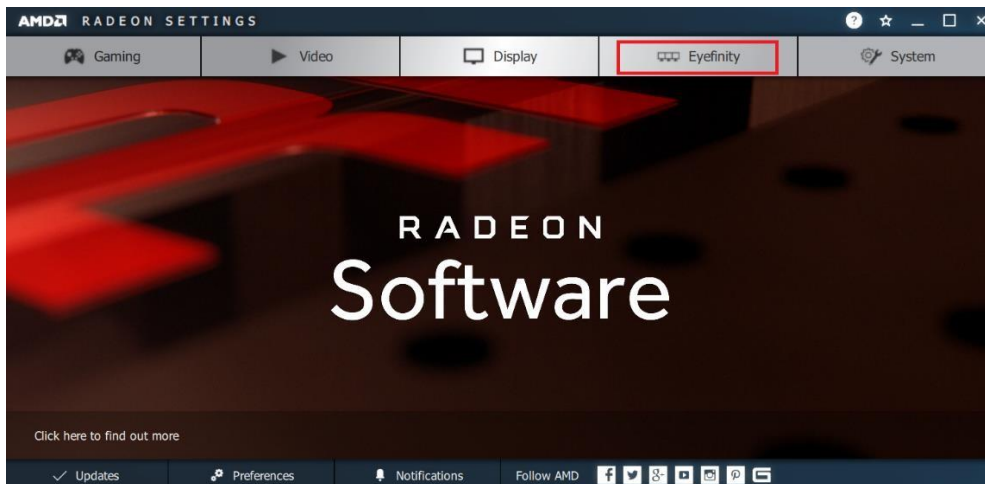
In the below example, Eyefinity Quick Setup is used to create a 3x1 AMD Eyefinity Display Group. So, arrange the displays in a 3x1 configuration in extended desktop before configuring AMD Eyefinity with Quick Setup.

To set up AMD Eyefinity with Quick Setup:

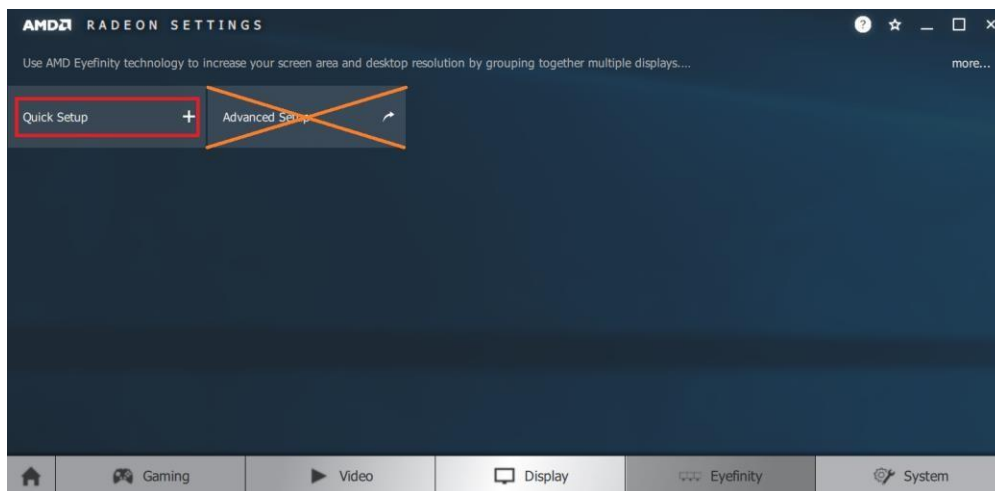
1. Open AMD Radeon Settings: Right-click on the desktop and select **AMD Radeon Settings**.



2. Click **Eyefinity** once **AMD Radeon Settings** opens.

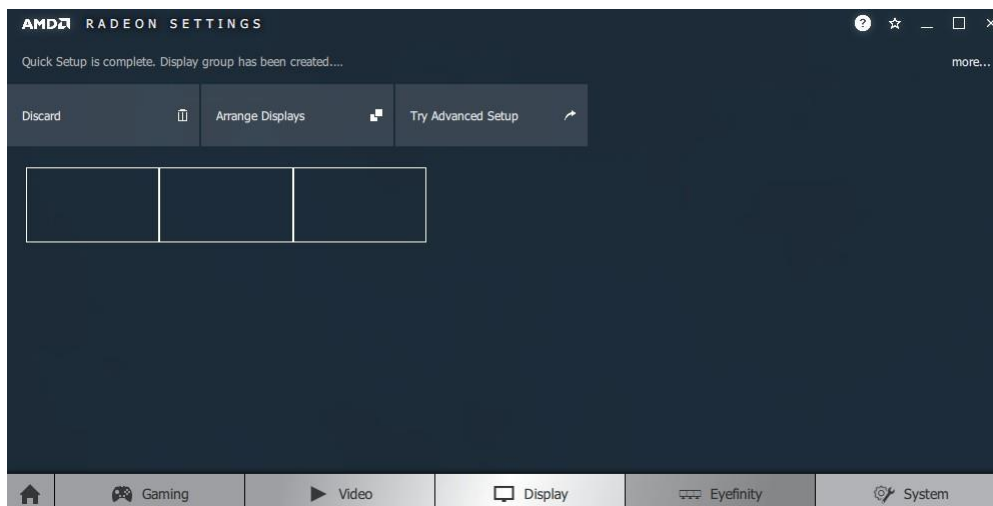


3. Click **Quick Setup** to automatically create an AMD Eyefinity Display Group based on the current (default) display configuration.



