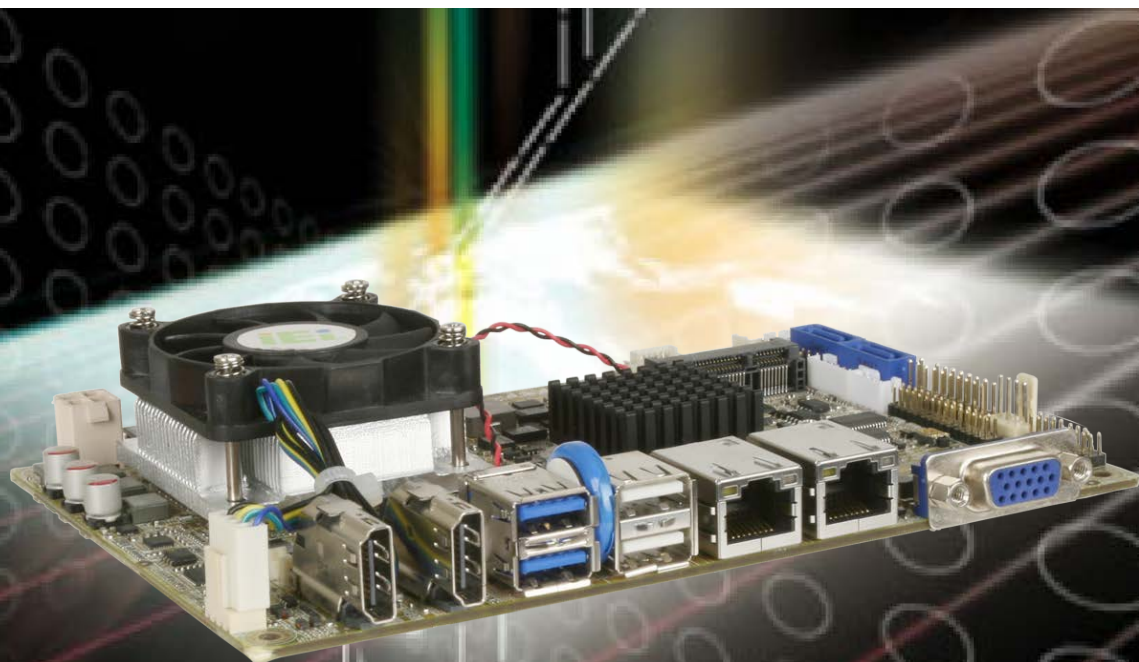




MODEL:
NANO-QM871-i1

EPIC SBC with 4th Gen Intel® Mobile Core™ i7/i5/i3 or Celeron® Processor, Dual HDMI, LVDS, VGA, Dual PCIe GbE, SATA 6Gb/s, USB 3.2 Gen 1, PCIe Mini, Intel® AMT 9.0, Audio and RoHS

User Manual



Revision

Date	Version	Changes
July 5, 2021	1.10	Updated Section 2.3: Packing List Updated Chapter 6: 6Software Drivers Changed audio IC to ALC888S
September 7, 2017	1.01	Modified Appendix D
July 10, 2014	1.00	Initial release



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Chapter

1

Introduction



1.1 Introduction

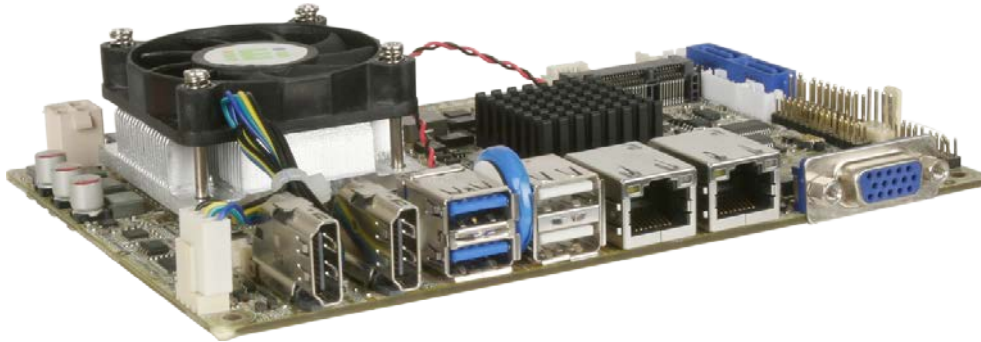


Figure 1-1: NANO-QM871-i1

The NANO-QM871-i1 is an EPIC SBC with a 4th generation Intel® mobile Core™ i7/i5/i3 or Celeron® processor and Intel® QM87 Express Chipset. Storage on the board is handled by two SATA 6Gb/s ports and one PCIe Mini socket for connecting a hard drive, optical drive or SSD.

The NANO-QM871-i1 features Intelligent Platform Management Interface (IPMI) that helps lower the overall costs of server management by enabling users to maximize IT resource, save time and manage multiple systems. The NANO-QM871-i1 supports IPMI 2.0 through the optional iRIS-1010 module.

The NANO-QM871-i1 has three types of graphics outputs that support triple independent display. A VGA output connects to a VGA monitor. One LVDS connector supports 18/24-bit dual-channel display. Two HDMI connectors support up to 1920x1200 resolution. Other connectors include RS-232 ports, RS-422/485 port, Gigabit Ethernet, USB 3.2 Gen 1 (5Gb/s) ports, USB 2.0 ports, TPM, SMBus and digital I/O.



NANO-QM871-i1 EPIC SBC

1.2 Model Variations

There are four models of the NANO-QM871-i1 series. The model variations are listed in **Table 1-1**.

Model	On-board Processor			
	Name	Speed	Cache	TDP
NANO-QM871-i1-i7	Intel® mobile Core™ i7-4700EQ	2.4 GHz	6 MB	47 W
NANO-QM871-i1-i5	Intel® mobile Core™ i5-4400E	2.7 GHz	3 MB	37 W
NANO-QM871-i1-i3	Intel® mobile Core™ i3-4100E	2.4 GHz	3 MB	37 W
NANO-QM871-i1-C	Intel® mobile Celeron® 2000E	1.5 GHz	2 MB	37 W

Table 1-1: Model Variations

1.3 Features

Some of the NANO-QM871-i1 motherboard features are listed below:

- EPIC form factor
- 4th generation Intel® mobile Core™ i7/i5/i3 or Celeron® processor
- One 204-pin 1600/1333 MHz DDR3/DDR3L SO-DIMM supported (system max. 8.0 GB)
- Dual PCIe GbE
- Intel® AMT 9.0 support
- Supports triple independent display with dual HDMI+VGA/dual HDMI+LVDS/HDMI+VGA+LVDS
- Supports IPMI 2.0 via the optional iRIS-1010 module
- One PCIe Mini card slot with mSATA support
- Complete I/O with six USB (two USB 3.2 Gen 1, four USB 2.0), two SATA 6Gb/s, three COM (two RS-232, one RS-422/485) and audio
- RoHS compliant

1.4 Connectors

The connectors on the NANO-QM871-i1 are shown in the figure below.

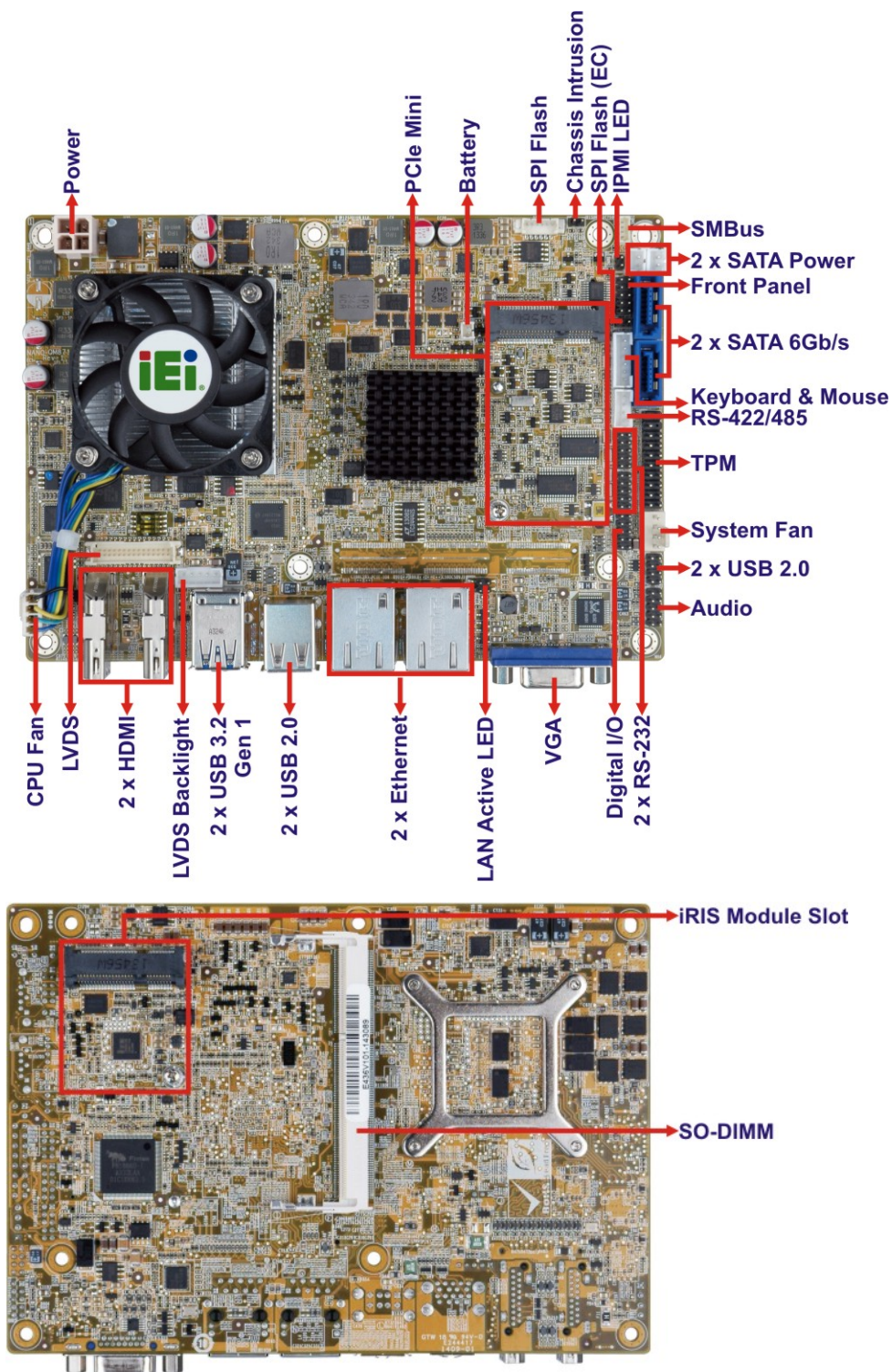


Figure 1-2: Connectors

NANO-QM871-i1 EPIC SBC

1.5 Dimensions

The main dimensions of the NANO-QM871-i1 are shown in the diagram below.

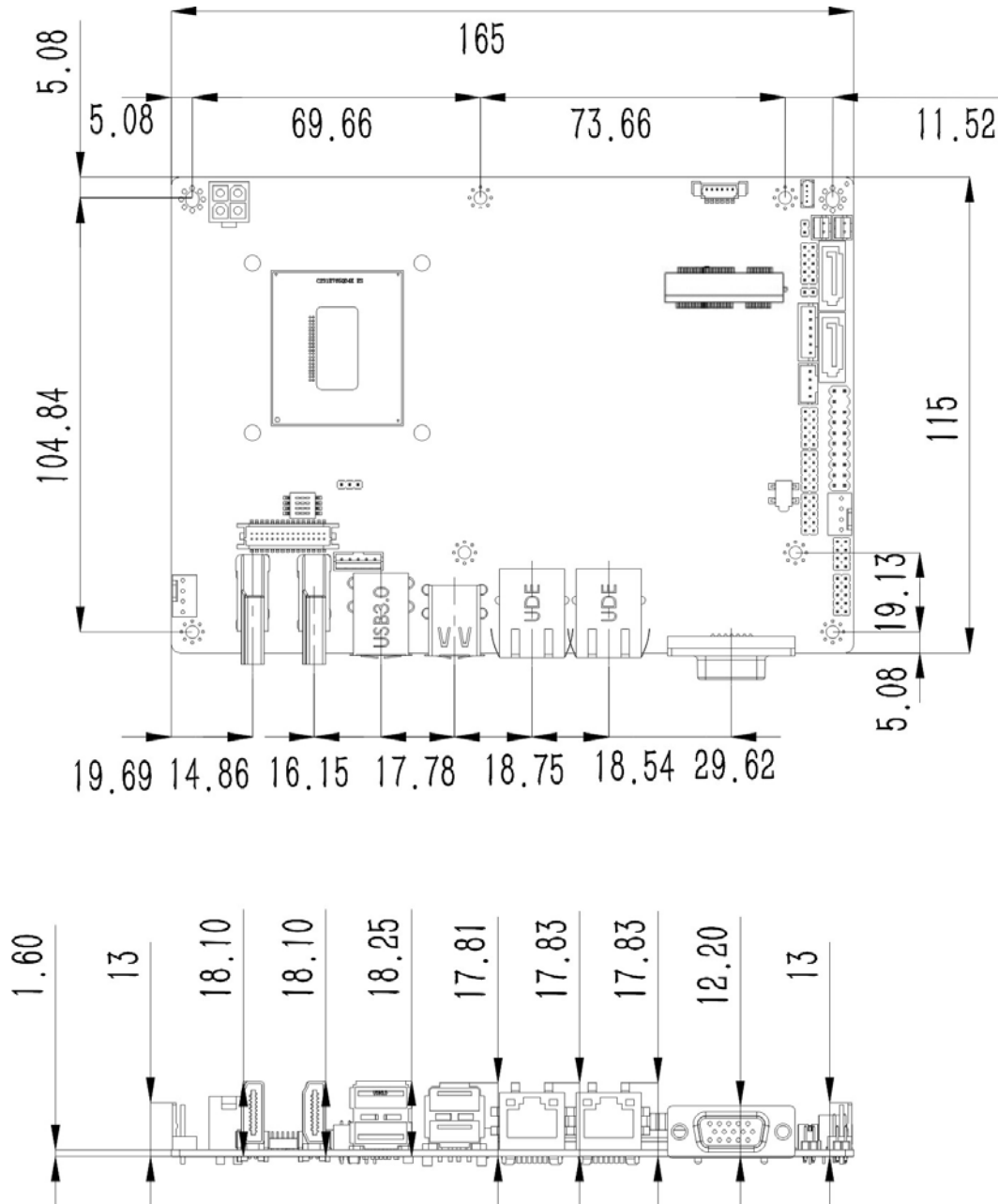


Figure 1-3: NANO-QM871-i1 Dimensions (mm)

