

MODEL:

KINO-QM770

**Mini-ITX SBC with 3rd Generation 22nm Intel® Mobile CPU
Up to 8.0 GB DDR3, DVI, HDMI, LVDS, Dual GbE, USB 3.0,
SATA 6Gb/s, PCIe Mini, PCIe x16, Intel® AMT, RoHS**

User Manual

Revision

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September 25, 2014	1.02	Modified Section 4.6.4: Display Mode Selection
December 7, 2012	1.01	Modified PICE Mini card slot specification Modified Table 4-5: Display Mode Selection Jumper Settings
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Chapter

1

Introduction

1.1 Introduction

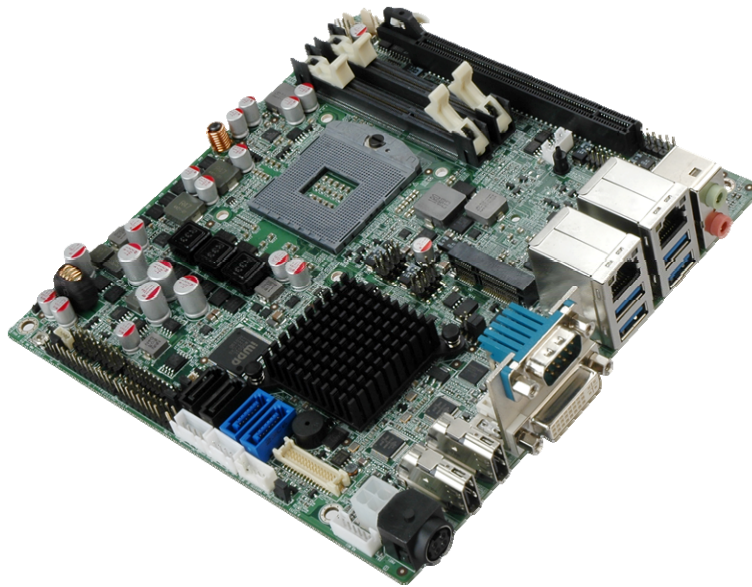


Figure 1-1: KINO-QM770

The KINO-QM770 is a Mini-ITX SBC with a 3rd generation 22nm Intel® mobile CPU and Intel® QM77 Express Chipset. Storage on the board is handled by two SATA 6Gb/s ports and two SATA 3Gb/s ports for connecting a hard drive, optical drive or SSD.

The board has three types of graphics outputs. A DVI-I output connects to a DVI monitor or a traditional VGA monitor. One LVDS connector supports 24-bit dual-channel display and two HDMI connectors support HDMI 1080p display.

Other slots and connectors include RS-232, RS-422/485, Gigabit Ethernet, USB 3.0 ports, USB 2.0 ports and digital I/O.

KINO-QM770 Mini-ITX SBC

1.2 Benefits

Some of the KINO-QM770 motherboard benefits include:

- Low power consumption
- Wide range of I/O interfaces
- Triple independent display support

1.3 Features

Some of the KINO-QM770 motherboard features are listed below:

- Mini-ITX form factor
- RoHS compliant
- Intel® AMT 8.0 support
- Dual GbE
- Supports HDMI, LVDS and DVI-I interface for triple independent display (HDMI V1.3a compliant)
- Eight USB ports (four USB 2.0, four USB 3.0)
- Three serial ports
- PCIe Mini card slot
- PCIe x16 slot

1.4 Connectors

The connectors on the KINO-QM770 are shown in the figure below.

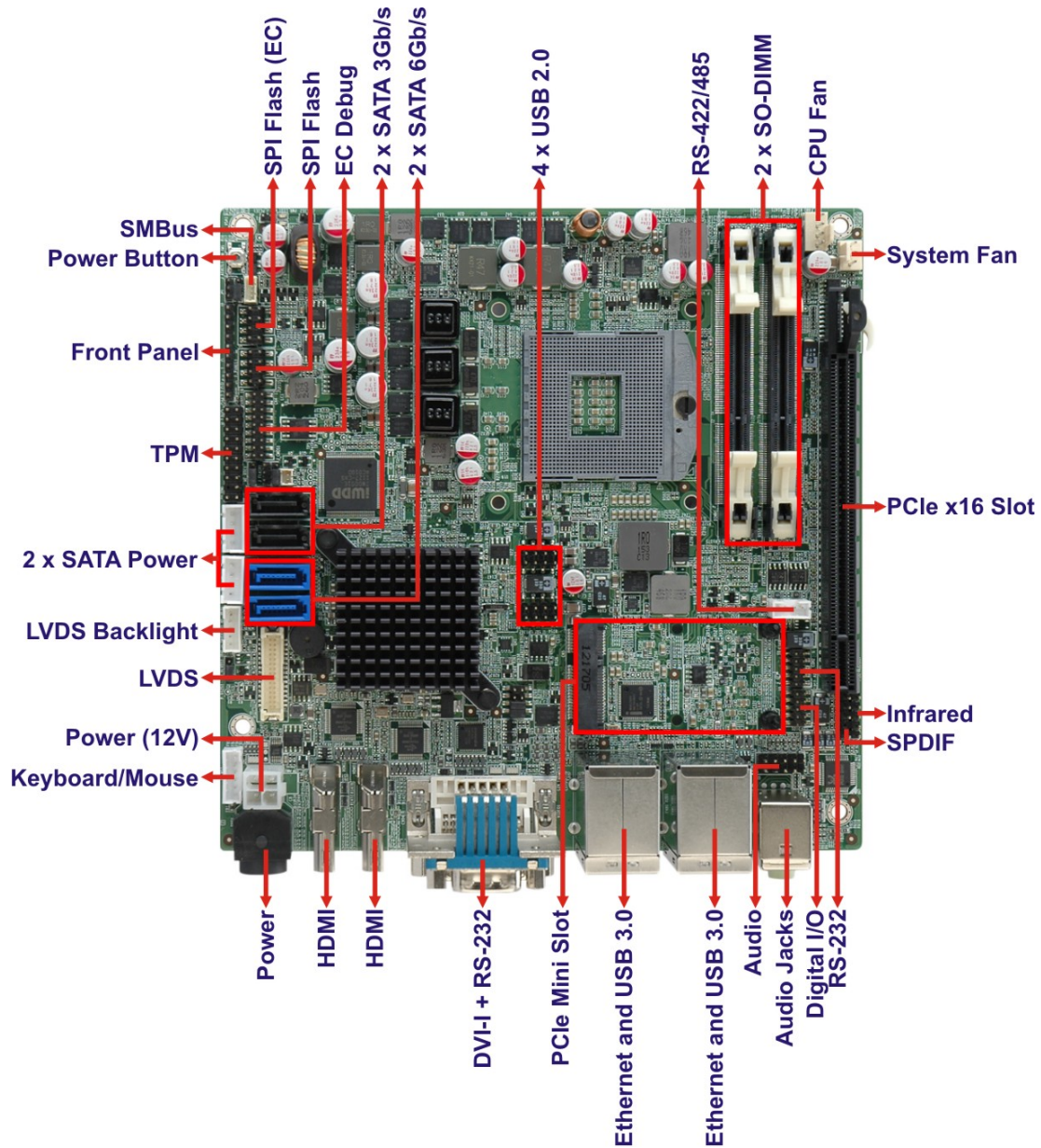


Figure 1-2: Connectors

KINO-QM770 Mini-ITX SBC

1.5 Dimensions

The main dimensions of the KINO-QM770 are shown in the diagram below.

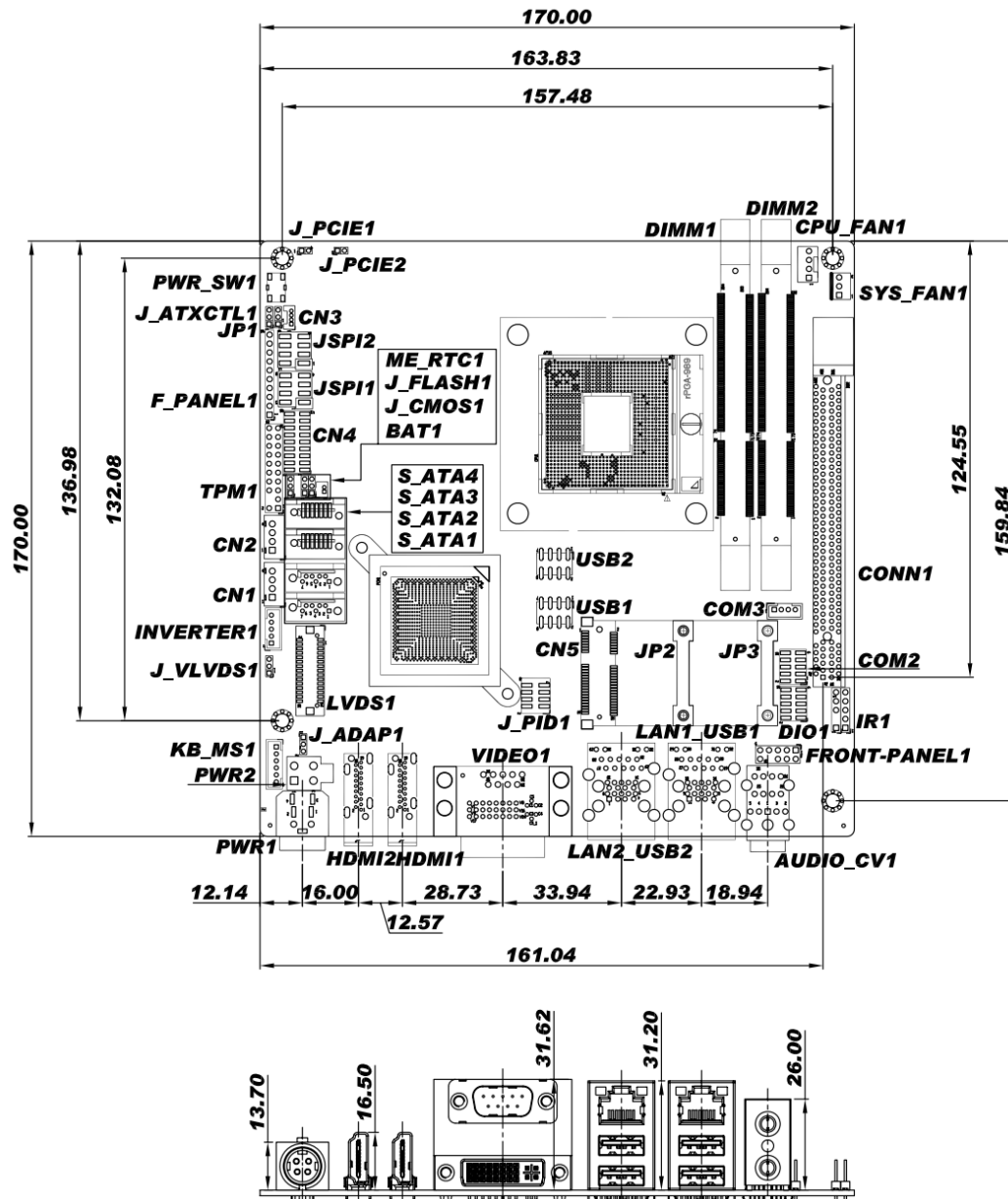


Figure 1-3: Dimensions (mm)

1.6 Data Flow

Figure 1-4 shows the data flow between the system chipset, the CPU and other components installed on the motherboard.

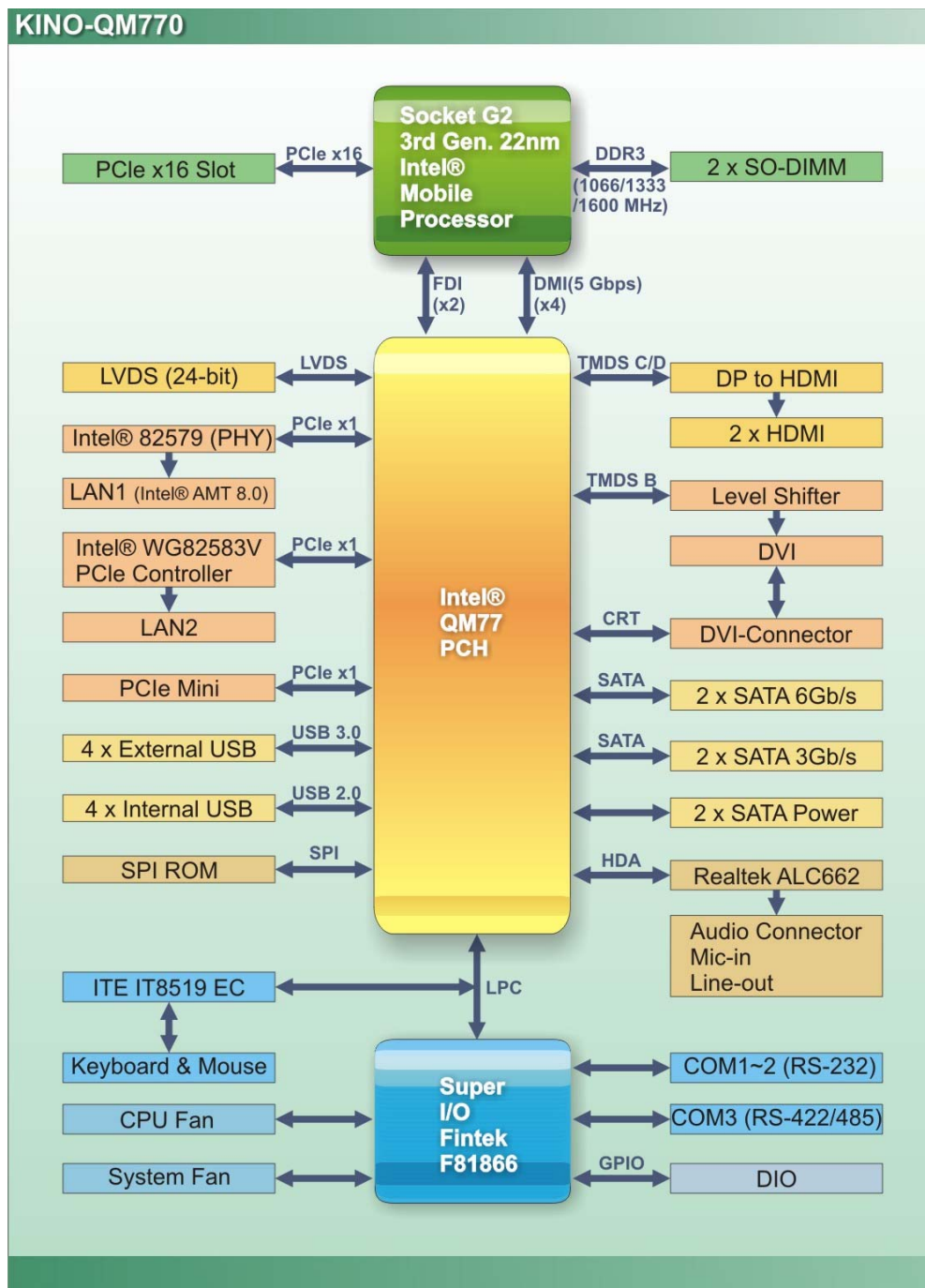


Figure 1-4: Data Flow Diagram

KINO-QM770 Mini-ITX SBC

1.7 Technical Specifications

KINO-QM770 technical specifications are listed in Table 1-1.

Specification	KINO-QM770
Form Factor	Mini-ITX
CPU Socket	Socket G2
CPU	3 rd generation 22nm Intel® mobile CPU
System Chipset	Intel® QM77
Memory	Two 204-pin 1600/1333/1066 MHz DDR3 SO-DIMM supported (system max. 16.0GB)
Graphics Engine	Intel® Gen 7 with DirectX 11, OGL 3.1, OCL 1.1
BIOS	UEFI BIOS
Digital I/O	8-bit, 4-bit input/4-bit output
Ethernet Controllers	LAN1: Intel® 82579 PHY (through PCIe x1) with Intel® AMT 8.0 support LAN2: Intel® 82583V PCIe Ethernet controller (through PCIe x1)
Audio	Realtek ALC662 HD Audio codec
Super I/O Controller	Fintek F81866
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	1 x Full-size PCIe Mini slot 1 x PCIe x16 slot
I/O Interface Connectors	
Display Output Ports (Triple Display Supported)	1 x DVI-I with analog CRT and DVI support 2 x HDMI (1080p) 1 x 18/24-bit dual-channel LVDS
Fan connector	One 4-pin wafer for CPU fan One 3-pin wafer for system fan
Keyboard/Mouse	One internal 6-pin wafer connector

Serial Ports	Two RS-232 COM connectors (one by pin header, one on rear side) One RS-422/485 COM connector (4-pin wafer)
USB Ports	Four internal USB 2.0 ports (by two 8-pin header) Four external USB 3.0 ports
SMBus	One 4-pin wafer connector
Storage	
SATA	2 x SATA 3Gb/s 2 x SATA 6Gb/s with RAID 0/1/5/10 support
Environmental and Power Specifications	
Power Supply	12V only, AT/ATX support
Power Connector	1 x External 4-pin DIN DC jack 1 x Internal 4-pin (2x2) power connector
Power Consumption	12V@6.08A (2.30GHz Intel® Core™ i7-3610QE CPU with two 4GB 1333MHz DDR3 memory running 3DMark06 burn-in)
Operating Temperature	-10°C ~ 60°C (32°F ~ 140°F)
Storage Temperature	-20°C ~ 70°C
Operating Humidity	5% ~ 95% (non-condensing)
Physical Specifications	
Dimensions	170 mm x 170 mm
Weight GW/NW	900 g/450 g

Table 1-1: Technical Specifications

Chapter

2

Packing List

2.1 Anti-static Precautions



WARNING!

Static electricity can destroy certain electronics. Make sure to follow the ESD precautions to prevent damage to the product, and injury to the user.

Make sure to adhere to the following guidelines:

- ***Wear an anti-static wristband:*** - Wearing an anti-static wristband can prevent electrostatic discharge.
- ***Self-grounding:*** - Touch a grounded conductor every few minutes to discharge any excess static buildup.
- ***Use an anti-static pad:*** When configuring any circuit board, place it on an anti-static mat.
- ***Only handle the edges of the PCB:*** - Don't touch the surface of the motherboard. Hold the motherboard by the edges when handling.

2.2 Unpacking Precautions







When the KINO-QM770 is unpacked, please do the following:

- Follow the antistatic guidelines above.
- Make sure the packing box is facing upwards when opening.
- Make sure all the packing list items are present.

KINO-QM770 Mini-ITX SBC**2.3 Packing List****NOTE:**

If any of the components listed in the checklist below are missing, do not proceed with the installation. Contact the IEI reseller or vendor the KINO-QM770 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The KINO-QM770 is shipped with the following components:

Quantity	Item and Part Number	Image
1	KINO-QM770 SBC	
2	SATA and power cable (P/N: 32801-000100-100-RS)	
2	RS-232 cable (P/N: 19800-000300-100-RS)	
1	I/O shielding (P/N: 45014-0037C0-00-RS)	
1	Mini jumper pack (2.0mm) (P/N: 33100-000033-RS)	
1	Utility CD	







Quantity	Item and Part Number	Image
1	One Key Recovery CD	
1	Quick installation guide	

Table 2-1: Packing List

2.4 Optional Items

These optional items are available.

Item and Part Number	Image
RS-422/485 cable (P/N: 32205-003800-100-RS)	
Dual USB cable (w bracket) (P/N: 19800-003100-100-RS)	
KB/MS PS/2 Y-cable (P/N: 32000-023800-RS)	
CPU cooler (P/N: CF-989A-RS-R12)	

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Item and Part Number	Image
Infineon TPM module (P/N: TPM-IN01-R11)	
DVI-VGA Adaptor (P/N: 33Z00-000031-RS)	
SATA to IDE/CF converter board (P/N: SACF-KIT01-R10)	

Table 2-2: Optional Items

Chapter

3

Connector Pinouts

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3.1 Peripheral Interface Connectors

Section 3.1.1 shows peripheral interface connector locations. Section 3.1.2 lists all the peripheral interface connectors seen in Section 3.1.1.

3.1.1 Layout

The figure below shows the on-board peripheral connectors, rear panel peripheral connectors and on-board jumpers.

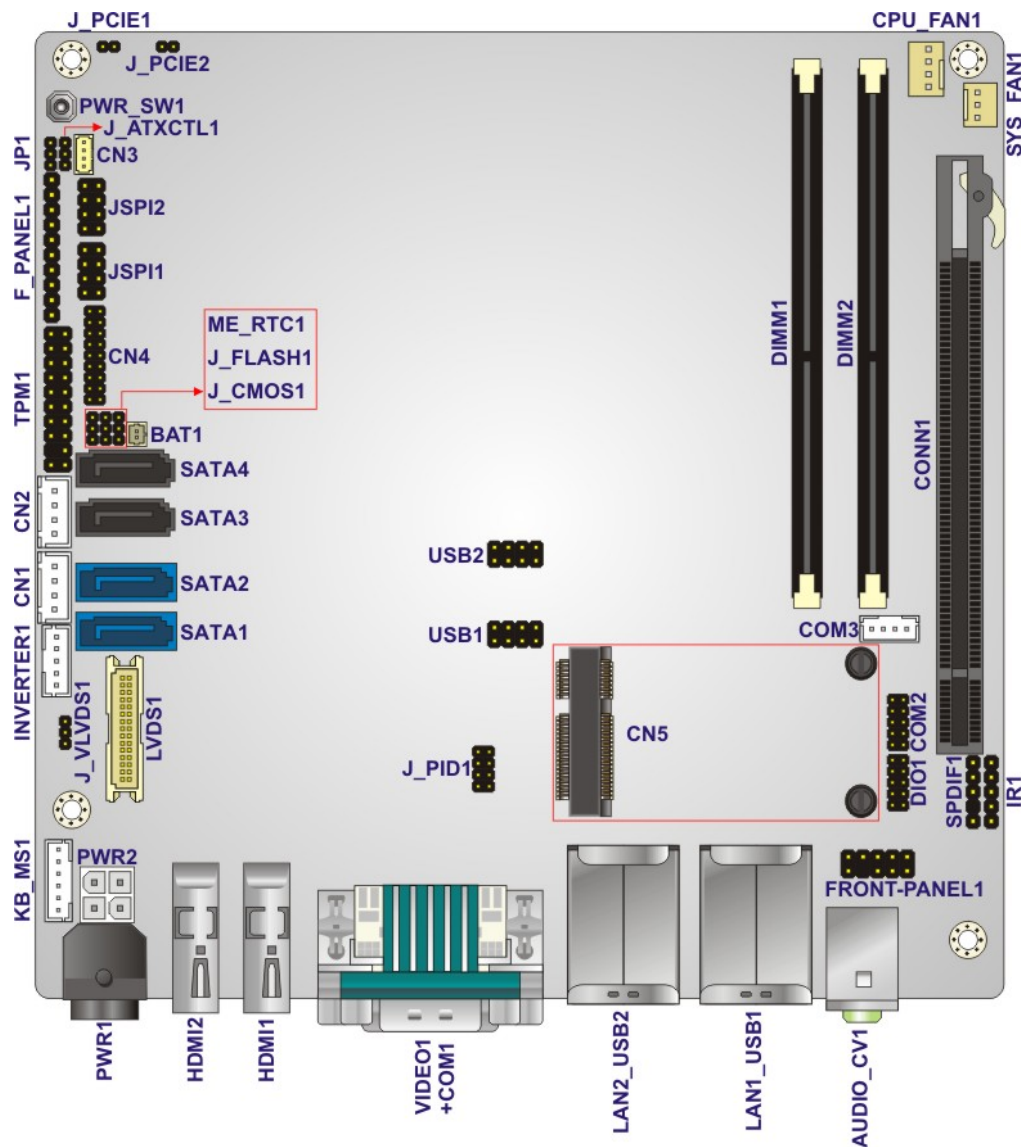


Figure 3-1: Connector and Jumper Locations



3.1.2 Peripheral Interface Connectors

The table below shows a list of the peripheral interface connectors on the KINO-QM770. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
Audio connector	10-pin header	FRONT-PANEL1
Battery connector	2-pin wafer	BAT1
Digital I/O connector	10-pin header	DIO1
EC debug port	18-pin header	CN4
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connector (system)	3-pin wafer	SYS_FAN1
Front panel connector	10-pin header	F_PANEL1
Infrared connector	5-pin header	IR1
Keyboard/mouse connector	6-pin wafer	KB_MS1
LVDS connector	30-pin crimp	LVDS1
LVDS backlight connector	5-pin wafer	INVERTER1
PCIe Mini card slot	PCIe Mini card slot	CN5
PCIe x16 slot	PCIe x16 slot	CONN1
Power button (on-board)	Push button	PWR_SW1
Power connector (12V)	4-pin connector	PWR2
RS-232 serial ports (COM2)	10-pin header	COM2
RS-422/485 serial port (COM3)	4-pin wafer	COM3
SATA 6Gb/s connectors	SATA connector	S_ATA1, S_ATA2
SATA 3Gb/s connectors	SATA connector	S_ATA3, S_ATA4
SATA power connectors	2-pin wafer	CN1, CN2
SMBus connector	4-pin wafer	CN3
SO-DIMM connectors	SO-DIMM connector	DIMM1, DIMM2
SPDIF connector	5-pin header	SPDIF1



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Connector	Type	Label
SPI Flash connector	8-pin header	JSPI1
SPI Flash connector (EC)	8-pin header	JSPI2
TPM connector	20-pin header	TPM1
USB 2.0 connectors	8-pin header	USB1, USB2

Table 3-1: Peripheral Interface Connectors**3.1.3 External Interface Panel Connectors**

The table below lists the rear panel connectors on the KINO-QM770. Detailed descriptions of these connectors can be found in a later section.

Connector	Type	Label
Audio jacks (mic-in, line-out)	Audio jack	AUDIO_CV1
DVI-I connector	DVI-I	VIDEO1
Ethernet and USB 3.0 connectors	RJ-45	LAN1_USB1, LAN2_USB2
HDMI connectors	HDMI	HDMI1, HDMI2
Power connector	4-pin DIN	PWR1
RS-232 serial port	DB-9	COM1

Table 3-2: Rear Panel Connectors**3.2 Internal Peripheral Connectors**

Internal peripheral connectors are found on the motherboard and are only accessible when the motherboard is outside of the chassis. This section has complete descriptions of all the internal, peripheral connectors on the KINO-QM770.

3.2.1 Audio Connector

CN Label: FRONT-PANEL1

CN Type: 10-pin header

CN Location: See **Figure 3-2**

CN Pinouts: See **Table 3-3**

This connector connects to speaker, microphone and audio input connectors on the front panel.

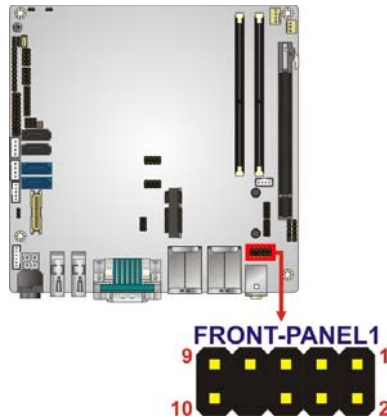


Figure 3-2: Audio Connector Location

Pin	Description	Pin	Description
1	LMIC2-L	2	ANALOG GND
3	LMIC2-R	4	PRESENCE#
5	LLINE2-R	6	MIC2-JD
7	FRONT-IO	8	NC
9	LLINE2-L	10	LINE2-JD

Table 3-3: Audio Connector Pinouts

3.2.2 Battery Connector



CAUTION:

Risk of explosion if battery is replaced by an incorrect type. Only certified engineers should replace the on-board battery.

Dispose of used batteries according to instructions and local regulations.

KINO-QM770 Mini-ITX SBC

CN Label: BAT1

CN Type: 2-pin wafer

CN Location: See **Figure 3-3**

CN Pinouts: See **Table 3-4**

This is connected to the system battery. The battery provides power to the system clock to retain the time when power is turned off.

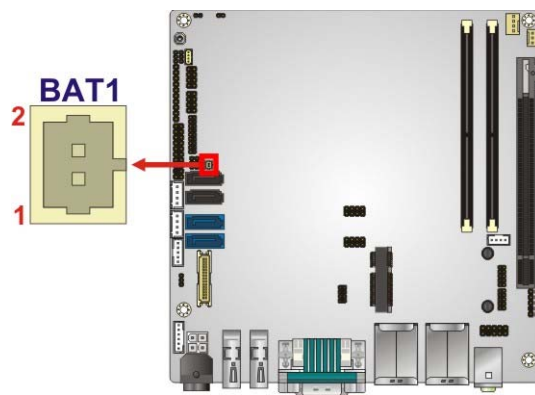


Figure 3-3: Battery Connector Location

Pin	Description
1	Battery+
2	Ground

Table 3-4: Battery Connector Pinouts

3.2.3 Digital I/O Connector

CN Label: DIO1

CN Type: 10-pin header

CN Location: See **Figure 3-4**

CN Pinouts: See **Table 3-5**

The digital I/O connector provides programmable input and output for external devices. The digital I/O provides 4-bit output and 4-bit input.

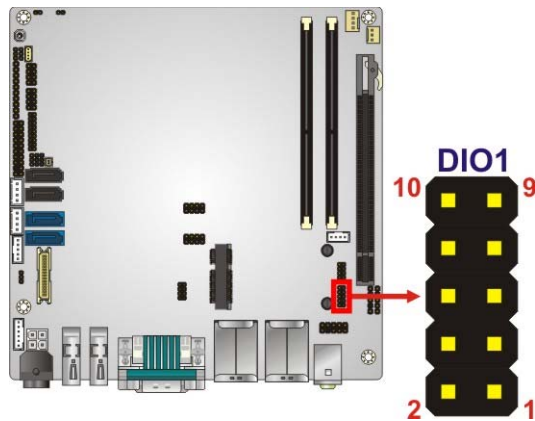


Figure 3-4: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	+V5S
3	Output 3	4	Output 2
5	Output 1	6	Output 0
7	Input 3	8	Input 2
9	Input 1	10	Input 0

Table 3-5: Digital I/O Connector Pinouts

3.2.4 EC Debug Port

CN Label: CN4

CN Type: 18-pin header

CN Location: See **Figure 3-5**

CN Pinouts: See **Table 3-6**

The connector is for EC debug only.