Note: At the time of writing, **Advanced Setup** for configuring Eyefinity is available. However, this feature is not supported. Do not confuse with **Try Advanced Setup** (see below picture), which becomes available after Eyefinity Quick Setup is complete. The **Try Advanced Setup** option is used to customize the Eyefinity Display Group created after Eyefinity Quick Setup is complete.

4. In this example, a 3x1 Eyefinity Display Group is created as shown below.

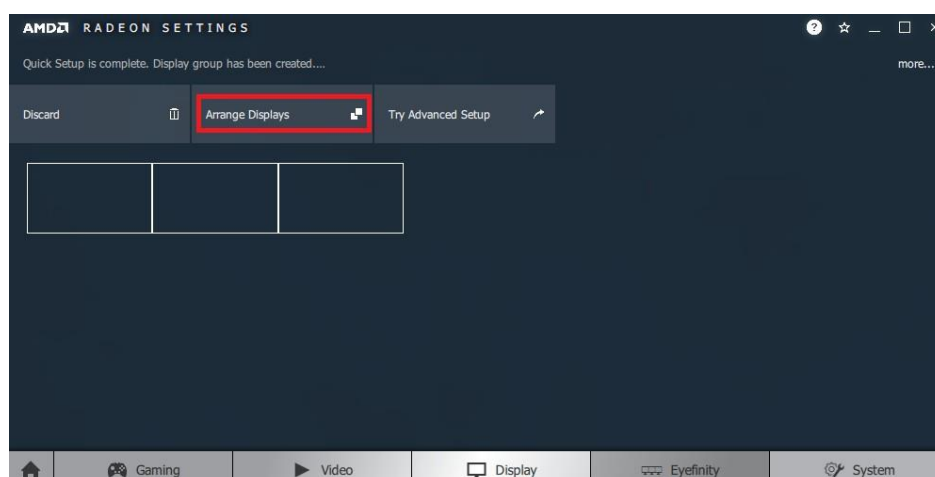


5. Once the AMD Eyefinity Display Group is created, the following options become available:
- **Discard** – Removes the AMD Eyefinity setup and restores the previous display configuration.
 - **Arrange Displays** – Arrange the position of each display in the AMD Eyefinity Display Group. Refer to the next section *Arrange Displays after Eyefinity Quick Setup* for details.
 - **Try Advanced Setup** – Additional settings to customize the AMD Eyefinity Display Group. Refer to *A.2 Customizing AMD Eyefinity Using Try Advanced Setup* for details.

Arrange Displays after Eyefinity Quick Setup

To arrange displays in desired positions (optional):

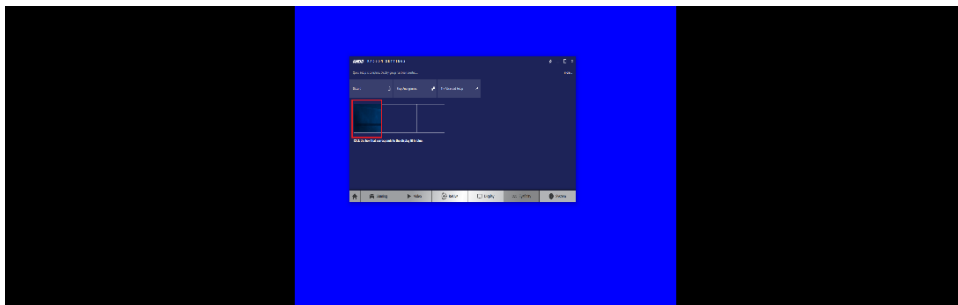
1. Click **Arrange Displays** after Eyefinity Quick Setup is complete.



2. The onscreen guide will show a grid representation of the Eyefinity Display Group and one of the physical displays will have a blue background.



3. Click on the box in the grid that matches the desired location of the highlighted display in blue.



4. Repeat Step #3 with the rest of displays to complete the **Arrange Displays** setup.

A.1.2 AMD Eyefinity Quick Setup with Part of All Displays

As mentioned previously, since Eyefinity Quick Setup uses the current (default) display configuration which involves all the connected displays, configuring Eyefinity with only a portion of the connected displays is not allowed.

For example, setting up 3 x 1 Eyefinity with 4 connected displays is not possible with Eyefinity Quick Setup.

The following example, which sets up 3 x 1 Eyefinity (Quick Setup) with a total of 4 x 4k connected displays, demonstrates the method to work around the limitation:

1. Physically connect the displays to be used for the Eyefinity Display Group. In this setup, the number of displays for Eyefinity should be less than the total number of displays to be used in the overall setup (i.e. Eyefinity Display Group + Extended Desktop Displays).

In this example, physically connect 3 of the 4 displays first and arrange them in 3 x 1 extended desktop in the Operating System's display settings.