1.6 Data Flow

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

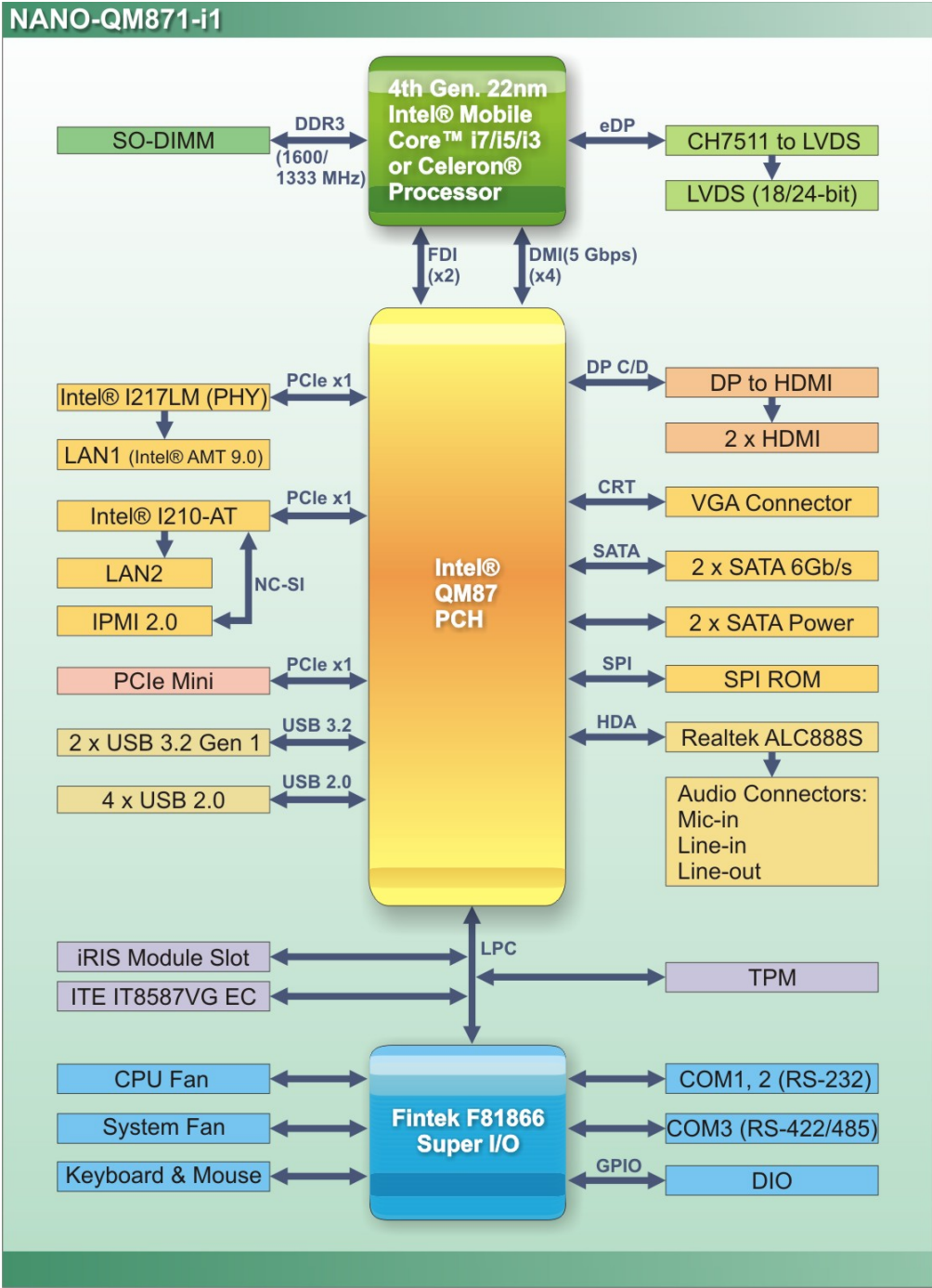


Figure 1-4: Data Flow Diagram

NANO-QM871-i1 EPIC SBC

1.7 Technical Specifications

The NANO-QM871-i1 technical specifications are listed in **Table 1-2**.

Specification	NANO-QM871-i1
Form Factor	EPIC
CPU	▪ Standard ○ Intel® mobile Core™ i7-4700EQ processor with Intel® AMT 9.0 support (2.4 GHz, quad-core, 6 MB cache, TDP=47 W) ○ Intel® mobile Core™ i5-4400E processor with Intel® AMT 9.0 support (2.7 GHz, dual-core, 3 MB cache, TDP=37 W) ○ Intel® mobile Core™ i3-4100E processor (2.4 GHz, dual-core, 3 MB cache, TDP=37 W) ○ Intel® mobile Celeron® 2000E processor (2.2 GHz, dual-core, 2 MB cache, 37 W TDP) ▪ By request ○ Intel® mobile Core™ i5-4402E processor with Intel® AMT 9.0 support (1.6 GHz, dual-core, 3 MB cache, TDP=25 W) ○ Intel® mobile Core™ i3-4102E processor (1.6 GHz, dual-core, 3 MB cache, TDP=25 W) ○ Intel® mobile Celeron® 2002E processor (1.5 GHz, dual-core, 2 MB cache, TDP=25 W)
PCH	Intel® QM87
Memory	One 204-pin 1600/1333 MHz DDR3/DDR3L SO-DIMM supported (system max. 8 GB)
Graphics Engine	Intel® HD Graphics Gen 7.5 supports DirectX 11.1, OpenGL 3.2 and OpenCL 1.2 Full MPEG2, VC1, AVC decode
Ethernet Controllers	LAN1: Intel® I217LM PHY with Intel® AMT 9.0 support LAN2: Intel® I210-AT PCIe Ethernet controller with NC-SI support
Audio	Realtek ALC888S HD Audio codec One internal audio connector (10-pin header)

Display Output	1 x VGA (up to 1920x1200@60Hz) 1 x 18/24-bit dual-channel LVDS by CH7511B DP to LVDS converter (up to 1920x1200@60Hz) 2 x HDMI (up to 2500x1600@60Hz) Supports triple independent display with dual HDMI+VGA/ dual HDMI+LVDS/HDMI+VGA+LVDS
Super I/O Controller	Fintek F81866
Embedded Controller	ITE IT8587VG
BIOS	UEFI BIOS
Watchdog Timer	Software programmable supports 1~255 sec. system reset
Expansion	1 x Full-size PCIe Mini card slot with mSATA support
IPMI 2.0	Supported by the optional iRIS-1010 module
IPMI LED	1 x 2-pin header for IPMI LED
Chassis Intrusion	1 x 2-pin header
Digital I/O	8-bit, 4-bit input/4-bit output
Fan Connectors	1 x 4-pin wafer for CPU fan 1 x 4-pin wafer for system fan
Front Panel	1 x 10-pin header (power LED, HDD LED, power button, reset button)
LAN Active LED	1 x 4-pin (2x2) header
Keyboard and Mouse	1 x 6-pin wafer connector for PS/2 keyboard and mouse
Serial Ports	2 x RS-232 COM connectors (10-pin header) 1 x RS-422/485 COM connector (4-pin wafer)
USB Ports	4 x USB 2.0 ports (two by 8-pin header, two on rear I/O) 2 x USB 3.2 Gen 1 (5Gb/s) ports (on rear I/O)
SATA	2 x SATA 6Gb/s ports with 5V power connectors (RAID 0/1 supported)
SMBus	1 x 4-pin wafer connector
TPM	1 x 20-pin header
Power Supply	12V only, AT/ATX support 1 x Internal 4-pin (2x2) power connector

NANO-QM871-i1 EPIC SBC

Power Consumption	12V@4.78A (2.4 GHz Intel® Core™ i7-4700EQ CPU with 4 GB 1333 MHz DDR3 memory)
Operating Temperature	-10°C ~ 60°C
Storage Temperature	-20°C ~ 60°C
Operating Humidity	5% ~ 95% (non-condensing)
Dimensions	115 mm x 165 mm
Weight GW/NW	850 g/350 g

Table 1-2: Technical Specifications

Chapter

2

Packing List

NANO-QM871-i1 EPIC SBC

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 NANO-QM871-i1 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.

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 NANO-QM871-i1 was purchased from or contact an IEI sales representative directly by sending an email to sales@ieiworld.com.

The NANO-QM871-i1 is shipped with the following components:

Quantity	Item and Part Number	Image
1	NANO-QM871-i1 SBC with CPU cooler	
2	SATA and power cable	
1	Audio cable	
1	Power cable	
2	RS-232 cable	

NANO-QM871-i1 EPIC SBC

Quantity	Item and Part Number	Image
1	Quick installation guide	

Table 2-1: Packing List

2.4 Optional Items

These optional items are available.

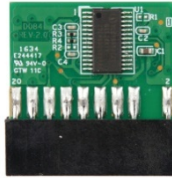
Item and Part Number	Image
iRIS-1010 module, IPMI 2.0 adapter card with AST1010 BMC chip (without KVM over IP function) for PCIe Mini socket interface (P/N: iRIS-1010-R10)	
Dual USB 2.0 cable (wo bracket) (P/N: 32001-008600-200-RS)	
RS-422/485 cable (200 mm) (P/N: 32205-003800-300-RS)	
KB/MS PS/2 Y-cable (P/N: 32006-001100-201-RS)	
Infineon TPM module (P/N: TPM-IN01-R20)	

Table 2-2: Optional Items

Chapter

3

Connector Pinouts

NANO-QM871-i1 EPIC SBC

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.

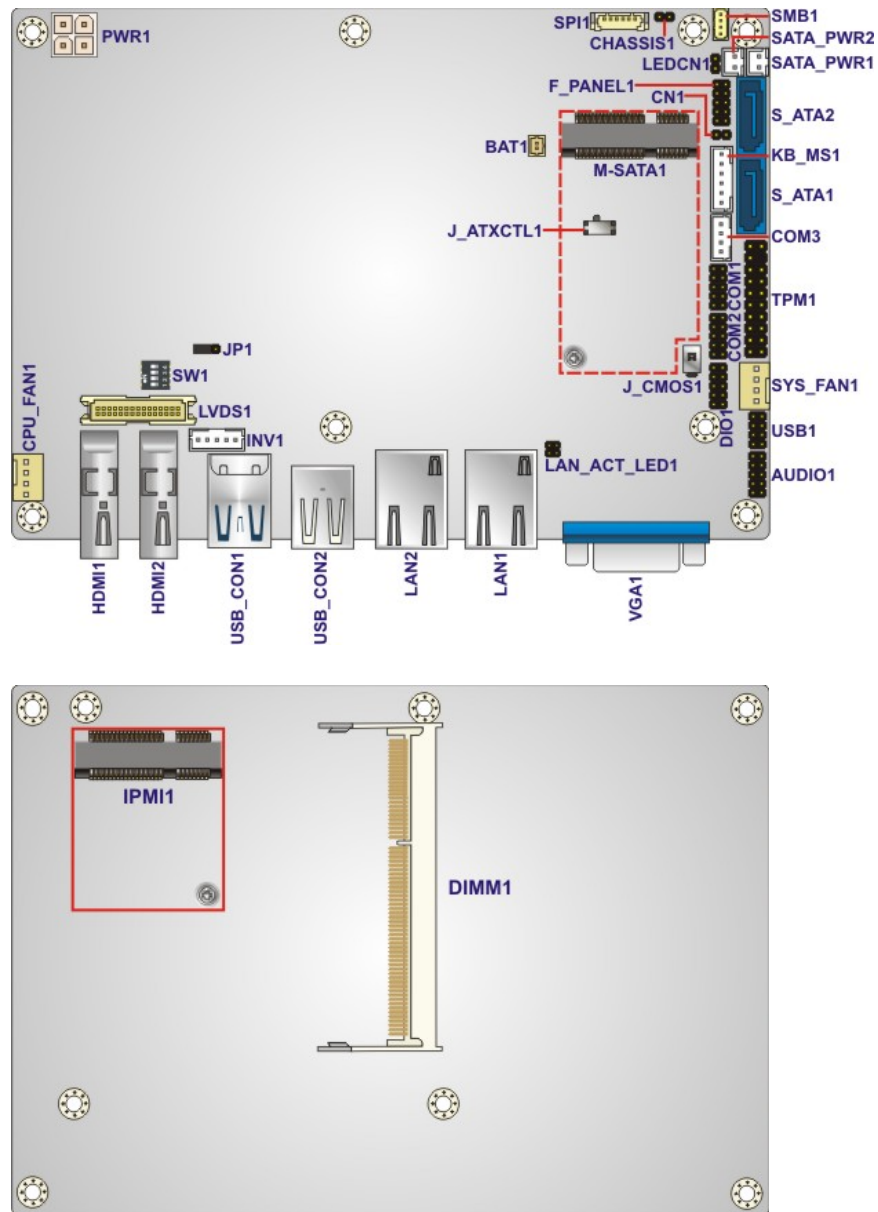


Figure 3-1: Connector and Jumper Locations



3.1.2 Peripheral Interface Connectors

The table below shows a list of the peripheral interface connectors on the NANO-QM871-i1. Detailed descriptions of these connectors can be found below.

Connector	Type	Label
Audio connector	10-pin header	AUDIO1
Battery connector	2-pin wafer	BAT1
Chassis intrusion	2-pin header	CHASSIS1
Digital I/O connector	10-pin header	DIO1
Fan connector (CPU)	4-pin wafer	CPU_FAN1
Fan connector (system)	4-pin wafer	SYS_FAN1
Front panel connector	10-pin header	F_PANEL1
IPMI active LED connector	2-pin header	LEDCN1
iRIS module slot	iRIS module slot	IPMI1
Keyboard and mouse connector	6-pin wafer	KB_MS1
LAN active LED connector	4-pin header	LAN_ACT_LED1
LVDS connector	30-pin crimp	LVDS1
LVDS backlight connector	5-pin wafer	INV1
PCIe Mini card slot	PCIe Mini card slot	M-SATA1
Power connector (12V)	4-pin connector	PWR1
RS-232 serial ports	10-pin header	COM1, COM2
RS-422/485 serial port	4-pin wafer	COM3
SATA 6Gb/s connectors	SATA connector	S_ATA1, S_ATA2
SATA power connectors	2-pin wafer	SATA_PWR1, SATA_PWR2
SMBus connector	4-pin wafer	SMB1
SO-DIMM connector	SO-DIMM connector	DIMM1
SPI Flash connector	6-pin wafer	SPI1



NANO-QM871-i1 EPIC SBC

Connector	Type	Label
SPI Flash connector (EC)	2-pin header	CN1
TPM connector	20-pin header	TPM1
USB 2.0 connector	8-pin header	USB1

Table 3-1: Peripheral Interface Connectors

3.1.3 External Interface Panel Connectors

The table below lists the rear panel connectors on the NANO-QM871-i1. Detailed descriptions of these connectors can be found in a later section.

Connector	Type	Label
Ethernet connectors	RJ-45	LAN1, LAN2
HDMI connectors	HDMI	HDMI1, HDMI2
USB 2.0 connector	USB Type-A	USB_CON2
USB 3.2 Gen 1 connector	USB Type-A	USB_CON1
VGA connector	DB-15	VGA1

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 NANO-QM871-i1.

3.2.1 Audio Connector

- CN Label:** AUDIO1
- CN Type:** 10-pin header, p=2.00 mm
- CN Location:** See **Figure 3-2**
- CN Pinouts:** See **Table 3-3**

The 10-pin audio connector is connected to external audio devices including speakers and microphones for the input and output of audio signals to and from the system.