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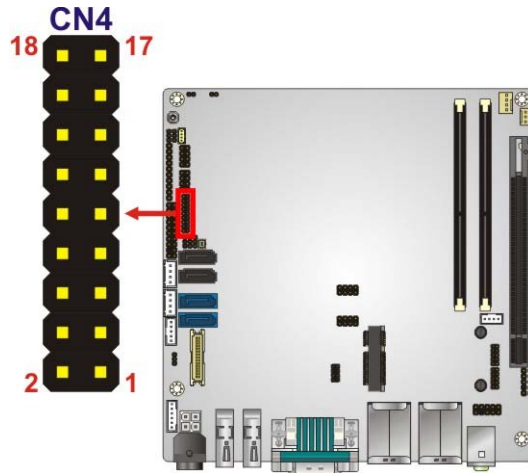


Figure 3-5: BIOS Debug Port Location

Pin	Description	Pin	Description
1	EC_EPP_STB#	2	EC_EPP_AFD#
3	EC_EPP_PD0	4	NC
5	EC_EPP_PD1	6	EC_EPP_INIT#
7	EC_EPP_PD2	8	EC_EPP_SLIN#
9	EC_EPP_PD3	10	GND
11	EC_EPP_PD4	12	NC
13	EC_EPP_PD5	14	EC_EPP_BUSY
15	EC_EPP_PD6	16	EC_EPP_KSI5
17	EC_EPP_PD7	18	EC_EPP_KSI4

Table 3-6: EC Debug Port Pinouts

3.2.5 Fan Connector (CPU)

CN Label: CPU_FAN1

CN Type: 4-pin wafer

CN Location: See Figure 3-6

CN Pinouts: See Table 3-7

The fan connector attaches to a CPU cooling fan.

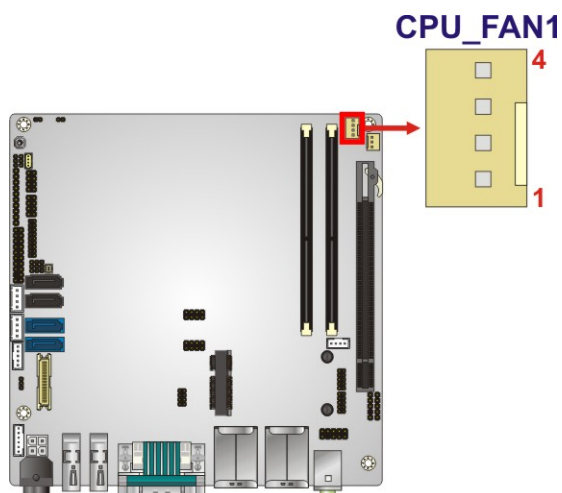


Figure 3-6: CPU Fan Connector Location

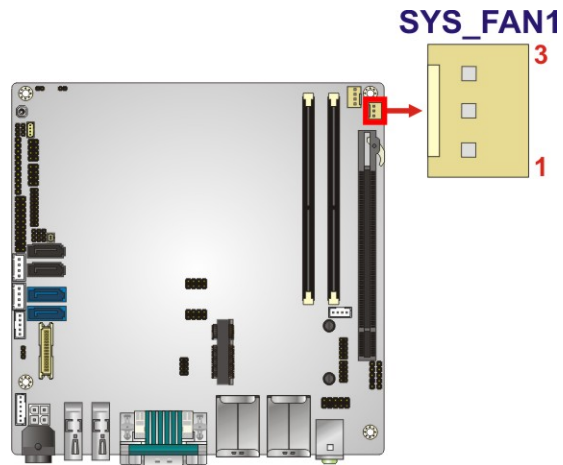
Pin	Description
1	GND
2	+V12S
3	Rotation Signal
4	PWM Control Signal

Table 3-7: CPU Fan Connector Pinouts

3.2.6 Fan Connector (System)

CN Label: SYS_FAN1
CN Type: 3-pin wafer
CN Location: See **Figure 3-7**
CN Pinouts: See **Table 3-8**

The fan connector attaches to a system cooling fan.

KINO-QM770 Mini-ITX SBC**Figure 3-7: System Fan Connector Location**

Pin	Description
1	Rotation Signal
2	+12V
3	GND

Table 3-8: System Fan Connector Pinouts**3.2.7 Front Panel Connector**

CN Label:	F_PANEL1
CN Type:	10-pin header
CN Location:	See Figure 3-8
CN Pinouts:	See Table 3-9

The front panel connector connects to the indicator LEDs and buttons on the computer's front panel.

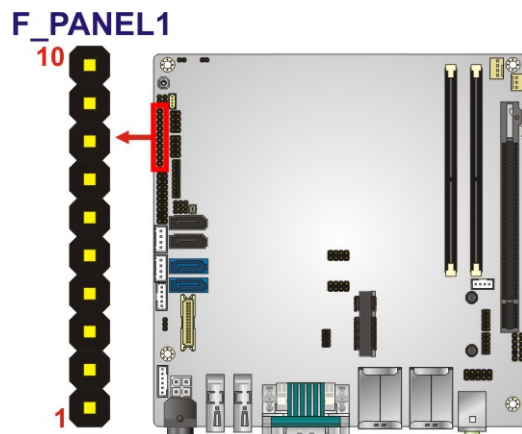


Figure 3-8: Front Panel Connector Location

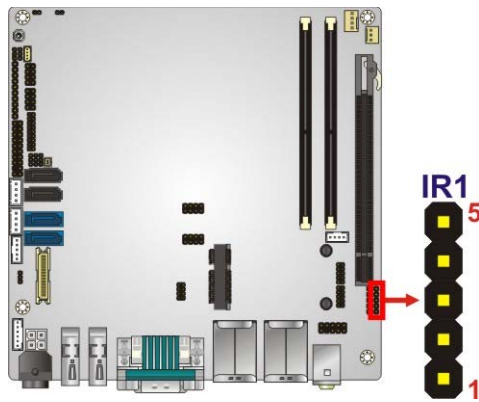
	Pin	Description		Pin	Description
	1	NC	Power LED	6	PWR_LED +
Power Button	2	PWR_BTN +		7	PWR_LED +
	3	PWR_BTN -		8	GROUND
HDD LED	4	HDD_LED +	Reset	9	RESET +
	5	HDD_LED -		10	GROUND

Table 3-9: Front Panel Connector Pinouts

3.2.8 Infrared Interface Connector

- CN Label:** IR1
- CN Type:** 5-pin header
- CN Location:** See **Figure 3-9**
- CN Pinouts:** See **Table 3-10**

The infrared connector attaches to an infrared receiver for use with remote controls.

KINO-QM770 Mini-ITX SBC**Figure 3-9: Infrared Connector Location**

Pin	Description
1	VCC (+5V)
2	NC
3	IR-RX
4	GND
5	IR-TX

Table 3-10: Infrared Connector Pinouts**3.2.9 Keyboard/Mouse Connector**

CN Label:	KB_MS1
CN Type:	6-pin wafer
CN Location:	See Figure 3-10
CN Pinouts:	See Table 3-11

The keyboard/mouse connector connects to a PS/2 Y-cable that can be connected to a PS/2 keyboard and mouse.

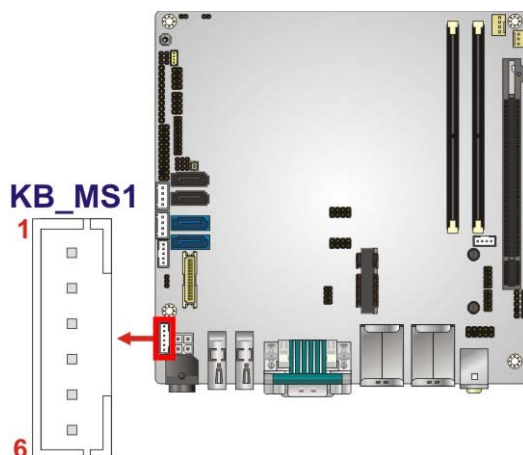


Figure 3-10: Keyboard/Mouse Connector Location

Pin	Description
1	VCC5_KBMS
2	Mouse Data
3	Mouse Clock
4	Keyboard Data
5	Keyboard Clock
6	GND

Table 3-11: Keyboard/Mouse Connector Pinouts

3.2.10 LVDS Connector

- CN Label:** LVDS1
- CN Type:** 30-pin crimp
- CN Location:** See **Figure 3-11**
- CN Pinouts:** See **Table 3-12**

The LVDS connector is for an LCD panel connected to the board.

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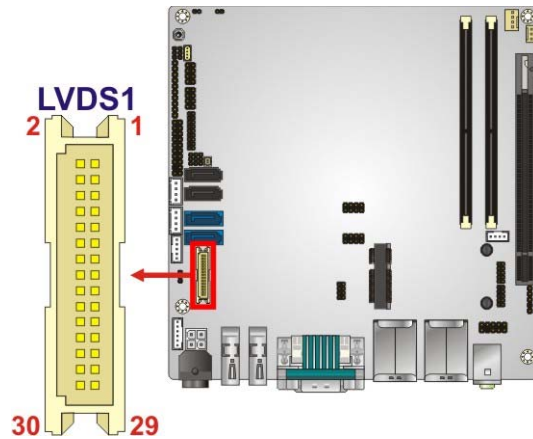


Figure 3-11: LVDS Connector Location

Pin	Description	Pin	Description
1	GROUND	2	GROUND
3	LVDS_A_TX0-P	4	LVDS_A_TX0-N
5	LVDS_A_TX1-P	6	LVDS_A_TX1-N
7	LVDS_A_TX2-P	8	LVDS_A_TX2-N
9	LVDS_A_TXCLK-P	10	LVDS_A_TXCLK-N
11	LVDS_A_TX3-P	12	LVDS_A_TX3-N
13	GROUND	14	GROUND
15	LVDS_B_TX0-P	16	LVDS_B_TX0-N
17	LVDS_B_TX1-P	18	LVDS_B_TX1-N
19	LVDS_B_TX2-P	20	LVDS_B_TX2-N
21	LVDS_B_TXCLK-P	22	LVDS_B_TXCLK-N
23	LVDS_B_TX3-P	24	LVDS_B_TX3-N
25	GROUND	26	GROUND
27	+LCD VCC	28	+LCD VCC
29	+LCD VCC	30	+LCD VCC

Table 3-12: LVDS Connector Pinouts

3.2.11 LVDS Backlight Connector

CN Label: INVERTER1

CN Type: 5-pin wafer

CN Location: See **Figure 3-12**

CN Pinouts: See **Table 3-13**

The backlight inverter connectors provide power to LCD panels.

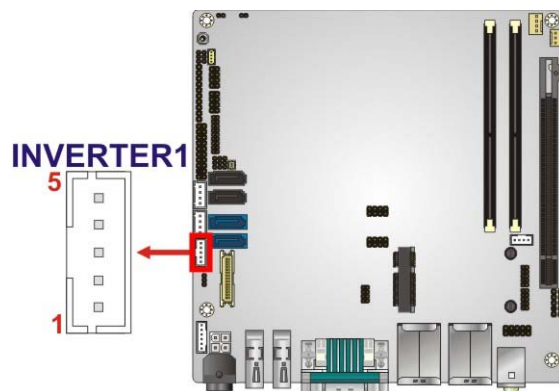


Figure 3-12: LVDS Backlight Inverter Connector

Pin	Description
1	BRIGHTNESS
2	GROUND
3	+12VS_LCD_BKL
4	GROUND
5	BACKLIGHT ENABLE

Table 3-13: Backlight Inverter Connector Pinouts

3.2.12 PCIe Mini Card Slot

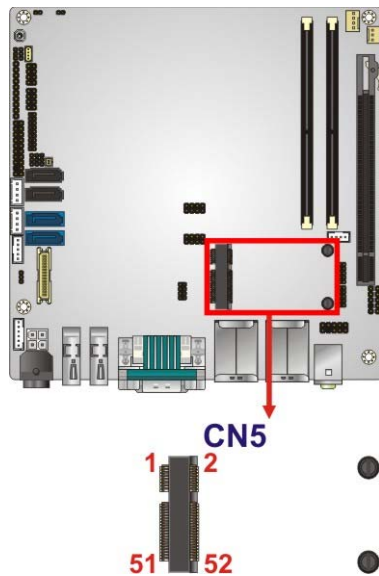
CN Label: CN5

CN Type: PCIe Mini card slot

CN Location: See **Figure 3-13**

KINO-QM770 Mini-ITX SBC**CN Pinouts:** See **Table 3-14**

The PCIe Mini card slot enables a PCIe Mini card expansion module to be connected to the board. Cards supported include among others wireless LAN (WLAN) cards and IEI PCIe Mini disk on module (DOM) SSD cards.

**Figure 3-13: PCIe Mini Card Slot Location**

Pin	Description	Pin	Description
1	PCIE_WAKE#	2	VCC3
3	N/C	4	GND
5	N/C	6	1.5V
7	N/C	8	N/C
9	GND	10	N/C
11	CLK-	12	N/C
13	CLK+	14	N/C
15	GND	16	N/C
17	PCIRST#	18	GND
19	N/C	20	VCC3
21	GND	22	PCIRST#
23	PERN2	24	3VDual
25	PERP2	26	GND

Pin	Description	Pin	Description
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PETN2	32	SMBDATA
33	PETP2	34	GND
35	GND	36	USBD-
37	N/C	38	USBD+
39	N/C	40	GND
41	N/C	42	N/C
43	N/C	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V
49	N/C	50	GND
51	N/C	52	VCC3

Table 3-14: PCIe Mini Card Slot Pinouts

3.2.13 PCI Express x16 Slot

CN Label: **CONN1**

CN Type: PCIe x16 slot

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-15** (Side A) **Table 3-16** (Side B)

The PCIe x16 expansion cards slot is for PCIe x16 expansion cards.

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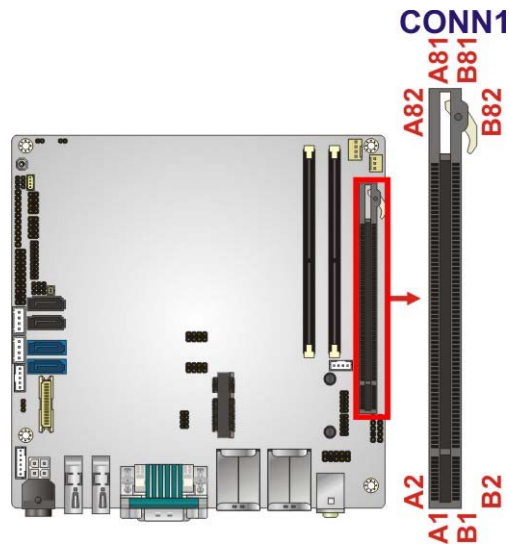


Figure 3-14: PCIe x16 Slot Location

Pin	Description	Pin	Description	Pin	Description	Pin	Description
A1	Name	A22	HSIn(1)	A43	HSIp(6)	A64	HSIp(11)
A2	PRSNT#1	A23	GND	A44	HSIn(6)	A65	HSIn(11)
A3	+12v	A24	GND	A45	GND	A66	GND
A4	+12v	A25	HSIp(2)	A46	GND	A67	GND
A5	GND	A26	HSIn(2)	A47	HSIp(7)	A68	HSIp(12)
A6	JTAG2	A27	GND	A48	HSIn(7)	A69	HSIn(12)
A7	JTAG3	A28	GND	A49	GND	A70	GND
A8	JTAG4	A29	HSIp(3)	A50	RSVD	A71	GND
A9	JTAG5	A30	HSIn(3)	A51	GND	A72	HSIp(13)
A10	+3.3v	A31	GND	A52	HSIp(8)	A73	HSIn(13)
A11	+3.3v	A32	RSVD	A53	HSIn(8)	A74	GND
A12	PWRGD	A33	RSVD	A54	GND	A75	GND
A13	GND	A34	GND	A55	GND	A76	HSIp(14)
A14	REFCLK+	A35	HSIp(4)	A56	HSIp(9)	A77	HSIn(14)
A15	REFCLK-	A36	HSIn(4)	A57	HSIn(9)	A78	GND
A16	GND	A37	GND	A58	GND	A79	GND
A17	HSIp(0)	A38	GND	A59	GND	A80	HSIp(15)
A18	HSIn(0)	A39	HSIp(5)	A60	HSIp(10)	A81	HSIn(15)



Pin	Description	Pin	Description	Pin	Description	Pin	Description
A19	GND	A40	HSIn(5)	A61	HSIn(10)	A82	GND
A20	RSVD	A41	GND	A62	GND		
A21	GND	A42	GND	A63	GND		

Table 3-15: PCIe x16 Side A Pinouts

Pin	Description	Pin	Description	Pin	Description	Pin	Description
B1	+12v	B22	GND	B43	GND	B64	GND
B2	+12v	B23	HSOp(2)	B44	GND	B65	GND
B3	RSVD	B24	HSOn(2)	B45	HSOp(7)	B66	HSOp(12)
B4	GND	B25	GND	B46	HSOn(7)	B67	HSOn(12)
B5	SMCLK	B26	GND	B47	GND	B68	GND
B6	SMDAT	B27	HSOp(3)	B48	PRSNT#2	B69	GND
B7	GND	B28	HSOn(3)	B49	GND	B70	HSOp(13)
B8	+3.3v	B29	GND	B50	HSOp(8)	B71	HSOn(13)
B9	JTAG1	B30	RSVD	B51	HSOn(8)	B72	GND
B10	3.3 Vaux	B31	PRSNT#2	B52	GND	B73	GND
B11	WAKE#	B32	GND	B53	GND	B74	HSOp(14)
B12	RSVD	B33	HSOp(4)	B54	HSOp(9)	B75	HSOn(14)
B13	GND	B34	HSOn(4)	B55	HSOn(9)	B76	GND
B14	HSOp(0)	B35	GND	B56	GND	B77	GND
B15	HSOn(0)	B36	GND	B57	GND	B78	HSOp(15)
B16	GND	B37	HSOp(5)	B58	HSOp(10)	B79	HSOn(15)
B17	PRSNT#2	B38	HSOn(5)	B59	HSOn(10)	B80	GND
B18	GND	B39	GND	B60	GND	B81	PRSNT#2
B19	HSOp(1)	B40	GND	B61	GND	B82	RSVD#2
B20	HSOn(1)	B41	HSOp(6)	B62	HSOp(11)		
B21	GND	B42	HSOn(6)	B63	HSOn(11)		

Table 3-16: PCIe x16 Side B Pinouts



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3.2.14 Power Button (On-board)

CN Label: PWR_SW1
CN Type: Push button
CN Location: See **Figure 3-15**

Push the on-board power button to power on the KINO-QM770.

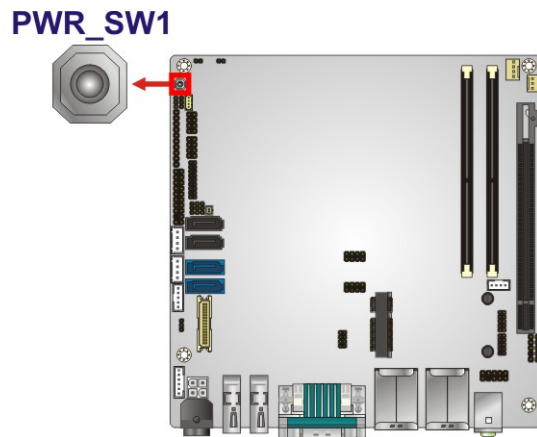


Figure 3-15: On-board Power Button Location

3.2.15 Power Connector (12V)

CN Label: PWR2
CN Type: 4-pin connector
CN Location: See **Figure 3-16**
CN Pinouts: See **Table 3-17**

The power connector is connected to an external power supply and supports 12V power input. Power is provided to the system, from the power supply through this connector.

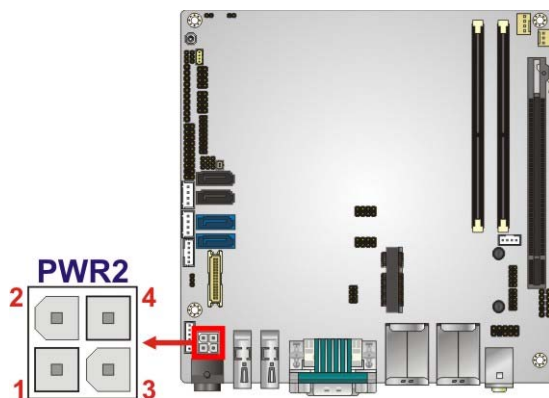


Figure 3-16: Power Connector Location

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

Table 3-17: Power Connector Pinouts

3.2.16 RS-232 Serial Port Connectors (COM2)

- CN Label:** COM2
- CN Type:** 10-pin header
- CN Location:** See **Figure 3-17**
- CN Pinouts:** See **Table 3-18**

The 10-pin serial port connector provides one RS-232 serial communications channel. The COM serial port connector can be connected to an external RS-232 serial port device.

KINO-QM770 Mini-ITX SBC

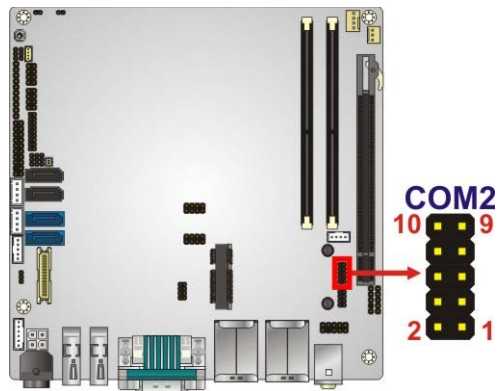


Figure 3-17: RS-232 Serial Port Connector Location

Pin	Description	Pin	Description
1	-NDCD2	6	-NCTS2
2	-NDSR2	7	-NDTR2
3	NSIN2	8	-XRI2
4	-NRTS2	9	GND
5	NSOUT2	10	GND

Table 3-18: Serial Port Connector Pinouts

3.2.17 RS-422/485 Serial Port Connector (COM3)

CN Label:	COM3
CN Type:	4-pin wafer
CN Location:	See Figure 3-18
CN Pinouts:	See Table 3-19

This connector provides RS-422 or RS-485 communications.

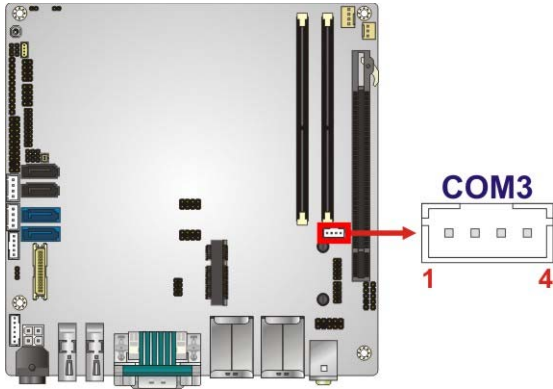


Figure 3-18: RS-422/485 Serial Port Connector Location

Pin	Description
1	RXD422-
2	RXD422+
3	TXD422+ /TXD485+
4	TXD422-/TXD485-

Table 3-19: RS-422/485 Serial Port Connector Pinouts

Use the optional RS-422/485 cable to connect to a serial device. The pinouts of the DB-9 connector are listed below.

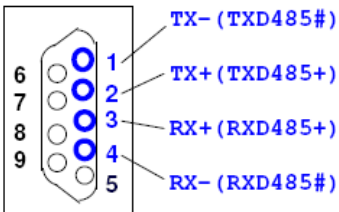
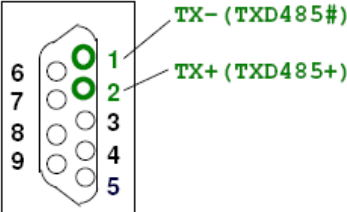
RS-422 Pinouts	RS-485 Pinouts
	

Table 3-20: DB-9 RS-422/485 Pinouts

3.2.18 SATA 6Gb/s Drive Connectors

- CN Label:

S_ATA1, S_ATA2
- CN Type:

7-pin SATA drive connectors
- CN Location:

See Figure 3-19

KINO-QM770 Mini-ITX SBC

CN Pinouts: See **Table 3-21**

The SATA connectors connect to SATA hard drives or optical drives with data transfer speeds as high as 6Gb/s.

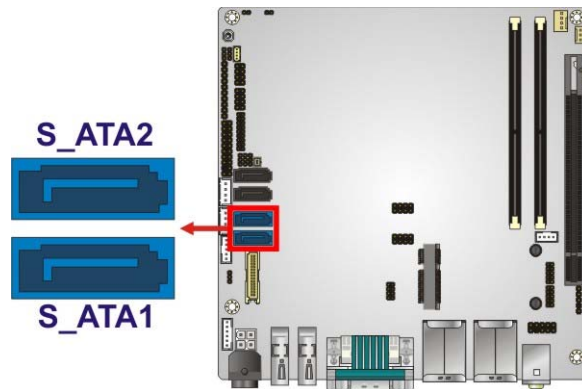


Figure 3-19: SATA 6Gb/s Drive Connector Locations

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 3-21: SATA 6Gb/s Drive Connector Pinouts

3.2.19 SATA 3Gb/s Drive Connectors

CN Label: **S_ATA3, S_ATA4**

CN Type: 7-pin SATA drive connectors

CN Location: See **Figure 3-20**

CN Pinouts: See **Table 3-22**

The SATA connectors connect to SATA hard drives or optical drives with data transfer speeds as high as 3Gb/s.

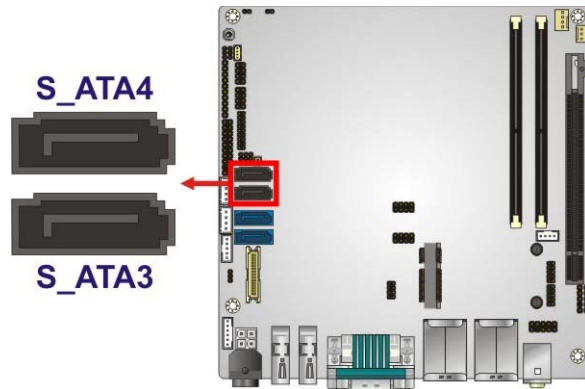


Figure 3-20: SATA 3Gb/s Drive Connector Locations

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

Table 3-22: SATA 3Gb/s Drive Connector Pinouts

3.2.20 SATA Power Connectors

- CN Label:** CN1, CN2
- CN Type:** 4-pin wafer
- CN Location:** See **Figure 3-21**
- CN Pinouts:** See **Table 3-23**

Use the SATA Power Connector to connect to SATA device power connections.

KINO-QM770 Mini-ITX SBC

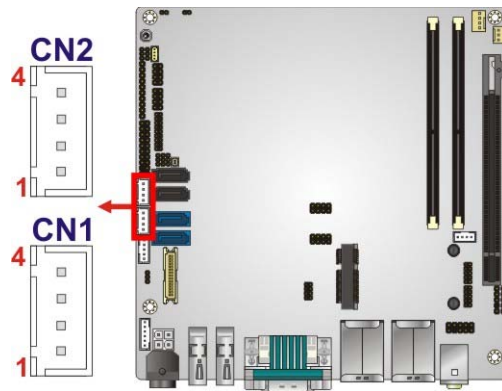


Figure 3-21: SATA Power Connector Locations

Pin	Description
1	+V12S
2	GND
3	GND
4	+V5S

Table 3-23: SATA Power Connector Pinouts

3.2.21 SMBus Connector

CN Label:	CN3
CN Type:	4-pin wafer
CN Location:	See Figure 3-22
CN Pinouts:	See Table 3-24

The SMBus (System Management Bus) connector provides low-speed system management communications.

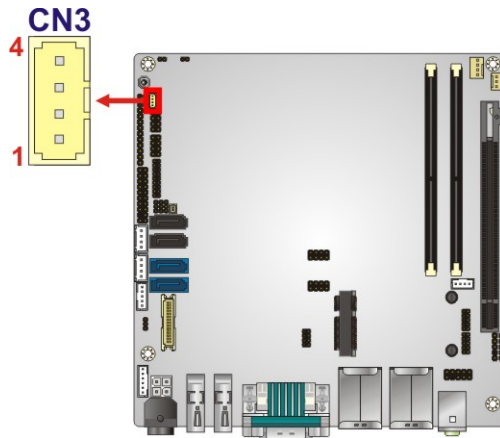


Figure 3-22: SMBus Connector Location

Pin	Description
1	GND
2	SMB_DATA
3	SMB_CLK
4	+V5S

Table 3-24: SMBus Connector Pinouts

3.2.22 SO-DIMM Connectors

CN Label: DIMM1, DIMM2

CN Type: 204-pin DDR3 SO-DIMM connector

CN Location: See **Figure 3-23**

The SO-DIMM connector is for installing memory on the system.

KINO-QM770 Mini-ITX SBC

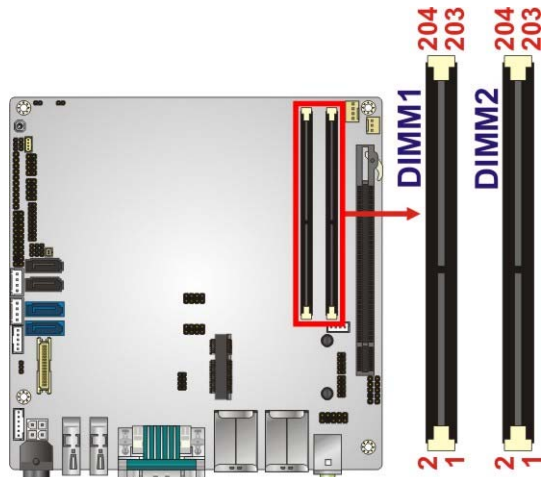


Figure 3-23: SO-DIMM Connector Locations

3.2.23 SPDIF Connector

CN Label:	SPDIF1
CN Type:	5-pin header
CN Location:	See Figure 3-24
CN Pinouts:	See Table 3-25

Use the SPDIF connector to connect digital audio devices to the system.