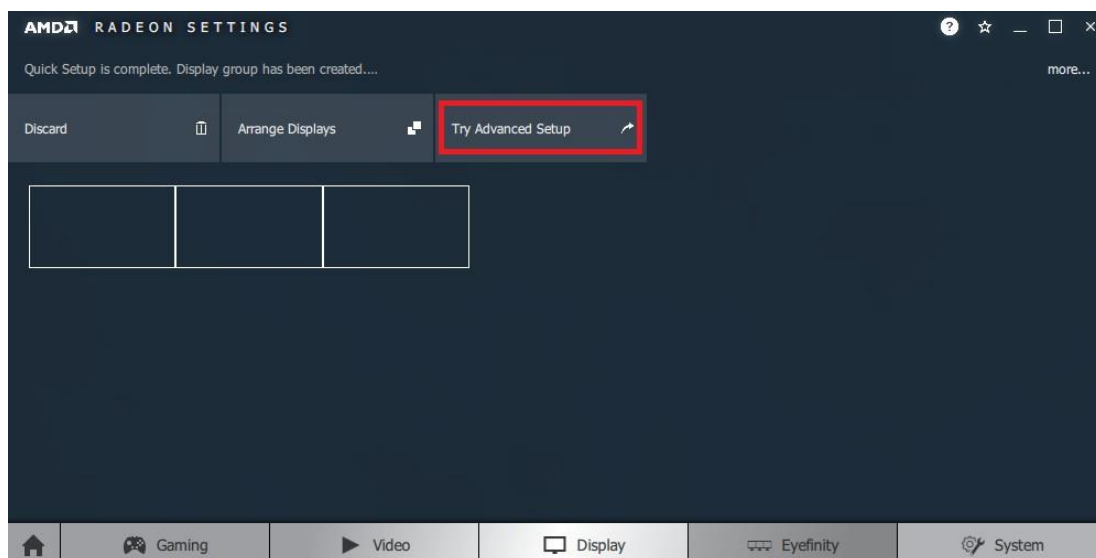
2. Follow the steps in Section 2.1, “AMD Eyefinity Quick Setup with All Displays” to configure Eyefinity.

In this example, a 3 x 1 Eyefinity Display Group has been created with 3 x 4k displays after Eyefinity Quick Setup is complete.

3. Once the 3 x 1 Eyefinity Display Group is created, connect (hotplug) the fourth display to the AMD graphics device.

The resulting setup consists of a 3 x 1 Eyefinity Display Group (11520 x 2160 resolution) + 1 x 4k (3840 x 2160 resolution) (in extended desktop).

A.2 Customizing AMD Eyefinity Using Try Advanced Setup



Try Advanced Setup becomes available after Eyefinity Quick Setup is complete (see above picture). It offers customization for the Eyefinity Display Group created, with options such as:

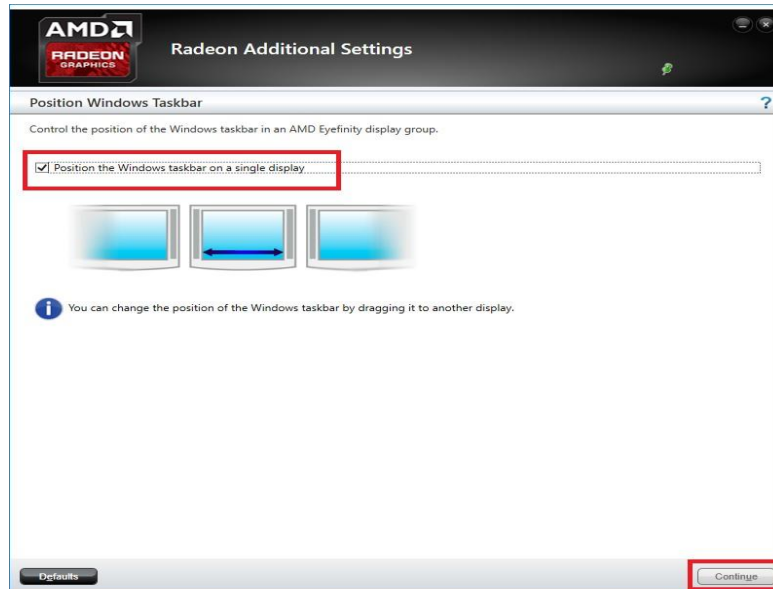
- Position Windows Taskbar
- Arrange Eyefinity Display Group
- Resize Desktop
- Disable Eyefinity Display Group
- Adjust Bezel Compensation
- Customize Eyefinity Desktop Resolution

A.2.1 Position Windows Taskbar

The **Position Windows Taskbar** option allows adjusting the Taskbar across all displays in the Eyefinity Display Group or in one preferred display. By default, the Taskbar extends across all displays in a single row AMD Eyefinity Display Group. In a multi-row AMD Eyefinity Display Group, it extends across the bottom row of displays.

To set the Taskbar position:

1. Click **Try Advanced Setup** (under **Eyefinity** tab in AMD Radeon Settings) after Eyefinity Quick Setup is complete.
2. Click **Position Windows Taskbar** once Radeon Additional Settings launches.
3. Check the **Position the Windows taskbar on a single display** option and click **Continue**.



4. To move the Taskbar, simply drag and drop it to the desired display. Ensure that the Taskbar setting is not set to “locked”.
5. To have the Taskbar running across multiple displays again, uncheck the **Position the Windows taskbar on a single display** option and click **Continue**.



A.2.2 Arrange Eyefinity Display Group

The **Arrange Eyefinity Display Group** option allows re-arranging the order of the displays in an AMD Eyefinity Display Group if needed.