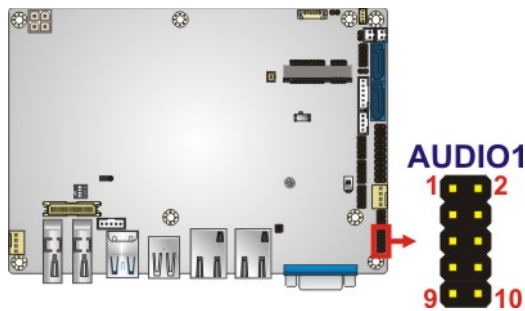


Figure 3-2: Audio Connector Location

Pin	Description	Pin	Description
1	SPK_OUT-R	2	LINE_IN-R
3	GND	4	GND
5	SPK_OUT-L	6	LINE_IN-L
7	GND	8	GND
9	MIC-R	10	MIC-L

Table 3-3: Audio Connector Pinouts

NANO-QM871-i1 EPIC SBC

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.

CN Label:	BAT1
CN Type:	2-pin wafer, p=1.25 mm
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. **NOTE: It is recommended to attach the RTC battery onto the system chassis in which the NANO-QM871-i1 is installed.**

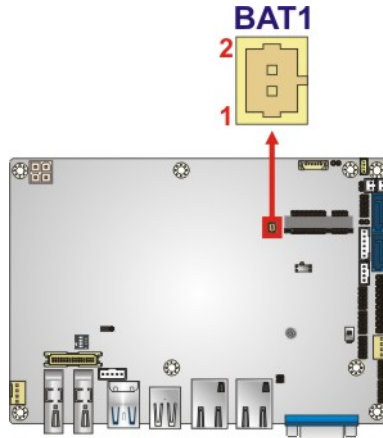


Figure 3-3: Battery Connector Location

Pin	Description
1	Battery +
2	Ground

Table 3-4: Battery Connector Pinouts

3.2.3 Chassis Intrusion Connector

- CN Label:CHASSIS1
- CN Type:2-pin header, p=2.00 mm
- CN Location:See Figure 3-4
- CN Pinouts:See Table 3-5

The chassis intrusion connector is for a chassis intrusion detection sensor or switch that detects if a chassis component is removed or replaced.

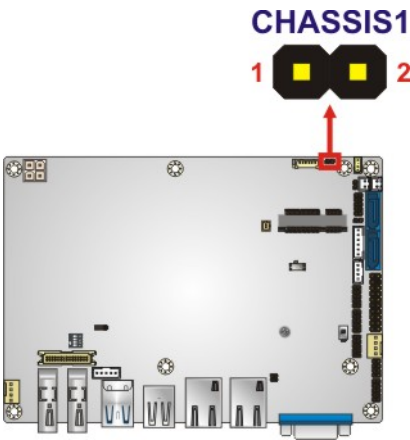


Figure 3-4: Chassis Intrusion Connector Location

Pin	Description
1	Pull High +3.3V
2	CHASSIS OPEN

Table 3-5: Chassis Intrusion Connector Pinouts

NANO-QM871-i1 EPIC SBC

3.2.4 Digital I/O Connector

CN Label:	DIO1
CN Type:	10-pin header, p=2.00 mm
CN Location:	See Figure 3-5
CN Pinouts:	See Table 3-6

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.

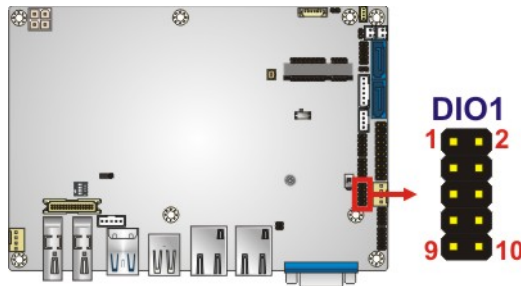


Figure 3-5: Digital I/O Connector Location

Pin	Description	Pin	Description
1	GND	2	+5V
3	DOUT3	4	DOUT2
5	DOUT1	6	DOUT0
7	DIN3	8	DIN2
9	DIN1	10	DIN0

Table 3-6: Digital I/O Connector Pinouts

3.2.5 Fan Connector (CPU)

- CN Label:** CPU_FAN1
- CN Type:** 4-pin wafer, p=2.54 mm
- CN Location:** See **Figure 3-6**
- CN Pinouts:** See **Table 3-7**

The fan connector attaches to a CPU cooling fan.

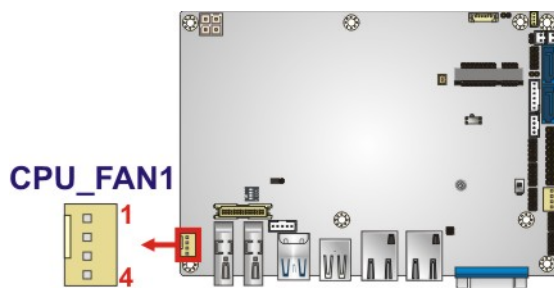


Figure 3-6: CPU Fan Connector Location

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

Table 3-7: CPU Fan Connector Pinouts

NANO-QM871-i1 EPIC SBC

3.2.6 Fan Connector (System)

- CN Label:** SYS_FAN1
- CN Type:** 4-pin wafer, p=2.54 mm
- CN Location:** See **Figure 3-7**
- CN Pinouts:** See **Table 3-8**

The fan connector attaches to a system cooling fan.

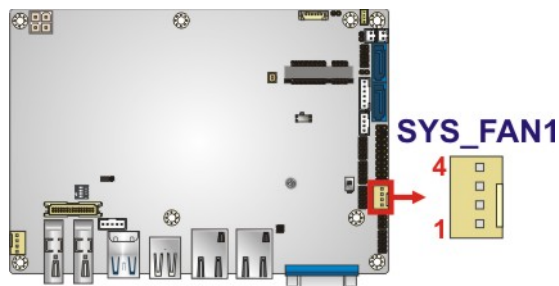


Figure 3-7: System Fan Connector Location

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

Table 3-8: System Fan Connector Pinouts

3.2.7 Front Panel Connector

- CN Label: F_PANEL1
- CN Type: 10-pin header, p=2.00 mm
- 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.

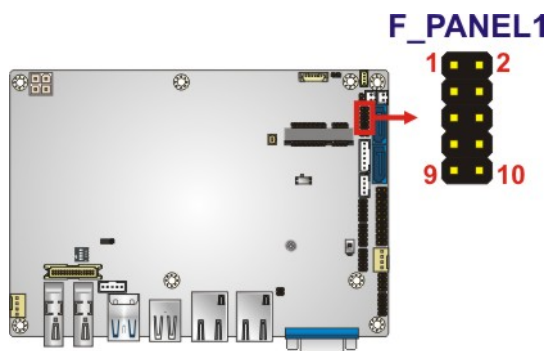


Figure 3-8: Front Panel Connector Location

Pin	Description	Pin	Description
1	PWR_LED+	2	PWRBTN_SW#
3	PWR_LED-	4	GND
5	NC	6	NC
7	HDD_LED+	8	EXTRST-
9	HDD_LED-	10	GND

Table 3-9: Front Panel Connector Pinouts

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3.2.8 IPMI Active LED Connector

CN Label:	LEDCN1
CN Type:	2-pin header, p=2.00 mm
CN Location:	See Figure 3-9
CN Pinouts:	See Table 3-10

The connector is for IPMI active LED connection.

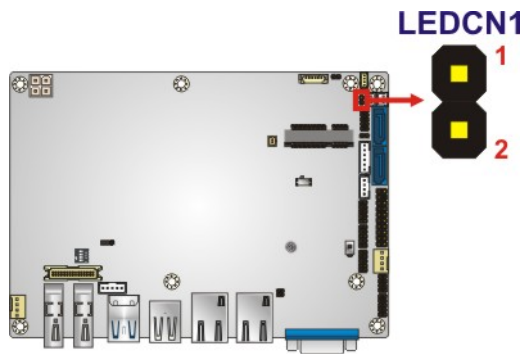


Figure 3-9: IPMI Active LED Connector

Pin	Description
1	IPMI_LED+
2	IPMI_LED-

Table 3-10: IPMI Active LED Connector Pinouts

3.2.9 iRIS Module Slot

CN Label: IPMI1
CN Type: iRIS module slot
CN Location: See **Figure 3-10**

The iRIS module slot allows installation of the iRIS-1010 module.



WARNING:

The iRIS module slot is designed to install the iRIS-1010 module only. DO NOT install other modules into the iRIS module slot. Doing so may cause damage to the NANO-QM871-i1.

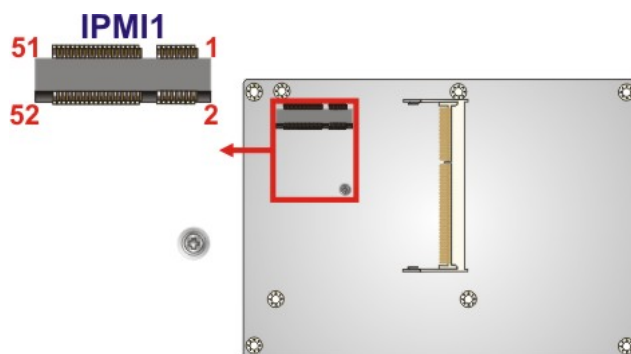


Figure 3-10: iRIS Module Slot Location

NANO-QM871-i1 EPIC SBC

3.2.10 Keyboard and Mouse Connector

CN Label:	KB_MS1
CN Type:	6-pin wafer, p=2.00 mm
CN Location:	See Figure 3-11
CN Pinouts:	See Table 3-11

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

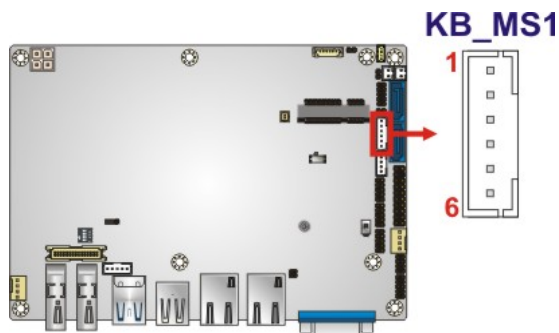


Figure 3-11: Keyboard and Mouse Connector Location

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

Table 3-11: Keyboard and Mouse Connector Pinouts

3.2.11 LAN Active LED Connector

- CN Label:** LAN_ACT_LED1
- CN Type:** 4-pin header, p=2.00 mm
- CN Location:** See **Figure 3-12**
- CN Pinouts:** See **Table 3-12**

The connector is for active LED connection of the external LAN ports.

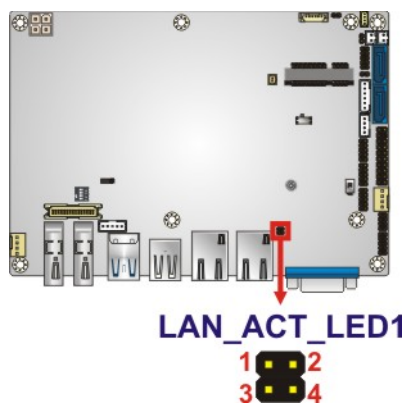


Figure 3-12: LAN Active LED Connector Location

Pin	Description	Pin	Description
1	LAN1_LINK_ACT-	2	V_3P3_LAN
3	LAN2_LINK_ACT-	4	+ 3.3A

Table 3-12: LAN Active LED Connector Pinouts

3.2.12 LVDS Connector

- CN Label:** LVDS1
- CN Type:** 30-pin crimp, p=1.25 mm
- CN Location:** See **Figure 3-13**
- CN Pinouts:** See **Table 3-13**

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

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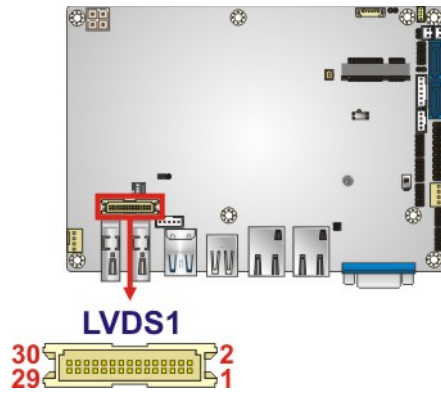


Figure 3-13: LVDS Connector Location

Pin	Description	Pin	Description
1	GND	2	GND
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	GND	14	GND
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	GND	26	GND
27	+LCD Vcc	28	+LCD Vcc
29	+LCD Vcc	30	+LCD Vcc

Table 3-13: LVDS Connector Pinouts

3.2.13 LVDS Backlight Connector

- CN Label: INV1
- CN Type: 5-pin wafer, p=2.00 mm
- CN Location: See Figure 3-14
- CN Pinouts: See Table 3-14

The backlight inverter connector provides power to the LCD panel connected to the board.

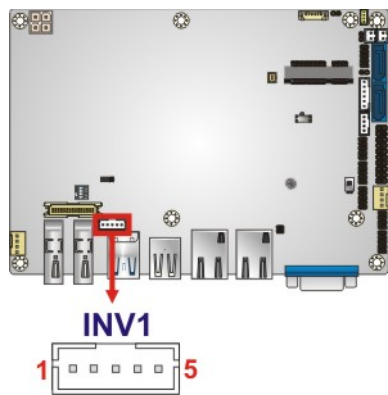


Figure 3-14: LVDS Backlight Inverter Connector

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

Table 3-14: Backlight Inverter Connector Pinouts

3.2.14 PCIe Mini Card Slot

- CN Label: M-SATA1
- CN Type: PCIe Mini card slot
- CN Location: See Figure 3-15
- CN Pinouts: See Table 3-15

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The PCIe Mini card slot enables a PCIe Mini card expansion module to be connected to the board. Cards supported include among others PCIe Mini cards and mSATA cards.

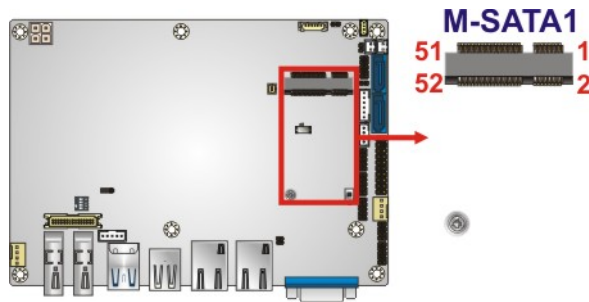


Figure 3-15: PCIe Mini Card Slot Location

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 (SATA_RX4+)	24	3VDual
25	PERP2 (SATA_RX4-)	26	GND
27	GND	28	1.5V
29	GND	30	SMBCLK
31	PETN2 (SATA_TX4-)	32	SMBDATA
33	PETP2 (SATA_TX4+)	34	GND
35	GND	36	USBD-
37	N/C	38	USBD+
39	N/C	40	GND
41	N/C	42	N/C

Pin	Description	Pin	Description
43	SATA_DET4_R_N	44	N/C
45	N/C	46	N/C
47	N/C	48	1.5V
49	N/C	50	GND
51	MSATA_SEL#	52	VCC3

Table 3-15: PCIe Mini Card Slot Pinouts

3.2.15 Power Connector (12V)

- CN Label:**
PWR1
- CN Type:**
4-pin connector, p=4.2 mm
- CN Location:**
See **Figure 3-16**
- CN Pinouts:**
See **Table 3-16**

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.