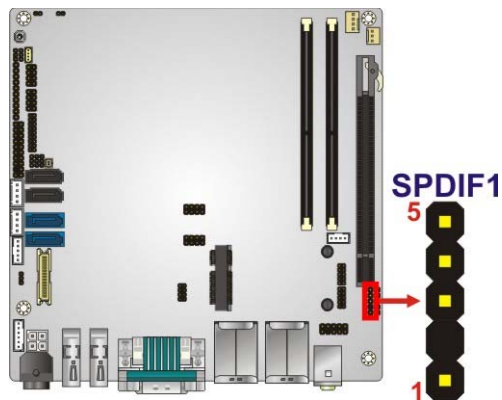


Figure 3-24: SPDIF Connector Location

PIN	DESCRIPTION
1	+V5S
2	NC

PIN	DESCRIPTION
3	SPDIFOUT
4	GND
5	SPDIFIN

Table 3-25: SPDIF Connector Pinouts

3.2.24 SPI Flash Connector

CN Label:	JSPI1
CN Type:	8-pin header
CN Location:	See Figure 3-25
CN Pinouts:	See Table 3-26

The 8-pin SPI Flash connector is used to flash the BIOS.

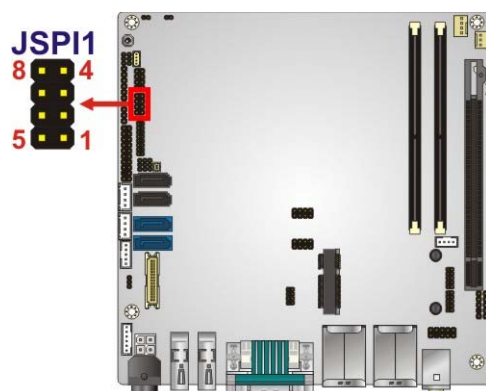


Figure 3-25: SPI Flash Connector Location

Pin	Description
1	+V3.3M_SPI_CON
2	SPI_CS
3	SPI_SO_SW
4	NC
5	GND
6	SPI_CLK_SW
7	SPI_SI_SW

KINO-QM770 Mini-ITX SBC

Pin	Description
8	NC

Table 3-26: SPI Flash Connector Pinouts

3.2.25 SPI Flash Connector (EC)

CN Label:	JSPI2
CN Type:	8-pin header
CN Location:	See Figure 3-26
CN Pinouts:	See Table 3-27

The 8-pin EC SPI Flash connector is used to flash the BIOS.

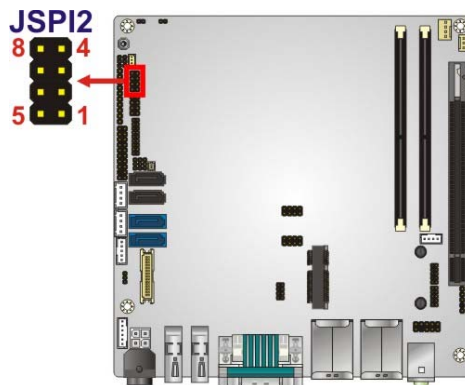


Figure 3-26: EC SPI Flash Connector Location

Pin	Description
1	+V3.3M_SPI_CON_EC
2	SPI_CS#0_CN_EC
3	SPI_SO_SW_EC
4	NC
5	GND
6	SPI_CLK_SW_EC
7	SPI_SI_SW_EC
8	NC

Table 3-27: EC SPI Flash Connector Pinouts

3.2.26 TPM Connector

- CN Label:** TPM1
- CN Type:** 20-pin header
- CN Location:** See **Figure 3-27**
- CN Pinouts:** See **Table 3-28**

The Trusted Platform Module (TPM) connector secures the system on bootup.

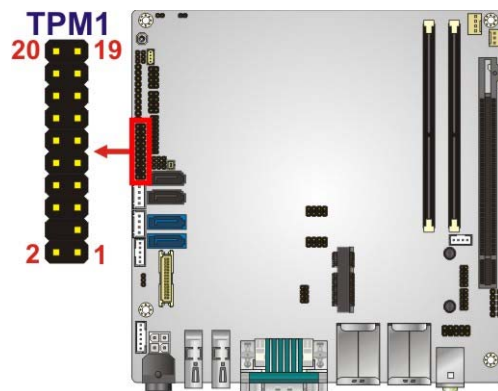


Figure 3-27: TPM Connector Location

Pin	Description	Pin	Description
1	LCLK	2	GND
3	LFRAME#	4	KEY
5	LRERST#	6	+5V
7	LAD3	8	LAD2
9	+3V	10	LAD1
11	LAD0	12	GND
13	SCL	14	SDA
15	SB3V	16	SERIRQ
17	GND	18	GLKRUN#
19	LPCPD#	20	LDRQ#

Table 3-28: TPM Connector Pinouts

KINO-QM770 Mini-ITX SBC**3.2.27 USB 2.0 Connectors**

CN Label: USB1, USB2

CN Type: 8-pin header

CN Location: See **Figure 3-28**

CN Pinouts: See **Table 3-29**

The USB header can connect to two USB devices.

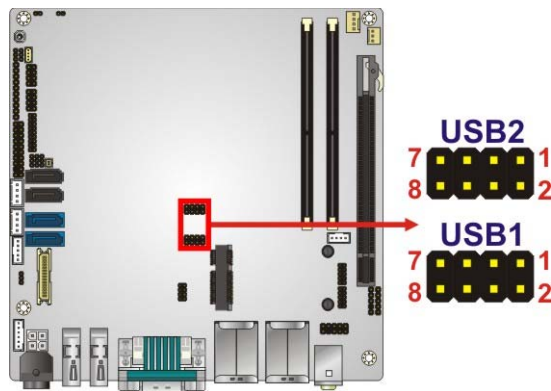


Figure 3-28: USB Connector Locations

Pin	Description	Pin	Description
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

Table 3-29: USB Port Connector Pinouts

3.3 External Interface Connectors

Figure 3-29 shows the KINO-QM770 motherboard external interface connectors. The KINO-QM770 on-board external interface connectors are shown in **Figure 3-29**.

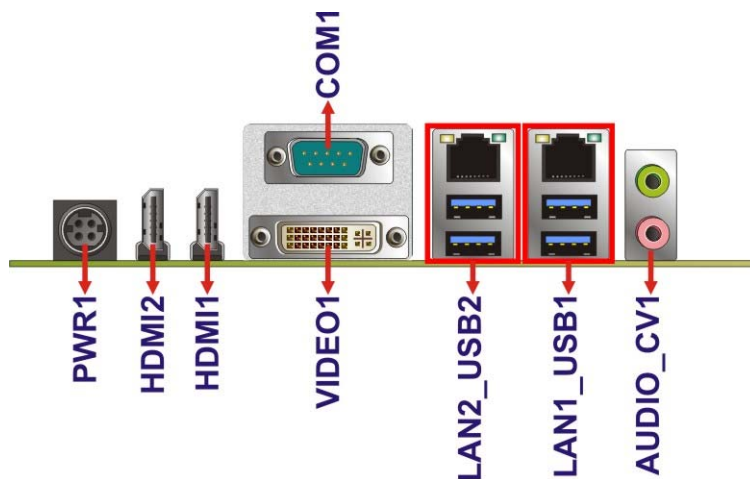


Figure 3-29: External Interface Connectors

3.3.1 Audio Connector

CN Label: AUDIO_CV1
CN Type: Audio jack
CN Location: See **Figure 3-29**

The audio jacks connect to external audio devices.

- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

KINO-QM770 Mini-ITX SBC



Figure 3-30: Audio Jacks

3.3.2 DVI Connector

- CN Label:** VIDEO1
- CN Type:** DVI connector
- CN Location:** See **Figure 3-29**
- CN Pinouts:** See **Table 3-30** and **Figure 3-31**

The 24-pin Digital Visual Interface (DVI) connector connects to high-speed, high-resolution digital displays. The DVI-I connector supports both digital and analog signals. Use the display mode selection jumper to configure the DVI-I connector (see **Section 4.6.4**)

Pin	Description	Pin	Description
C1	BR	V10	Data 1+
C2	BG	V11	GND
C3	BB	V12	N/C
C4	HS	V13	N/C
C5	GND	V14	+5V Power
C5-1	NC	V15	Hot Plug Detect
V1	Data 2-	V16	HPDET
V2	Data 2+	V17	Data 0-
V3	GND	V18	Data 0+
V4	N/C	V19	GND
V5	N/C	V20	N/C
V6	DDC Clock	V21	N/C
V7	DDC Data	V22	N/C

Pin	Description	Pin	Description
V8	VS	V23	DVI_Clock +
V9	Data 1-	V24	DVI_Clock -

Table 3-30: DVI Connector Pinouts

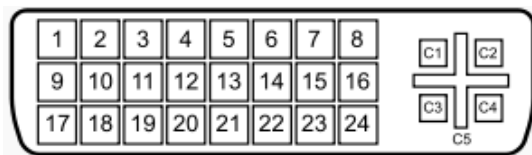


Figure 3-31: DVI-I Connector

3.3.3 Ethernet and USB 3.0 Connectors

CN Label: LAN1_USB1, LAN2_USB2

CN Type: RJ-45 and USB 3.0 combo connector

CN Location: See **Figure 3-29**

CN Pinouts: See **Table 3-31**

The LAN connector connects to a local network.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MD0+	5	MD2+
2	MD0-	6	MD2-
3	MD1+	7	MD3+
4	MD1-	8	MD3-

Table 3-31: LAN Pinouts

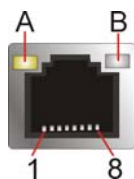


Figure 3-32: Ethernet Connector

KINO-QM770 Mini-ITX SBC

LED	Description	LED	Description
A	on: linked blinking: data is being sent/received	B	off: 10 Mb/s green: 100 Mb/s orange: 1000 Mb/s

Table 3-32: Connector LEDs

The USB 3.0 connector can be connected to a USB device.

Pin	Description
1	VBUS
2	D1-
3	D1+
4	GND1
5	STDA_SSRX1_N
6	STDA_SSRX1_P
7	GND_DRAIN
8	STDA_SSTX1_N
9	STDA_SSTX1_P

Table 3-33: USB Port Pinouts**3.3.4 HDMI Connectors**

CN Label: HDMI1, HDMI2

CN Type: HDMI connector

CN Location: See **Figure 3-29**

CN Pinouts: See **Table 3-34** and **Figure 3-33**

The HDMI connector connects to a display device with HDMI interface.

Pin	Description	Pin	Description
1	HDMI_DATA2	13	N/C
2	GND	14	N/C
3	HDMI_DATA2#	15	HDMI_SCL
4	HDMI_DATA1	16	HDMI_SDA

Pin	Description	Pin	Description
5	GND	17	GND
6	HDMI_DATA1#	18	+5V
7	HDMI_DATA0	19	HDMI_HPD
8	GND	20	HDMI_GND
9	HDMI_DATA0#	21	HDMI_GND
10	HDMI_CLK	22	HDMI_GND
11	GND	23	HDMI_GND
12	HDMI_CLK#		

Table 3-34: HDMI Connector Pinouts

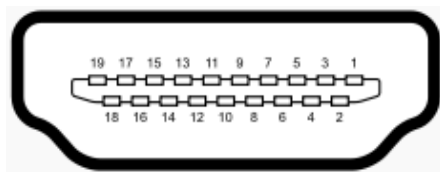


Figure 3-33: HDMI Connector

3.3.5 Power Connector (12 V, Power Adapter)

- CN Label:** PWR1
- CN Type:** 4-pin Mini-DIN
- CN Location:** See **Figure 3-29**
- CN Pinouts:** See **Figure 3-34**

The connector supports the 12V power adapter.

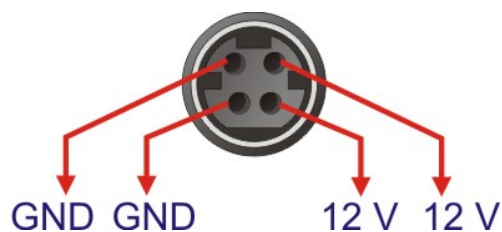


Figure 3-34: 4-pin Power Mini-DIN Connection

KINO-QM770 Mini-ITX SBC**3.3.6 Serial Port Connector (COM1)**

CN Label: COM1
CN Type: DB-9
CN Location: See **Figure 3-29**
CN Pinouts: See **Table 3-35**

The serial port connects to a RS-232 serial communications device.

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	DATA CARRIER DETECT (DCD1)	6	DATA SET READY (DSR1)
2	RECEIVE DATA (RXD1)	7	REQUEST TO SEND (RTS1)
3	TRANSMIT DATA (TXD1)	8	CLEAR TO SEND (CTS1)
4	DATA TERMINAL READY (DTR1)	9	RING INDICATOR (RI1)
5	GND		

Table 3-35: Serial Port Pinouts

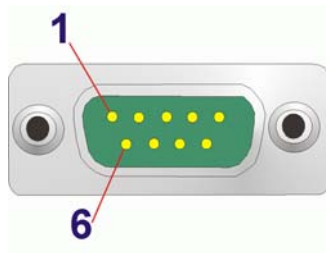


Figure 3-35: Serial Port Pinouts

Chapter

4

Installation

KINO-QM770 Mini-ITX SBC

4.1 Anti-static Precautions

**WARNING:**

Failure to take ESD precautions during installation may result in permanent damage to the product and severe injury to the user.

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the KINO-QM770. Dry climates are especially susceptible to ESD. It is therefore critical to strictly adhere to the following anti-static precautions whenever the KINO-QM770, or any other electrical component, is handled.

- ***Wear an anti-static wristband:*** - Wearing a simple anti-static wristband can help to prevent ESD from damaging the board.
- ***Self-grounding:*** - Before handling the board touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.
- ***Use an anti-static pad:*** When configuring the KINO-QM770, place it on an anti-static pad. This reduces the possibility of ESD damaging the KINO-QM770.
- ***Only handle the edges of the PCB:-*** When handling the PCB, hold it by the edges.

4.2 Installation Considerations

**NOTE:**

The following installation notices and installation considerations should be read and understood before the KINO-QM770 is installed. All installation notices pertaining to the installation of KINO-QM770 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the KINO-QM770 and injury to the person installing the motherboard.

**WARNING:**

The installation instructions described in this manual should be carefully followed in order to prevent damage to the KINO-QM770, KINO-QM770 components and injury to the user.

Before and during the installation please **DO** the following:

- **Read the user manual:**
 - The user manual provides a complete description of the installation instructions and configuration options.
- **Wear an electrostatic discharge cuff (ESD):**
 - Electronic components are easily damaged by ESD. Wearing an ESD cuff removes ESD from the body and helps prevent ESD damage.
- **Place on an antistatic pad:**
 - When installing or configuring the motherboard, place it on an antistatic pad. This helps to prevent potential ESD damage.
- **Turn all power off:**
 - Make sure the product is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the KINO-QM770 **DO NOT**:

- **DO NOT** remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- **DO NOT** use the product before verifying all the cables and power connectors are properly connected.
- **DO NOT** allow screws to come in contact with the PCB circuit, connector pins, or its components.

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4.3 CPU, CPU Cooling Kit and SO-DIMM Installation

**WARNING:**

A CPU should never be turned on without the specified cooling kit being installed. If the cooling kit (heat sink and fan) is not properly installed and the system turned on, permanent damage to the CPU, KINO-QM770 and other electronic components attached to the system may be incurred. Running a CPU without a cooling kit may also result in injury to the user.

The CPU, CPU cooling kit and DIMM are the most critical components of the KINO-QM770. If one of these component is not installed the KINO-QM770 cannot run.

4.3.1 Socket G2 CPU Installation

**WARNING:**

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure the correct cooling kit is properly installed.

To install a socket G2 CPU onto the KINO-QM770, follow the steps below:

**WARNING:**

When handling the CPU, only hold it on the sides. DO NOT touch the pins at the bottom of the CPU.

Step 1: Unlock the CPU retention screw. When shipped, the retention screw of the CPU socket should be in the unlocked position. If it is not in the unlocked position, use a screwdriver to unlock the screw. See **Figure 4-1**.

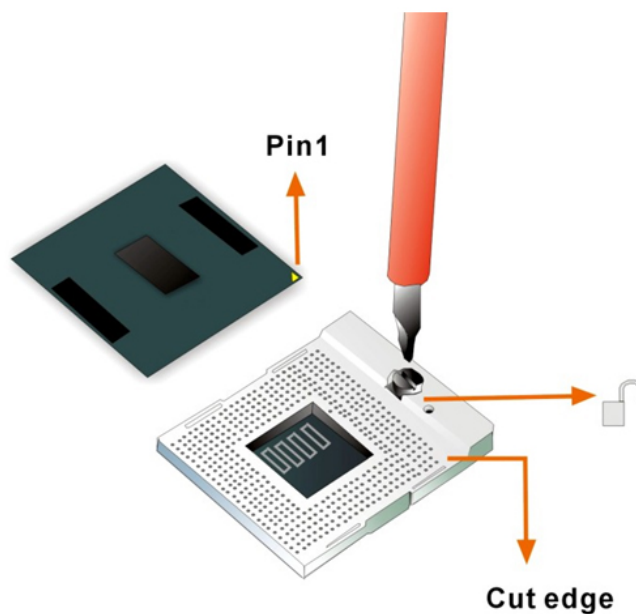


Figure 4-1: Unlock CPU socket retention screw

Step 2: Inspect the CPU socket. Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 3: Correctly Orientate the CPU. Make sure the IHS (integrated heat sink) side is facing upwards.

Step 4: Correctly position the CPU. Match the Pin 1 mark with the cut edge on the CPU socket. See **Figure 4-1**.

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Step 5: Align the CPU pins. Carefully align the CPU pins with the holes in the CPU socket.

Step 6: Insert the CPU. Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly.

Step 7: Lock the retention screw. Rotate the retention screw into the locked position.

See Figure 4-2.

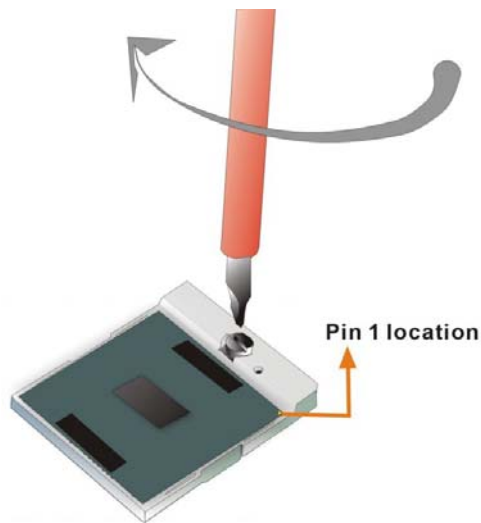


Figure 4-2: Lock the CPU Socket Retention Screw

4.3.2 Socket G2 Cooling Kit Installation

An IEI Socket G2 CPU cooling kit can be purchased separately (See **Chapter 2**). The cooling kit is comprised of a CPU heat sink and a cooling fan.



WARNING:

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit, please follow the steps below.

Step 1: Install the support bracket. Remove the tape from the support bracket. From the solder side of the board, align the support bracket to the holes on board and stick in place.

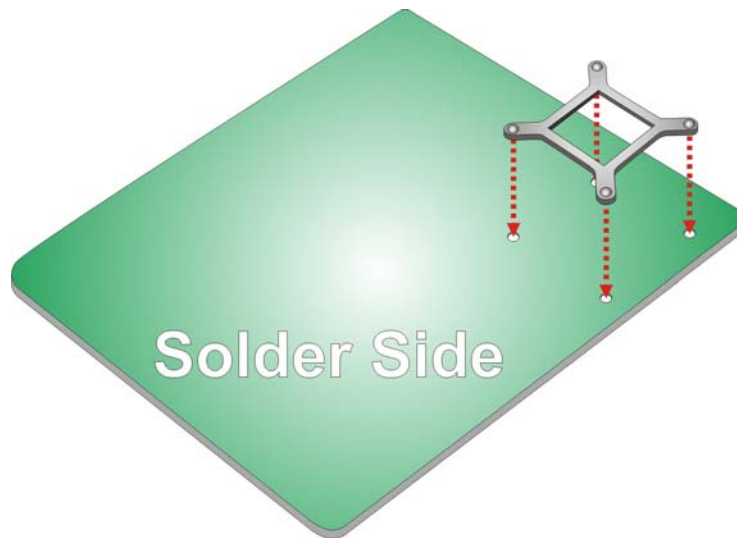


Figure 4-3: Install Support Bracket

Step 2: Properly orient the cooling kit. The CPU fan cable must not interfere with the fan or other moving parts. Make sure the cable can be routed away from the moving parts.

Step 3: Properly align the cooling kit. Line up the four screws with the screw holes on the support bracket below the board (**Figure 4-4**).

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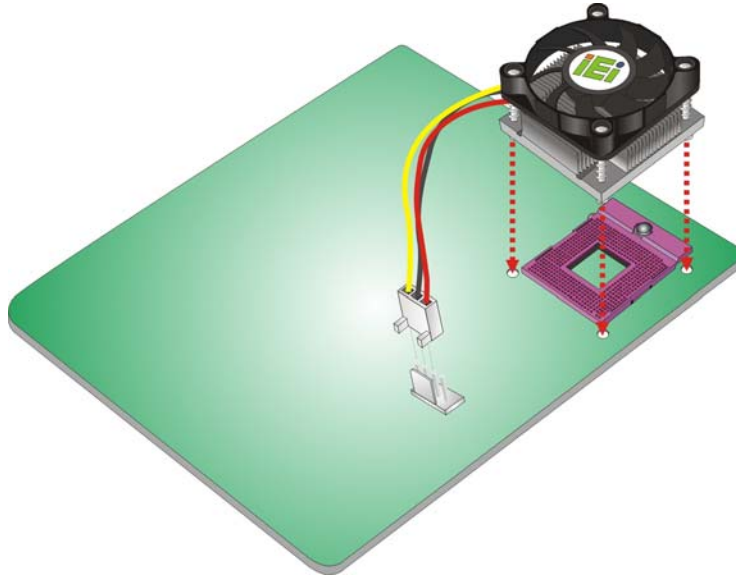


Figure 4-4: Align the Cooling Kit

- Step 4:** **Place the cooling kit onto the CPU.** Push down the fan with some pressure to secure the cooling kit with the support bracket. See **Figure 4-5**.
- Step 5:** **Tighten the screws.** Use a screwdriver to tighten the four screws. In a diagonal pattern, tighten each screw a few turns then move to the next one, until they are all secured. Do not overtighten the screws. See **Figure 4-5**.
- Step 6:** **Connect the fan cable.** Connect the cooling kit fan cable to the fan connector on the board. Carefully route the cable away from heat generating chips and fan blades.

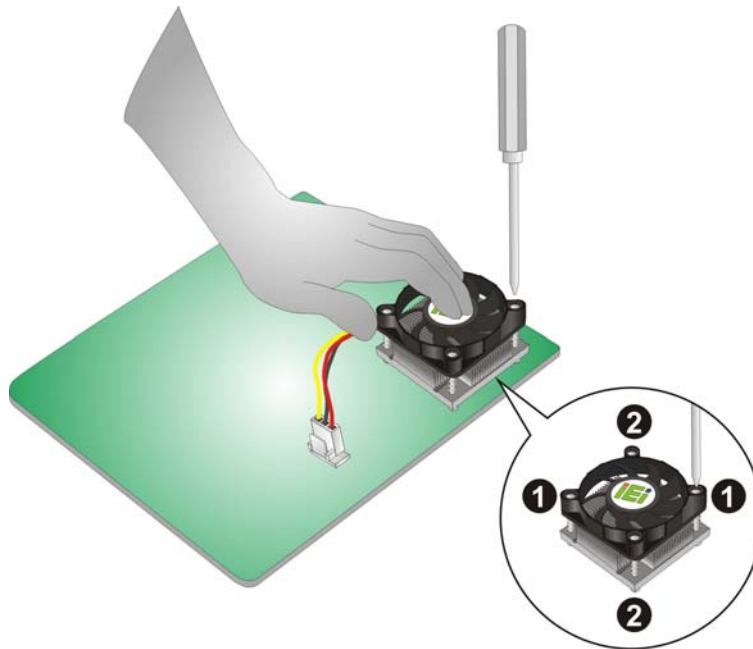


Figure 4-5: Secure the Cooling Kit

4.4 SO-DIMM Installation

To install a SO-DIMM, please follow the steps below and refer to **Figure 4-6**.

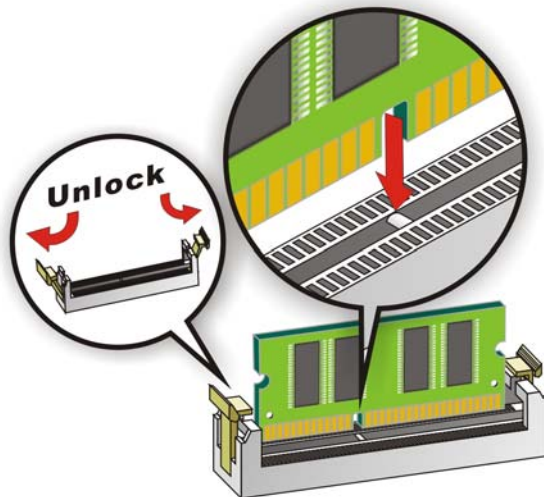


Figure 4-6: SO-DIMM Installation

Step 1: Open the SO-DIMM socket handles. Open the two handles outwards as far as they can. See **Figure 4-6**.

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- Step 2: Align the SO-DIMM with the socket.** Align the SO-DIMM so the notch on the memory lines up with the notch on the memory socket. See **Figure 4-6**.
- Step 3: Insert the SO-DIMM.** Once aligned, press down until the SO-DIMM is properly seated. Clip the two handles into place. See **Figure 4-6**.
- Step 4: Removing a SO-DIMM.** To remove a SO-DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.

4.5 PCIe Mini Card Installation

A PCIe Mini card slot is located on the solder side of the KINO-QM770. To install the PCIe Mini card, please refer to the diagram and instructions below.

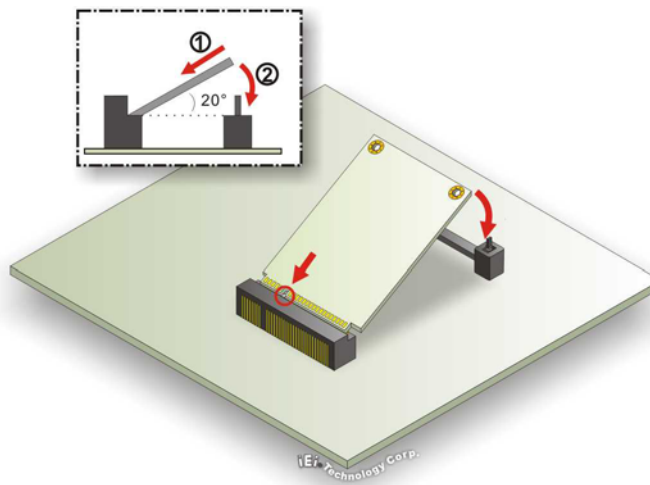


Figure 4-7: PCIe Mini Card Installation

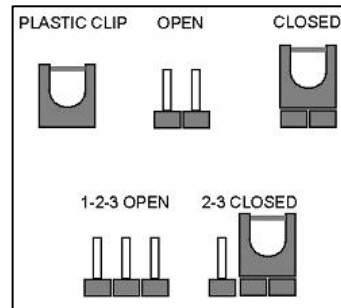
- Step 1: Insert into the socket at an angle.** Line up the notch on the card with the notch on the connector. Slide the PCIe Mini card into the socket at an angle of about 20°.
- Step 2: Push down until the card clips into place.** Push the other end of the card down until it clips into place on the plastic connector.

4.6 Jumper Settings



NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.



Before the KINO-QM770 is installed in the system, the jumpers must be set in accordance with the desired configuration. The jumpers on the KINO-QM770 are listed in Table 4-1.

Description	Label	Type
AT/ATX mode selection	J_ATXCTL1	3-pin header
Clear CMOS	J_CMOS1	3-pin header
Clear ME RTC registers	ME_RTC1	3-pin header
Display mode selection (CRT/DVI)	JP1	3-pin header
Flash descriptor security override	J_FLASH1	3-pin header
LVDS voltage selection	J_VLVDS1	3-pin header
LVDS resolution selection	J_PID1	8-pin header
PCIe channel mode selection	J_PCIE1 J_PCIE2	2-pin header

Table 4-1: Jumpers

KINO-QM770 Mini-ITX SBC

4.6.1 AT/ATX Mode Selection

Jumper Label:	J_ATXCTL1
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-2
Jumper Location:	See Figure 4-8

Set both of the jumpers select AT or ATX power mode for the KINO-QM770. AT power mode limits the system to on/off. ATX allows the system to use various power saving states and enter a standby state, so the system can be turned on remotely over a network. The settings on both jumpers should be the same.

Pin	Description
Short 1-2	ATX mode (Default)
Short 2-3	AT mode

Table 4-2: AT/ATX Mode Selection Jumper Settings

J_ATXCTL1

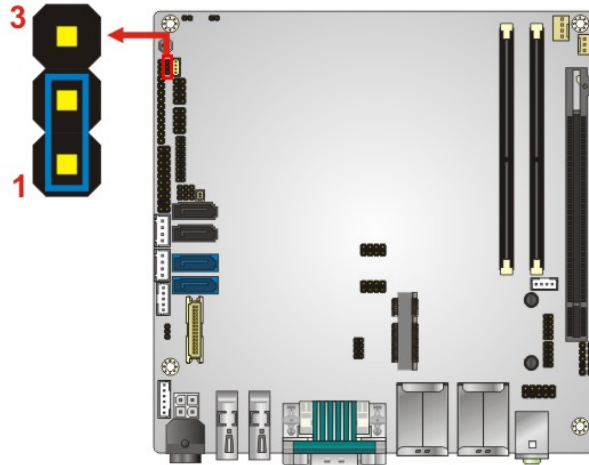


Figure 4-8: AT/ATX Mode Selection Jumper Location

4.6.2 Clear CMOS

Jumper Label:	J_CMOS1
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-3

Jumper Location: See **Figure 4-9**

If the KINO-QM770 fails to boot due to improper BIOS settings, the clear CMOS jumper clears the CMOS data and resets the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the “CMOS Settings Wrong” message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

The clear CMOS jumper settings are shown in Table 4-3.