To re-arrange the displays in an Eyefinity Display Group:

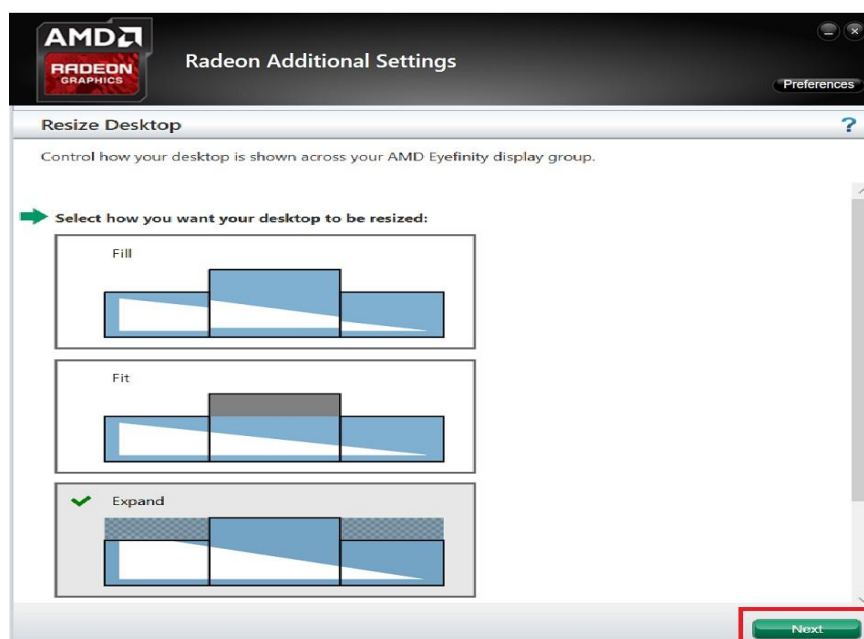
1. Click **Try Advanced Setup** (under **Eyefinity** tab in AMD Radeon Settings) after Eyefinity Quick Setup is complete.
2. Click **Arrange Eyefinity Display Group** once Radeon Additional Settings launches.
3. Use the same method as described in Section 2.1.1, “Arrange Displays after Eyefinity Quick Setup” (Step #2 to #4) to complete re-arranging the displays in an Eyefinity Display Group.

A.2.3 Resize Desktop

When displays in an AMD Eyefinity Display Group are configured to use different resolutions, rotations, or alignments, the desktop image may appear stretched or cropped. In an AMD Eyefinity Group consisting of displays with mixed dimensions (different sizes, resolutions, orientations), the **Resize Desktop** option changes how the desktop image is shown across the displays by resizing it.

To resize the desktop:

1. Click **Try Advanced Setup** (under **Eyefinity** tab in AMD Radeon Settings) after Eyefinity Quick Setup is complete.
2. Click **Resize Desktop** once Radeon Additional Settings launches.



3. Choose one of the following options:

- **Fill** - Fill the entire area of each display with its portion of the desktop. The desktop may appear stretched on certain displays.
- **Fit** - Resize the desktop to the height of the shortest display. Show the entire desktop across all displays without cropping or stretching the desktop. Certain areas of your displays may appear blank.
- **Expand** - Resize the desktop to the height of the tallest display. Portions of the desktop, for example, the Taskbar, may appear cropped or missing on certain displays.

4. Click **Next** to complete and save the setup.

A.2.4 Disable Eyefinity Display Group

The **Disable Eyefinity Display Group** option disables an already configured Eyefinity Display Group to return all displays in the group to the original display configuration.

To disable the Eyefinity Display Group:

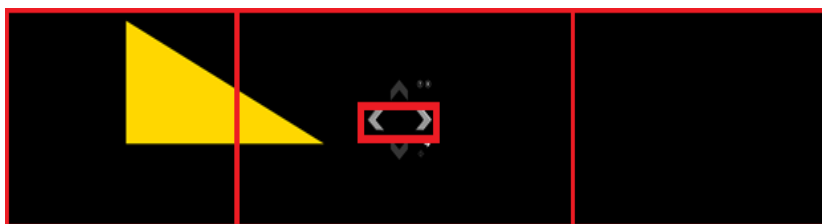
1. Click **Try Advanced Setup** (under **Eyefinity** tab in AMD Radeon Settings) after Eyefinity Quick Setup is complete.
2. Click **Disable Eyefinity Display Group** once Radeon Additional Settings launches.

A.2.5 Adjust Bezel Compensation

In an AMD Eyefinity Display Group the edges (bezels) of the displays may cause the image to appear disjointed or not continuous. The **Adjust Bezel Compensation** feature provides alignment functions that allow the desktop to appear continuous across all displays in an Eyefinity Display Group.

To adjust bezel compensation:

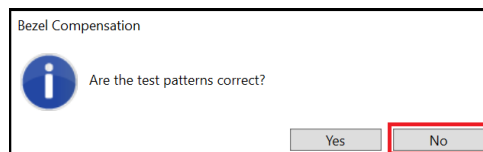
1. Click **Try Advanced Setup** (under **Eyefinity** tab in AMD Radeon Settings) after Eyefinity Quick Setup is complete.
2. Click **Adjust Bezel Compensation** once Radeon Additional Settings launches.
3. Use the Chevrons (arrow heads) to move the triangle test pattern until it is properly aligned (as shown in below picture).



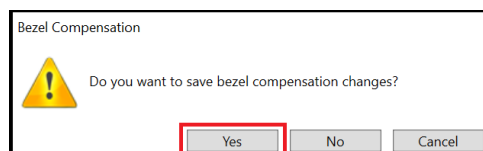
- Click on the directional arrow:



Then click **No** for the “Are the test patterns correct?” box to repeat Step #3 for the next set of bezels.



- When complete, click the **X** button and Yes to save the changes and close the tool.