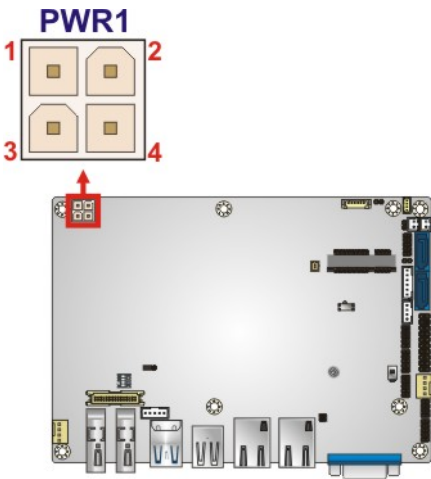


Figure 3-16: Power Connector Location

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

Table 3-16: Power Connector Pinouts

NANO-QM871-i1 EPIC SBC

3.2.16 RS-232 Serial Port Connectors

CN Label:	COM1, COM2
CN Type:	10-pin header, p=2.00 mm
CN Location:	See Figure 3-17
CN Pinouts:	See Table 3-17

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

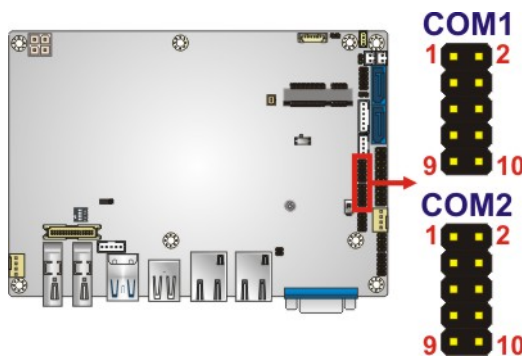


Figure 3-17: RS-232 Serial Port Connector Location

Pin	Description	Pin	Description
1	-ND CD	2	-ND SR
3	NSIN	4	-NR TS
5	NSOUT	6	-NC TS
7	-ND TR	8	-XR I
9	GND	10	GND

Table 3-17: RS-232 Serial Port Connector Pinouts

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

CN Label:	COM3
CN Type:	4-pin wafer, p=2.00 mm
CN Location:	See Figure 3-18
CN Pinouts:	See Table 3-18

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

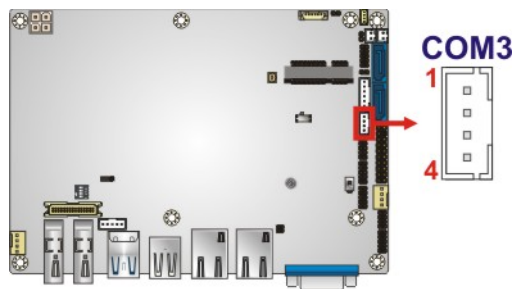


Figure 3-18: RS-422/485 Serial Port Connector Location

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

Table 3-18: 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.

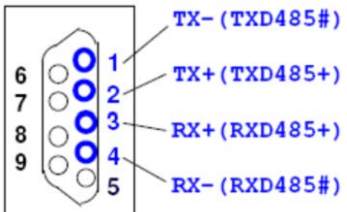
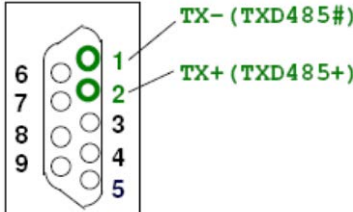
RS-422 Pinouts	RS-485 Pinouts
	

Table 3-19: DB-9 RS-422/485 Pinouts

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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
CN Pinouts:	See Table 3-20

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

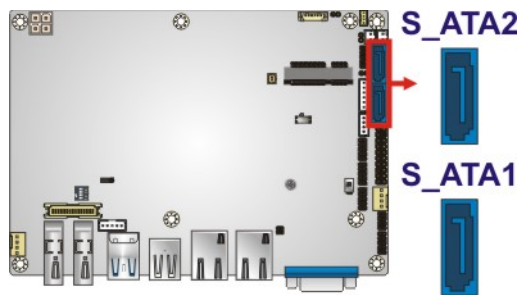


Figure 3-19: SATA 6Gb/s Drive Connector Locations

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

Table 3-20: SATA 6Gb/s Drive Connector Pinouts

3.2.19 SATA Power Connectors

- CN Label: SATA_PWR1, SATA_PWR2
- CN Type: 2-pin wafer, p=2.00 mm
- CN Location: See Figure 3-20
- CN Pinouts: See Table 3-21

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

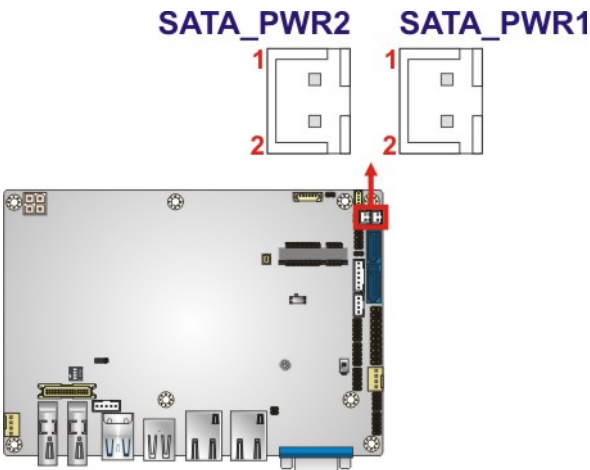


Figure 3-20: SATA Power Connector Locations

Pin	Description
1	+V5S
2	GND

Table 3-21: SATA Power Connector Pinouts

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3.2.20 SMBus Connector

CN Label:	SMB1
CN Type:	4-pin wafer, p=1.25 mm
CN Location:	See Figure 3-21
CN Pinouts:	See Table 3-22

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

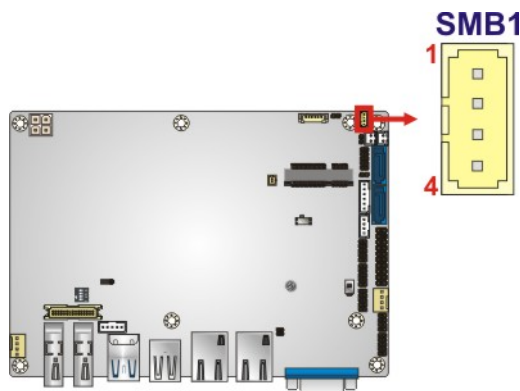


Figure 3-21: SMBus Connector Location

Pin	Description
1	GND
2	SMB_DATA
3	SMB_CLK
4	+V5S

Table 3-22: SMBus Connector Pinouts

3.2.21 SO-DIMM Connector

CN Label: DIMM1
CN Type: 204-pin DDR3 SO-DIMM connector
CN Location: See **Figure 3-22**

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

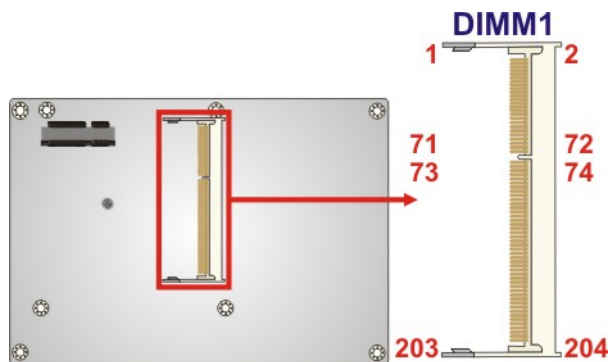


Figure 3-22: SO-DIMM Connector Locations

3.2.22 SPI Flash Connector

CN Label: SPI1
CN Type: 6-pin wafer, p=1.25 mm
CN Location: See **Figure 3-23**
CN Pinouts: See **Table 3-23**

The 6-pin SPI Flash connector is used to flash the BIOS.

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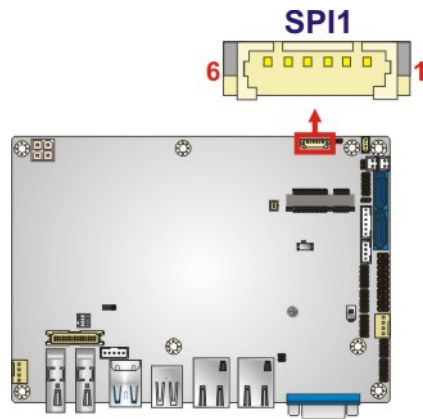


Figure 3-23: SPI Flash Connector Location

Pin	Description
1	+V3.3M_SPI_CON
2	SPI_CS#0_CN
3	SPI_SO_SW
4	SPI_CLK_SW
5	SPI_SI_SW
6	GND

Table 3-23: SPI Flash Connector Pinouts

3.2.23 SPI Flash Connector (EC)

CN Label:	CN1
CN Type:	2-pin header, p=2.00 mm
CN Location:	See Figure 3-24
CN Pinouts:	See Table 3-24

The 2-pin EC SPI flash connector is used to flash the EC BIOS.

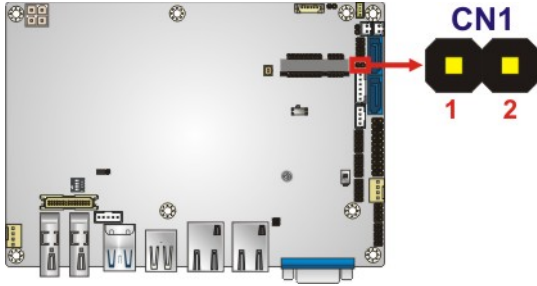


Figure 3-24: EC SPI Flash Connector Location

Pin	Description
1	SMCLK1_EC
2	SMDAT1_EC

Table 3-24: EC SPI Flash Connector Pinouts

3.2.24 TPM Connector

- CN Label:TPM1
- CN Type:20-pin header, p=2.54 mm
- CN Location:See Figure 3-25
- CN Pinouts:See Table 3-25

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

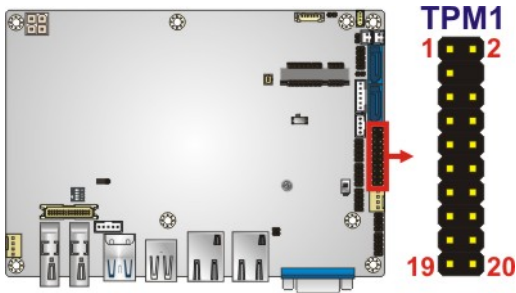


Figure 3-25: TPM Connector Location

Pin	Description	Pin	Description
1	LCLK	2	GND
3	LFRAME#	4	KEY
5	LRERST#	6	+5V

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Pin	Description	Pin	Description
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 3-25: TPM Connector Pinouts

3.2.25 USB 2.0 Connector

CN Label: **USB1**

CN Type: 8-pin header, p=2.00 mm

CN Location: See **Figure 3-26**CN Pinouts: See **Table 3-26**

The USB header can connect to two USB devices.

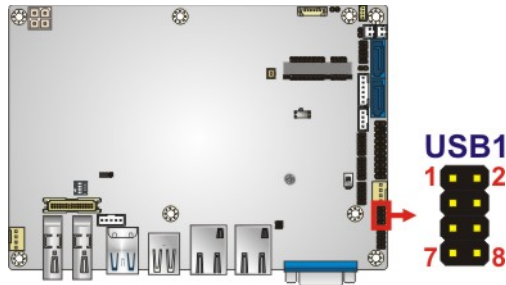


Figure 3-26: USB Connector Locations

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

Table 3-26: USB Port Connector Pinouts

3.3 External Interface Connectors

The NANO-QM871-i1 on-board external interface connectors are shown in **Figure 3-27**.

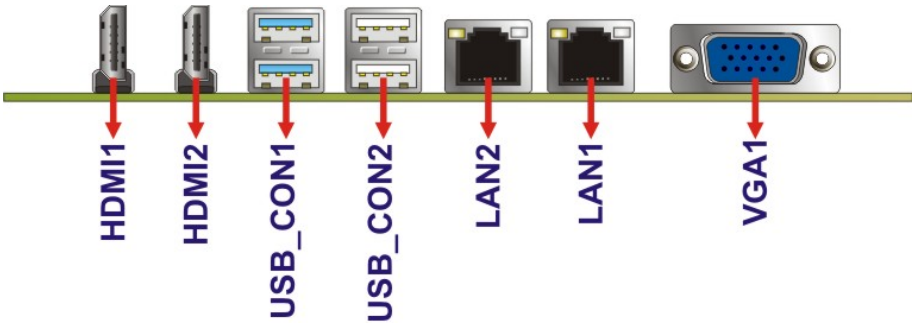


Figure 3-27: External Interface Connectors

3.3.1 Ethernet Connectors

- CN Label: LAN1, LAN2
- CN Type: RJ-45 connector
- CN Location: See **Figure 3-27**
- CN Pinouts: See **Table 3-27**

The NANO-QM871-i1 is equipped with two built-in RJ-45 Ethernet controllers. Each controller can connect to the LAN through one RJ-45 LAN connector.

PIN	DESCRIPTION	PIN	DESCRIPTION
1	MDIA0+	5	MDIA2-
2	MDIA0-	6	MDIA1-
3	MDIA1+	7	MDIA3+
4	MDIA2+	8	MDIA3-

Table 3-27: LAN Pinouts

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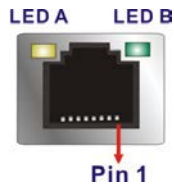


Figure 3-28: Ethernet Connector

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 3-28: Connector LEDs

3.3.2 HDMI Connectors

CN Label: HDMI1, HDMI2

CN Type: HDMI connector

CN Location: See **Figure 3-27**

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

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

Pin	Description	Pin	Description
1	HDMI_DATA2+	11	GND
2	GND	12	HDMI_CLK#
3	HDMI_DATA2#-	13	N/C
4	HDMI_DATA1+	14	N/C
5	GND	15	HDMI_SCL
6	HDMI_DATA1#-	16	HDMI_SDA
7	HDMI_DATA0+	17	GND
8	GND	18	+5VCC
9	HDMI_DATA0#-	19	HDMI_HPD
10	HDMI_CLK+		

Table 3-29: HDMI Connector Pinouts

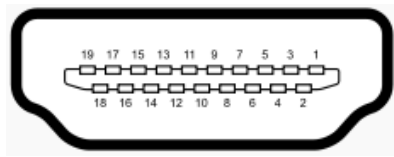


Figure 3-29: HDMI Connector

3.3.3 USB 2.0 Connector

- CN Label:** USB_CON2
- CN Type:** Dual USB Type-A port
- CN Location:** See **Figure 3-27**
- CN Pinouts:** See **Table 3-30**

The ports connect to both USB 2.0 and USB 1.1 devices.

Pin	Description
1	VBUS
2	D1-
3	D1+
4	GND

Table 3-30: External USB 2.0 Port Pinouts

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3.3.4 USB 3.2 Gen 1 Connector

CN Label:	USB_CON1
CN Type:	Dual USB Type-A port
CN Location:	See Figure 3-27
CN Pinouts:	See Table 3-31

The NANO-QM871-i1 has two external USB 3.2 Gen 1 (5Gb/s) ports. Each USB 3.2 Gen 1 port 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 3-31: External USB 3.2 Gen 1 Port Pinouts

3.3.5 VGA Connector

- CN Label:

VGA1
- CN Type:

15-pin Female
- CN Location:

See **Figure 3-27**
- CN Pinouts:

See **Figure 3-30** and **Table 3-32**

Connects to a monitor that accepts a standard VGA input.