Pin	Description
Short 1-2	Keep CMOS Setup (Default)
Short 2-3	Clear CMOS Setup

Table 4-3: Clear CMOS Jumper Settings

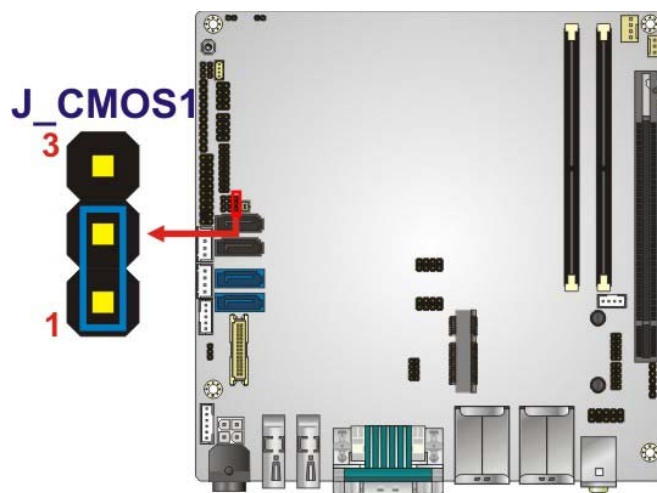


Figure 4-9: Clear CMOS Jumper Location

KINO-QM770 Mini-ITX SBC

4.6.3 Clear ME RTC Registers

Jumper Label:	ME_RTC1
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-4
Jumper Location:	See Figure 4-10

Resets the RTC registers used for the Intel® Management Engine when the on-board battery is changed.

Pin	Description
Short 1-2	Save ME RTC registers (Default)
Short 2-3	Clear ME RTC registers

Table 4-4: Clear ME RTC Registers Jumper Settings

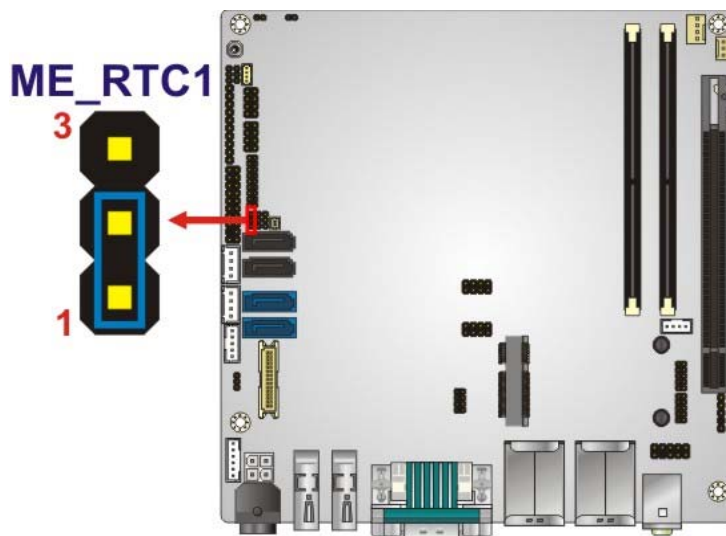


Figure 4-10: Clear ME RTC Registers Jumper Location

4.6.4 Display Mode Selection

Jumper Label:	JP1
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-5

Jumper Location: See **Figure 4-11**

Sets the external DVI-I connector as an analog CRT connector or a DVI connector.

Pin	Description
Open	DVI (Default)
Short 1-2	CRT

Table 4-5: Display Mode Selection Jumper Settings

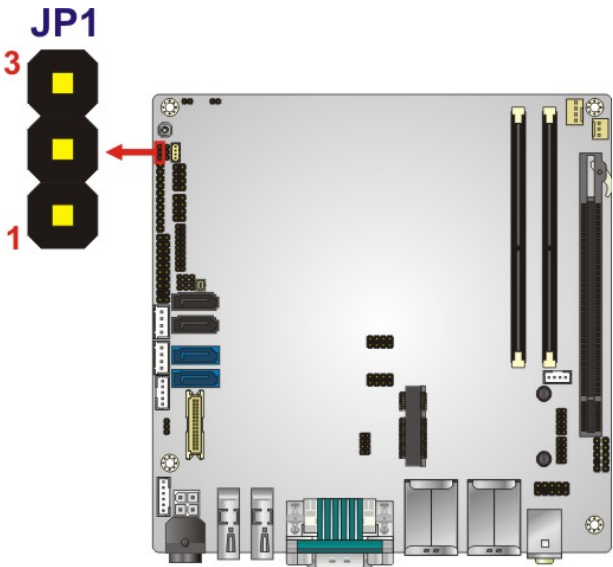


Figure 4-11: Display Mode Selection Jumper Location

4.6.5 Flash Descriptor Security Override

Jumper Label: J_FLASH1
Jumper Type: 3-pin header
Jumper Settings: See **Table 4-6**
Jumper Location: See **Figure 4-12**

The Flash Descriptor Security Override jumper specifies whether to override the flash descriptor.

KINO-QM770 Mini-ITX SBC

Setting	Description
Short 1-2	Disabled (Default)
Short 2-3	Enabled

Table 4-6: Flash Descriptor Security Override Jumper Settings

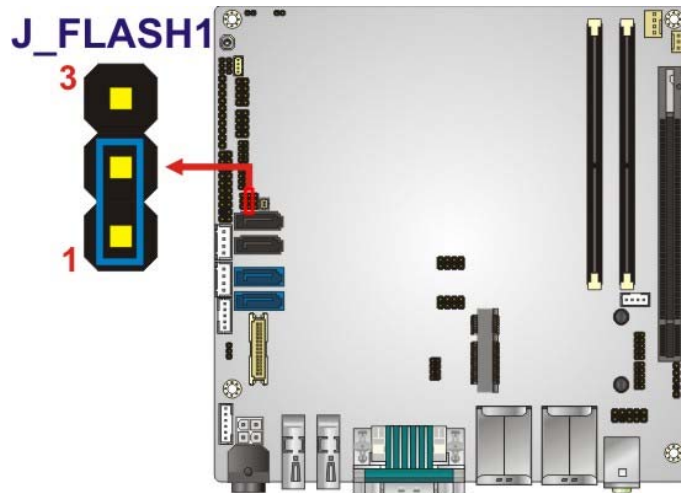


Figure 4-12: Flash Descriptor Security Override Jumper Location

4.6.6 LVDS Voltage Selection

Jumper Label:	J_VLVDS1
Jumper Type:	3-pin header
Jumper Settings:	See Table 4-7
Jumper Location:	See Figure 4-13

Selects the voltage of the LVDS connector.

Pin	Description
Short 1-2	+3.3 V (Default)
Short 2-3	+5 V

Table 4-7: LVDS Voltage Selection Jumper Settings

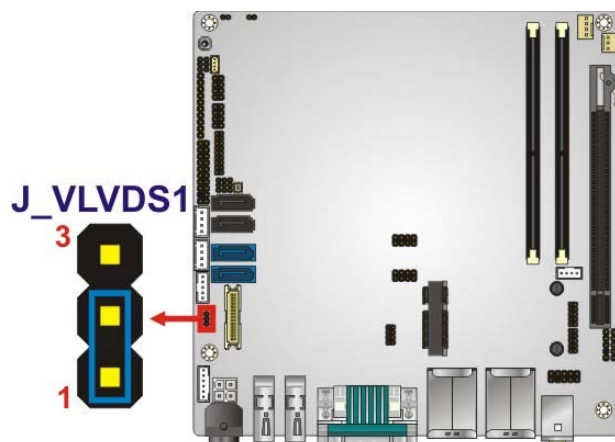


Figure 4-13: LVDS Voltage Selection Jumper Location

4.6.7 LVDS Resolution Selection

Jumper Label:	J_PID1
Jumper Type:	8-pin header
Jumper Settings:	See Table 4-8
Jumper Location:	See Figure 4-14

Selects the resolution of the LCD panel connected to the LVDS connector.

Pin	Description
OPEN	640 X 480 (18bit)
1-2	800 X 600 (18bit)
3-4	1024 X 768 (18bit)
1-2 & 3-4	1024 X 768 (24bit) Default
5-6	1280 X 800 (24bit)
1-2 & 5-6	1280 X 1024 (48bit)
3-4 & 5-6	1366 X 768 (24bit)
1-2 & 3-4 & 5-6	1440 X 900 (48bit)
7-8	1400 X 1050 (48bit)
1-2 & 7-8	1600 X 900 (48bit)
3-4 & 7-8	1600 X 1200 (48bit)
1-2 & 3-4 & 7-8	1680 X 1050 (48bit)

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Pin	Description
5-6 & 7-8	1920 X 1080 (48bit)
1-2 & 5-6 & 7-8	1920 X 1200 (48bit)
3-4 & 5-6 & 7-8	2048 X 1536 (48bit)
1-2 & 3-4 & 5-6 & 7-8	LVDS disabled

Table 4-8: LVDS Resolution Selection Jumper Settings

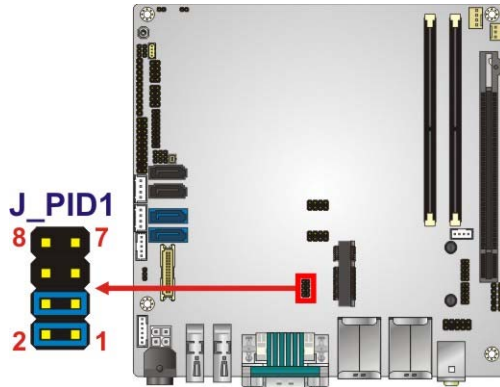


Figure 4-14: LVDS Resolution Selection Jumper Location

4.6.8 PCIe Channel Mode Selection

Jumper Label: J_PCIE1, J_PCIE2

Jumper Type: 2-pin header

Jumper Settings: See Table 4-9

Jumper Location: See Figure 4-15

Sets the PCIe x16 slot channel mode.

J_PCIE1	J_PCIE2	Description
Open	Open	PCIe x16 (Default)
Open	Closed	Reserved
Closed	Open	PCIe x8, PCIe x8
Closed	Closed	PCIe x8, PCIe x4, PCIe x4

Table 4-9: PCIe Channel Mode Selection Jumper Settings

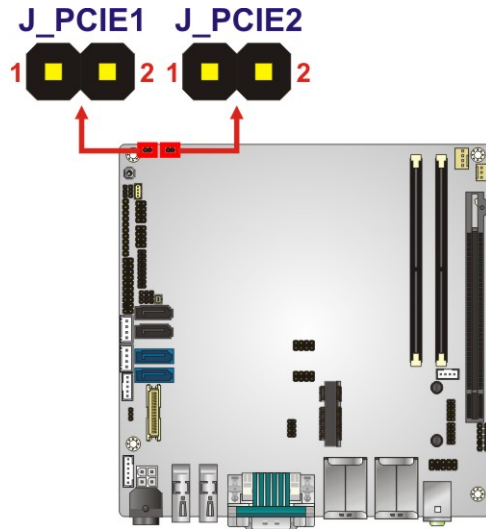


Figure 4-15: PCIe Channel Mode Selection Jumper Location

4.7 Chassis Installation

4.7.1 Airflow



WARNING:

Airflow is critical for keeping components within recommended operating temperatures. The chassis should have fans and vents as necessary to keep things cool.

The KINO-QM770 must be installed in a chassis with ventilation holes on the sides allowing airflow to travel through the heat sink surface. In a system with an individual power supply unit, the cooling fan of a power supply can also help generate airflow through the board surface.

4.7.2 Motherboard Installation

To install the KINO-QM770 motherboard into the chassis please refer to the reference material that came with the chassis.

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4.8 Internal Peripheral Device Connections

This section outlines the installation of peripheral devices to the onboard connectors.

4.8.1 SATA Drive Connection

The KINO-QM770 is shipped with two SATA drive cable. To connect the SATA drive to the connector, please follow the steps below.

Step 1: Locate the SATA connector and the SATA power connector. The locations of the connectors are shown in **Chapter 3**.

Step 2: Insert the cable connector. Insert the cable connector into the on-board SATA drive connector and the SATA power connector. See **Figure 4-16**.

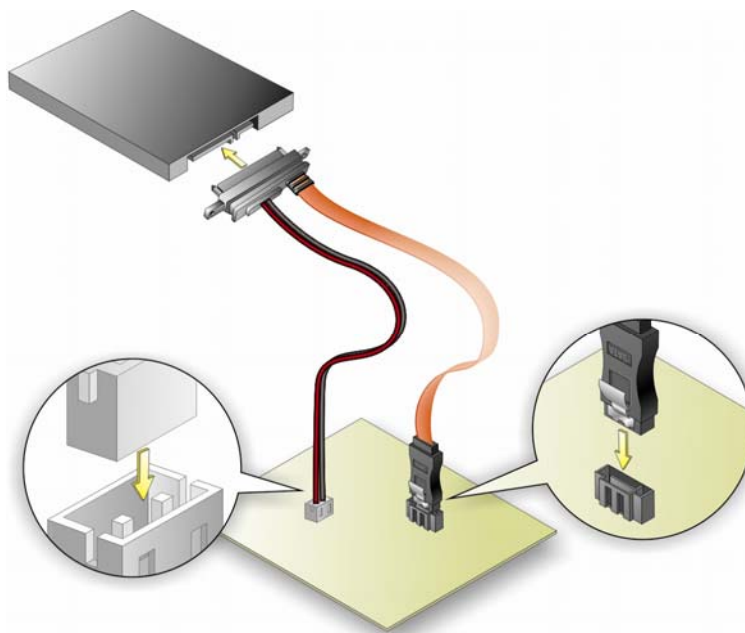


Figure 4-16: SATA Drive Cable Connection

Step 3: Connect the cable to the SATA disk. Connect the connector on the other end of the cable to the connector at the back of the SATA drive. See **Figure 4-16**.

Step 4: To remove the SATA cable from the SATA connector, press the clip on the connector at the end of the cable.

4.8.2 Single RS-232 Cable (w/o Bracket)

The single RS-232 cable consists of one serial port connector attached to a serial communications cable that is then attached to a D-sub 9 male connector. To install the single RS-232 cable, please follow the steps below.

Step 1: Locate the connector. The location of the RS-232 connector is shown in Chapter 3.

Step 2: Insert the cable connector. Insert the connector into the serial port pin header. See Figure 4-17. A key on the front of the cable connectors ensures the connector can only be installed in one direction.

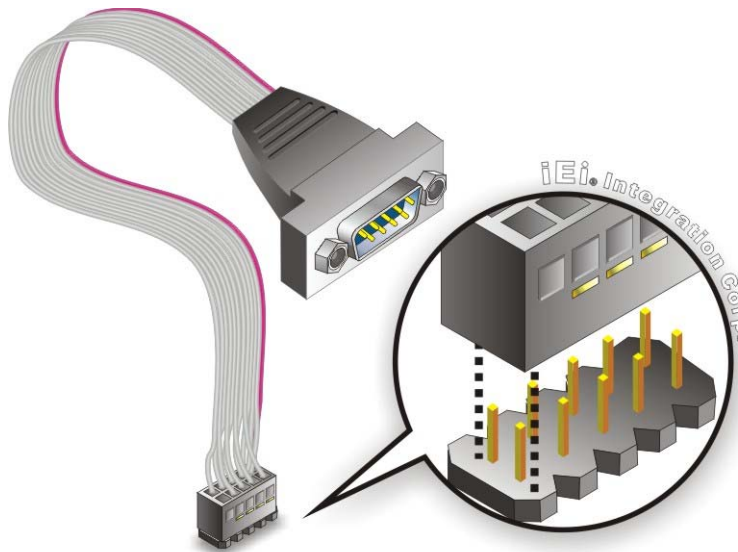


Figure 4-17: Single RS-232 Cable Installation

Step 3: Secure the bracket. The single RS-232 connector has two retention screws that must be secured to a chassis or bracket.

Step 4: Connect the serial device. Once the single RS-232 connector is connected to a chassis or bracket, a serial communications device can be connected to the system.

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4.9 External Peripheral Interface Connection

Devices can be connected to the external connectors. To install external devices, follow the directions in the subsections below.

4.9.1 Audio Connector

The audio jacks on the external audio connector enable the KINO-QM770 to be connected to a stereo sound setup. To install the audio devices, follow the steps below.

Step 1: Identify the audio plugs. The plugs on your home theater system or speakers may not match the colors on the rear panel. If audio plugs are plugged into the wrong jacks, sound quality will be very bad.

Step 2: Plug the audio plugs into the audio jacks. Plug the audio plugs into the audio jacks. If the plugs on your speakers are different, an adapter will need to be used to plug them into the audio jacks.

- **Line Out port (Lime):** Connects to a headphone or a speaker.
- **Microphone (Pink):** Connects to a microphone.

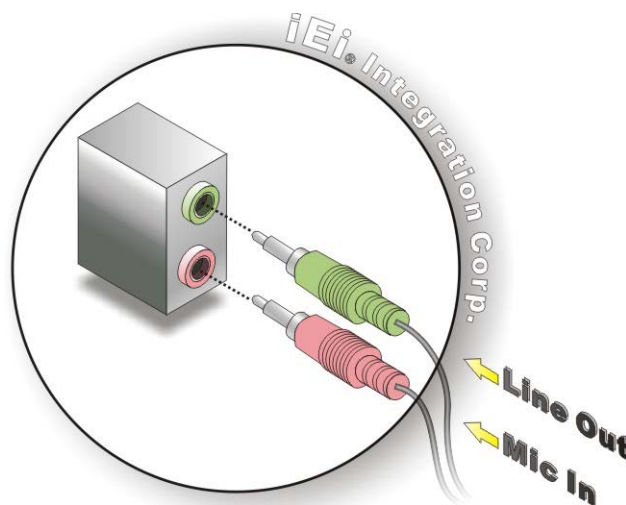


Figure 4-18: Audio Connector

Step 3: Check audio clarity. Check that the sound is coming through the right speakers by adjusting the balance front to rear and left to right.

4.9.2 DVI Display Device Connection

The KINO-QM770 has a single female DVI-I connector on the external peripheral interface panel. The DVI-I connector is connected to a digital display device. To connect a digital display device to the KINO-QM770, please follow the instructions below.

Step 1: Locate the DVI-I connector. The location of the DVI-I connector is shown in another chapter.

Step 2: Align the DVI-I connector. Align the male DVI-I connector on the digital display device cable with the female DVI-I connector on the external peripheral interface.

Step 3: Insert the DVI-I connector Once the connectors are properly aligned with the male connector, insert the male connector from the digital display device into the female connector on the KINO-QM770. See Figure 4-19.

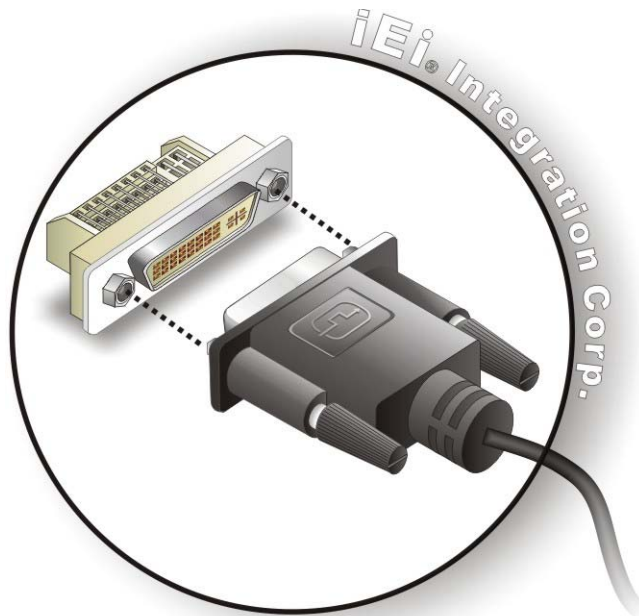


Figure 4-19: DVI Connector

Step 4: Secure the connector. Secure the DVI-I connector from the digital display device to the external interface by tightening the two retention screws on either side of the connector.

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4.9.3 HDMI Display Device Connection

The HDMI connector transmits a digital signal to compatible HDMI display devices such as a TV or computer screen. To connect the HDMI cable to the KINO-QM770, follow the steps below.

Step 1: **Locate the HDMI connector.** The location is shown in **Chapter 3**.

Step 2: **Align the connector.** Align the HDMI connector with the HDMI port. Make sure the orientation of the connector is correct.

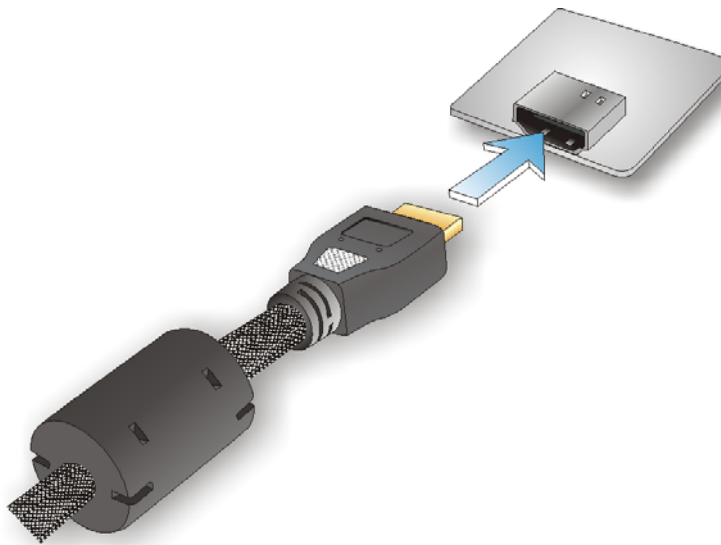


Figure 4-20: HDMI Connection

Step 3: **Insert the HDMI connector.** Gently insert the HDMI connector. The connector should engage with a gentle push. If the connector does not insert easily, check again that the connector is aligned correctly, and that the connector is being inserted with the right way up.

4.9.4 LAN Connection (Single Connector)

There are two external RJ-45 LAN connectors. The RJ-45 connectors enable connection to an external network. To connect a LAN cable with an RJ-45 connector, please follow the instructions below.

Step 1: **Locate the RJ-45 connectors.** The locations of the USB connectors are shown in **Chapter 3**.

Step 2: **Align the connectors.** Align the RJ-45 connector on the LAN cable with one of the RJ-45 connectors on the KINO-QM770. See Figure 4-21.

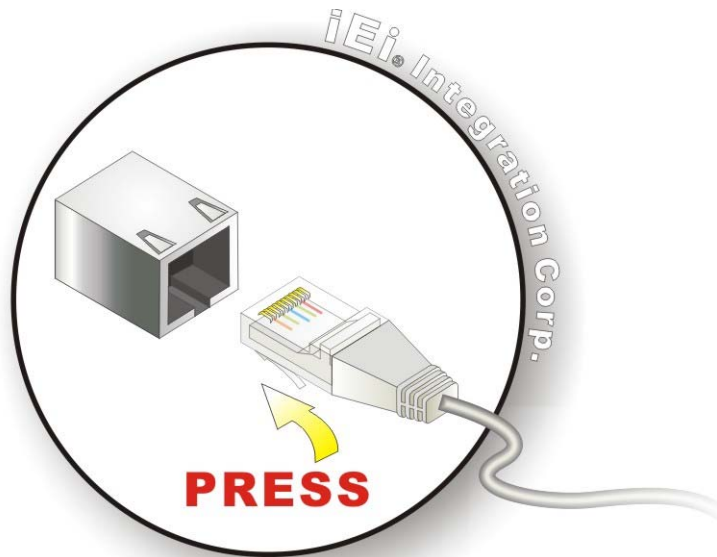


Figure 4-21: LAN Connection

Step 3: **Insert the LAN cable RJ-45 connector.** Once aligned, gently insert the LAN cable RJ-45 connector into the on-board RJ-45 connector.

4.9.5 USB Connection (Dual Connector)

The external USB 3.0 connectors provide easier and quicker access to external USB devices. Follow the steps below to connect USB devices to the KINO-QM770.

Step 1: **Locate the USB 3.0 connectors.** The locations of the USB 3.0 connectors are shown in **Chapter 3**.

Step 2: **Insert a USB 3.0 plug.** Insert the USB 3.0 plug of a device into the USB 3.0 on the external peripheral interface. See Figure 4-22.

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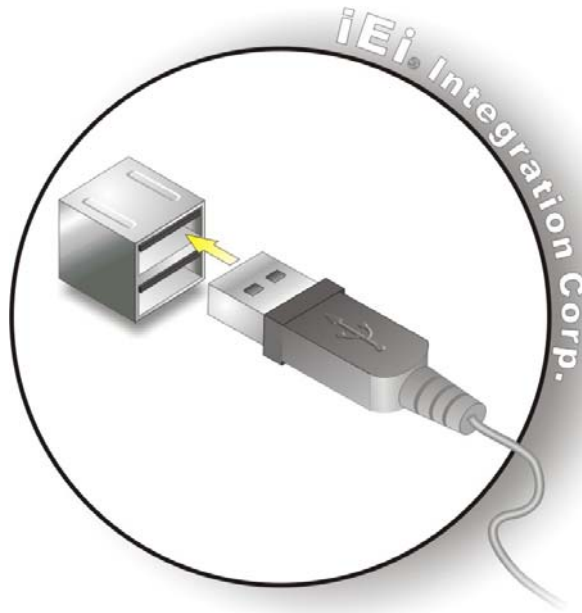


Figure 4-22: USB Connector

4.10 Intel® AMT Setup Procedure

The KINO-QM770 is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

- Step 1:** Make sure the **DIMM1** socket is installed with one DDR3 SO-DIMM.
- Step 2:** Connect an Ethernet cable to the RJ-45 connector labeled **LAN1**.
- Step 3:** The AMI BIOS options regarding the Intel® ME or Intel® AMT must be enabled,
- Step 4:** Properly install the Intel® Management Engine Components drivers from the iAMT Driver & Utility directory in the driver CD. See **Section 6.9**.
- Step 5:** Configure the Intel® Management Engine BIOS extension (MEBx). To get into the Intel® MEBx settings, press <Ctrl+P> after a single beep during boot-up process. Enter the Intel® current ME password as it requires (the Intel® default password is **admin**).

**NOTE:**

To change the password, enter a new password following the strong password rule (containing at least one upper case letter, one lower case letter, one digit and one special character, and be at least eight characters).

Chapter

5

BIOS

5.1 Introduction

The BIOS is programmed onto the BIOS chip. The BIOS setup program allows changes to certain system settings. This chapter outlines the options that can be changed.

5.1.1 Starting Setup

The UEFI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** or **F2** key as soon as the system is turned on or
2. Press the **DELETE** or **F2** key when the “**Press Del to enter SETUP**” message appears on the screen.

If the message disappears before the **DELETE** or **F2** key is pressed, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the PageUp and PageDown keys to change entries, press **F1** for help and press **Esc** to quit. Navigation keys are shown in.

Key	Function
Up arrow	Move to the item above
Down arrow	Move to the item below
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
+	Increase the numeric value or make changes
-	Decrease the numeric value or make changes
Page up	Move to the next page
Page down	Move to the previous page

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Key	Function
Esc	Main Menu – Quit and do not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Load previous values
F3 key	Load optimized defaults
F4 key	Save changes and Exit BIOS

Table 5-1: BIOS Navigation Keys**5.1.3 Getting Help**

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot After Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in Chapter 4.

5.1.5 BIOS Menu Bar

The **menu bar** on top of the BIOS screen has the following main items:

- Main – Changes the basic system configuration.
- Advanced – Changes the advanced system settings.
- Chipset – Changes the chipset settings.
- Boot – Changes the system boot configuration.
- Security – Sets User and Supervisor Passwords.
- Save & Exit – Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

The **Main** BIOS menu (**BIOS Menu 1**) appears when the **BIOS Setup** program is entered.

The **Main** menu gives an overview of the basic system information.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Main	Advanced	Chipset Boot Security Save & Exit
BIOS Information		Set the Date. Use Tab to switch between Date elements.
BIOS Vendor	American Megatrends	
Core Version	4.6.5.3 0.18	
Compliancy	UEFI 2.3; PI 1.2	
Project Version	B207AR02.ROM	
Build Date	06/05/2012 11:37:12	-----
iWDD Vendor	ICP	←→: Select Screen
iWDD Version	B214ER14.bin	↑ ↓: Select Item
		EnterSelect
System Date	[Tue 01/15/2012]	F1 General Help
System Time	[14:20:27]	F2 Previous Values
		F3 Optimized Defaults
Access Level	Administrator	F4 Save
		ESC Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.		

BIOS Menu 1: Main

→ BIOS Information

The **BIOS Information** lists a brief summary of the BIOS. The fields in **BIOS Information** cannot be changed. The items shown in the system overview include:

- **BIOS Vendor:** Installed BIOS vendor
- **Core Version:** Current BIOS version
- **Project Version:** the board version
- **Build Date and Time:** Date and time the current BIOS version was made

The System Overview field also has two user configurable fields:

→ System Date [xx/xx/xx]

Use the **System Date** option to set the system date. Manually enter the day, month and year.

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→ System Time [xx:xx:xx]

Use the **System Time** option to set the system time. Manually enter the hours, minutes and seconds.

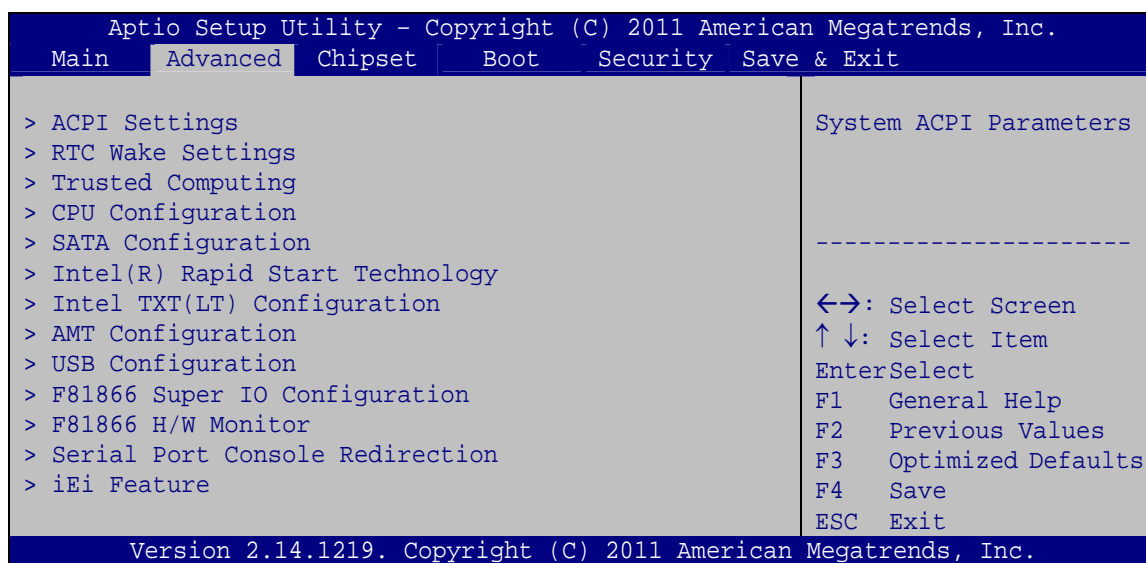
5.3 Advanced

Use the **Advanced** menu (**BIOS Menu 2**) to configure the CPU and peripheral devices through the following sub-menus:



WARNING!