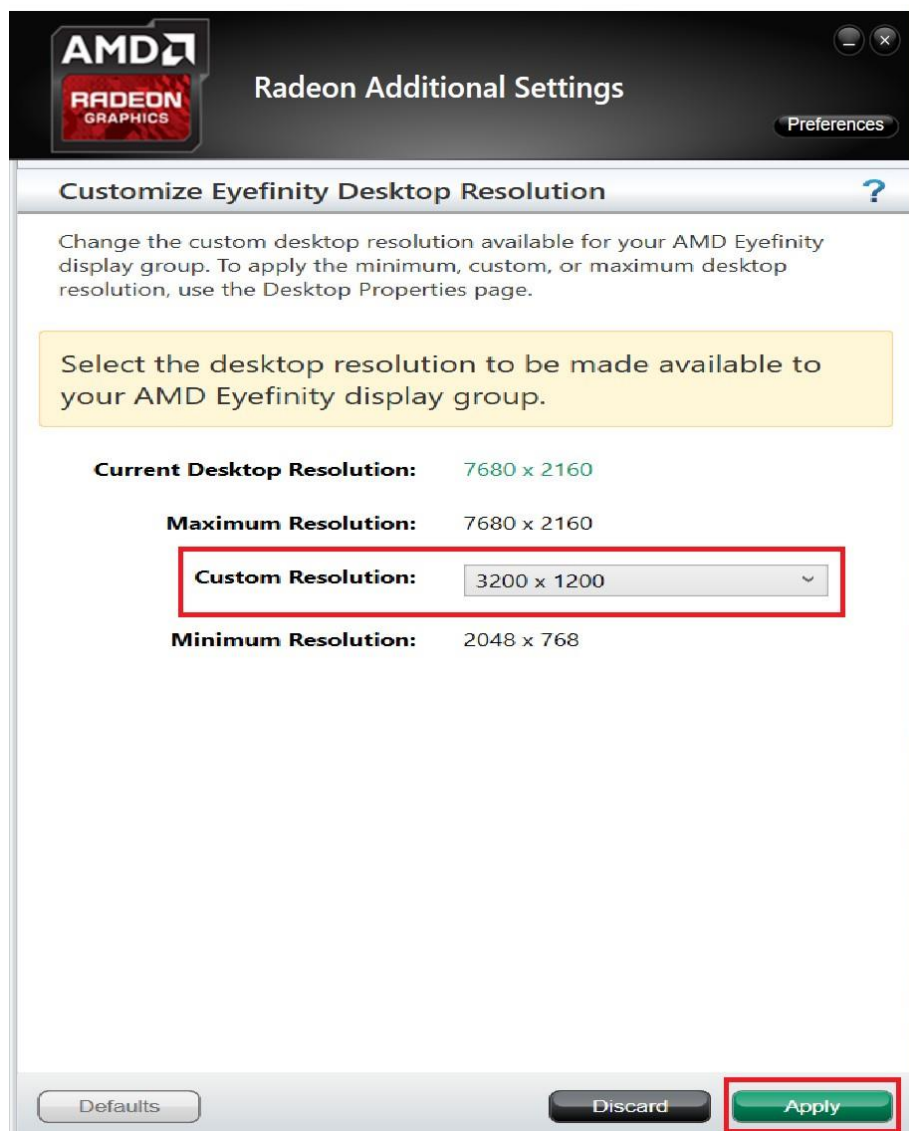
A.2.6 Customize Eyefinity Desktop Resolution

The **Customize Eyefinity Desktop Resolution** option allows the desktop size of an AMD Eyefinity Display Group to be changed to any resolution that is listed in the Custom Resolution drop-down menu. Once the desired Custom Resolution is chosen in **Customize Eyefinity Desktop Resolution**, this particular resolution becomes available in the Operating System’s display settings menu for selection.

To customize Eyefinity desktop resolution:

- Click **Try Advanced Setup** (under **Eyefinity** tab in AMD Radeon Settings) after Eyefinity Quick Setup is complete.
- Click **Customize Eyefinity Desktop Resolution** once Radeon Additional Settings launches.

3. In the **Customize Eyefinity Desktop Resolution** menu, the minimum and maximum resolutions are automatically determined based on your displays and cannot be changed. Use the **Custom Resolution** drop-down menu to select from a list of supported resolutions.

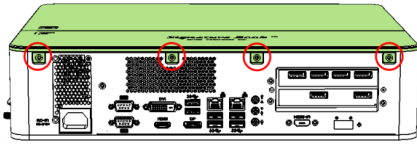


4. Select the preferred resolution from the **Custom Resolution** drop-down menu, and click **Apply** to save the setting.
5. Open the Operating System's display settings menu to change the resolution to the Custom Resolution selected in Step #4.

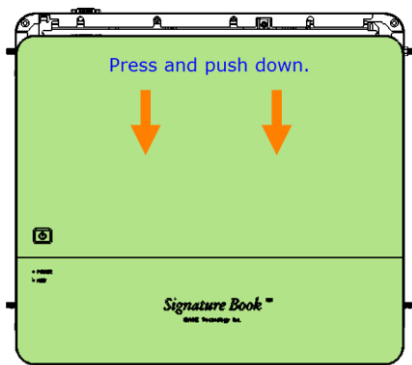
B. Matrox C900 Graphics Card Installation

To install the Matrox C900 graphics card(s) to SI-61S-AI, follow the instructions below.

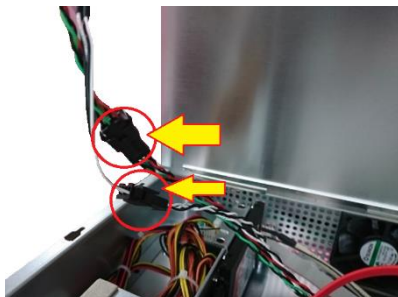
1. Remove the 4 screws from the SI-61S-AI cover.



2. Push down and open the SI-61S-AI cover.



3. Remove the cables below from the cover.



4. Remove two hole plugs as the figure 4-A indicated below. Then use a Philips screwdriver through the holes to remove the screw for each expansion slot filler.