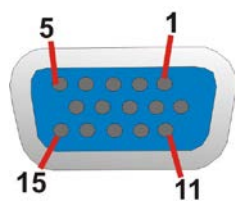


Figure 3-30: VGA Connector

Pin	Description	Pin	Description
1	RED	9	5V
2	GREEN	10	GROUND
3	BLUE	11	NC
4	NC	12	DDCDAT
5	GND	13	HSYNC
6	GND	14	VSYNC
7	GND	15	DDCCLK
8	GND		

Table 3-32: VGA Connector Pinouts

Chapter

4

Installation

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 NANO-QM871-i1. Dry climates are especially susceptible to ESD. It is therefore critical to strictly adhere to the following anti-static precautions whenever the NANO-QM871-i1, 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 NANO-QM871-i1, place it on an anti-static pad. This reduces the possibility of ESD damaging the NANO-QM871-i1.
- ***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 NANO-QM871-i1 is installed. All installation notices pertaining to the installation of NANO-QM871-i1 should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the NANO-QM871-i1 and injury to the person installing the motherboard.

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**WARNING:**

The installation instructions described in this manual should be carefully followed in order to prevent damage to the NANO-QM871-i1, NANO-QM871-i1 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 NANO-QM871-i1 **DO NOT:**

- Remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- Use the product before verifying all the cables and power connectors are properly connected.
- Allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 Cooling Kit Installation

An IEI 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.

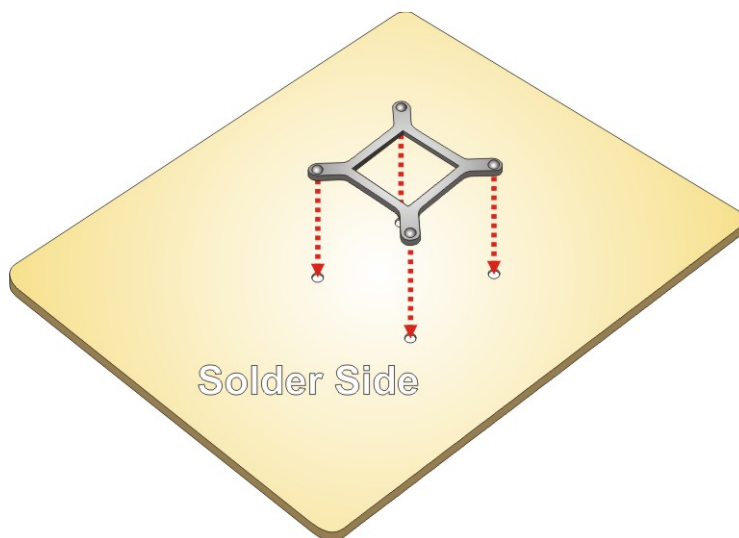


Figure 4-1: Install Support Bracket

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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 4-2**).

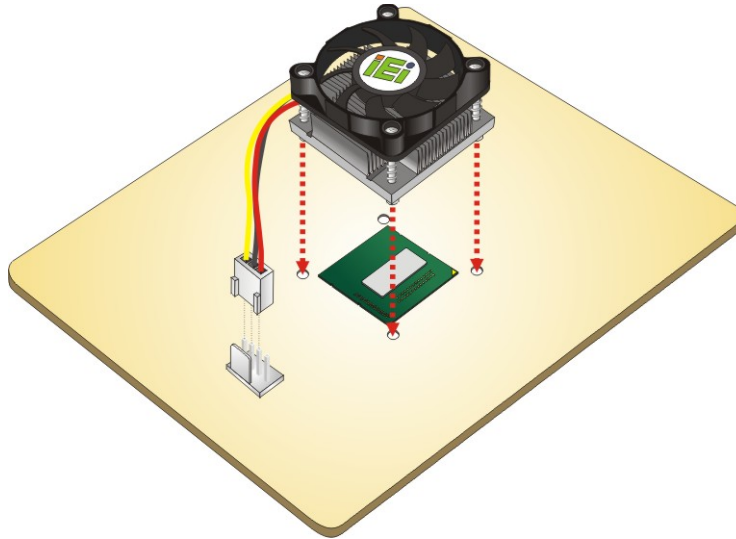


Figure 4-2: Align the Cooling Kit

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 4-3**.

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 4-3**.

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.

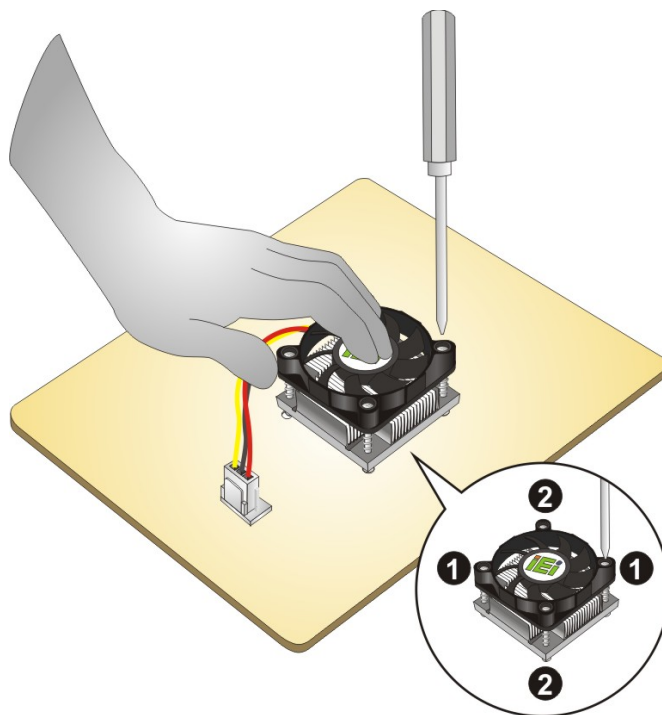


Figure 4-3: Secure the Cooling Kit

4.4 SO-DIMM Installation



WARNING:

Using incorrectly specified SO-DIMM may cause permanent damage to the NANO-QM871-i1. Please make sure the purchased SO-DIMM complies with the memory specifications of the NANO-QM871-i1. SO-DIMM specifications compliant with the NANO-QM871-i1 are listed in Chapter 1.

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

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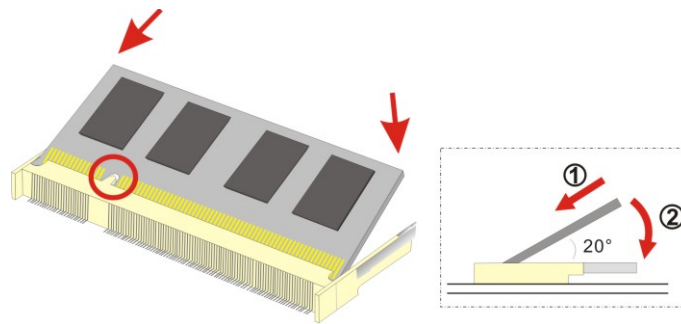


Figure 4-4: SO-DIMM Installation

- Step 1:** Locate the SO-DIMM socket. Place the NANO-QM871-i1 on an anti-static pad with the solder side facing up.
- Step 2:** Align the SO-DIMM with the socket. Align the notch on the memory with the notch on the memory socket.
- Step 3:** Insert the SO-DIMM. Push the memory in at a 20° angle. (See **Figure 4-4**)
- Step 4:** Seat the SO-DIMM. Gently push downwards and the arms clip into place. (See **Figure 4-4**)

4.5 iRIS-1010 Module Installation



WARNING:

The iRIS module slot is designed to install the iRIS-1010 module only. DO NOT install other modules into the iRIS module slot. Doing so may cause damage to the NANO-QM871-i1.

To install the iRIS-1010 module, please follow the steps below.

- Step 1:** Locate the iRIS module slot. The iRIS module slot is located on the solder side of the motherboard. See **Figure 3-10**.
- Step 2:** Remove the retention screw. Remove the retention screw as shown in **Figure 4-5**.

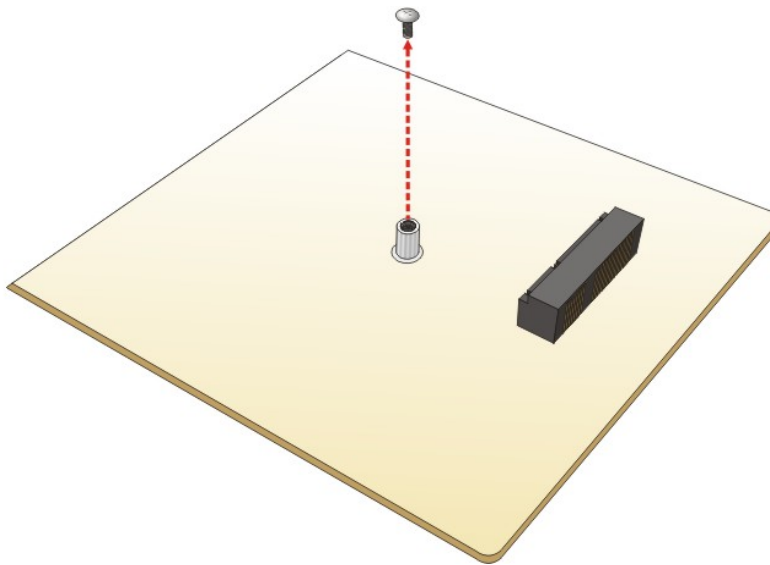


Figure 4-5: Removing the Retention Screw for the iRIS-1010 Module

Step 3: **Insert into the slot at an angle.** Line up the notch on the module with the notch on the slot. Slide the iRIS-1010 module into the slot at an angle of about 20° (Figure 4-6).

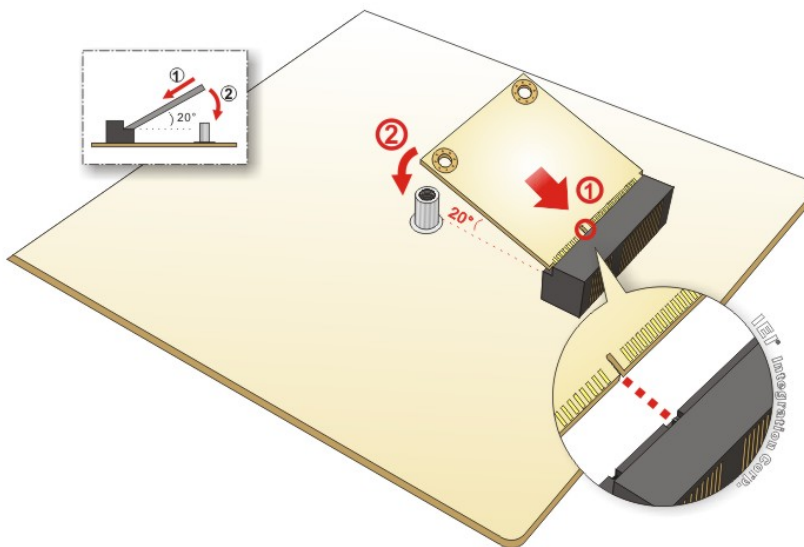


Figure 4-6: Inserting the iRIS-1010 Module into the Slot at an Angle

Step 4: **Secure the iRIS-1010 module.** Secure the iRIS-1010 module with the retention screw previously removed (Figure 4-7).

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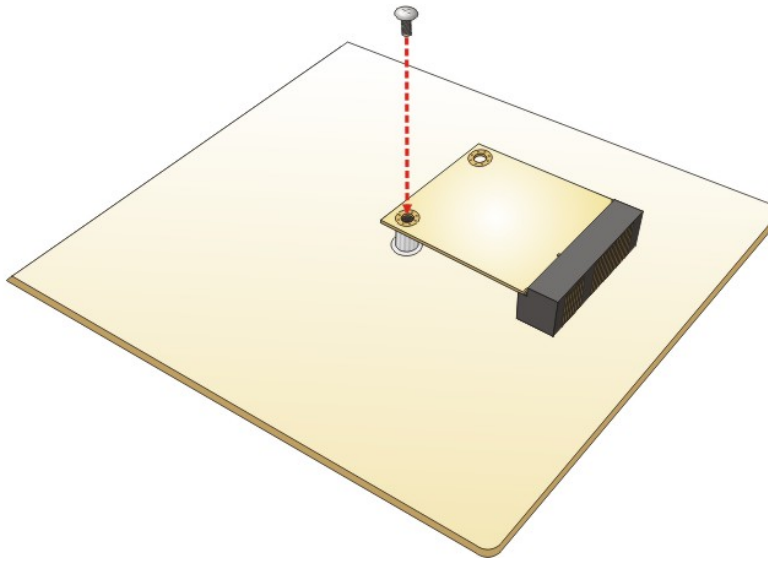


Figure 4-7: Securing the iRIS-1010 Module

**NOTE:**

After installing the iRIS-1010 module, use **LAN2** port to establish a network connection.

4.6 PCIe Mini Card Installation

One PCIe Mini card slot is located on the NANO-QM871-i1. To install the PCIe Mini card, please refer to the diagram and instructions below.

Step 1: Locate the PCIe Mini card slot. See Figure 3-15.

Step 2: Remove the retention screw. Remove the retention screw as shown in Figure 4-8.

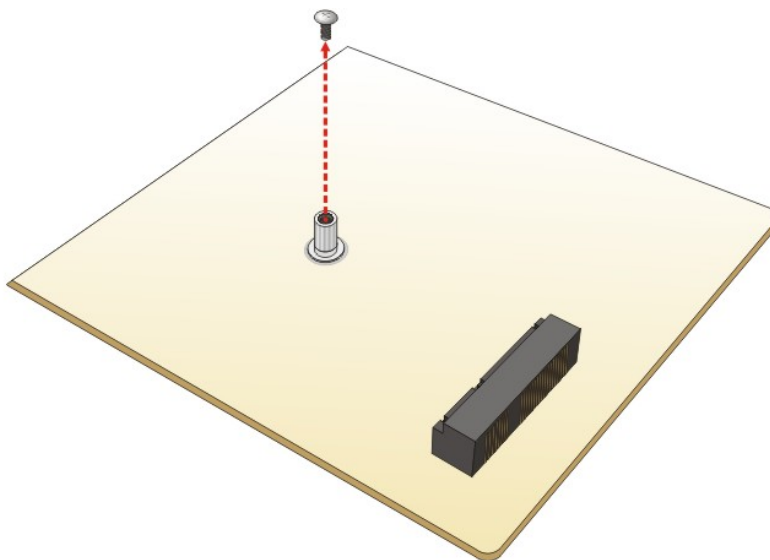


Figure 4-8: Removing the Retention Screw

Step 3: **Insert into the socket at an angle.** Line up the notch on the card with the notch on the slot. Slide the PCIe Mini card into the socket at an angle of about 20° (Figure 4-9).

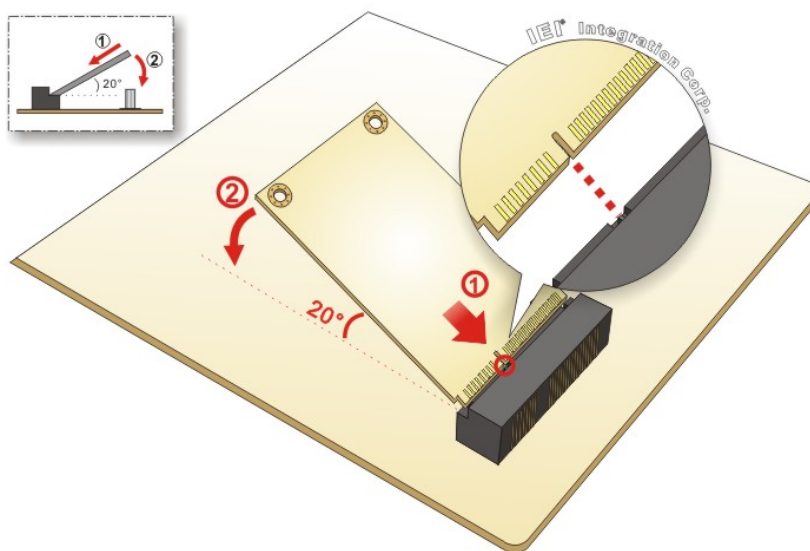


Figure 4-9: Inserting the Full-size PCIe Mini Card into the Slot at an Angle

Step 4: **Secure the full-size PCIe Mini card.** Secure the full-size PCIe Mini card with the retention screw previously removed (Figure 4-10).