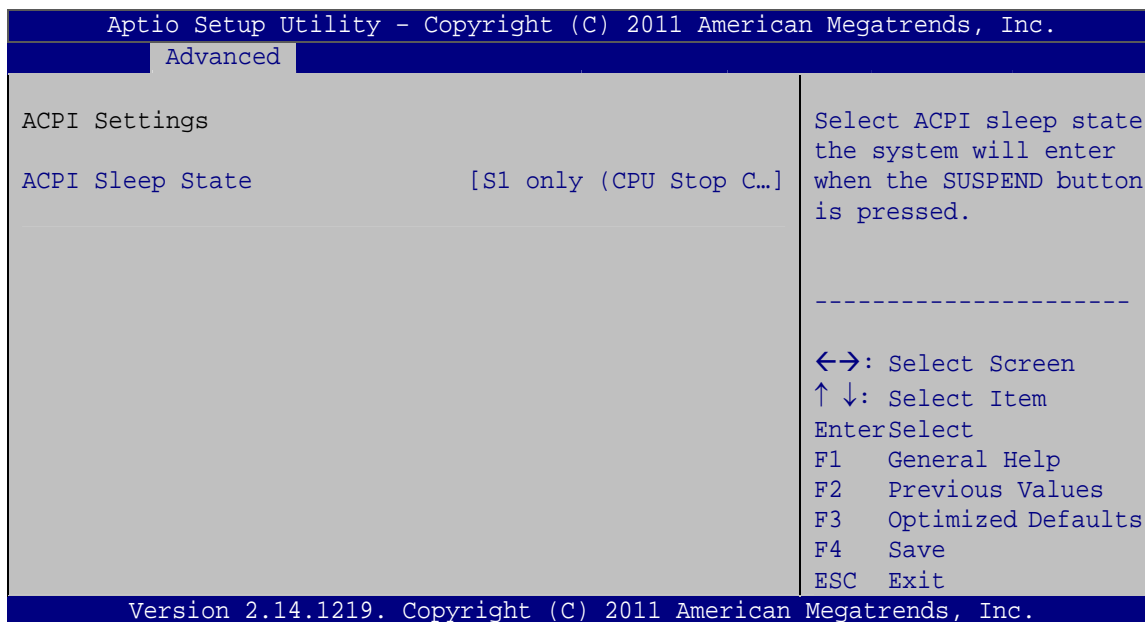
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



BIOS Menu 2: Advanced

5.3.1 ACPI Configuration

The **ACPI Configuration** menu (**BIOS Menu 3**) configures the Advanced Configuration and Power Interface (ACPI) options.



BIOS Menu 3: ACPI Configuration

→ **ACPI Sleep State [S1 only (CPU Stop Clock)]**

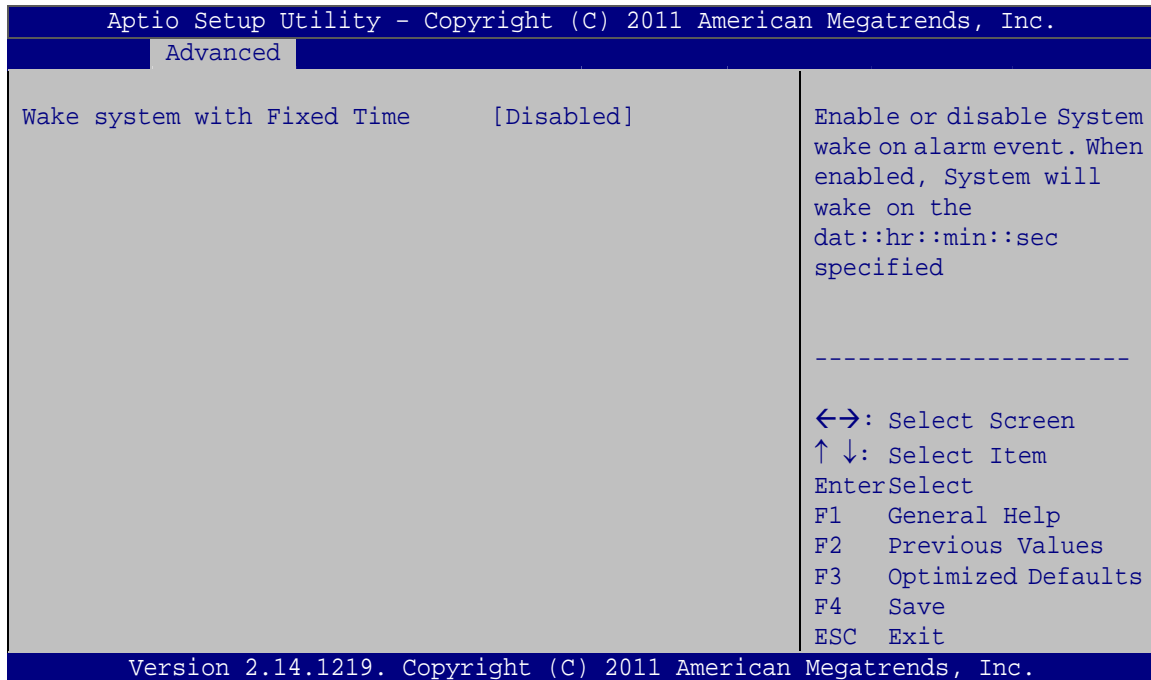
Use the **ACPI Sleep State** option to specify the sleep state the system enters when it is not being used.

- **S1 only (CPU Stop Clock)** **DEFAULT** The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.
- **S3 only (Suspend to RAM)** The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved.

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5.3.2 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 4**) configures RTC wake event.

**BIOS Menu 4: RTC Wake Settings**➔ **Wake System with Fixed Time [Disabled]**

Use the **Wake System with Fixed Time** option to specify the time the system should be roused from a suspended state.

➔ **Disabled** **DEFAULT** The real time clock (RTC) cannot generate a wake event

➔ **Enabled**

If selected, the following appears with values that can be selected:

*Wake up every day

*Wake up date

*Wake up hour

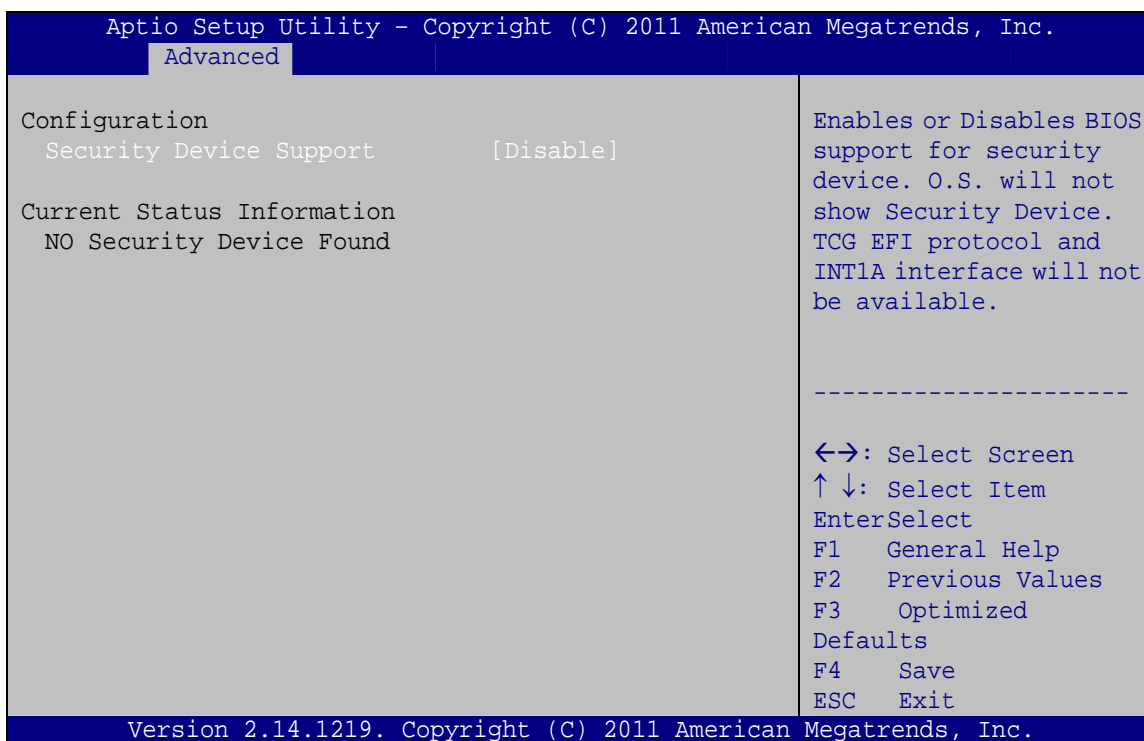
*Wake up minute

*Wake up second

After setting the alarm, the computer turns itself on from a suspend state when the alarm goes off.

5.3.3 Trusted Computing

Use the **Trusted Computing** menu (**BIOS Menu 5**) to configure settings related to the Trusted Computing Group (TCG) Trusted Platform Module (TPM).



BIOS Menu 5: Trusted Computing

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➔ Security Device Support [Disable]

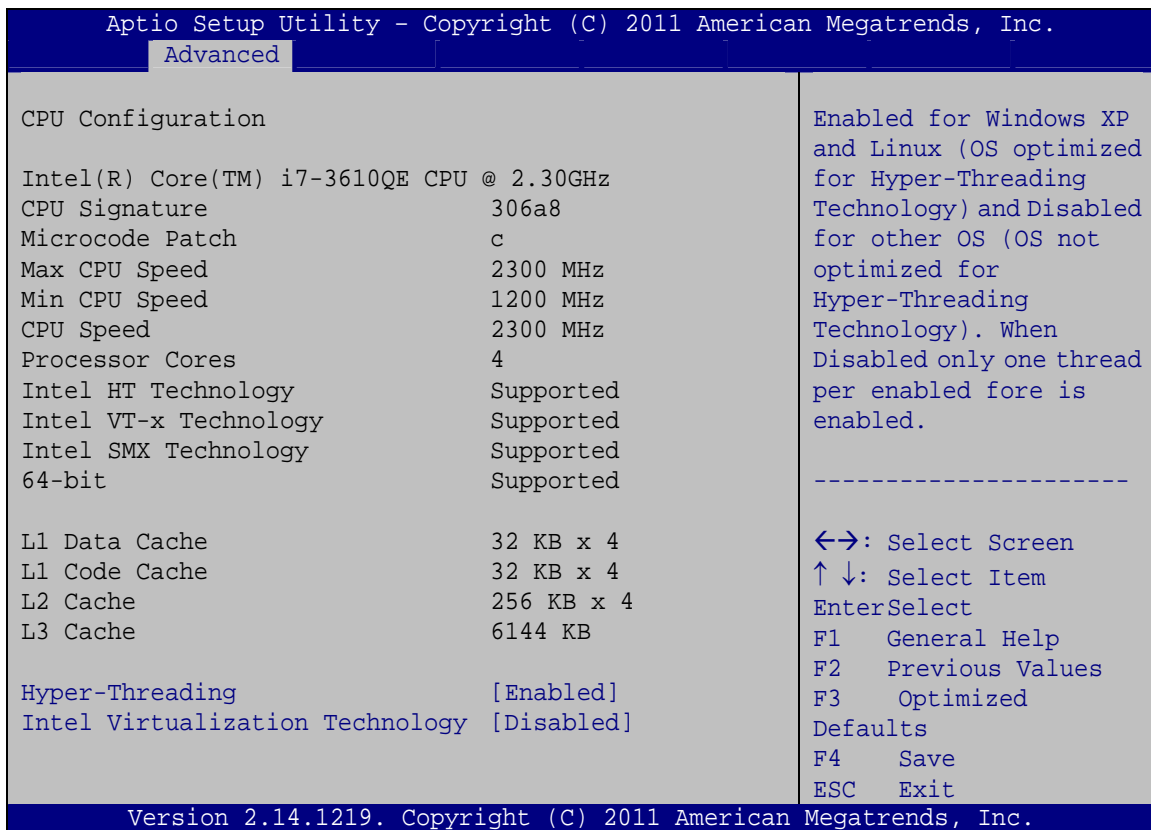
Use the **Security Device Support** option to configure support for the TPM.

➔ **Disable** **DEFAULT** TPM support is disabled.

➔ **Enable** TPM support is enabled.

5.3.4 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 6**) to view detailed CPU specifications and configure the CPU.



BIOS Menu 6: CPU Configuration

The CPU Configuration menu (**BIOS Menu 6**) lists the following CPU details:

- Processor Type: Lists the brand name of the CPU being used
- CPU Signature: Lists the CPU signature value.
- Microcode Patch: Lists the microcode patch being used.

- Max CPU Speed: Lists the maximum CPU processing speed.
- Min CPU Speed: Lists the minimum CPU processing speed.
- CPU Speed: Lists the CPU processing speed
- Processor Core: Lists the number of the processor cores
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.
- Intel VT-x Technology: Indicates if Intel VT-x Technology is supported by the CPU.
- Intel SMX Technology: Indicates if Intel SMX Technology is supported by the CPU.
- 64-bit: Indicates if 64-bit is supported by the CPU.
- L1 Data Cache: Lists the amount of data storage space on the L1 cache.
- L1 Code Cache: Lists the amount of code storage space on the L1 cache.
- L2 Cache: Lists the amount of storage space on the L2 cache.
- L3 Cache: Lists the amount of storage space on the L3 cache.

→ Hyper Threading [Enabled]

Use the **Hyper Threading** to enable or disable the CPU hyper threading function.

- **Disabled** Disables the use of hyper threading technology
- **Enabled** **DEFAULT** Enables the use of hyper threading technology

→ Intel Virtualization Technology [Disabled]

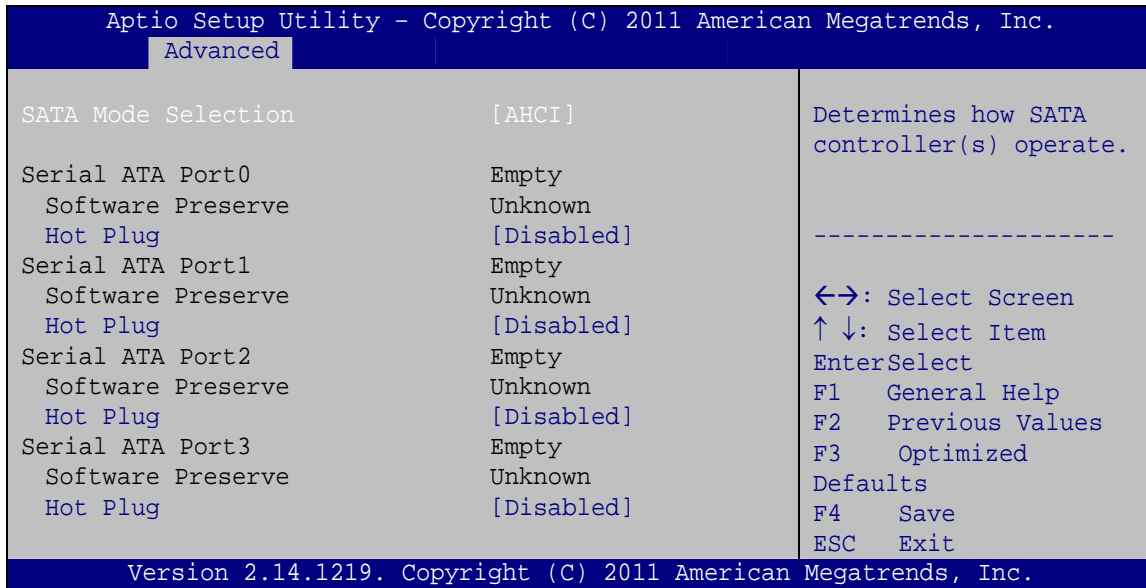
Use the **Intel Virtualization Technology** option to enable or disable virtualization on the system. When combined with third party software, Intel Virtualization technology allows several OSs to run on the same system at the same time.

- **Disabled** **DEFAULT** Disables Intel Virtualization Technology.
- **Enabled** Enables Intel Virtualization Technology.

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5.3.5 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 7**) to change and/or set the configuration of the SATA devices installed in the system.



BIOS Menu 7: SATA Configuration

→ SATA Mode Selection [AHCI]

Use the **SATA Mode Selection** option to configure SATA devices as normal IDE devices.

- **IDE** Configures SATA devices as normal IDE device.
- **AHCI** **DEFAULT** Configures SATA devices as AHCI device.
- **RAID** Configures SATA devices as RAID device.

→ Hot Plug [Disabled]

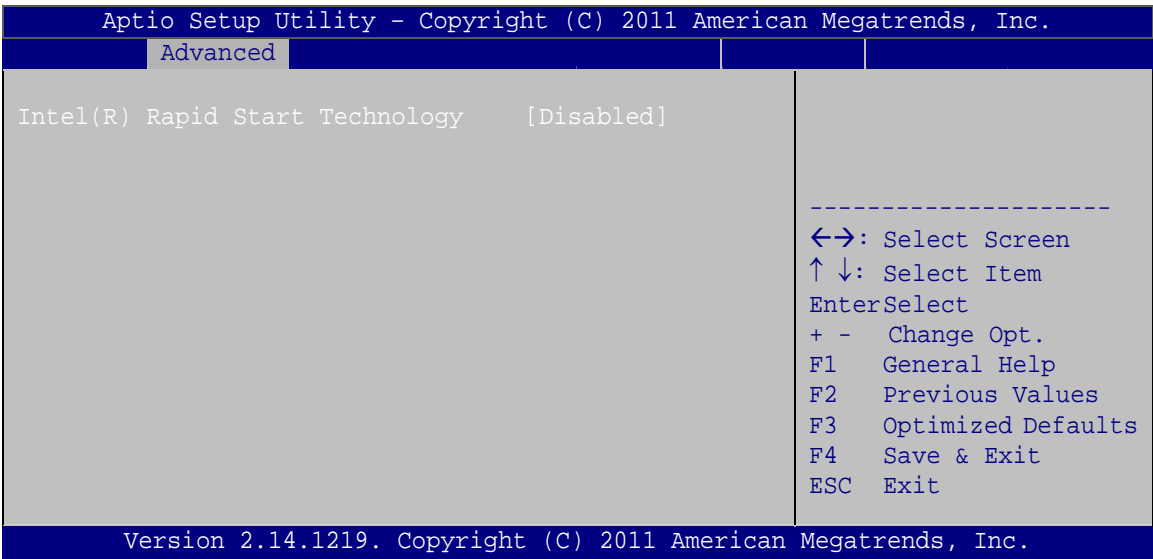
Use the **Hot Plug** option to enable or disable the hot plug function.

- **Disabled** **DEFAULT** Disables the hot plug function.
- **Enabled** Enables the hot plug function.



5.3.6 Intel(R) Rapid Start Technology

Use the **Intel(R) Rapid Start Technology** menu to configure Intel® Rapid Start Technology support.



BIOS Menu 8: Intel(R) Rapid Start Technology

➔ Intel(R) Rapid Start Technology [Disabled]

Use **Intel(R) Rapid Start Technology** option to enable or disable the Intel® Rapid Start Technology function.

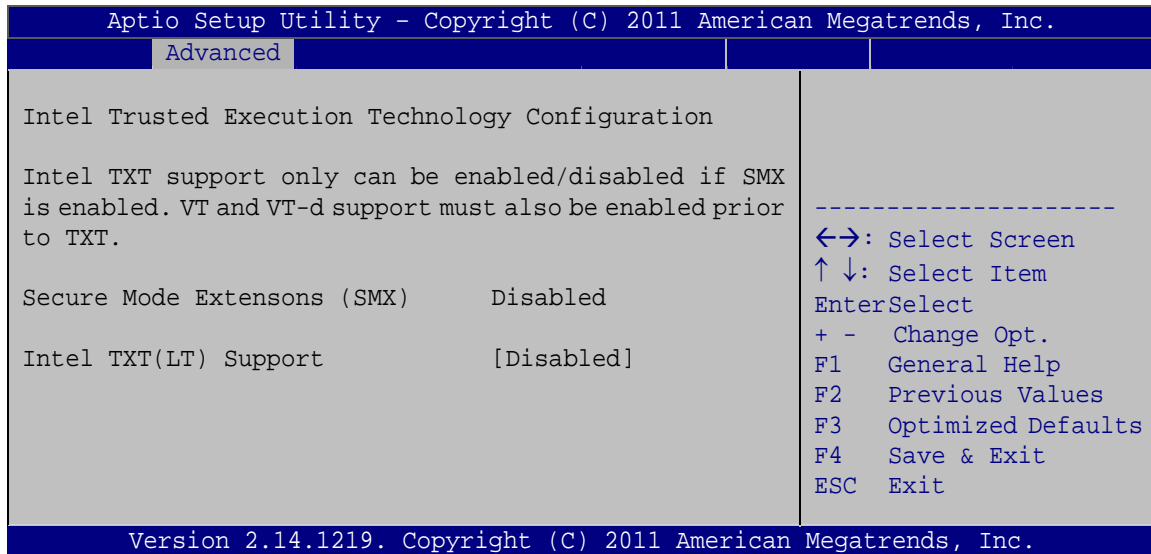
- ➔ **Disabled** **DEFAULT** Intel® Rapid Start Technology is disabled
- ➔ **Enabled** Intel® Rapid Start Technology is enabled

5.3.7 Intel TXT(LT) Configuration

Use the **Intel TXT(LT) Configuration** menu to configure Intel® Trusted Execution Technology support.



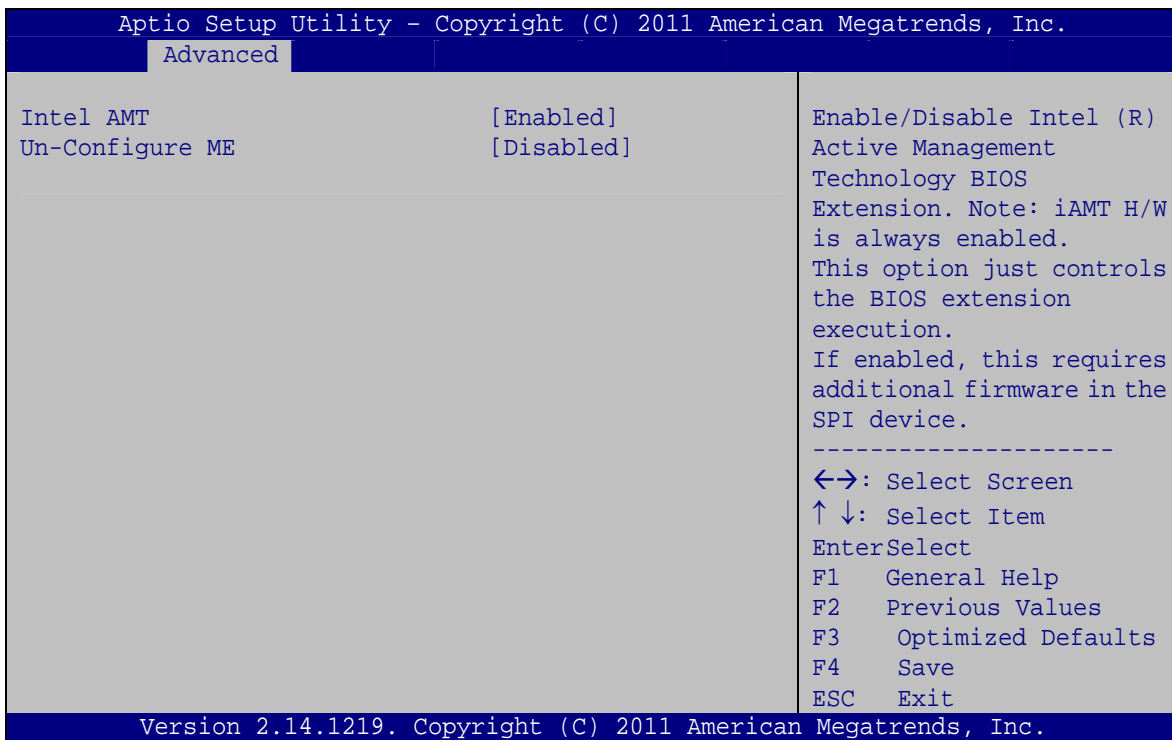
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BIOS Menu 9: Intel TXT(LT) Configuration

5.3.8 AMT Configuration

The **AMT Configuration** menu (**BIOS Menu 10**) allows the advanced power management options to be configured.



BIOS Menu 10: AMT Configuration

→ Intel AMT [Enabled]

Use **Intel AMT** option to enable or disable the Intel® AMT function.

- **Disabled** Intel® AMT is disabled
- **Enabled** **DEFAULT** Intel® AMT is enabled

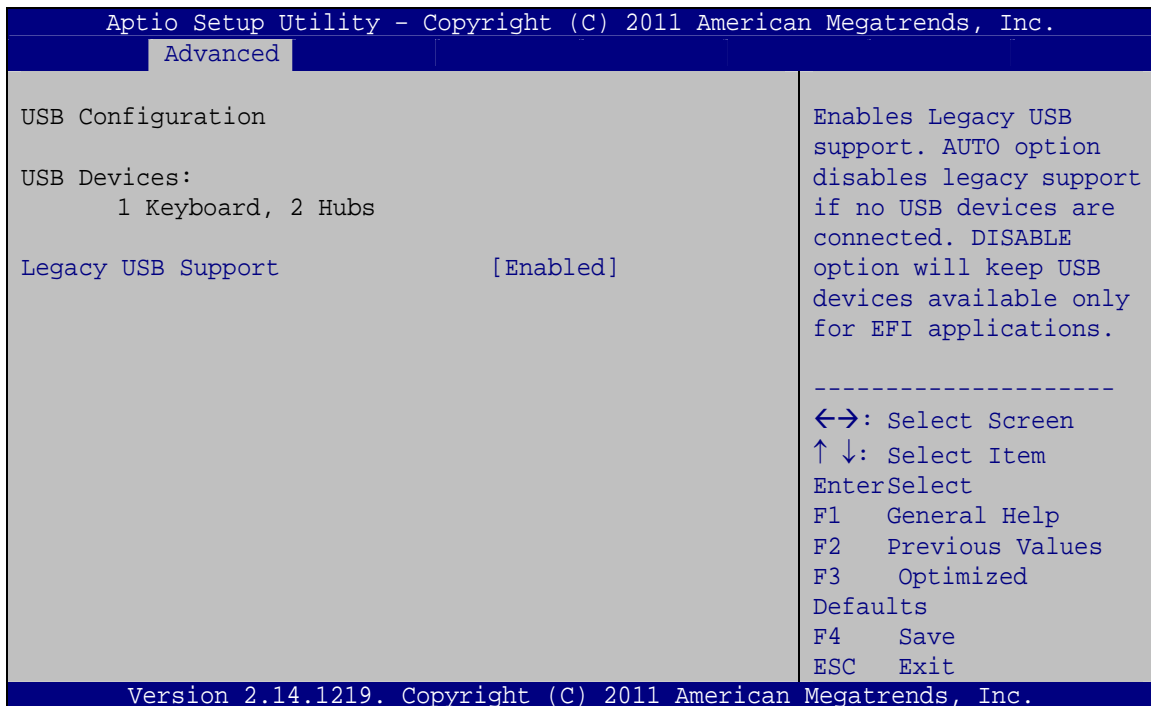
→ Un-Configure ME [Disabled]

Use the **Un-Configure ME** option to perform ME unconfigure without password operation.

- **Disabled** **DEFAULT** Not perform ME unconfigure
- **Enabled** To perform ME unconfigure

5.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 11**) to read USB configuration information and configure the USB settings.



BIOS Menu 11: USB Configuration

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➔ USB Devices

The **USB Devices Enabled** field lists the USB devices that are enabled on the system

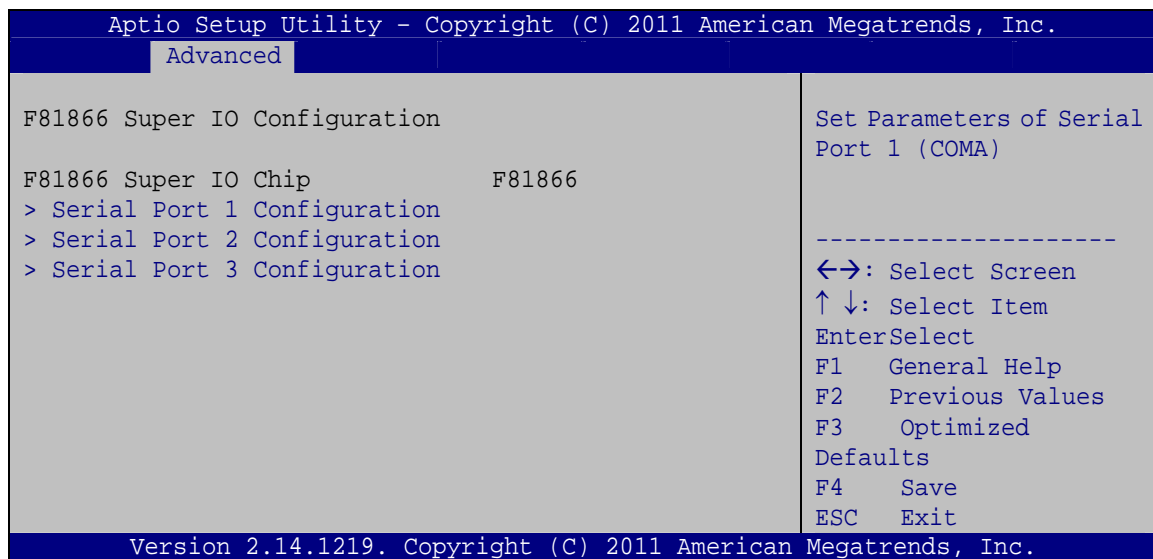
➔ Legacy USB Support [Enabled]

Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

- | | | | |
|---|-----------------|----------------|---|
| ➔ | Enabled | DEFAULT | Legacy USB support enabled |
| ➔ | Disabled | | Legacy USB support disabled |
| ➔ | Auto | | Legacy USB support disabled if no USB devices are connected |

5.3.10 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 12**) to set or change the configurations for the FDD controllers, parallel ports and serial ports.