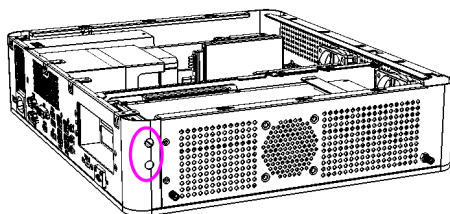


Figure 4-A

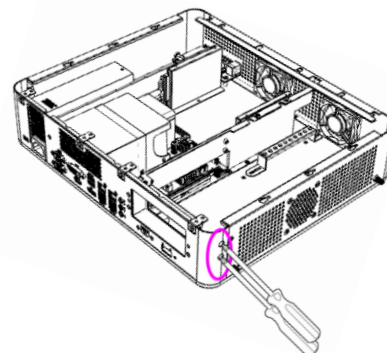
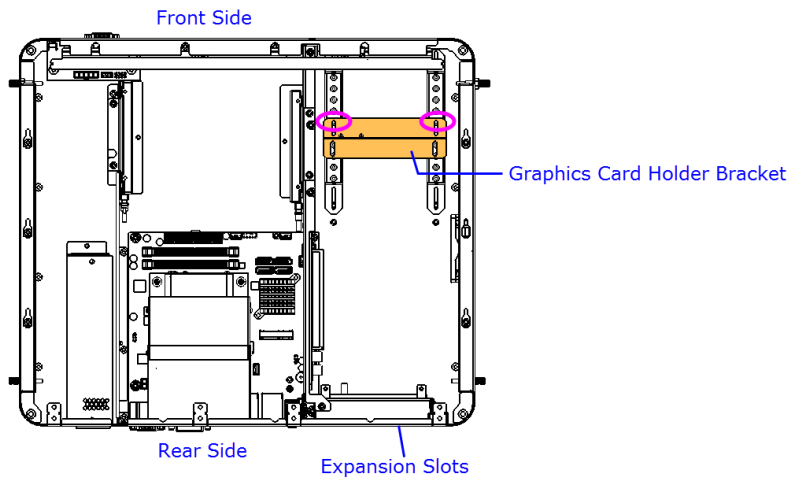
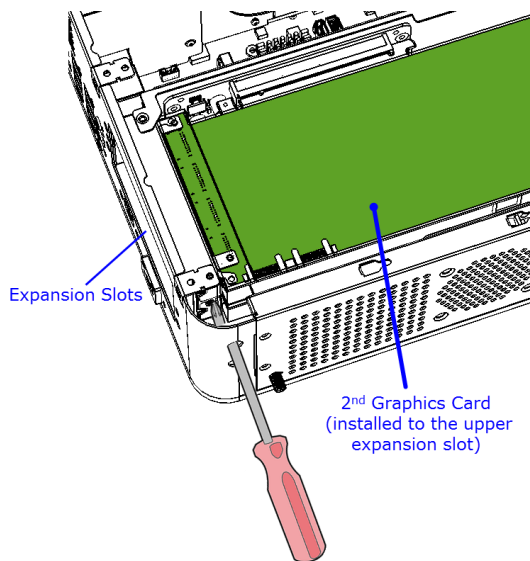


Figure 4-B

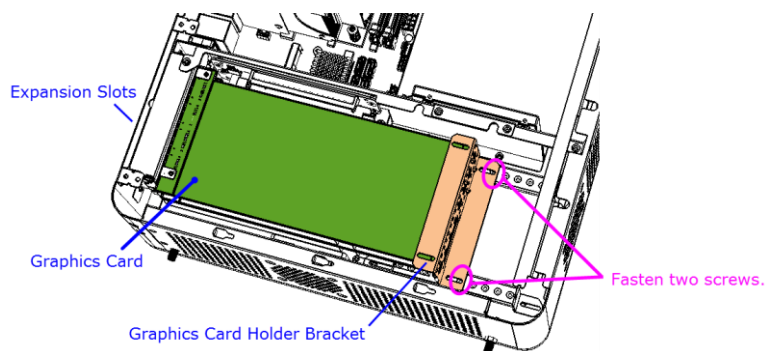
5. Remove the graphics card holder bracket by releasing two screws as circled below.



6. Install the graphics card to the lower expansion slot. If you would like to use two cards, install the 2nd card to the upper slot later.
7. Install the 2nd card to the upper slot by carefully holding it and fasten the screw to fix it.



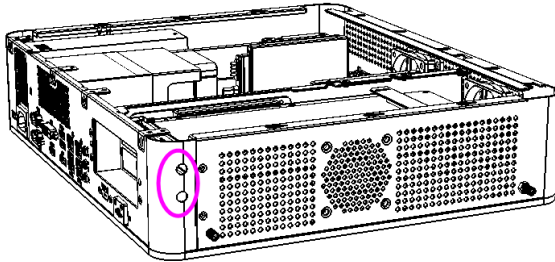
8. Install the graphics card holder bracket which you removed at Step 6 and secure it with two screws.



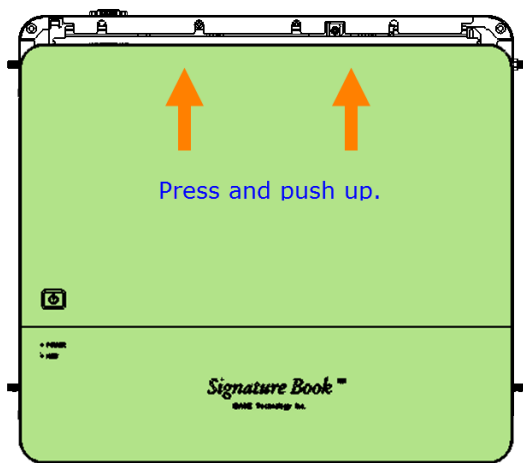
9. If you use two graphics cards, you will need to connect a ribbon cable to both cards.