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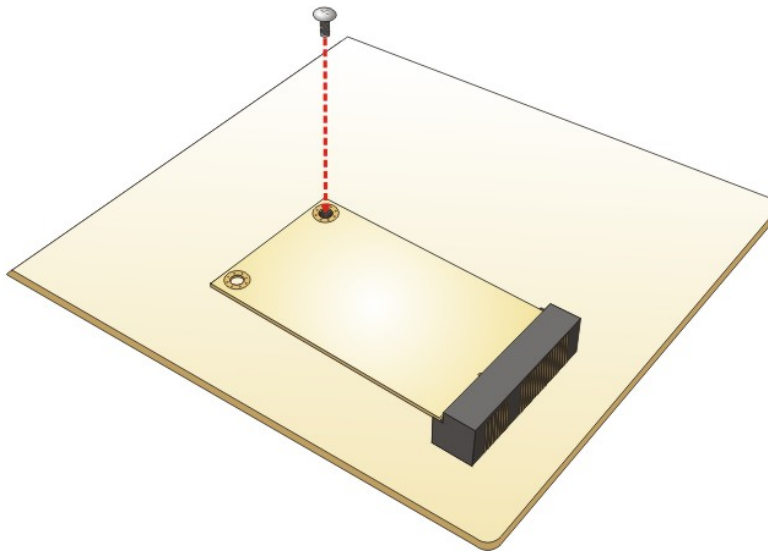


Figure 4-10: Securing the Full-size PCIe Mini Card

4.7 System Configuration

The system configuration is controlled by buttons, jumpers and switches. The system configuration should be performed before installation.

4.7.1 AT/ATX Mode Selection

Jumper Label:	J_ATXCTL1
Jumper Type:	Switch
Jumper Settings:	See Figure 4-11
Jumper Location:	See Figure 4-11

Set the switch to select AT or ATX power mode for the NANO-QM871-i1. 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. To configure, see the diagram below.

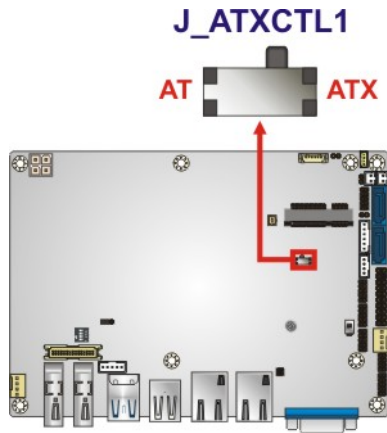


Figure 4-11: AT/ATX Mode Selection Jumper Location

4.7.2 Clear CMOS

Jumper Label:	J_CMOS1
Jumper Type:	Push button
Jumper Location:	See Figure 4-12

If the NANO-QM871-i1 fails to boot due to improper BIOS settings, the clear CMOS button clears the CMOS data and resets the system BIOS information. To do this, push the clear CMOS button for three seconds, then restart the system.

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.

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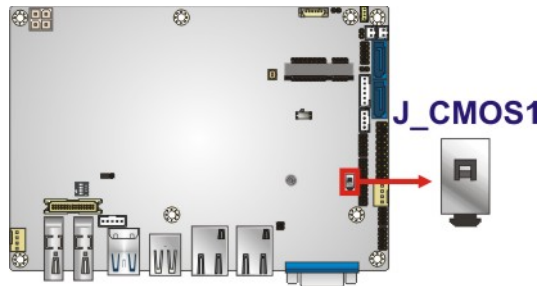


Figure 4-12: Clear CMOS Jumper Location

4.7.3 LVDS Voltage Selection

Jumper Label:	JP1
Jumper Type:	3-pin header, p=2.00 mm
Jumper Settings:	See Table 4-1
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 4-1: LVDS Voltage Selection Jumper Settings

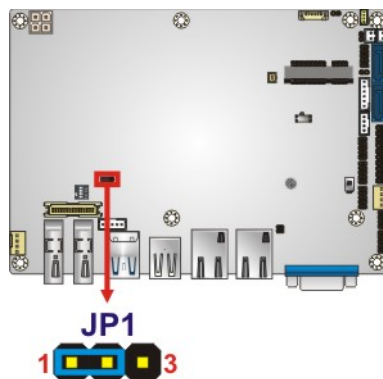


Figure 4-13: LVDS Voltage Selection Jumper Location



4.7.4 LVDS Resolution Selection

- Jumper Label: SW1
- Jumper Type: DIP switch
- Jumper Settings: See Table 4-2
- Jumper Location: See Figure 4-14

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

* ON=0, OFF=1; S= Single, D=Dual

SW1 (4-3-2-1)	Description
0000	800x600 18bit S (default)
0001	1024x768 18bit S
0010	1024x768 24bit S
0011	1280x768 18bit S
0100	1280x800 18bit S
0101	1280x960 18bit S
0110	1280x1024 24bit D
0111	1366x768 18bit S
1000	1366x768 24bit S
1001	1440x960 24bit D
1010	1400x1050 24bit D
1011	1600x900 24bit D
1100	1680x1050 24bit D
1101	1600x1200 24bit D
1110	1920x1080 24bit D
1111	1920x1200 24bit D

Table 4-2: LVDS Resolution Selection Jumper Settings



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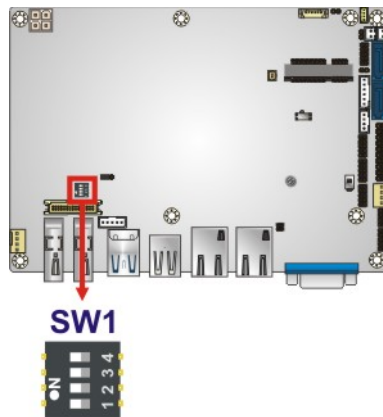


Figure 4-14: LVDS Resolution Selection Jumper Location

4.8 Chassis Installation

4.8.1 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 NANO-QM871-i1 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.

4.8.2 Motherboard Installation

To install the NANO-QM871-i1 motherboard into the chassis please refer to the reference material that came with the chassis.

4.9 Internal Peripheral Device Connections

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

4.9.1 AT/ATX Power Connection

Follow the instructions below to connect the NANO-QM871-i1 to an AT or ATX power supply.



WARNING:

Disconnect the power supply power cord from its AC power source to prevent a sudden power surge to the NANO-QM871-i1.

- Step 1:** **Locate the power cable.** The power cable is shown in the packing list in Chapter 2.
- Step 2:** **Connect the Power Cable to the Motherboard.** Connect the 4-pin (2x2) Molex type power cable connector to the power connector on the motherboard. See Figure 4-15.

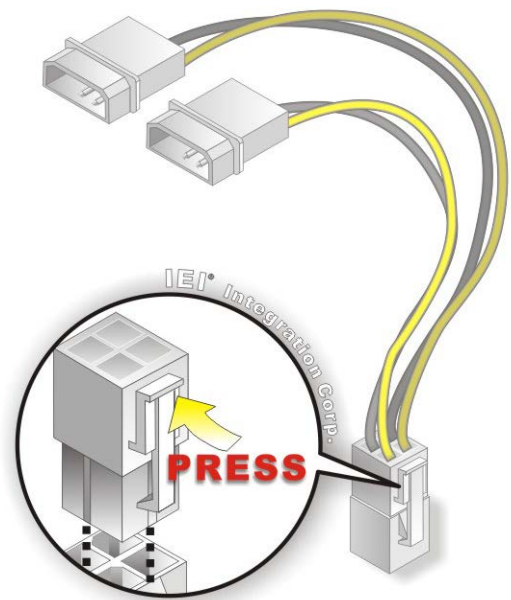


Figure 4-15: Power Cable to Motherboard Connection

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Step 3: Connect Power Cable to Power Supply. Connect one of the 4-pin (1x4) Molex type power cable connectors to an AT/ATX power supply. See **Figure 4-16**.

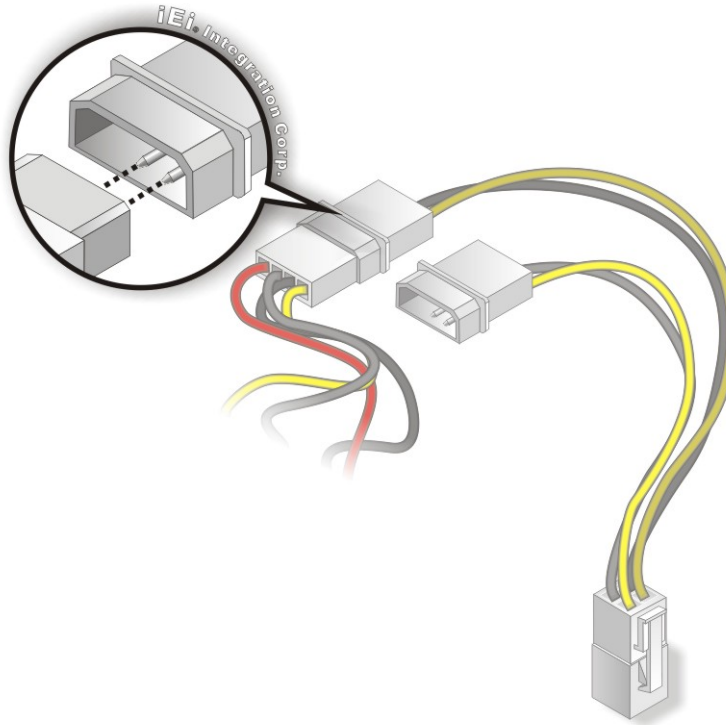


Figure 4-16: Connect Power Cable to Power Supply

4.9.2 Audio Kit Installation

The Audio Kit that came with the NANO-QM871-i1 connects to the 10-pin audio connector on the NANO-QM871-i1. The audio kit consists of three audio jacks. One audio jack, Mic In, connects to a microphone. The remaining two audio jacks, Line-In and Line-Out, connect to two speakers. To install the audio kit, please refer to the steps below:

Step 1: Locate the audio connector. The location of the 10-pin audio connector is shown in **Chapter 3**.

Step 2: Align pin 1. Align pin 1 on the on-board connector with pin 1 on the audio kit connector. Pin 1 on the audio kit connector is indicated with a white dot. See **Figure 4-17**.

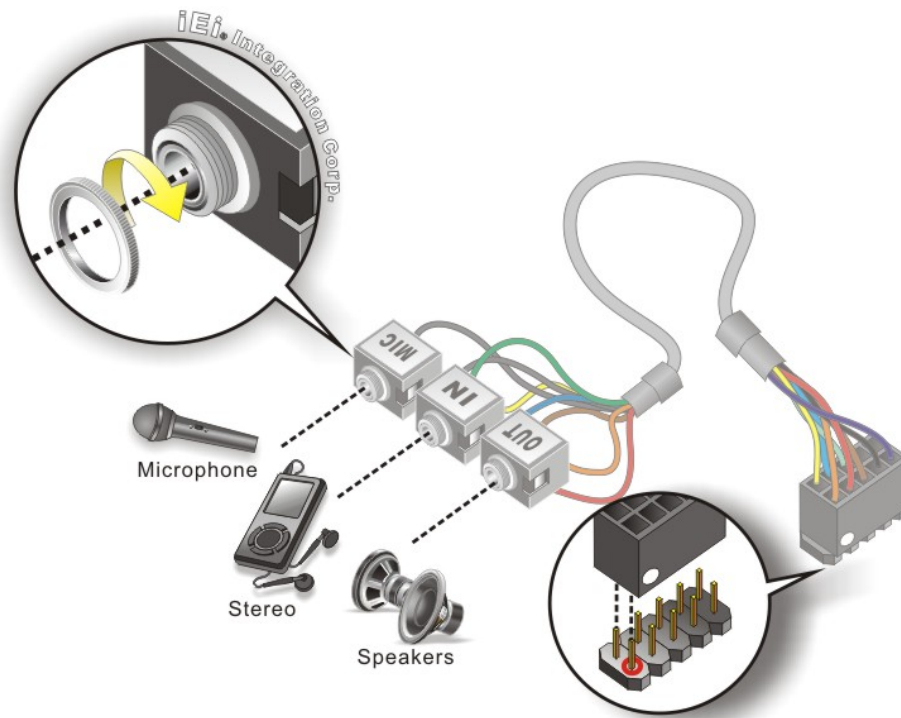


Figure 4-17: Audio Kit Cable Connection

Step 3: **Connect the audio devices.** Connect one speaker to the line-in audio jack, one speaker to the line-out audio jack and a microphone to the mic-in audio jack.

4.9.3 LVDS LCD Installation

The NANO-QM871-i1 can be connected to a TFT LCD screen through the LVDS crimp connectors on the board. To connect a TFT LCD to the NANO-QM871-i1, please follow the steps below.

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

Step 2: **Insert the cable connector.** Insert the connector from the LVDS PCB driving board to the LVDS connector as shown in **Figure 4-18**. When connecting the connectors, make sure the pins are properly aligned.

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**WARNING:**

The diagram below is merely for illustration. The configuration and connection of the cables from the TFT LCD screen being installed may be different. Please refer to the installation manual that came with the TFT LCD screen.

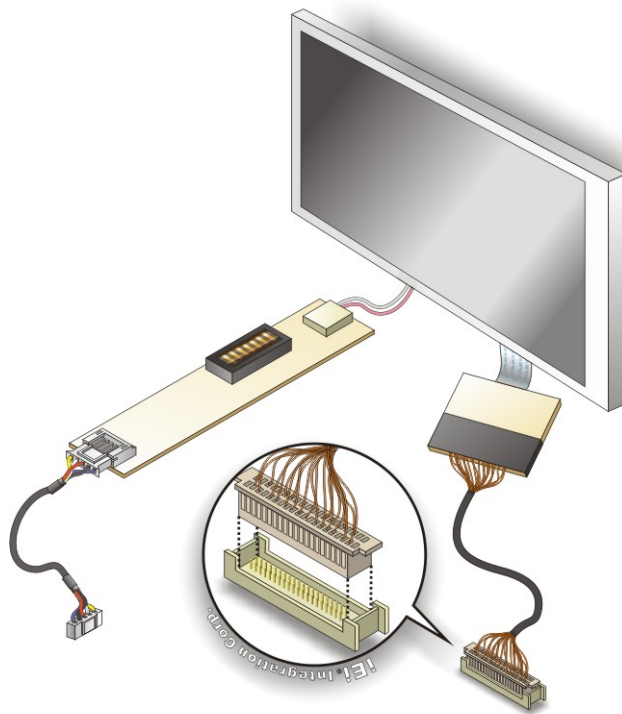


Figure 4-18: LVDS Connector

Step 3: **Locate the backlight inverter connector.** The location of the backlight inverter connector is shown in **Chapter 3**.