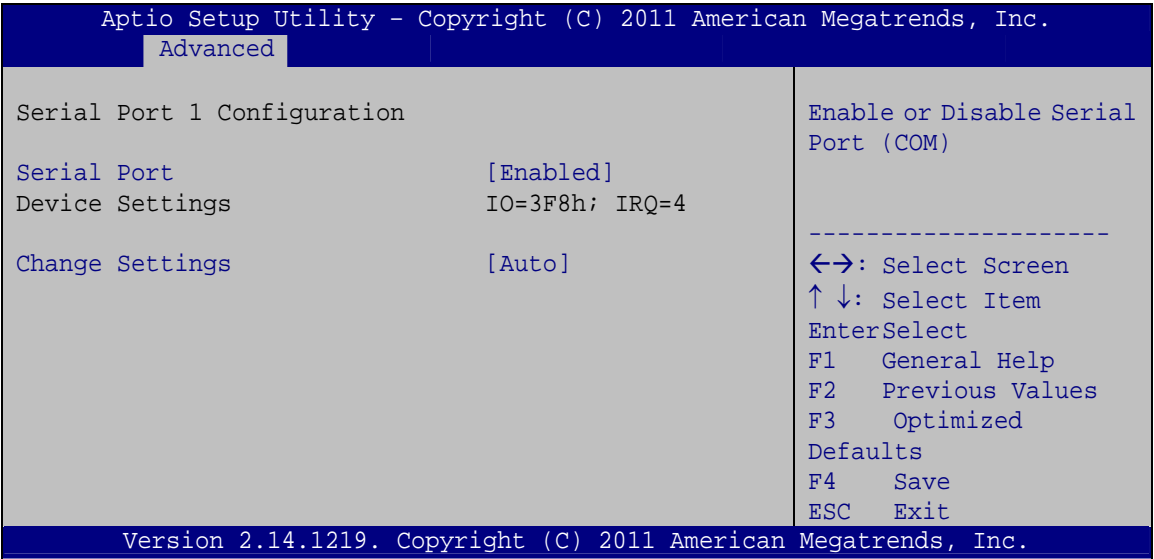


BIOS Menu 12: F81866 Super IO Configuration



5.3.10.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 13**) to configure the serial port n.



BIOS Menu 13: Serial Port n Configuration

5.3.10.1.1 Serial Port 1 Configuration

➔ Serial Port [Enabled]

Use the **Serial Port** option to enable or disable the serial port.

- ➔ **Disabled** Disable the serial port
- ➔ **Enabled** **DEFAULT** Enable the serial port

➔ Change Settings [Auto]

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

- ➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=3F8h; IRQ=4** Serial Port I/O port address is 3F8h and the interrupt address is IRQ4



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- ➔ **IO=3F8h;**
IRQ=3, 4 Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4
- ➔ **IO=2F8h;**
IRQ=3, 4 Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4
- ➔ **IO=3E8h;**
IRQ=3, 4 Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4
- ➔ **IO=2E8h;**
IRQ=3, 4 Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4

5.3.10.1.2 Serial Port 2 Configuration

➔ **Serial Port [Enabled]**

Use the **Serial Port** option to enable or disable the serial port.

- ➔ **Disabled** Disable the serial port
- ➔ **Enabled** **DEFAULT** Enable the serial port

➔ **Change Settings [Auto]**

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

- ➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=2F8h;**
IRQ=3 Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
- ➔ **IO=3F8h;**
IRQ=3, 4 Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4
- ➔ **IO=2E8h;**
IRQ=3, 4 Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4
- ➔ **IO=3E8h;**
IRQ=3, 4 Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4



- | | | |
|---|----------------------|---|
| ➔ | IO=2E8h;
IRQ=3, 4 | Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4 |
|---|----------------------|---|

5.3.10.1.3 Serial Port 3 Configuration

➔ Serial Port [Enabled]

Use the **Serial Port** option to enable or disable the serial port.

- | | | |
|---|------------------------|-------------------------|
| ➔ | Disabled | Disable the serial port |
| ➔ | Enabled DEFAULT | Enable the serial port |

➔ Change Settings [Auto]

Use the **Change Settings** option to change the serial port IO port address and interrupt address.

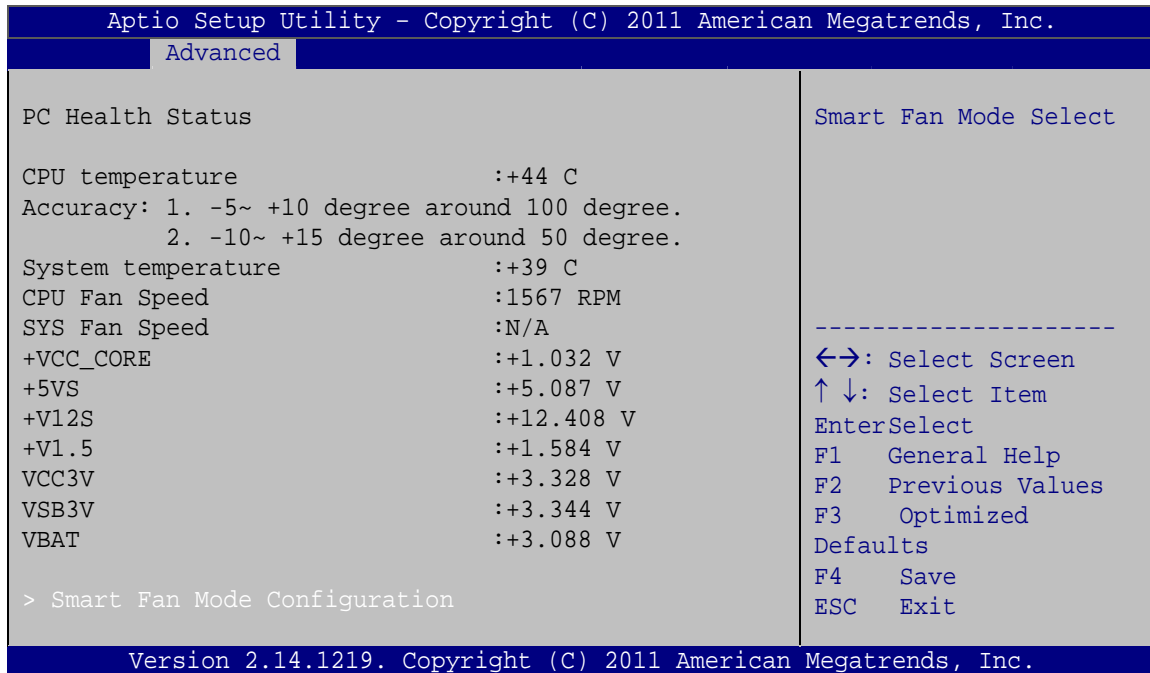
- | | | |
|---|----------------------|---|
| ➔ | Auto DEFAULT | The serial port IO port address and interrupt address are automatically detected. |
| ➔ | IO=3E8h;
IRQ=5 | Serial Port I/O port address is 3E8h and the interrupt address is IRQ5 |
| ➔ | IO=3F8h;
IRQ=3, 4 | Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4 |
| ➔ | IO=2F8h;
IRQ=3, 4 | Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4 |
| ➔ | IO=3E8h;
IRQ=5, 7 | Serial Port I/O port address is 3E8h and the interrupt address is IRQ5, 7 |
| ➔ | IO=2E8h;
IRQ=5, 7 | Serial Port I/O port address is 2E8h and the interrupt address is IRQ5, 7 |
| ➔ | IO=2E0h;
IRQ=5, 7 | Serial Port I/O port address is 2E0h and the interrupt address is IRQ5, 7 |



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5.3.11 F81866 H/W Monitor

The **F8186 H/W Monitor** menu (**BIOS Menu 14**) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 14: F81866 H/W Monitor

➔ PC Health Status

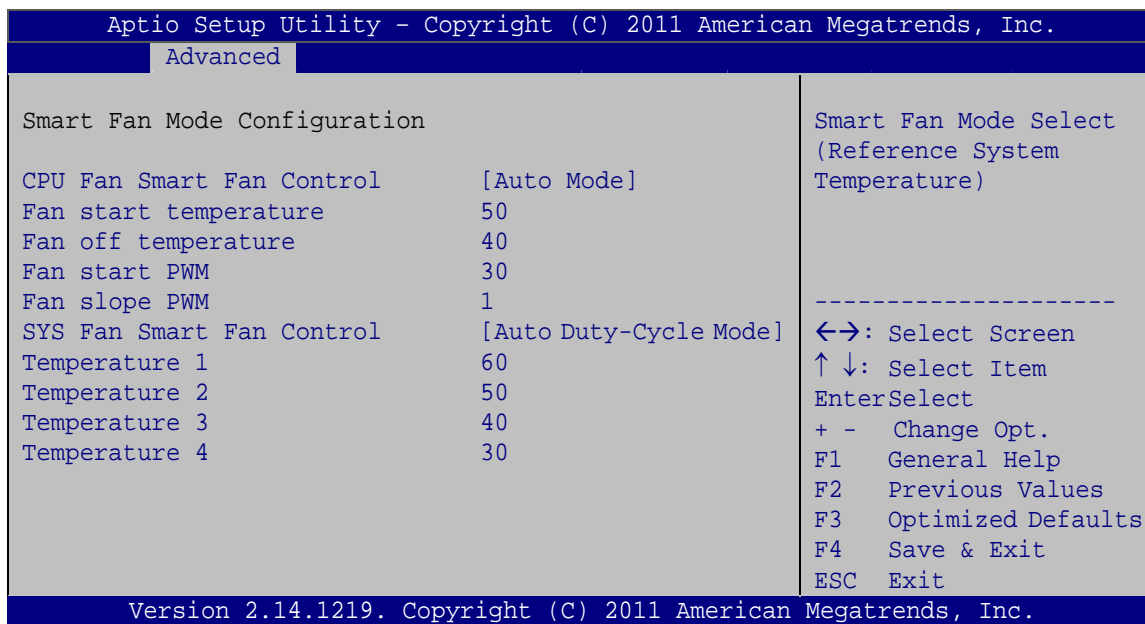
The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
 - CPU Temperature
 - System Temperature
- Fan Speeds:
 - CPU Fan Speed
 - System Fan Speed
- Voltages:
 - +VCC_CORE
 - +5VS
 - +V12S

- +V1.5
- VCC3V
- VSB3V
- VBAT

5.3.11.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 15**) to configure the smart fan temperature and speed settings.



BIOS Menu 15: Smar Fan Mode Configuration

→ CPU Fan Smart Fan Control [Auto Mode]

Use the **CPU_FAN1 Smart Fan Control** option to configure the CPU Smart Fan (CPU_FAN1).

→ Manual Mode

The fan spins at the speed set in Manual by Duty Cycle settings

→ Auto Mode

DEFAULT

The fan adjusts its speed using Auto by Duty-Cycle settings

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→ **SYS Fan Smart Fan Control [Auto Duty-Cycle Mode]**

Use the **SYS_FAN1 Smart Fan Control** option to configure the System Smart Fan (SYS_FAN1).

- | | | | |
|---|-----------------------------|----------------|---|
| → | Manual Mode | Duty | The fan spins at the speed set in Manual by Duty Cycle settings |
| → | Auto Duty-Cycle Mode | DEFAULT | The fan adjusts its speed using Auto by Duty-Cycle settings |

→ **Fan start/off temperature**

Use the + or – key to change the **Fan start/off temperature** value. Enter a decimal number between 1 and 128.

→ **Fan start PWM**

Use the + or – key to change the **Fan start PWM** value. Enter a decimal number between 1 and 128.

→ **Fan slope PWM**

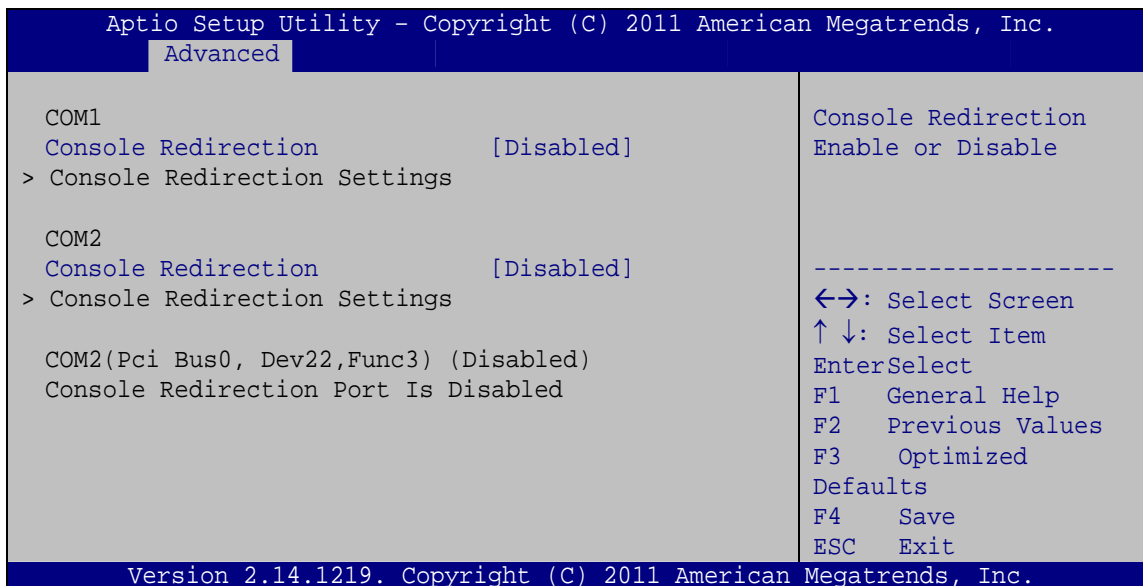
Use the + or – key to change the **Fan slope PWM** value. Enter a decimal number between 1 and 64.

→ **Temperature n**

Use the + or – key to change the fan **Temperature n** value. Enter a decimal number between 1 and 100.

5.3.12 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 16**) allows the console redirection options to be configured. Console redirection allows users to maintain a system remotely by re-directing keyboard input and text output through the serial port.



BIOS Menu 16: Serial Port Console Redirection

→ Console Redirection [Disabled]

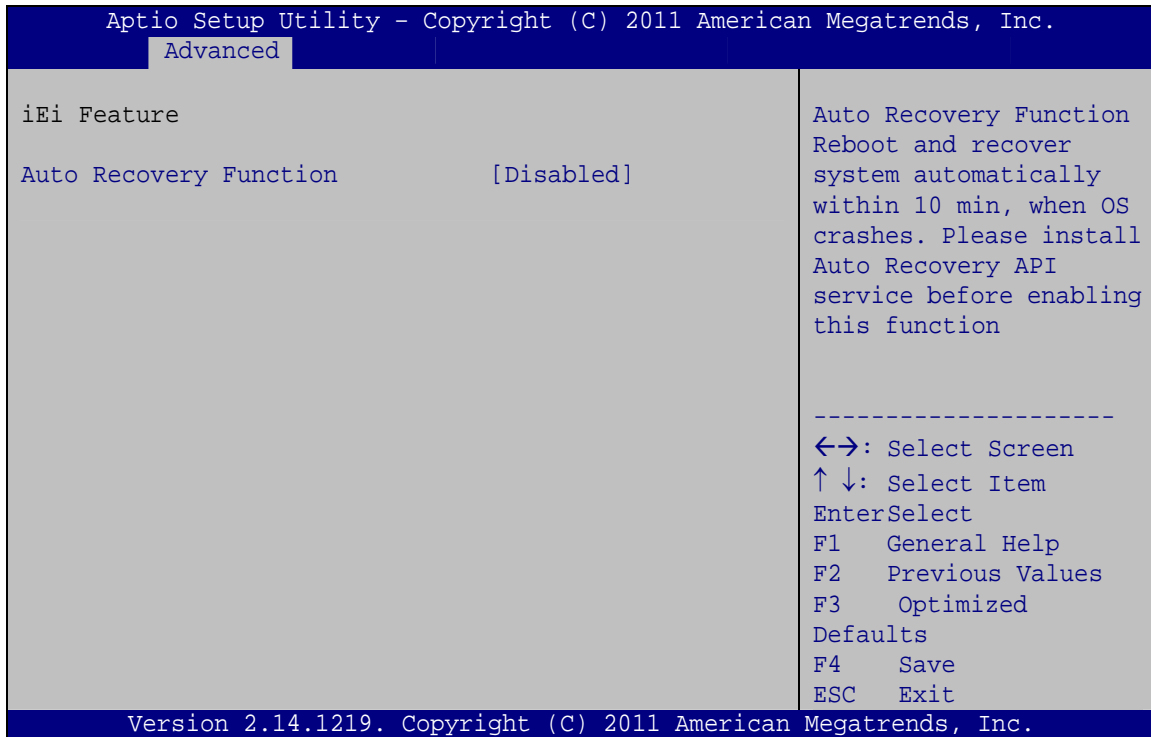
Use **Console Redirection** option to enable or disable the console redirection function.

- **Disabled** **DEFAULT** Disabled the console redirection function
- **Enabled** Enabled the console redirection function

5.3.13 IEI Feature

Use the **IEI Feature** menu (**BIOS Menu 17**) to configure One Key Recovery function.

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BIOS Menu 17: IEI Feature

➔ Auto Recovery Function [Disabled]

Use the **Auto Recovery Function** BIOS option to enable or disable the auto recovery function of the IEI One Key Recovery.

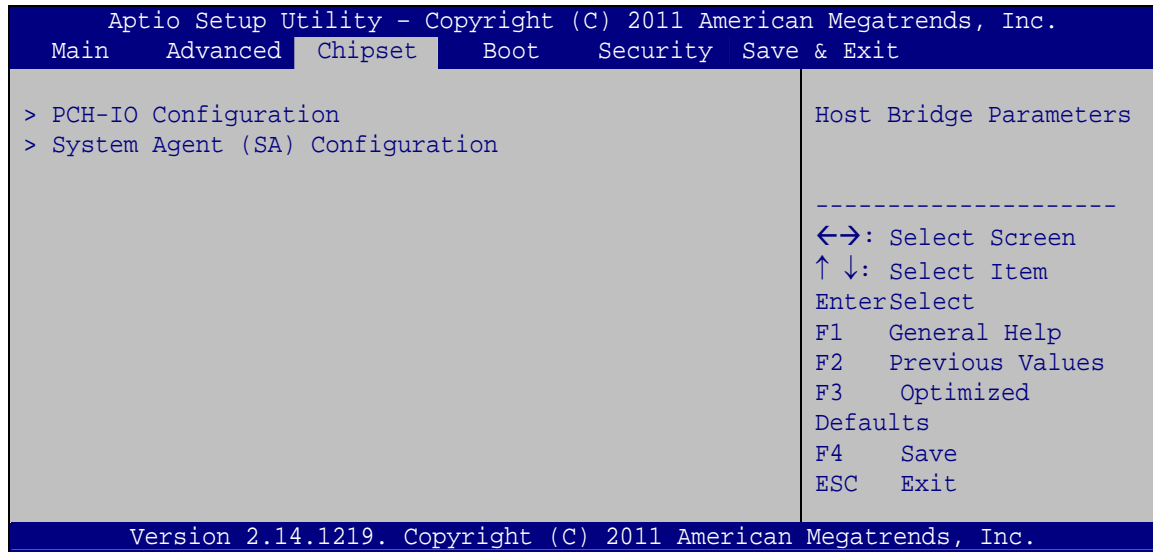
- ➔ **Disabled** **DEFAULT** Auto recovery function disabled
- ➔ **Enabled** Auto recovery function enabled

5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 18**) to access the Hostbridge and Southbridge configuration menus.

**WARNING!**

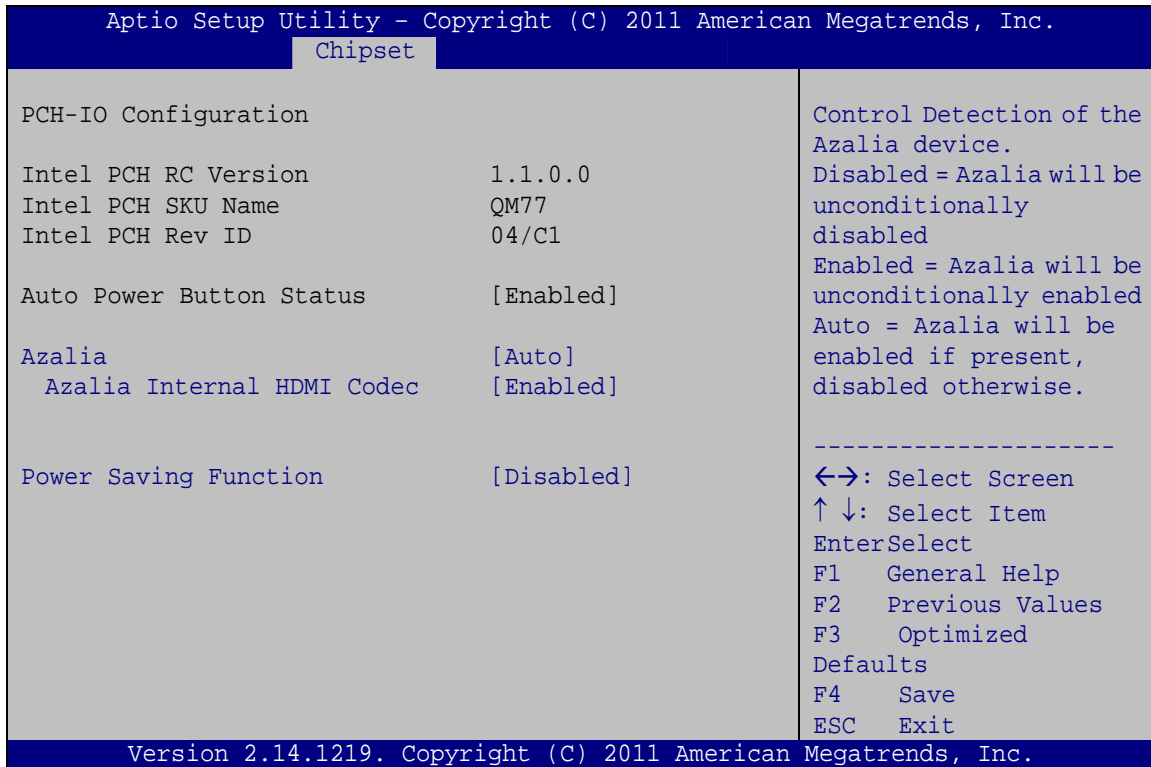
Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.

**BIOS Menu 18: Chipset**

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5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 19**) to configure the PCH chipset.



BIOS Menu 19: PCH-IO Configuration

→ Azalia [Auto]

Use the **Azalia** option to enable or disable the High Definition Audio controller.

- **Disabled** The onboard High Definition Audio controller is disabled
- **Enabled** The onboard High Definition Audio controller automatically detected and enabled
- **Auto** **DEFAULT** The onboard High Definition Audio controller automatically detected and enabled

→ Azalia internal HDMI codec [Enabled]

Use the **Azalia internal HDMI codec** option to enable or disable the internal HDMI codec for High Definition Audio.

- ➔ **Disabled** Disable internal HDMI codec for High Definition Audio
- ➔ **Enabled** **DEFAULT** Enable internal HDMI codec for High Definition Audio

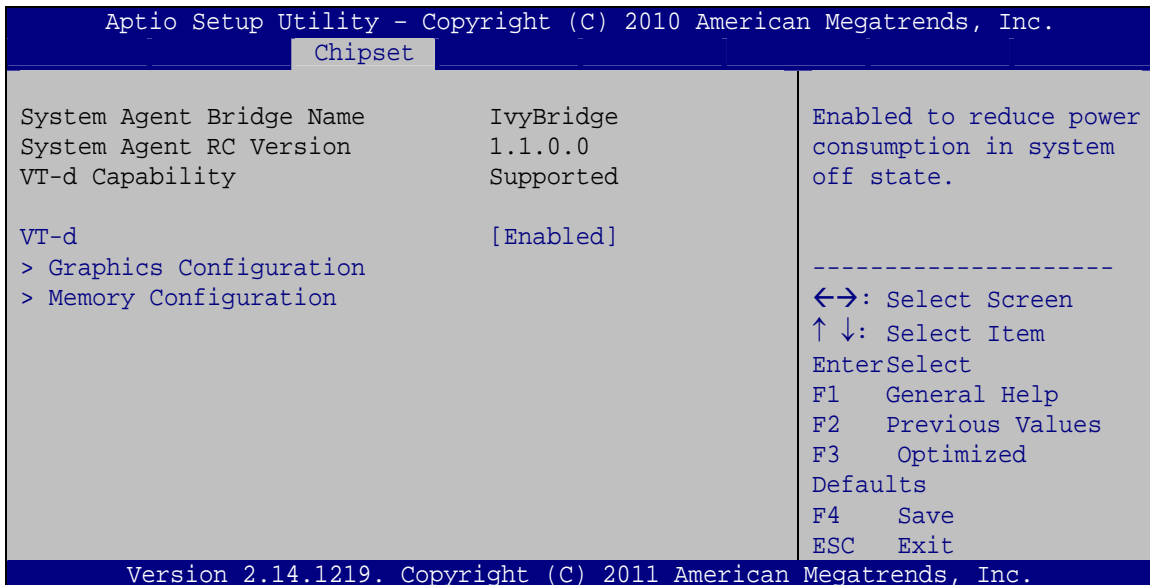
➔ **Power Saving Function [Disabled]**

Use the **Power Saving Function** BIOS option to enable or disable the power saving function.

- ➔ **Disabled** **DEFAULT** Power saving function is disabled.
- ➔ **Enabled** Power saving function is enabled. It will reduce power consumption when the system is off.

5.4.2 System Agent (SA) Configuration

Use the **System Agent (SA) Configuration** menu (**BIOS Menu 20**) to configure the Southbridge chipset.



BIOS Menu 20: System Agent (SA) Configuration

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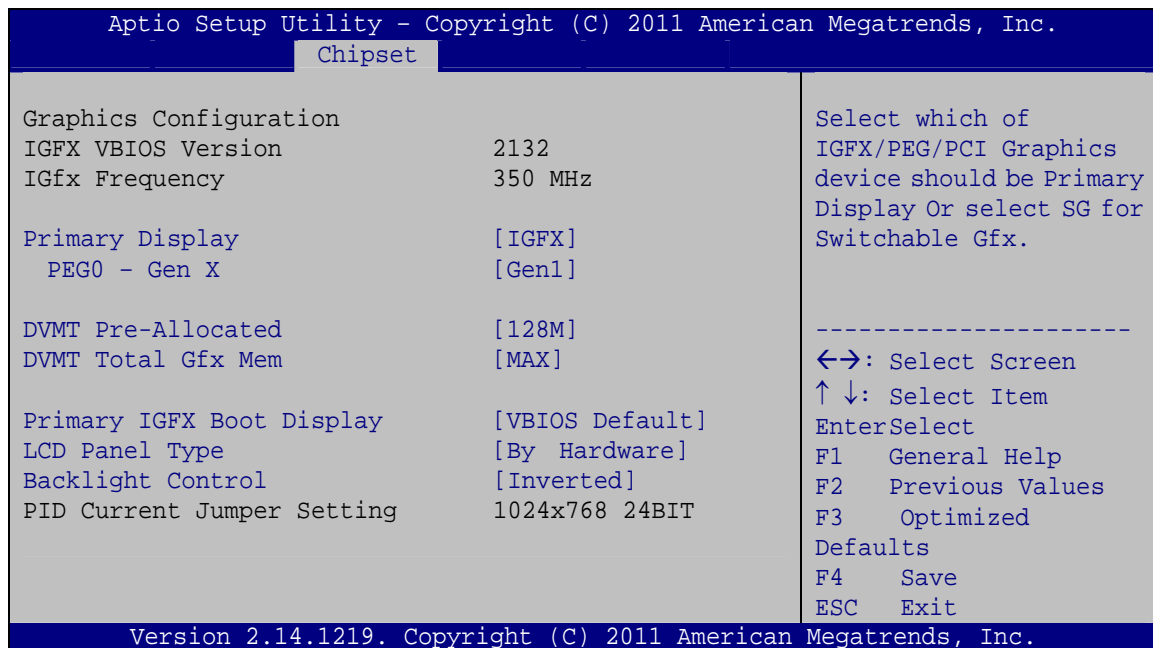
→ VT-d [Enabled]

Use the **VT-d** option to enable or disable VT-d support.

- **Disabled** Disables VT-d support.
- **Enabled** **DEFAULT** Enables VT-d support.

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** menu to configure the video device connected to the system.



BIOS Menu 21: Graphics Configuration

→ Primary Display [IGFX]

Use the **Primary Display** option to select the primary graphics controller the system uses.

The following options are available:

- IGFX **Default**
- PEG

→ PEG0 – Gen X [Gen1]

Use the **PEG0 – Gen X** option to configure PEG0 B0:D1:F0. The following options are available:

- Gen1 **Default**
- Gen2
- Gen3

→ DVMT Pre-Allocated [128MB]

Use the **DVMT Pre-Allocated** option to set the amount of system memory allocated to the integrated graphics processor when the system boots. The system memory allocated can then only be used as graphics memory, and is no longer available to applications or the operating system. Configuration options are listed below:

- 32M
- 64M
- 96M
- 128M **Default**
- 256M
- 512M
- 1024M

→ DVMT Total Gfx Mem [MAX]

Use the **DVMT Total Gfx Mem** option to select DVMT5.0 total graphic memory size used by the internal graphic device. The following options are available:

- 128M
- 256M
- MAX **Default**

→ Primary IGFX Boot Display [VBIOS Default]

Use the **Primary IGFX Boot Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- VBIOS Default **DEFAULT**

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- DVI
- LVDS
- HDMI 2
- HDMI 1

→ LCD Panel Type [By Hardware]

Use the **LCD Panel Type** option to select the type of flat panel connected to the system.
Configuration options are listed below.