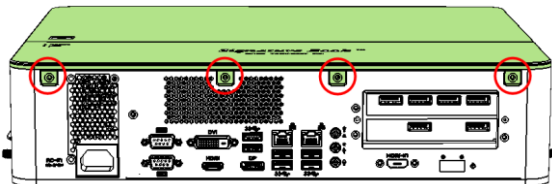
10. Install the hole plugs.



11. Restore the cables mentioned at Step 3 back to their original state.
12. Close the cover and push it upwards.



13. Fasten the 4 screws.



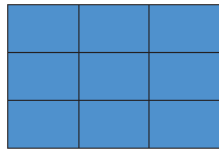
C. Video Walls Configuration for Matrox C900 Graphics Card

Matrox C900 graphics card features stretched desktop1 mode to deliver a single, ultra-large desktop across all displays attached to one card — ideal for video wall, industrial artificial intelligence (AI), and presentation applications. In stretched desktop mode all the video outputs are synchronized, and they must be set to run at the same resolution.

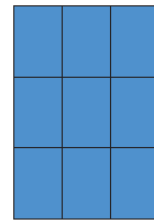
C.1 Single-Card Configuration

With a Matrox C900, you can create a display configuration of 9 screens as the most popular layouts below:

3 x 3 Landscape



3 x 3 Portrait



9 x 1 Landscape



1 x 9 Portrait



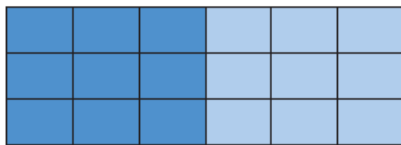
C.2 Dual-Card Configuration

Two Matrox C900 cards combined within a single system support configurations up to 15 and 18 screens.

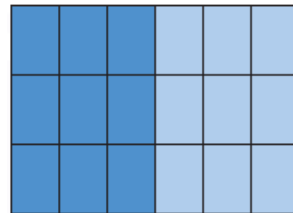
When operating a dual-board configuration, stretched desktop mode is available across the displays attached to one card; the board-to-board framelock feature available with C900 ensures that all the displays are running in synch and refreshed at the same time.

The most popular dual-card configuration options are as follows. Please contact us if you can't find the configuration you are looking for.

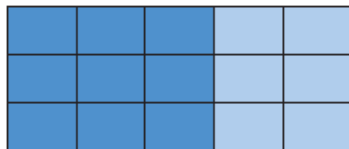
6 x 3 Landscape



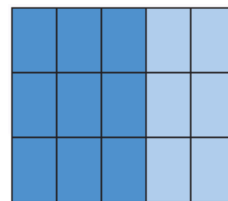
6 x 3 Portrait



5 x 3 Landscape



5 x 3 Portrait



D. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000070-0x00000070	System CMOS/real time clock
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x0000FFFF-0x0000FFFF	Motherboard resources
0x00001800-0x000018FE	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller

Address	Device Description
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00000800-0x0000087F	Motherboard resources
0x0000E000-0x0000EFFF	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115
0x0000E000-0x0000EFFF	Realtek 8821AE Wireless LAN 802.11ac PCI-E NIC
0x000000F0-0x000000F0	Numeric data processor
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x00001854-0x00001857	Motherboard resources
0x0000F090-0x0000F097	Intel(R) Desktop/Workstation/Server Express Chipset SATA RAID Controller
0x0000F080-0x0000F083	Intel(R) Desktop/Workstation/Server Express Chipset SATA RAID Controller
0x0000F060-0x0000F07F	Intel(R) Desktop/Workstation/Server Express Chipset SATA RAID Controller
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x0000F0A0-0x0000F0A7	Intel(R) Active Management Technology - SOL (COM5)

Address	Device Description
0x0000F000-0x0000F03F	Intel(R) HD Graphics 630
0x000003B0-0x000003BB	Intel(R) HD Graphics 630
0x000003C0-0x000003DF	Intel(R) HD Graphics 630
0x0000FF00-0x0000FFFE	Motherboard resources
0x0000F040-0x0000F05F	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x0000D000-0x0000DFFF	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #7 - A116

E. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ 14	Motherboard resources
IRQ 4294967290	Intel(R) I211 Gigabit Network Connection
IRQ 4294967287	Intel(R) I211 Gigabit Network Connection
IRQ 4294967286	Intel(R) I211 Gigabit Network Connection
IRQ 4294967285	Intel(R) I211 Gigabit Network Connection
IRQ 4294967284	Intel(R) I211 Gigabit Network Connection
IRQ 4294967283	Intel(R) I211 Gigabit Network Connection
IRQ 4294967282	Intel(R) Ethernet Connection (2) I219-LM
IRQ 4294967293	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #6 - A115
IRQ 13	Numeric data processor
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 7	Communications Port (COM4)
IRQ 0	System timer
IRQ 4294967291	Intel(R) Desktop/Workstation/Server Express Chipset SATA RAID Controller
IRQ 54 ~ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ 511	Microsoft ACPI-Compliant System
IRQ 4294967294	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #5 - A114
IRQ 19	Intel(R) Active Management Technology - SOL (COM5)
IRQ 4294967281	Intel(R) Management Engine Interface
IRQ 8	System CMOS/real time clock
IRQ 4294967289	Intel(R) USB 3.0 eXtensible Host Controller - 1.0 (Microsoft)
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family SMBus - A123

Level	Function
IRQ 11	Intel(R) 100 Series/C230 Series Chipset Family Thermal subsystem - A131
IRQ 1	Standard PS/2 Keyboard
IRQ 12	Microsoft PS/2 Mouse
IRQ 4294967292	Intel(R) 100 Series/C230 Series Chipset Family PCI Express Root Port #7 - A116
IRQ 4294967288	Realtek 8821AE Wireless LAN 802.11ac PCI-E NIC
IRQ 16	High Definition Audio Controller
IRQ 16	MZ0380 PCI

F. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for the use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven.