Step 4: **Connect backlight connector.** Connect the backlight connector to the driver TFT LCD PCB as shown in **Figure 4-19**. When inserting the cable connector, make sure the pins are properly aligned.

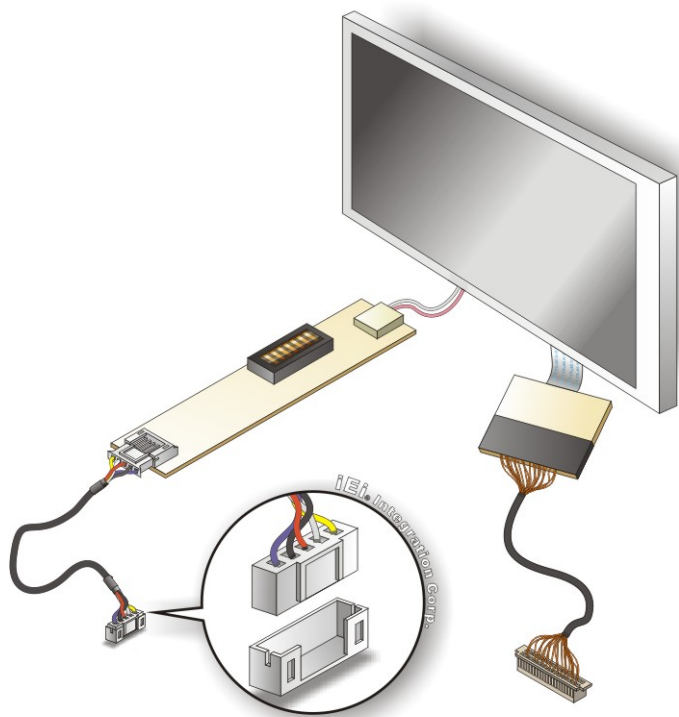


Figure 4-19: Backlight Inverter Connection

4.9.4 SATA Drive Connection

The NANO-QM871-i1 is shipped with two SATA drive cables. 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 4-20**.

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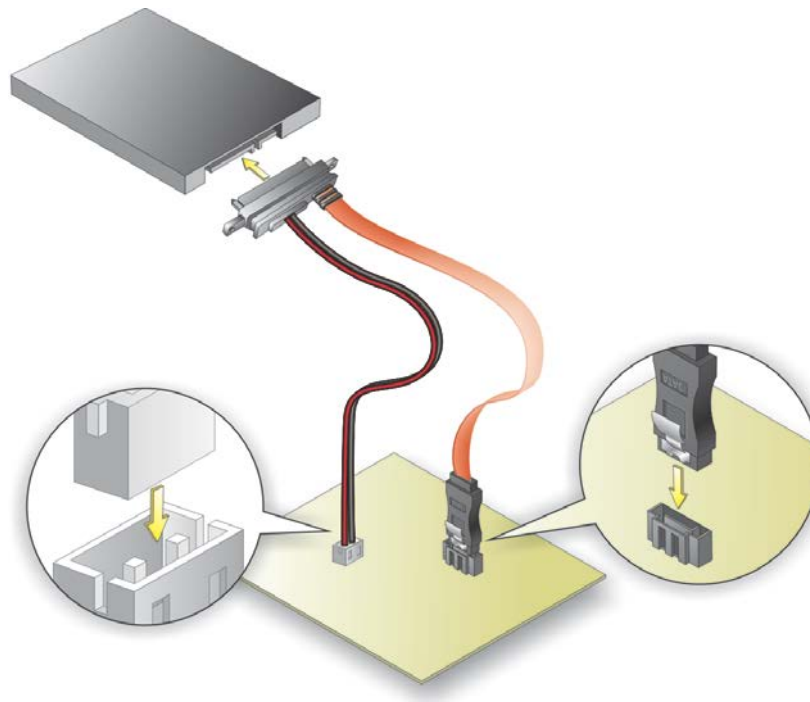


Figure 4-20: SATA Drive Cable Connection

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 4-20**.

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

4.9.5 Single RS-232 Cable

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 locations of the RS-232 connectors are shown in **Chapter 3**.

Step 2: **Insert the cable connector.** Insert the connector into the serial port header. See **Figure 4-21**. A key on the front of the cable connector ensures the connector can only be installed in one direction.

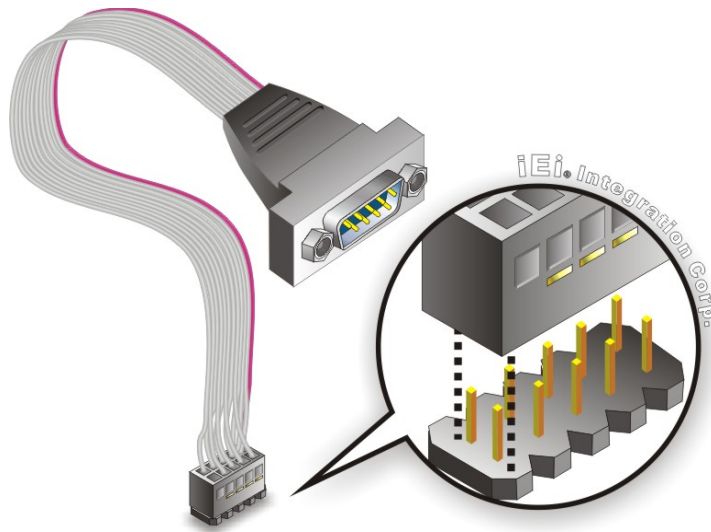


Figure 4-21: Single RS-232 Cable Installation

- 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.

4.10 Intel® AMT Setup Procedure

The NANO-QM871-i1 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 obtained from IEI Resource Download Center. See **Chapter 6**.

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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.



NOTE:

Some of the BIOS options may vary throughout the life cycle of the product and are subject to change without prior notice.

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

If the message disappears before the **DEL** 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 the following table.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
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



Key	Function
-	Decrease the numeric value or make changes
Page Up key	Move to the next page
Page Dn key	Move to the previous page
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
F1	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2	Load previous values
F3	Load optimized defaults
F4	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 are 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.



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- 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) 2012 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		4.6.5.4			
Compliance		UEFI 2.3.1; PI 1.2			
Project Version		E436AR10.ROM			
Build Date and Time		05/12/2014 14:08:15			
iWDD Vendor		iEi			
iWDD Version		B436ER12.bin			
Processor Information					
Name		Haswell			
Brand String		Intel(R) Celeron(R) CPU			
Frequency		1500 MHz			
Processor ID		306c3			
Stepping		C0			
Number of Processors		2Core(s) / 2Thread(s)			
Microcode Revision		17			
GT Info		GT1 (800 MHz)			
IGFX VBIOS Version		2167			
Memory RC Version		1.6.2.1			
Total Memory		4096 MB (DDR3)			
Memory Frequency		1600 MHz			
PCH Information					
Name		LynxPoint			
PCH SKU		QM87			
Stepping		05/C2			
LAN PHY Revision		A3		-----	
ME FW Version		9.0.10.1372			
ME Firmware SKU		5MB		→←: Select Screen	
SPI Clock Frequency				↑↓: Select Item	
DOFR Support		Unsupported		Enter: Select	
Read Status Clock Frequency		50 MHz		+/-: Change Opt.	
Write Status Clock Frequency		50 MHz		F1: General Help	
Fast Read Status Clock Frequency		50 MHz		F2: Previous Values	
System Date		[Tue 07/08/2014]		F3: Optimized Defaults	
System Time		[15:10:27]		F4: Save & Exit	
Access Level		Administrator		ESC: Exit	
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.					

BIOS Menu 1: Main

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➔ System Overview

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 Information
- Processor Information
- Memory Information
- PCH Information
- SPI Clock Frequency

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.

➔ System Time [xx:xx:xx]

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

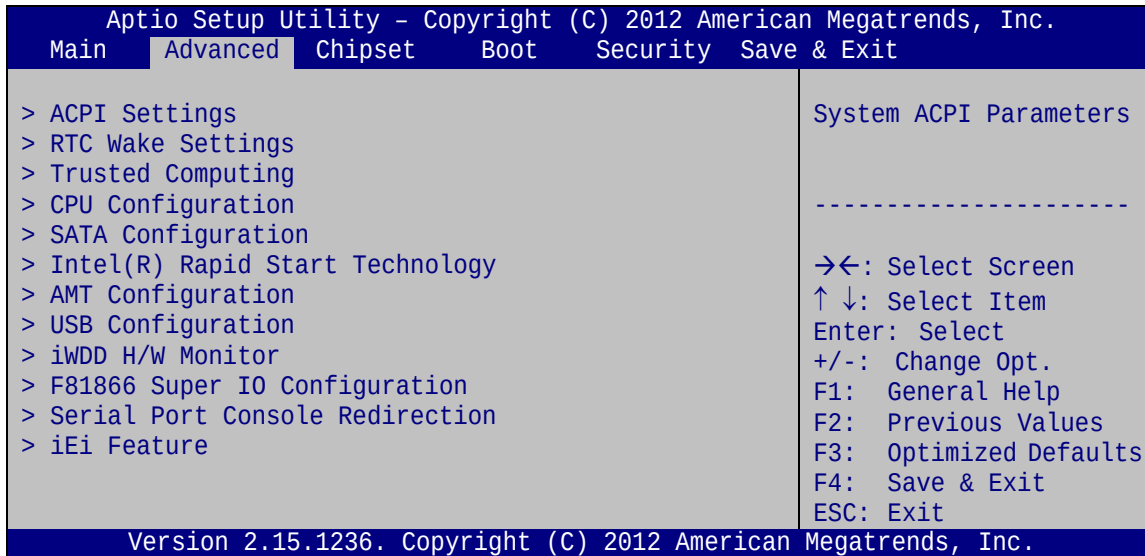
5.3 Advanced

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



WARNING:

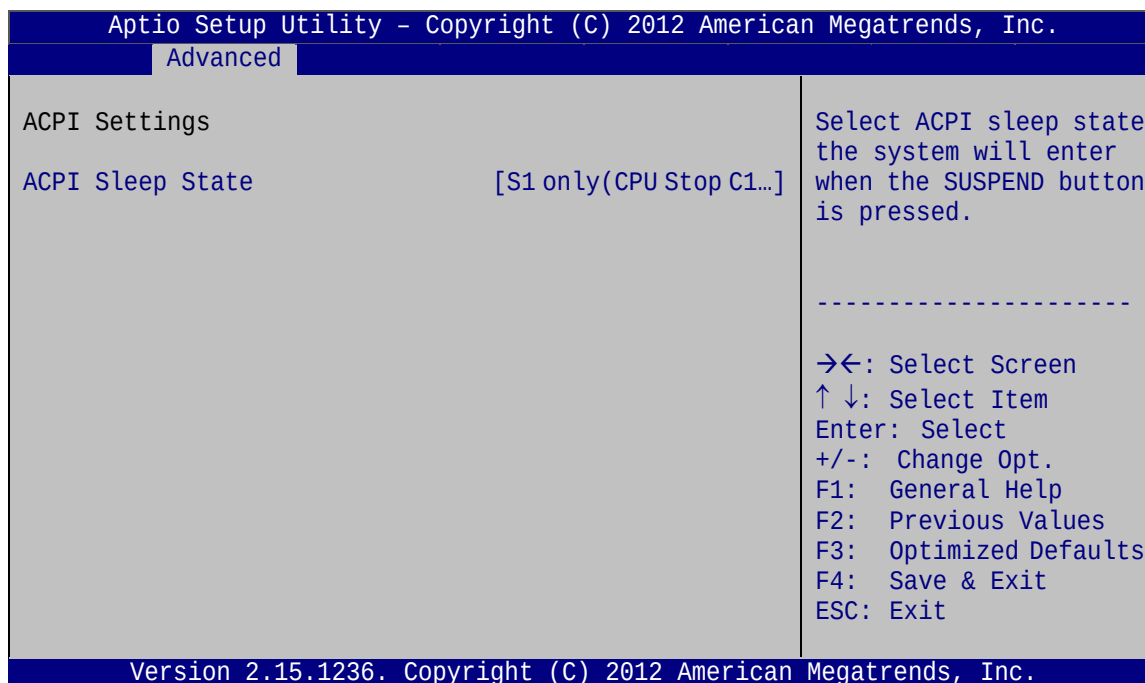
Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.



BIOS Menu 2: Advanced

5.3.1 ACPI Settings

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



BIOS Menu 3: ACPI Settings



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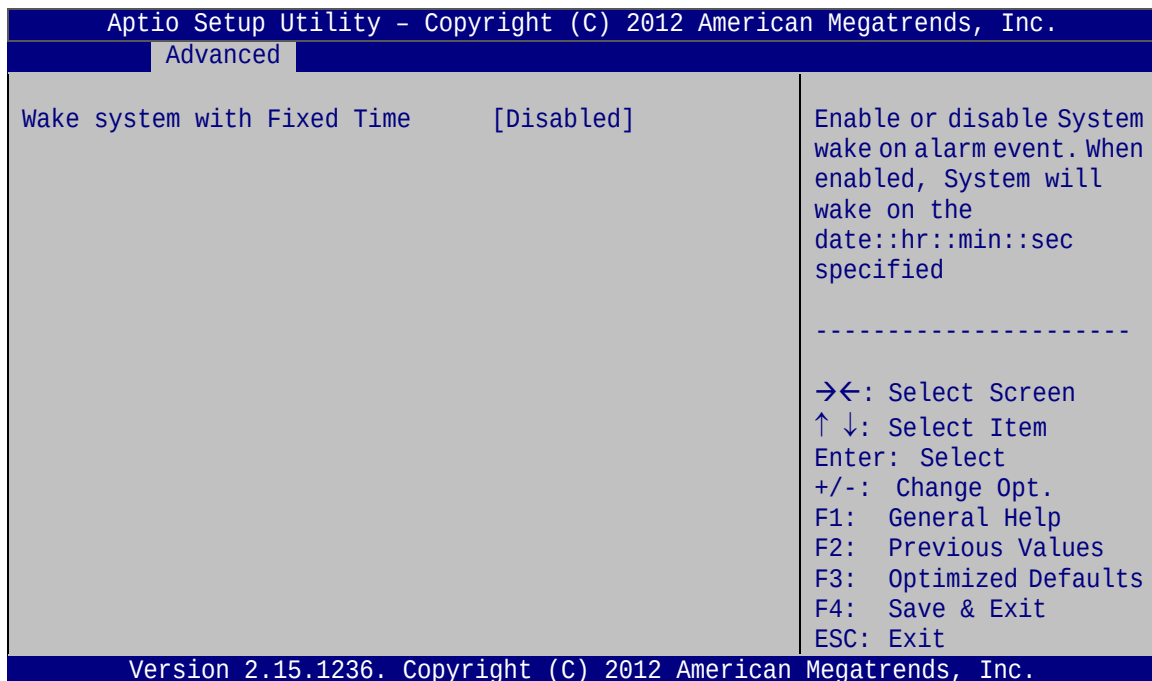
➔ ACPI Sleep State [S1 only (CPU Stop Clock)]

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. |

5.3.2 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 4**) enables the system to wake at the specified time.



BIOS Menu 4: RTC Wake Settings

➔ **Wake system with Fixed Time [Disabled]**

Use the **Wake system with Fixed Time** option to enable or disable the system wake on alarm event.