- | | |
|-------------------|----------------|
| ▪ By Hardware | DEFAULT |
| ▪ 640x480 18BIT | |
| ▪ 800x600 18BIT | |
| ▪ 1024x768 18BIT | |
| ▪ 1024x768 24BIT | |
| ▪ 1280x800 24BIT | |
| ▪ 1280x1024 48BIT | |
| ▪ 1366x768 24BIT | |
| ▪ 1440x900 48BIT | |
| ▪ 1400x1050 48BIT | |
| ▪ 1600x900 48BIT | |
| ▪ 1600x1200 48BIT | |
| ▪ 1680x1050 48BIT | |
| ▪ 1920x1080 48BIT | |
| ▪ 1920x1200 48BIT | |
| ▪ 2048x1536 48BIT | |

→ Backlight Control [Inverted]

Use the **Backlight Control** option to select the backlight control mode.

- | | | |
|-------------------|----------------|---|
| → Inverted | DEFAULT | The LVDS backlight is brighter at high voltage level. |
| → Normal | | The LVDS backlight is brighter at low voltage level. |

5.4.2.2 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 22**) to view memory information.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Chipset		
Memory Information		
Memory RC Version	1.1.0.0	
Memory Frequency	1333 MHz	
Total Memory	4096 MB (DDR3)	
DIMM#0	4096 MB (DDR3)	
CAS Latency (tCL)	9	
Minimum delay time		-----
CAS to RAS (tRCDmin)	9	←→: Select Screen
Row Precharge (tRPmin)	9	↑ ↓: Select Item
Active to Precharge (tRASmin)	24	EnterSelect
XMP Profile 1	Not Supported	+/-: Change Opt.
XMP Profile 2	Not Supported	F1 General Help
		F2 Previous Values
		F3 Optimized Defaults
		F4 Save & Exit
		ESC Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.		

BIOS Menu 22: Memory Configuration

5.5 Boot

Use the **Boot** menu (**BIOS Menu 23**) to configure system boot options.

Aptio Setup Utility - Copyright (C) 2011 American Megatrends, Inc.		
Main	Advanced	Chipset
	Boot	Security
	Save & Exit	
Boot Configuration		
Bootup NumLock State	[On]	Select the keyboard NumLock state
Quiet Boot	[Enabled]	
Fast Boot	[Disabled]	-----
CSM16 Module Version	07.69	←→: Select Screen
Option ROM Messages	[Force BIOS]	↑ ↓: Select Item
Launch PXE OpROM	[Disabled]	EnterSelect
UEFI Boot	[Disabled]	F1 General Help
		F2 Previous Values
		F3 Optimized Defaults
Boot Option Priorities		F4 Save
		ESC Exit
Version 2.14.1219. Copyright (C) 2011 American Megatrends, Inc.		

BIOS Menu 23: Boot

KINO-QM770 Mini-ITX SBC**→ Bootup NumLock State [On]**

Use the **Bootup NumLock State** BIOS option to specify if the number lock setting must be modified during boot up.

- | | | |
|--------------|----------------|--|
| → On | DEFAULT | Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit. |
| → Off | | Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged. |

→ Quiet Boot [Enabled]

Use the **Quiet Boot** BIOS option to select the screen display when the system boots.

- | | | |
|-------------------|----------------|---|
| → Disabled | | Normal POST messages displayed |
| → Enabled | DEFAULT | OEM Logo displayed instead of POST messages |

→ Fast Boot [Disabled]

Use the **Fast Boot** option to enable or disable boot with initialization of a minimal set of devices required to launch active boot option. It has no effect for BBS boot options.

- | | | |
|-------------------|----------------|--------------------|
| → Disabled | DEFAULT | Disable fast boot. |
| → Enabled | | Enable fast boot |

→ Option ROM Messages [Force BIOS]

Use the **Option ROM Messages** option to set the Option ROM display mode.

- | | | |
|-----------------------|----------------|----------------------------------|
| → Force BIOS | DEFAULT | Sets display mode to force BIOS. |
| → Keep Current | | Sets display mode to current. |

→ Launch PXE OpROM [Disabled]

Use the **Launch PXE OpROM** option to enable or disable boot option for legacy network devices.

- | | | |
|-------------------|----------------|----------------------------|
| → Disabled | DEFAULT | Ignore all PXE Option ROMs |
| → Enabled | | Load PXE Option ROMs. |

→ UEFI Boot [Disabled]

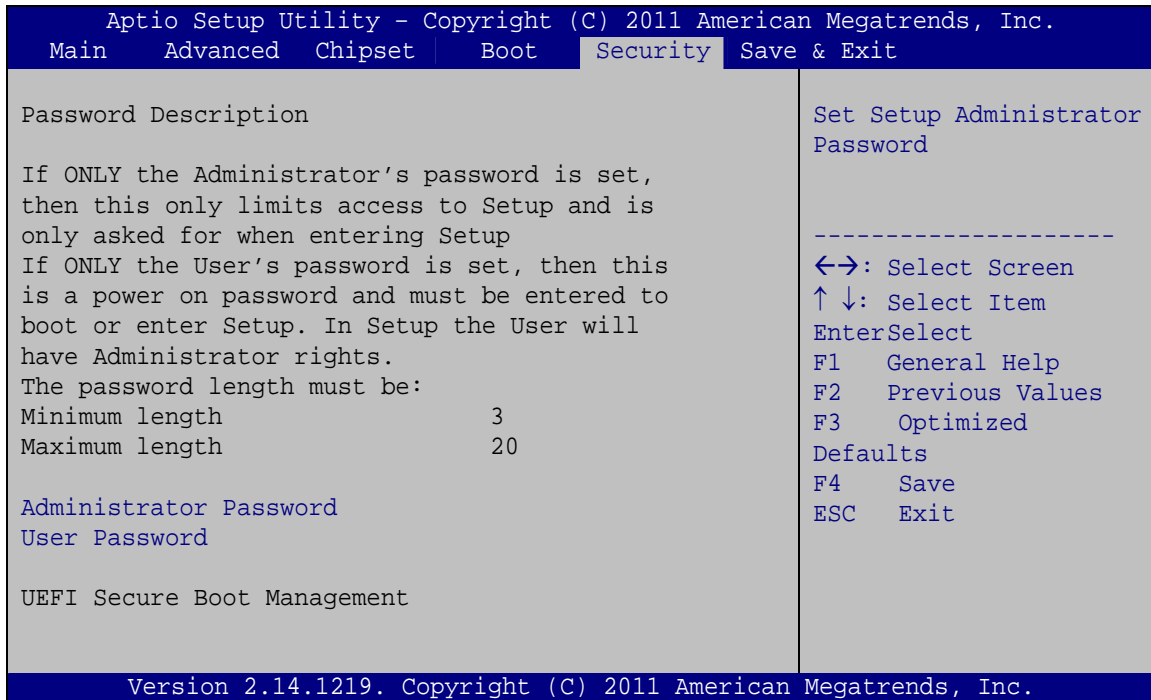
Use the **UEFI Boot** option to enable or disable to boot from the UEFI devices.

- | | | |
|-------------------|----------------|-------------------------------------|
| → Enabled | | Boot from UEFI devices is enabled. |
| → Disabled | DEFAULT | Boot from UEFI devices is disabled. |

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5.6 Security

Use the **Security** menu (**BIOS Menu 24**) to set system and user passwords.



BIOS Menu 24: Security

→ Administrator Password

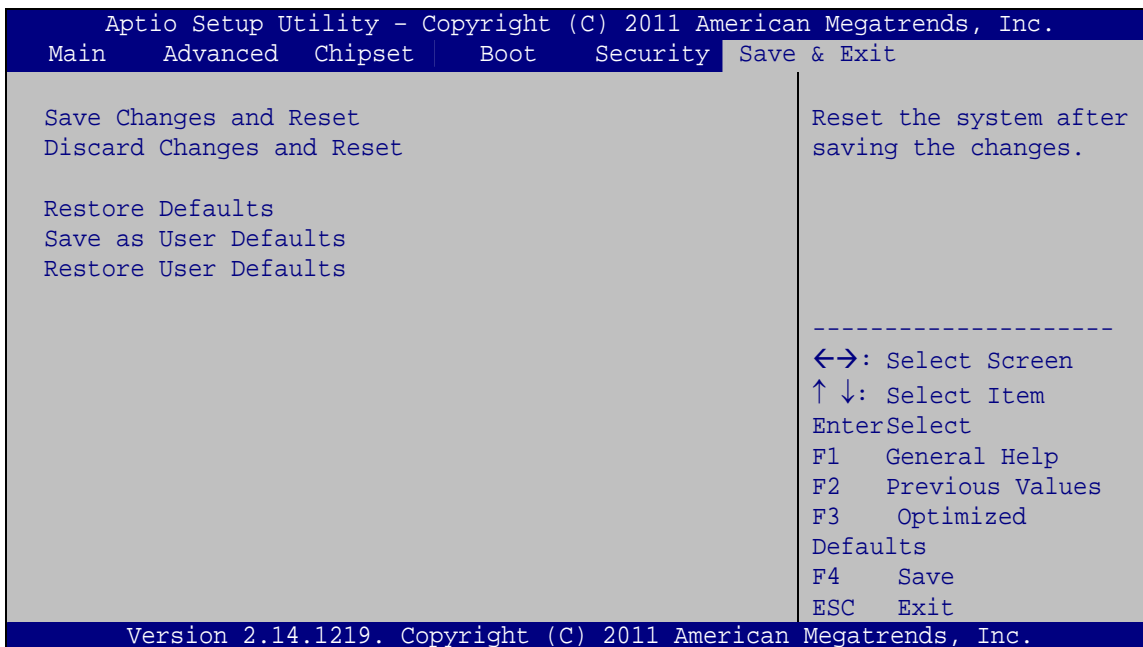
Use the **Administrator Password** to set or change a administrator password.

→ User Password

Use the **User Password** to set or change a user password.

5.7 Exit

Use the **Exit** menu (**BIOS Menu 25**) to load default BIOS values, optimal failsafe values and to save configuration changes.



BIOS Menu 25:Exit

➔ Save Changes and Reset

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ Discard Changes and Reset

Use the **Discard Changes and Reset** option to exit the system without saving the changes made to the BIOS configuration setup program.

➔ Restore Defaults

Use the **Restore Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F3 key can be used for this operation.**

➔ Save as User Defaults

Use the **Save as User Defaults** option to save the changes done so far as user defaults.

➔ Restore User Defaults

Use the **Restore User Defaults** option to restore the user defaults to all the setup options.

Chapter

6

Software Drivers

6.1 Available Software Drivers



NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit the IEI website or contact technical support for the latest updates.

The following drivers can be installed on the system:

- Chipset
- Graphics
- LAN
- Audio
- SATA (Intel® Rapid Storage Technology)
- USB 3.0
- Intel® AMT

Installation instructions are given below.

6.2 Software Installation

All the drivers for the KINO-QM770 are on the CD that came with the system. To install the drivers, please follow the steps below.

Step 1: Insert the CD into a CD drive connected to the system.



NOTE:

If the installation program doesn't start automatically:
Click "Start->My Computer->CD Drive->autorun.exe"

Step 2: The driver main menu appears (**Figure 6-1**).

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Figure 6-1: Introduction Screen

Step 3: Click KINO-QM770.

Step 4: A new screen with a list of available drivers appears (**Figure 6-2**).



Figure 6-2: Available Drivers

Step 5: Install all of the necessary drivers in this menu.

6.3 Chipset Driver Installation

To install the chipset driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click “Chipset”.

Step 3: Locate the setup file and double click on it.

Step 4: The **Welcome Screen** in **Figure 6-3** appears.

Step 5: Click **Next** to continue.



Figure 6-3: Chipset Driver Welcome Screen

Step 6: The license agreement in **Figure 6-4** appears.

Step 7: Read the **License Agreement**.

Step 8: Click **Yes** to continue.

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Figure 6-4: Chipset Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-5** appears.

Step 10: Click **Next** to continue.

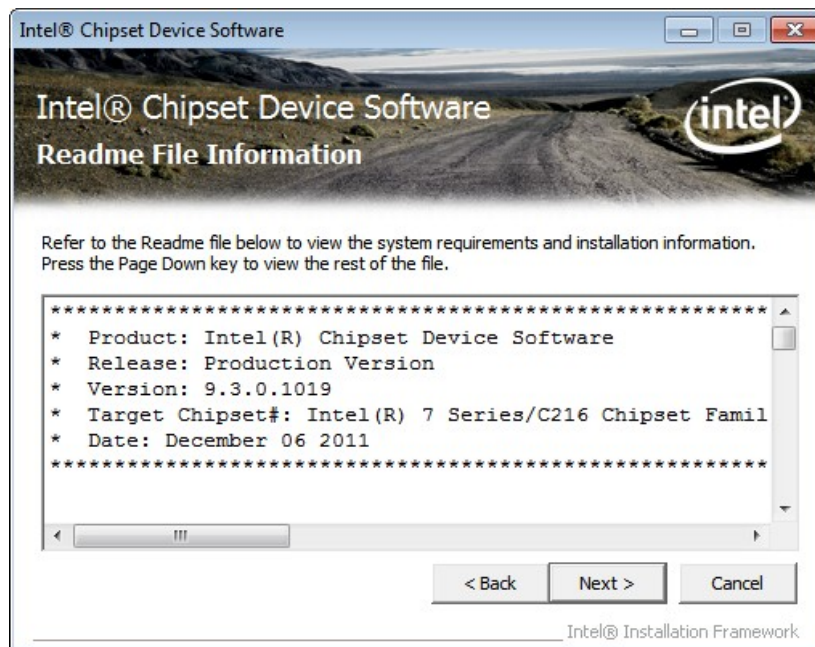


Figure 6-5: Chipset Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-6**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.

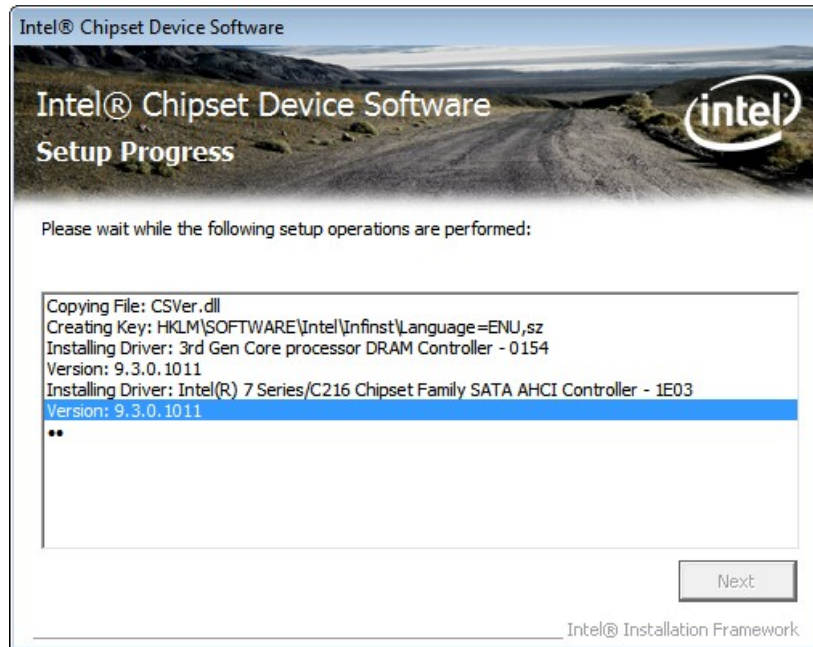


Figure 6-6: Chipset Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-7** appears.

Step 14: Select “**Yes, I want to restart this computer now**” and click **Finish**.

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Figure 6-7: Chipset Driver Installation Finish Screen

6.4 Graphics Driver Installation

To install the Graphics driver, please do the following.

- Step 1:** Access the driver list. (See **Section 6.2**)
- Step 2:** Click "**Graphics**" and select the folder which corresponds to the operating system.
- Step 3:** Double click the setup file.
- Step 4:** The **Welcome Screen** in **Figure 6-8** appears.
- Step 5:** Click **Next** to continue.

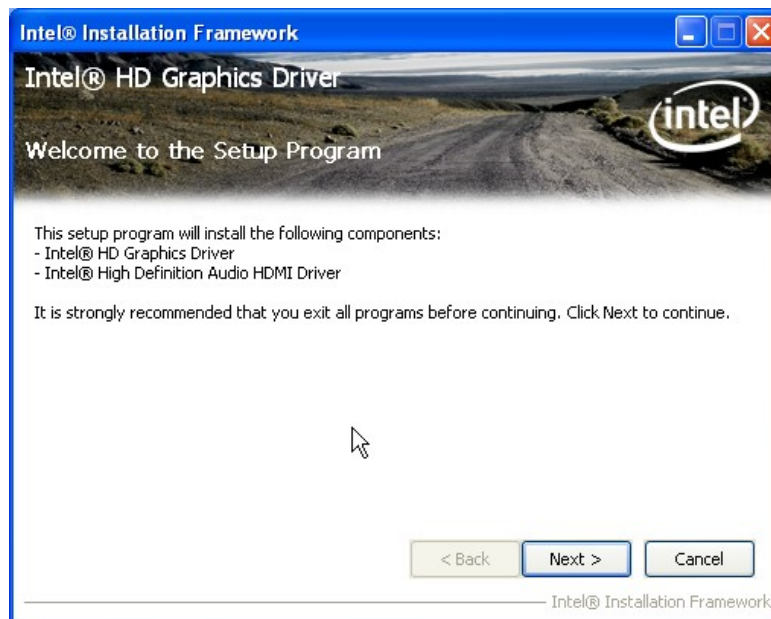


Figure 6-8: Graphics Driver Welcome Screen

Step 6: The License Agreement in Figure 6-9 appears.

Step 7: Click **Yes** to accept the agreement and continue.



Figure 6-9: Graphics Driver License Agreement

Step 8: Setup Operations are performed as shown in Figure 6-10.

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Step 9: Once the **Setup Operations** are complete, click **Next** to continue.

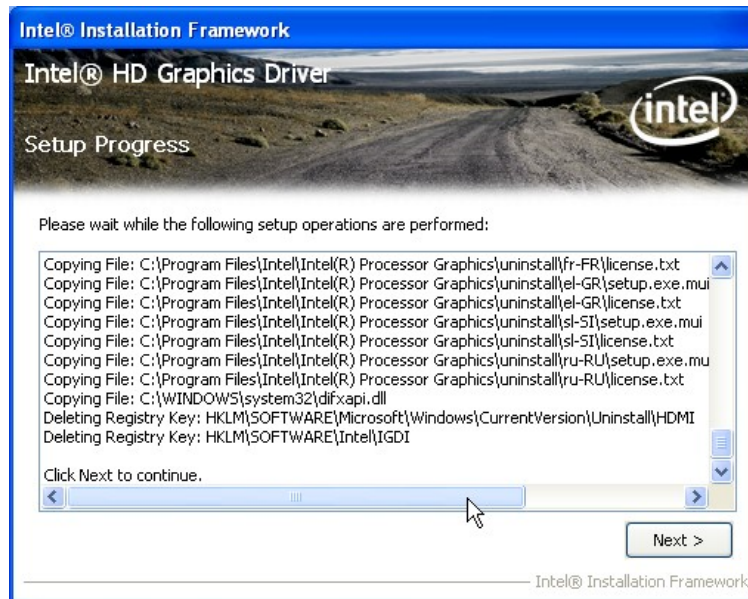


Figure 6-10: Graphics Driver Setup Operations

Step 10: The **Finish** screen in Figure 6-11 appears.

Step 11: Select “Yes, I want to restart this computer now” and click **Finish**.



Figure 6-11: Graphics Driver Installation Finish Screen

6.5 LAN Driver Installation

Step 1: Right-click the Computer button from the start menu and select **Properties**.

(Figure 6-12).

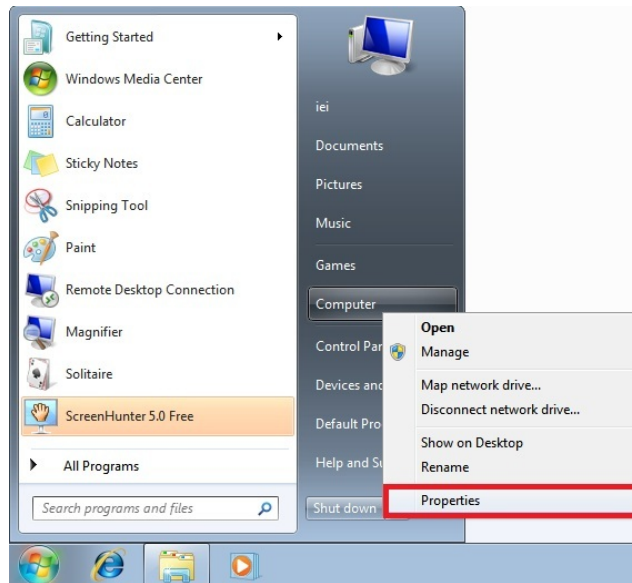


Figure 6-12: Windows Control Panel

Step 2: The system control panel window in **Figure 6-13** appears.

Step 3: Click the Device Manager link (**Figure 6-13**).

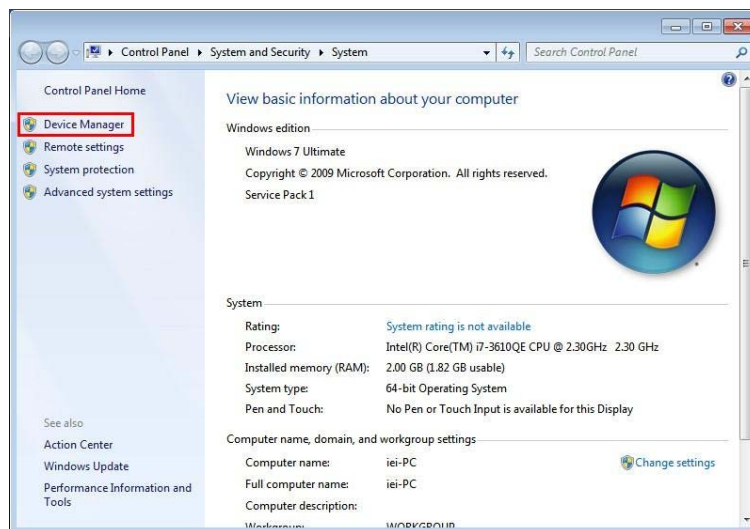


Figure 6-13: System Control Panel

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Step 4: A list of system hardware devices appears (**Figure 6-14**).

Step 5: Right-click the Ethernet Controller that has question marks next to it (this means Windows does not recognize the device).

Step 6: Select **Update Driver Software**.

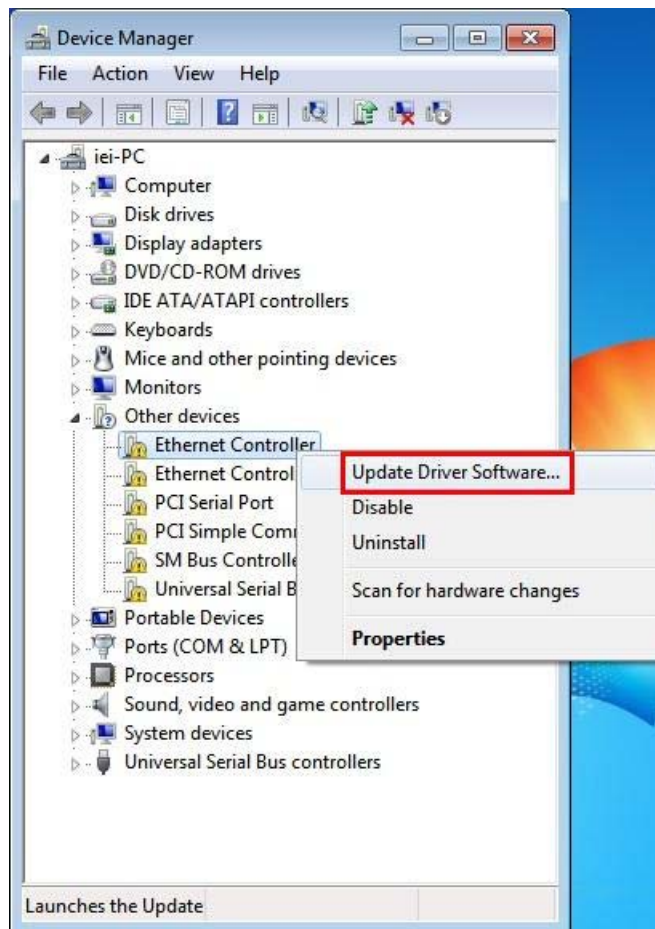


Figure 6-14: Device Manager List

Step 7: The Update Driver Software Window appears (**Figure 6-15**).

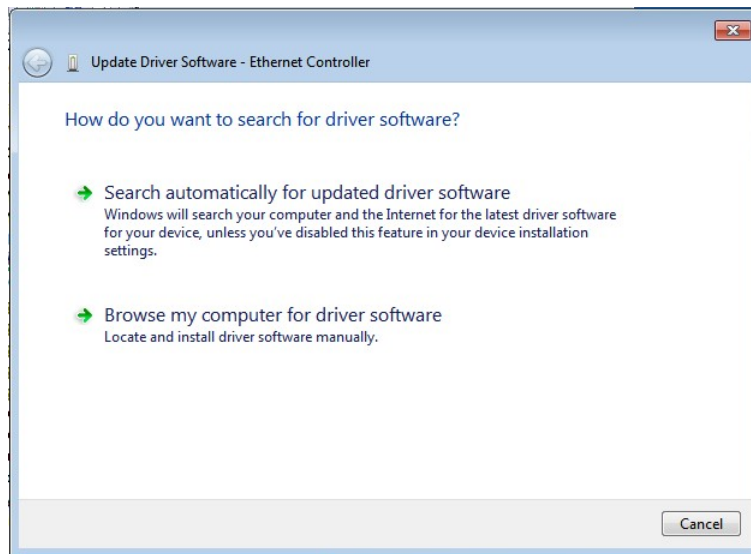


Figure 6-15: Update Driver Software Window

Step 8: Select “Browse my computer for driver software” and click **NEXT** to continue.

Step 9: Click Browse to select “X:\3-LAN” directory in the **Locate File** window, where “X:\” is the system CD drive. (Figure 6-16).

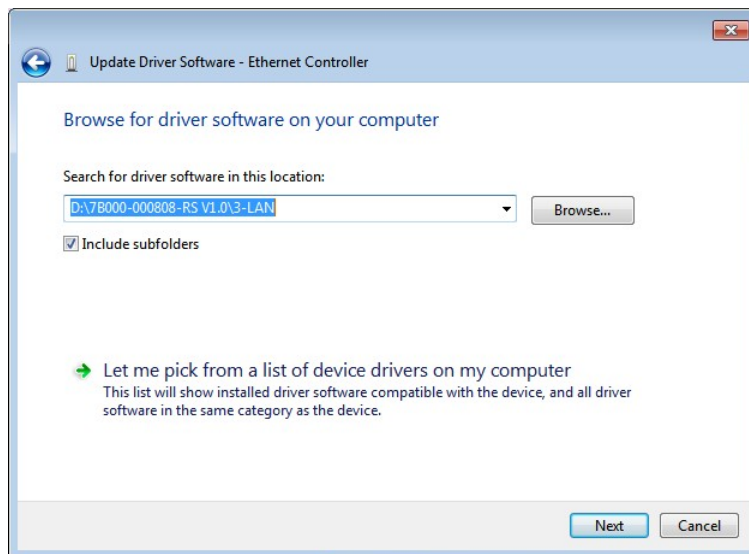


Figure 6-16: Locate Driver Files

Step 10: Click **NEXT** to continue.

Step 11: Driver Installation is performed as shown in Figure 6-17.

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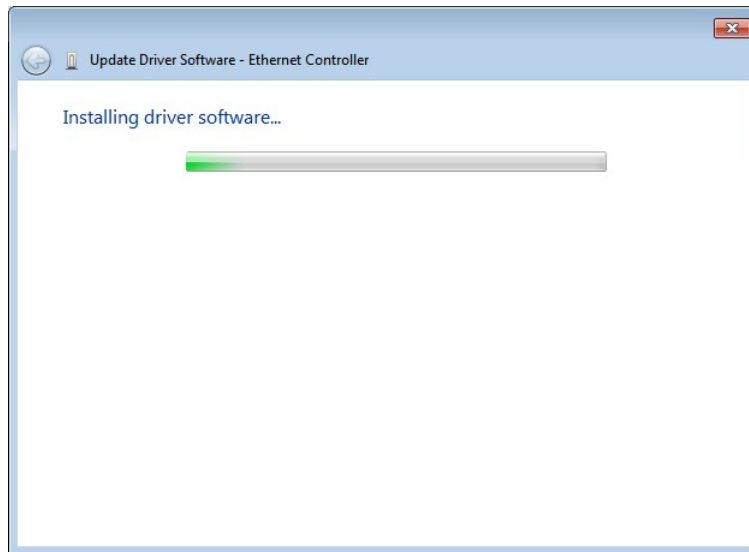


Figure 6-17: LAN Driver Installation

Step 12: The **Finish** screen in **Figure 6-18** appears. Click **Close** to exit.

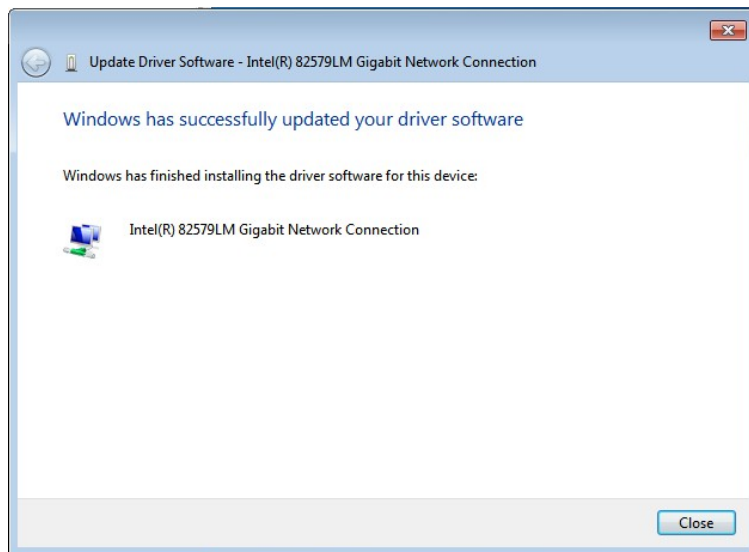


Figure 6-18: LAN Driver Installation Complete

6.6 Audio Driver Installation

To install the audio driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click “**Audio**” and select the folder which corresponds to the operating system.