Under normal circumstance, you will need to restart the WDT at regular intervals before the timer counts to zero.

Sample Code:

```
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81846.H"
//-----
int main (int argc, char *argv[]);
void EnableWDT(int);
void DisableWDT(void);
//-----
int main (int argc, char *argv[])
{
    unsigned char bBuf;
    unsigned char bTime;
    char **endptr;

    char SIO;
    printf("Fintek 81846 watch dog program\n");

    SIO = Init_F81846();
    if (SIO == 0)
    {

        printf("Can not detect Fintek 81846, program abort.\n");
        return(1);
    }

    }

    if (argc != 2)
    {
        printf(" Parameter incorrect!!\n");
        return (1);
    }
}
```

```

    }

    bTime = strtol(argv[1], endptr, 10);
    printf("System will reset after %d seconds\n", bTime);

    if (bTime)
    {
        EnableWDT(bTime);
    }
    else
    {
        DisableWDT();
    }

    return 0;
}
//-----
void EnableWDT(int interval)
{
    unsigned char bBuf;

    bBuf = Get_F81846_Reg(0x2B);
    bBuf &= (~0x20);
    Set_F81846_Reg(0x2B, bBuf);           //Enable WDTO

    Set_F81846_LD(0x07);                 //switch to logic device 7
    Set_F81846_Reg(0x30, 0x01);         //enable timer

    bBuf = Get_F81846_Reg(0xF5);
    bBuf &= (~0x0F);
    bBuf |= 0x52;
    Set_F81846_Reg(0xF5, bBuf);         //count mode is second

    Set_F81846_Reg(0xF6, interval);     //set timer

    bBuf = Get_F81846_Reg(0xFA);
    bBuf |= 0x01;
    Set_F81846_Reg(0xFA, bBuf);         //enable WDTO output

    bBuf = Get_F81846_Reg(0xF5);
    bBuf |= 0x20;
    Set_F81846_Reg(0xF5, bBuf);         //start counting
}
//-----
void DisableWDT(void)
{
    unsigned char bBuf;

    Set_F81846_LD(0x07);                 //switch to logic device 7

    bBuf = Get_F81846_Reg(0xFA);
    bBuf &= ~0x01;
    Set_F81846_Reg(0xFA, bBuf);         //disable WDTO output

    bBuf = Get_F81846_Reg(0xF5);
    bBuf &= ~0x20;
    bBuf |= 0x40;
    Set_F81846_Reg(0xF5, bBuf);         //disable WDT
}

```

```

}
//-----

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include "F81846.H"
#include <dos.h>
//-----
unsigned int F81846_BASE;
void Unlock_F81846 (void);
void Lock_F81846 (void);
//-----
unsigned int Init_F81846(void)
{
    unsigned int result;
    unsigned char ucDid;

    F81846_BASE = 0x4E;
    result = F81846_BASE;

    ucDid = Get_F81846_Reg(0x20);
    if (ucDid == 0x07)                                //Fintek 81846
    {
        goto Init_Finish;
    }

    F81846_BASE = 0x2E;
    result = F81846_BASE;

    ucDid = Get_F81846_Reg(0x20);
    if (ucDid == 0x07)                                //Fintek 81846
    {
        goto Init_Finish;
    }

    F81846_BASE = 0x00;
    result = F81846_BASE;

Init_Finish:
    return (result);
}
//-----
void Unlock_F81846 (void)
{
    outportb(F81846_INDEX_PORT, F81846_UNLOCK);
    outportb(F81846_INDEX_PORT, F81846_UNLOCK);
}
//-----
void Lock_F81846 (void)

```

```
{
    outportb(F81846_INDEX_PORT, F81846_LOCK);
}
//-----
void Set_F81846_LD( unsigned char LD)
{
    Unlock_F81846();
    outportb(F81846_INDEX_PORT, F81846_REG_LD);
    outportb(F81846_DATA_PORT, LD);
    Lock_F81846();
}
//-----
void Set_F81846_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_F81846();
    outportb(F81846_INDEX_PORT, REG);
    outportb(F81846_DATA_PORT, DATA);
    Lock_F81846();
}
//-----
unsigned char Get_F81846_Reg(unsigned char REG)
{
    unsigned char Result;
    Unlock_F81846();
    outportb(F81846_INDEX_PORT, REG);
    Result = inportb(F81846_DATA_PORT);
    Lock_F81846();
    return Result;
}
//-----

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#ifndef F81846_H
#define F81846_H 1
//-----
#define F81846_INDEX_PORT (F81846_BASE)
#define F81846_DATA_PORT (F81846_BASE+1)
//-----
#define F81846_REG_LD 0x07
//-----
#define F81846_UNLOCK 0x87
#define F81846_LOCK 0xAA
//-----
```



```
unsigned int Init_F81846(void);  
void Set_F81846_LD( unsigned char);  
void Set_F81846_Reg( unsigned char, unsigned char);  
unsigned char Get_F81846_Reg( unsigned char);  
//-----  
#endif //    F81846_H
```