Step 3: Double click the setup file.

Step 4: The **InstallShield Wizard** is prepared to guide the user through the rest of the process.

Step 5: Once initialized, the **InstallShield Wizard** welcome screen appears
(**Figure 6-19**).

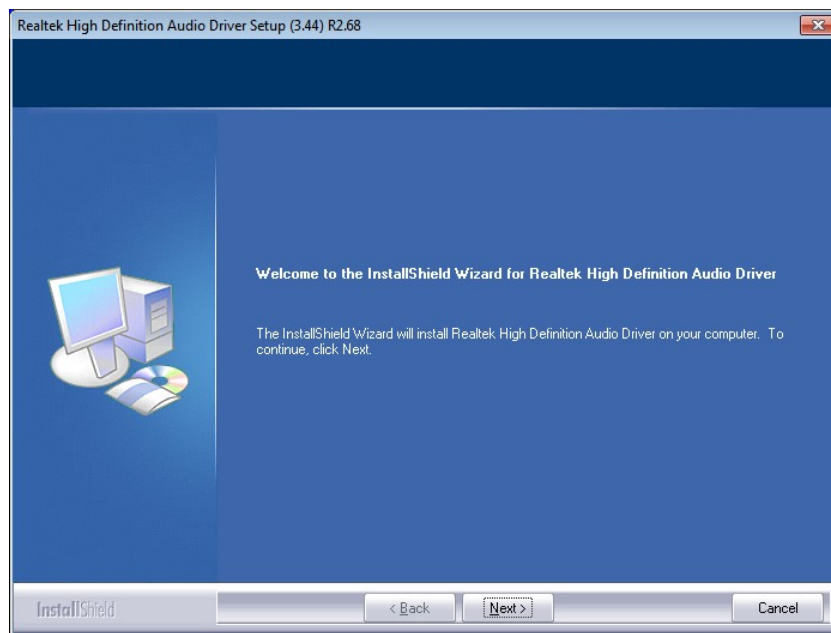


Figure 6-19: InstallShield Wizard Welcome Screen

Step 6: Click **NEXT** to continue the installation.

Step 7: InstallShield starts to install the new software as shown in **Figure 6-20**.

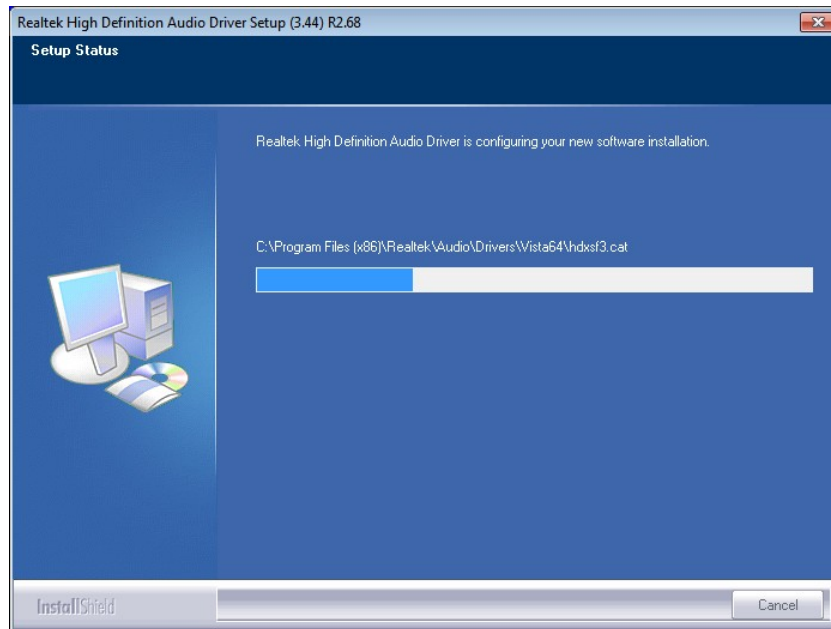
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Figure 6-20: Audio Driver Software Configuration

Step 8: After the driver installation process is complete, a confirmation screen appears (Figure 6-21).

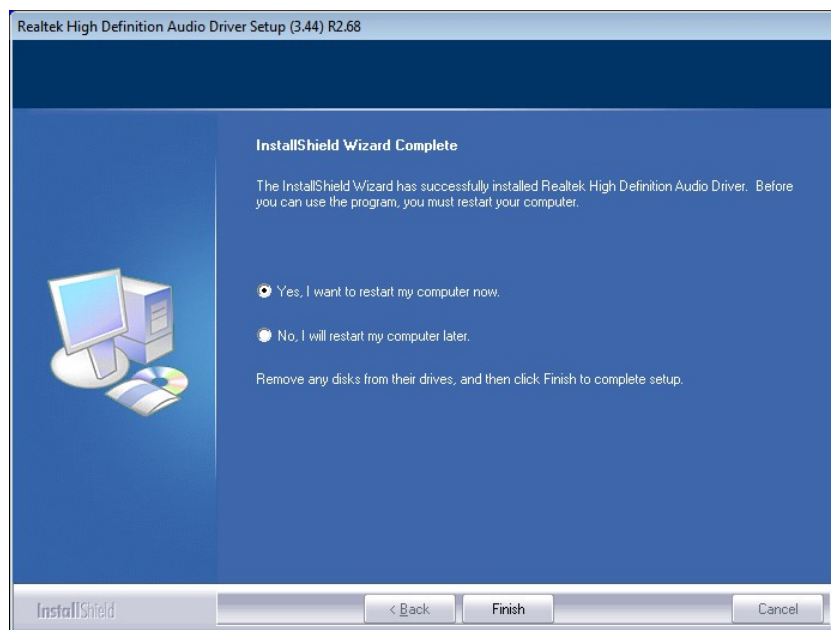


Figure 6-21: Restart the Computer

Step 9: The confirmation screen offers the option of restarting the computer now or later.

For the settings to take effect, the computer must be restarted. Click **FINISH** to restart the computer.

6.7 Intel® Rapid Storage Technology Driver Installation

To install the Intel® Rapid Storage Technology driver, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click “**SATA**”.

Step 3: Locate the setup file and double click on it.

Step 4: The **Welcome Screen** in **Figure 6-22** appears.

Step 5: Click **Next** to continue.

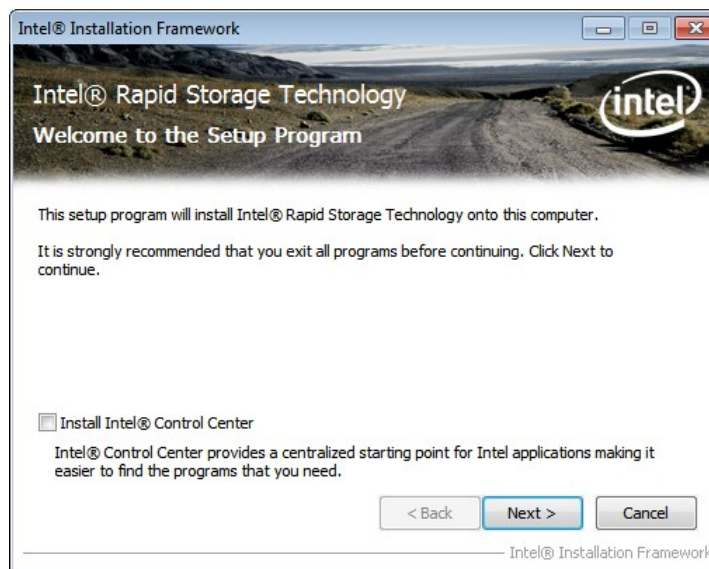


Figure 6-22: SATA RAID Driver Welcome Screen

Step 6: The license agreement in **Figure 6-23** appears.

Step 7: Read the **License Agreement**.

Step 8: Click **Yes** to continue.

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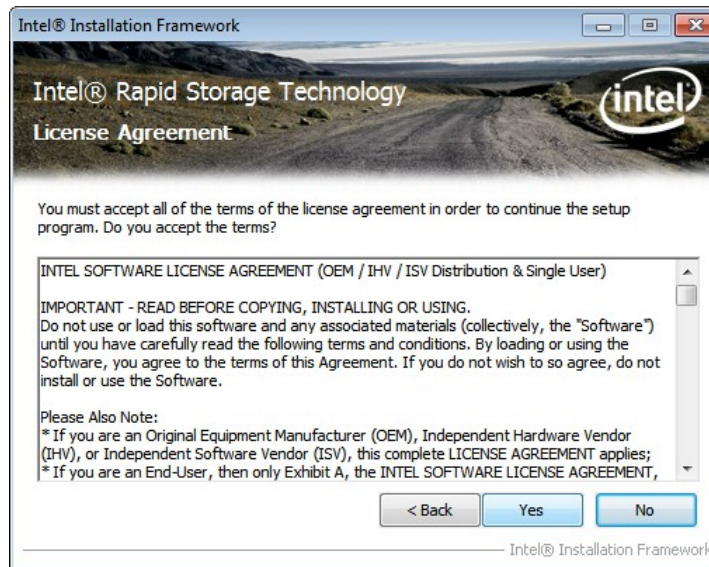


Figure 6-23: SATA RAID Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-24** appears.

Step 10: Click **Next** to continue.

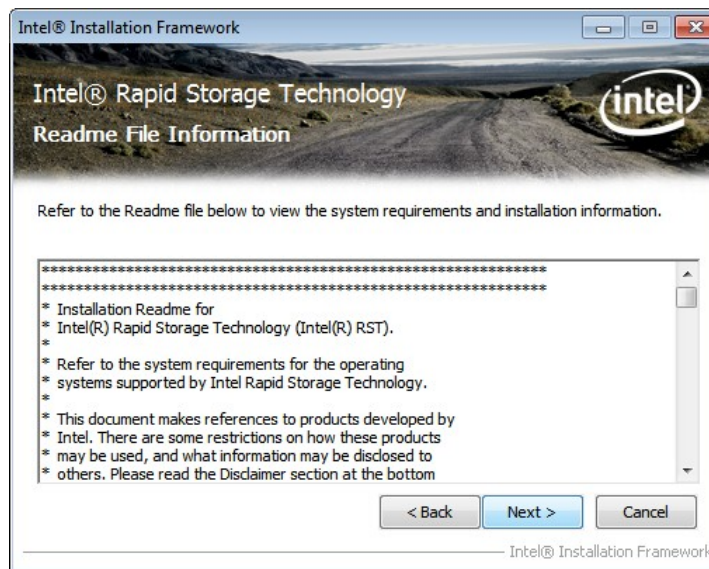


Figure 6-24: SATA RAID Driver Read Me File

Step 11: **Setup Operations** are performed as shown in **Figure 6-25**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.

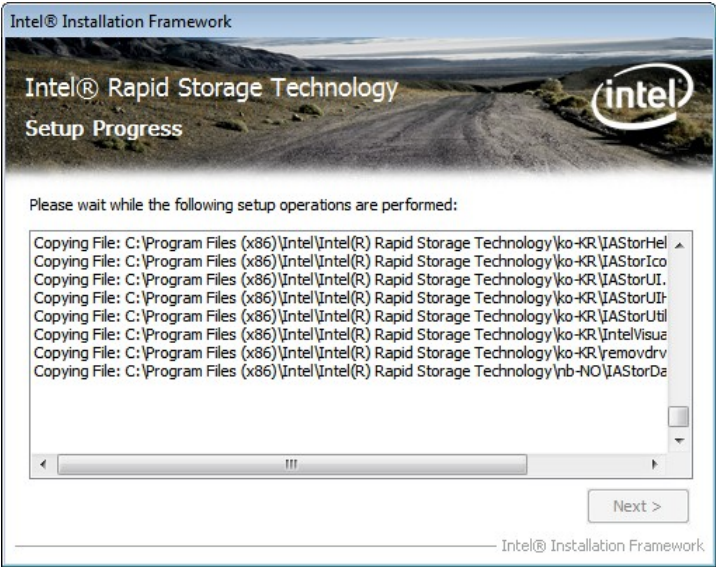


Figure 6-25: SATA RAID Driver Setup Operations

- Step 13:** The **Finish** screen in Figure 6-26 appears.
- Step 14:** Select “**Yes, I want to restart this computer now**” and click **Finish**.



Figure 6-26: SATA RAID Driver Installation Finish Screen

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6.8 USB 3.0 Driver Installation

**WARNING:**

Do not run this driver's installer (Setup.exe) from a USB storage device (ie. external USB hard drive or USB thumb drive). For proper installation, please copy driver files to a local hard drive folder and run from there.

To install the touch panel software driver, please follow the steps below.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click “**USB 3.0**”.

Step 3: Locate the setup file and double click on it.

Step 4: The **Welcome Screen** in **Figure 6-27** appears.

Step 5: Click **Next** to continue.



Figure 6-27: USB 3.0 Driver Welcome Screen

Step 6: The license agreement in **Figure 6-28** appears.

Step 7: Read the **License Agreement**.

Step 8: Click **Yes** to continue.



Figure 6-28: USB 3.0 Driver License Agreement

Step 9: The **Read Me** file in **Figure 6-29** appears.

Step 10: Click **Next** to continue.



Figure 6-29: USB 3.0 Driver Read Me File

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Step 11: **Setup Operations** are performed as shown in **Figure 6-30**.

Step 12: Once the **Setup Operations** are complete, click **Next** to continue.

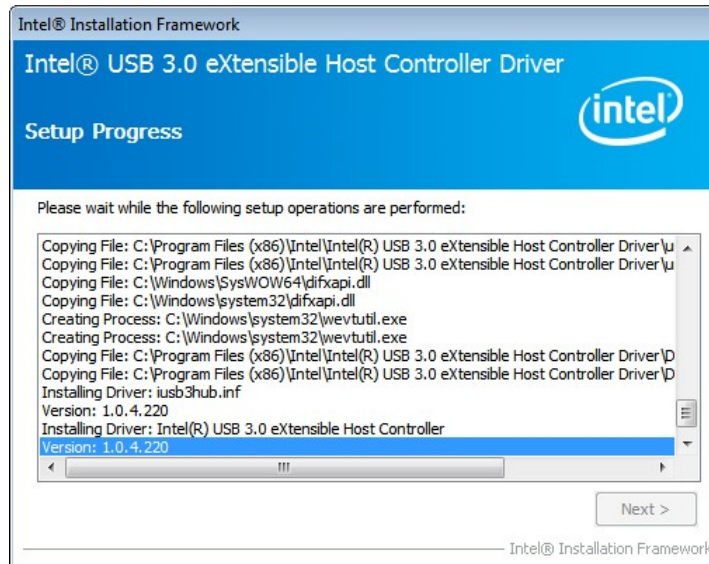


Figure 6-30: USB 3.0 Driver Setup Operations

Step 13: The **Finish** screen in **Figure 6-31** appears.

Step 14: Select “**Yes, I want to restart this computer now**” and click **Finish**.



Figure 6-31: USB 3.0 Driver Installation Finish Screen

6.9 Intel® AMT Driver Installation

The package of the Intel® AMT components includes

- Intel® Management Engine Interface (Intel® ME Interface)
- Intel® Dynamic Application Loader
- Intel® Identity Protection Technology (Intel® IPT)
- Serial Over LAN (SOL)
- Intel® Manageability Engine Firmware Recovery Agent
- Intel® Management and Security Status
- Local Management Service (LMS)
- User Notification Service (UNS)

To install these Intel® AMT components, please do the following.

Step 1: Access the driver list. (See **Section 6.2**)

Step 2: Click “**iAMT**”.

Step 3: Locate the setup file and double click it.

Step 4: When the setup files are completely extracted the **Welcome Screen** in **Figure 6-32** appears.

Step 5: Click **Next** to continue.

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Figure 6-32: Intel® ME Driver Welcome Screen

Step 6: The license agreement in **Figure 6-33** appears.

Step 7: Read the **License Agreement**.

Step 8: Click **Yes** to continue.

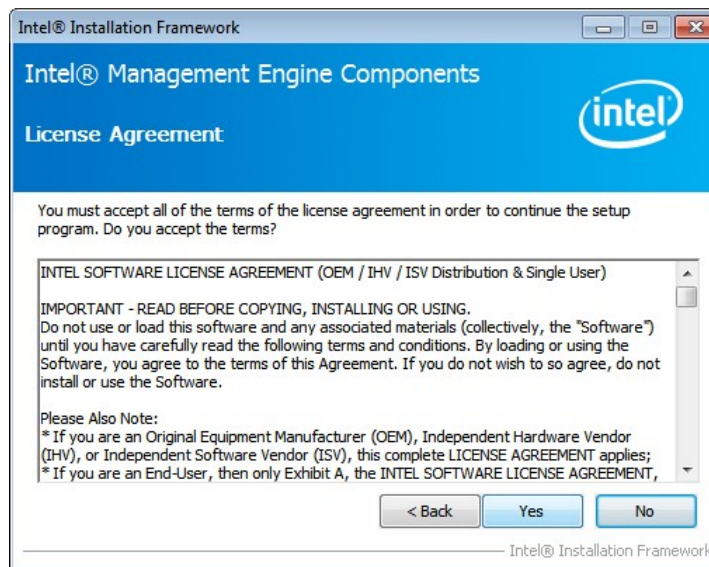


Figure 6-33: Intel® ME Driver License Agreement

Step 9: **Setup Operations** are performed as shown in **Figure 6-34**.

Step 10: Once the **Setup Operations** are complete, click **Next** to continue.

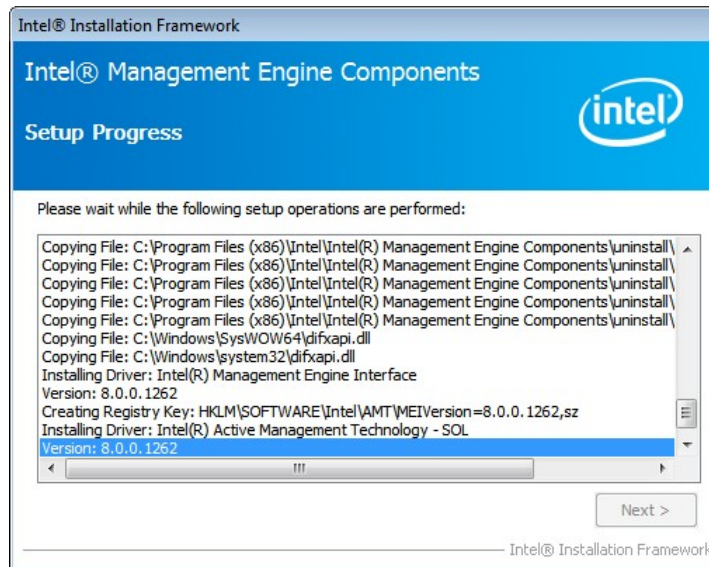


Figure 6-34: Intel® ME Driver Setup Operations

Step 11: The **Finish** screen in Figure 6-35 appears.

Step 12: Select “Yes, I want to restart this computer now” and click **Finish**.

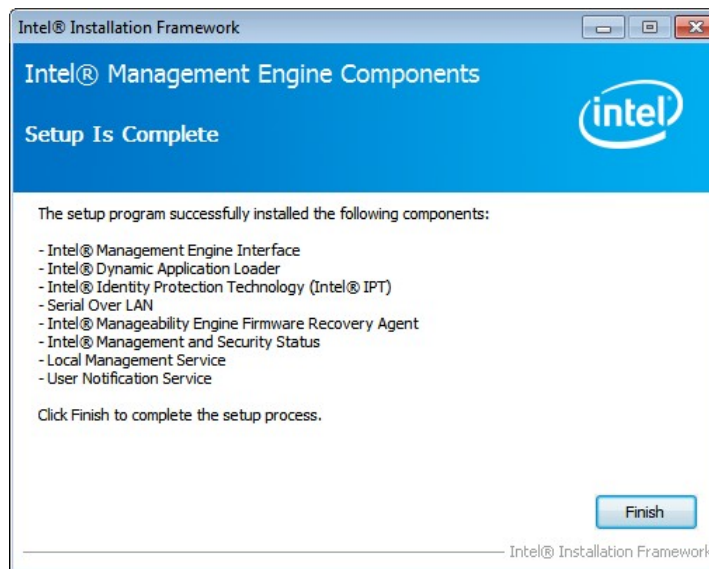


Figure 6-35: Intel® ME Driver Installation Finish Screen

Appendix

A

BIOS Options

Below is a list of BIOS configuration options in the BIOS chapter.

BIOS Information	82
System Date [xx/xx/xx]	82
System Time [xx:xx:xx]	83
ACPI Sleep State [S1 only (CPU Stop Clock)]	84
Wake System with Fixed Time [Disabled]	85
Security Device Support [Disable]	87
Hyper Threading [Enabled]	88
Intel Virtualization Technology [Disabled]	88
SATA Mode Selection [AHCI]	89
Hot Plug [Disabled]	89
Intel(R) Rapid Start Technology [Disabled]	90
Intel AMT [Enabled]	92
Un-Configure ME [Disabled]	92
USB Devices	93
Legacy USB Support [Enabled]	93
Serial Port [Enabled]	94
Change Settings [Auto]	94
Serial Port [Enabled]	95
Change Settings [Auto]	95
Serial Port [Enabled]	96
Change Settings [Auto]	96
PC Health Status	97
CPU Fan Smart Fan Control [Auto Mode]	98
SYS Fan Smart Fan Control [Auto Duty-Cycle Mode]	99
Fan start/off temperature	99
Fan start PWM	99
Fan slope PWM	99
Temperature n	99
Console Redirection [Disabled]	100
Auto Recovery Function [Disabled]	101
Azalia [Auto]	103
Azalia internal HDMI codec [Enabled]	103
Power Saving Function [Disabled]	104

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VT-d [Enabled].....	105
Primary Display [IGFX]	105
PEG0 – Gen X [Gen1].....	106
DVMT Pre-Allocated [128MB].....	106
DVMT Total Gfx Mem [MAX].....	106
Primary IGFX Boot Display [VBIOS Default]	106
LCD Panel Type [By Hardware]	107
Backlight Control [Inverted].....	107
Bootup NumLock State [On].....	109
Quiet Boot [Enabled]	109
Fast Boot [Disabled]	109
Option ROM Messages [Force BIOS].....	110
Launch PXE OpROM [Disabled]	110
UEFI Boot [Disabled]	110
Administrator Password	111
User Password	111
Save Changes and Reset	112
Discard Changes and Reset	112
Restore Defaults	112
Save as User Defaults	112
Restore User Defaults	112

Appendix

B

Terminology

KINO-QM770 Mini-ITX SBC

AC '97	Audio Codec 97 (AC'97) refers to a codec standard developed by Intel® in 1997.
ACPI	Advanced Configuration and Power Interface (ACPI) is an OS-directed configuration, power management, and thermal management interface.
AHCI	Advanced Host Controller Interface (AHCI) is a SATA Host controller register-level interface.
ATA	The Advanced Technology Attachment (ATA) interface connects storage devices including hard disks and CD-ROM drives to a computer.
ARMD	An ATAPI Removable Media Device (ARMD) is any ATAPI device that supports removable media, besides CD and DVD drives.
ASKIR	Amplitude Shift Keyed Infrared (ASKIR) is a form of modulation that represents a digital signal by varying the amplitude ("volume") of the signal. A low amplitude signal represents a binary 0, while a high amplitude signal represents a binary 1.
BIOS	The Basic Input/Output System (BIOS) is firmware that is first run when the computer is turned on and can be configured by the end user
CODEC	The Compressor-Decompressor (CODEC) encodes and decodes digital audio data on the system.
CompactFlash®	CompactFlash® is a solid-state storage device. CompactFlash® devices use flash memory in a standard size enclosure. Type II is thicker than Type I, but a Type II slot can support both types.
CMOS	Complimentary metal-oxide-conductor is an integrated circuit used in chips like static RAM and microprocessors.
COM	COM refers to serial ports. Serial ports offer serial communication to expansion devices. The serial port on a personal computer is usually a male DB-9 connector.
DAC	The Digital-to-Analog Converter (DAC) converts digital signals to analog signals.
DDR	Double Data Rate refers to a data bus transferring data on both the rising and falling edges of the clock signal.

DMA	Direct Memory Access (DMA) enables some peripheral devices to bypass the system processor and communicate directly with the system memory.
DIMM	Dual Inline Memory Modules are a type of RAM that offer a 64-bit data bus and have separate electrical contacts on each side of the module.
DIO	The digital inputs and digital outputs are general control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.
EHCI	The Enhanced Host Controller Interface (EHCI) specification is a register-level interface description for USB 2.0 Host Controllers.
EIDE	Enhanced IDE (EIDE) is a newer IDE interface standard that has data transfer rates between 4.0 MBps and 16.6 MBps.
EIST	Enhanced Intel® SpeedStep Technology (EIST) allows users to modify the power consumption levels and processor performance through application software. The application software changes the bus-to-core frequency ratio and the processor core voltage.
FSB	The Front Side Bus (FSB) is the bi-directional communication channel between the processor and the Northbridge chipset.
GbE	Gigabit Ethernet (GbE) is an Ethernet version that transfers data at 1.0 Gbps and complies with the IEEE 802.3-2005 standard.
GPIO	General purpose input
HDD	Hard disk drive (HDD) is a type of magnetic, non-volatile computer storage device that stores digitally encoded data.
ICH	The Input/Output Control Hub (ICH) is an Intel® Southbridge chipset.
IrDA	Infrared Data Association (IrDA) specify infrared data transmission protocols used to enable electronic devices to wirelessly communicate with each other.
L1 Cache	The Level 1 Cache (L1 Cache) is a small memory cache built into the system processor.
L2 Cache	The Level 2 Cache (L2 Cache) is an external processor memory cache.

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LCD	Liquid crystal display (LCD) is a flat, low-power display device that consists of two polarizing plates with a liquid crystal panel in between.
LVDS	Low-voltage differential signaling (LVDS) is a dual-wire, high-speed differential electrical signaling system commonly used to connect LCD displays to a computer.
POST	The Power-on Self Test (POST) is the pre-boot actions the system performs when the system is turned-on.
RAM	Random Access Memory (RAM) is volatile memory that loses data when power is lost. RAM has very fast data transfer rates compared to other storage like hard drives.
SATA	Serial ATA (SATA) is a serial communications bus designed for data transfers between storage devices and the computer chipsets. The SATA bus has transfer speeds up to 1.5 Gbps and the SATA II bus has data transfer speeds of up to 3.0 Gbps.
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology (S.M.A.R.T) refers to automatic status checking technology implemented on hard disk drives.
UART	Universal Asynchronous Receiver-transmitter (UART) is responsible for asynchronous communications on the system and manages the system's serial communication (COM) ports.
UHCI	The Universal Host Controller Interface (UHCI) specification is a register-level interface description for USB 1.1 Host Controllers.
USB	The Universal Serial Bus (USB) is an external bus standard for interfacing devices. USB 1.1 supports 12Mbps data transfer rates and USB 2.0 supports 480Mbps data transfer rates.
VGA	The Video Graphics Array (VGA) is a graphics display system developed by IBM.

Appendix

C

Digital I/O Interface

KINO-QM770 Mini-ITX SBC

C.1 Introduction

The DIO connector on the KINO-QM770 is interfaced to GPIO ports on the Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.



NOTE:

For further information, please refer to the datasheet for the Super I/O chipset.

The BIOS interrupt call **INT 15H** controls the digital I/O.

INT 15H:

AH – 6FH	
<u>Sub-function:</u>	
AL – 8	: Set the digital port as INPUT
AL	: Digital I/O input value



C.2 Assembly Language Sample 1

```
MOV    AX, 6F08H    ;setting the digital port as input
INT     15H          ;
```

AL low byte = value

AH – 6FH	
<u>Sub-function:</u>	
AL – 9	: Set the digital port as OUTPUT
BL	: Digital I/O input value

C.3 Assembly Language Sample 2

```
MOV    AX, 6F09H    ;setting the digital port as output
MOV    BL, 09H       ;digital value is 09H
INT     15H          ;
```

Digital Output is 1001b



Appendix

D

Hazardous Materials Disclosure

D.1 Hazardous Materials Disclosure Table for IPB Products Certified as RoHS Compliant Under 2002/95/EC Without Mercury

The details provided in this appendix are to ensure that the product is compliant with the Peoples Republic of China (China) RoHS standards. The table below acknowledges the presences of small quantities of certain materials in the product, and is applicable to China RoHS only.

A label will be placed on each product to indicate the estimated “Environmentally Friendly Use Period” (EFUP). This is an estimate of the number of years that these substances would “not leak out or undergo abrupt change.” This product may contain replaceable sub-assemblies/components which have a shorter EFUP such as batteries and lamps. These components will be separately marked.

Please refer to the table on the next page.

KINO-QM770 Mini-ITX SBC

Part Name	Toxic or Hazardous Substances and Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (CR(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
Housing	O	O	O	O	O	O
Display	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O
Battery	O	O	O	O	O	O

O: This toxic or hazardous substance is contained in all of the homogeneous materials for the part is below the limit requirement in SJ/T11363-2006

X: This toxic or hazardous substance is contained in at least one of the homogeneous materials for this part is above the limit requirement in SJ/T11363-2006

此附件旨在确保本产品符合中国 RoHS 标准。以下表格标示此产品中某有毒物质的含量符合中国 RoHS 标准规定的限量要求。

本产品上会附有“环境友好使用期限”的标签，此期限是估算这些物质“不会有泄漏或突变”的年限。本产品可能包含有较短的环境友好使用期限的可替换元件，像是电池或灯管，这些元件将会单独标示出来。

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (CR(VI))	多溴联苯 (PBB)	多溴二苯 醚 (PBDE)
壳体	O	O	O	O	O	O
显示	O	O	O	O	O	O
印刷电路板	O	O	O	O	O	O
金属螺帽	O	O	O	O	O	O
电缆组装	O	O	O	O	O	O
风扇组装	O	O	O	O	O	O
电力供应组装	O	O	O	O	O	O
电池	O	O	O	O	O	O
O: 表示该有毒有害物质在该部件所有物质材料中的含量均在 SJ/T11363-2006 标准规定的限量要求以下。						
X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T11363-2006 标准规定的限量要求。						