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

- **Enabled**
- If selected, the **Wake up every day** option appears allowing you to enable to disable the system to wake every day at the specified time. Besides, the following options appear with values that can be selected:

Wake up every day

Wake up date

Wake up hour

Wake up minute

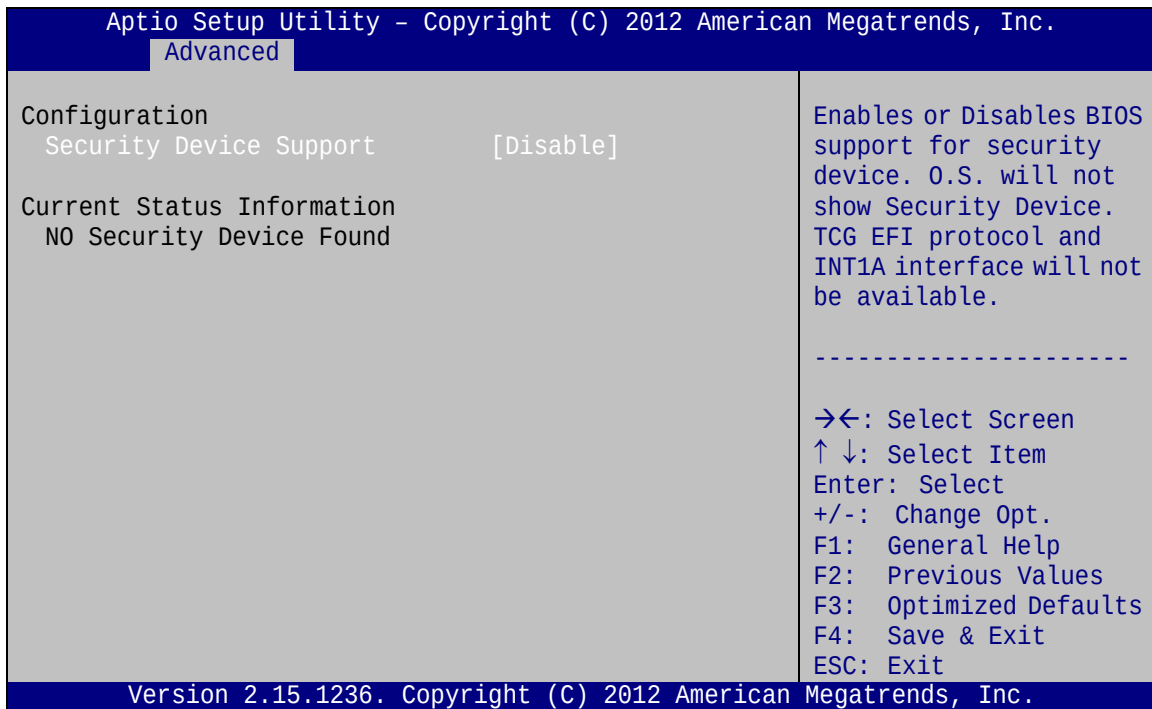
Wake up second

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

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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).

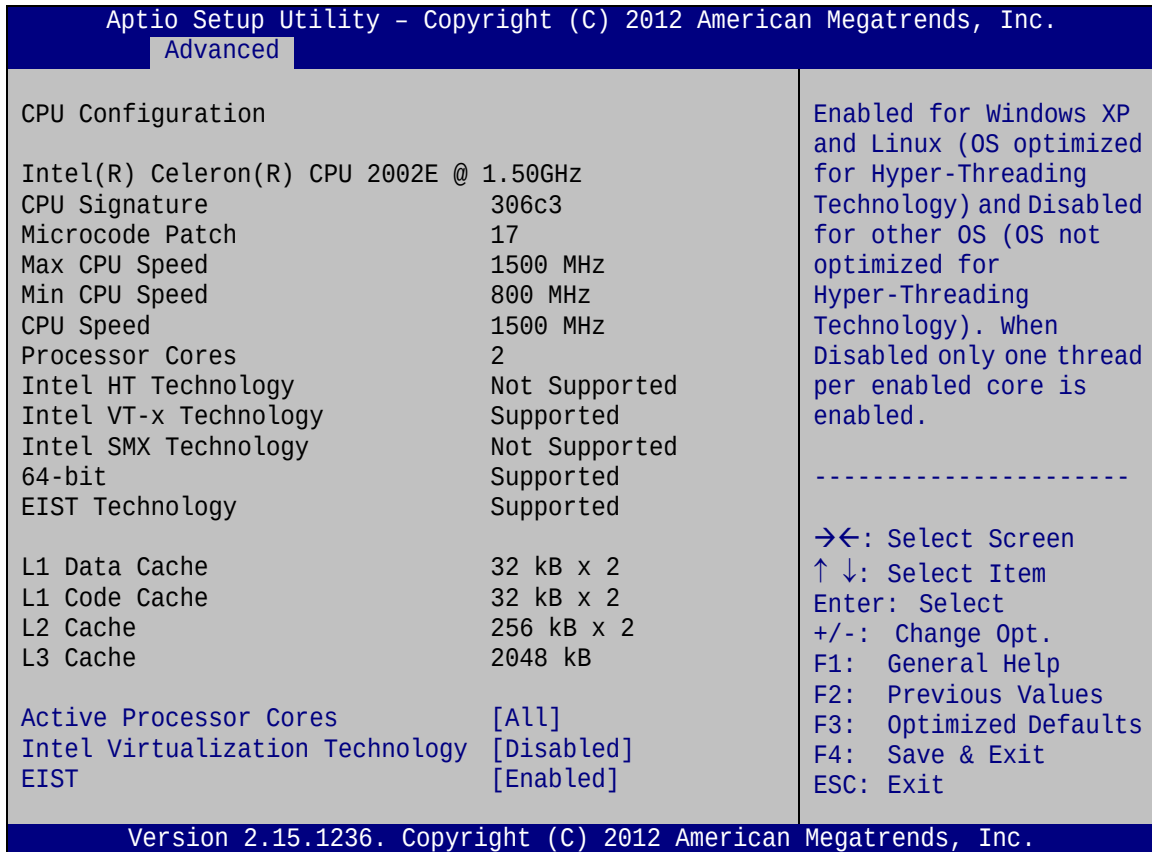
**BIOS Menu 5: Trusted Computing**➔ **Security Device Support [Disable]**

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 Cores: Lists the number of the processor core
- Intel HT Technology: Indicates if Intel HT Technology is supported by the CPU.

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- 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.
- EIST Technology: Indicates if the Enhanced Intel SpeedStep® Technology (EIST) 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.

➔ Active Processor Cores [All]

Use the **Active Processor Cores** option to configure the number of cores to enable in each processor package.

- ➔ **All** **DEFAULT** All cores are enabled in the processor package.
- ➔ **1** One of the cores is enabled in the processor package.

➔ 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.

➔ EIST [Enabled]

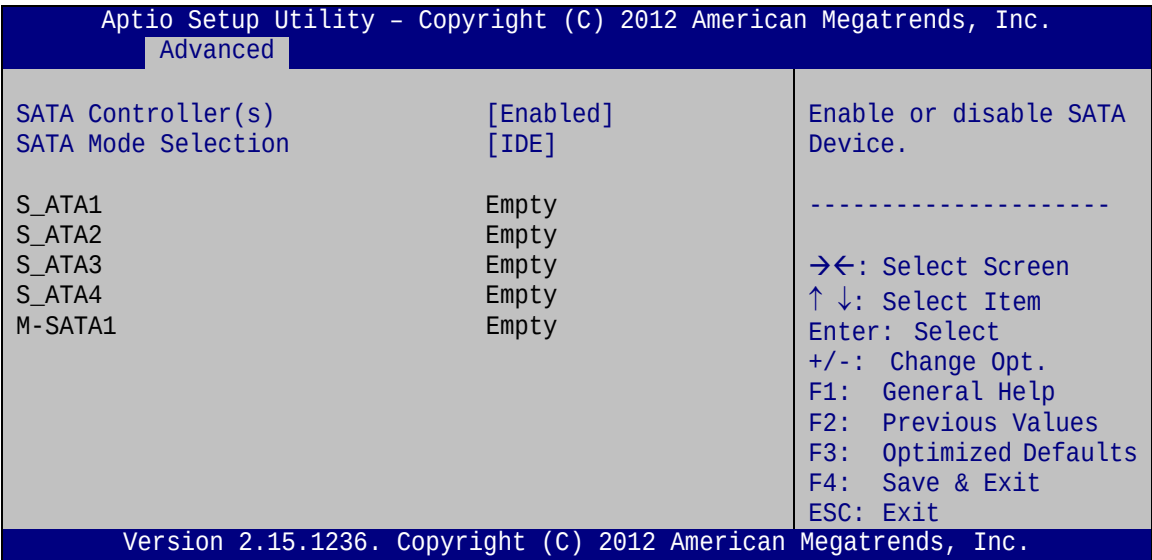
Use the **EIST** BIOS option to enable or disable the Intel SpeedStep® Technology.

- ➔ **Disabled** Disables the Intel SpeedStep® Technology.
- ➔ **Enabled** **DEFAULT** Enables the Intel SpeedStep® Technology.



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 Controller(s) [Enabled]

Use the **SATA Controller(s)** option to configure the SATA controller.

- ➔ **Enabled** **DEFAULT** Enable SATA controller.
- ➔ **Disabled** Disable SATA controller.

➔ SATA Mode Selection [IDE]

Use the **SATA Mode Selection** option to configure SATA devices.

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



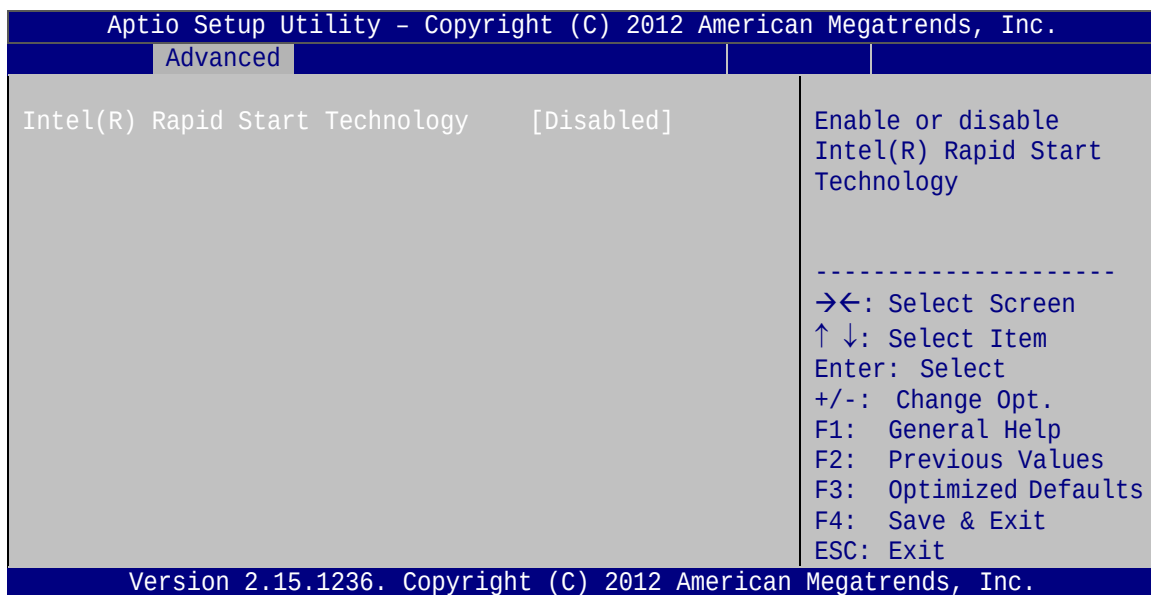
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**NOTE:**

Before accessing the RAID configuration utility, ensure to set the **Option ROM Messages** BIOS option in the **Boot** menu to **Force BIOS**. This is to allow the “Press <CTRL+I> to enter Configuration Utility.....” message to appear during POST. Press Ctrl+I when prompted to enter the RAID configuration utility.

5.3.6 Intel(R) Rapid Start Technology

Use the **Intel(R) Rapid Start Technology (BIOS Menu 8)** menu to configure Intel® Rapid Start Technology support.



BIOS Menu 8: Intel(R) Rapid Start Technology

➔ Intel(R) Rapid Start Technology [Disabled]

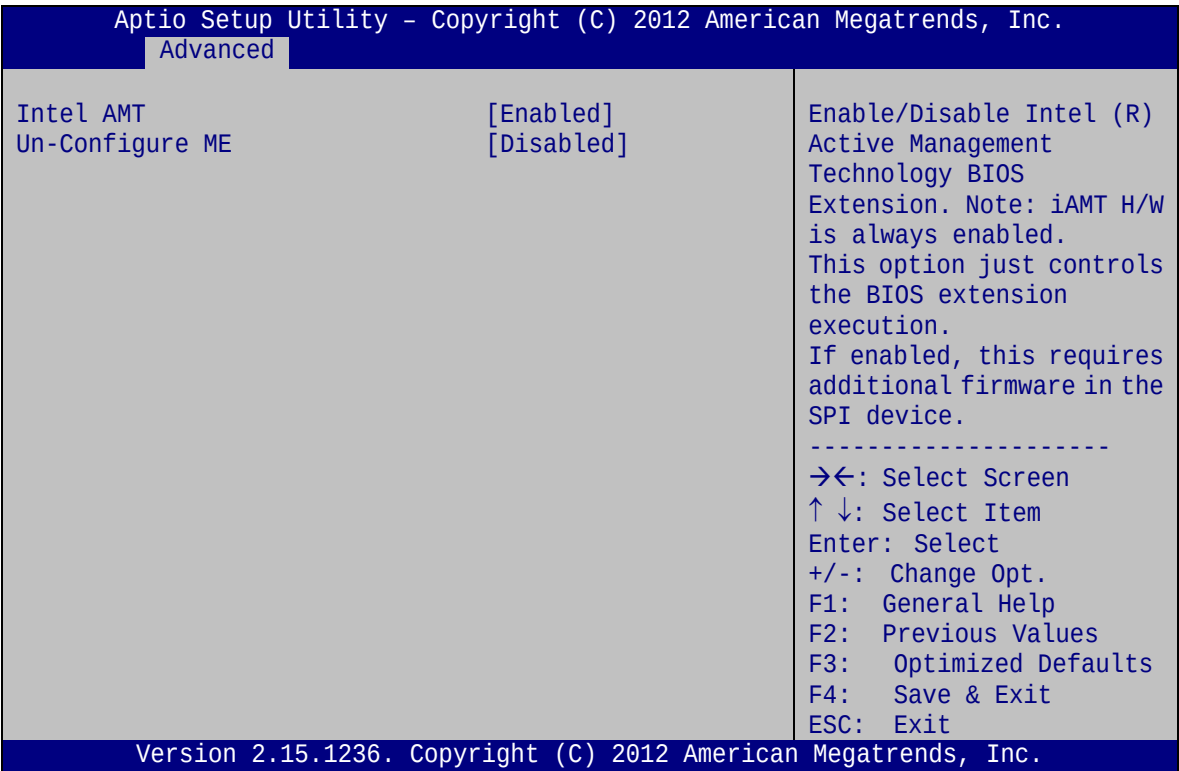
Use **Intel(R) Rapid Start Technology** option to enable or disable the Intel® Rapid Start Technology function.

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



5.3.7 AMT Configuration

The **AMT Configuration** menu (**BIOS Menu 9**) allows the Intel® AMT options to be configured.



BIOS Menu 9: 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.

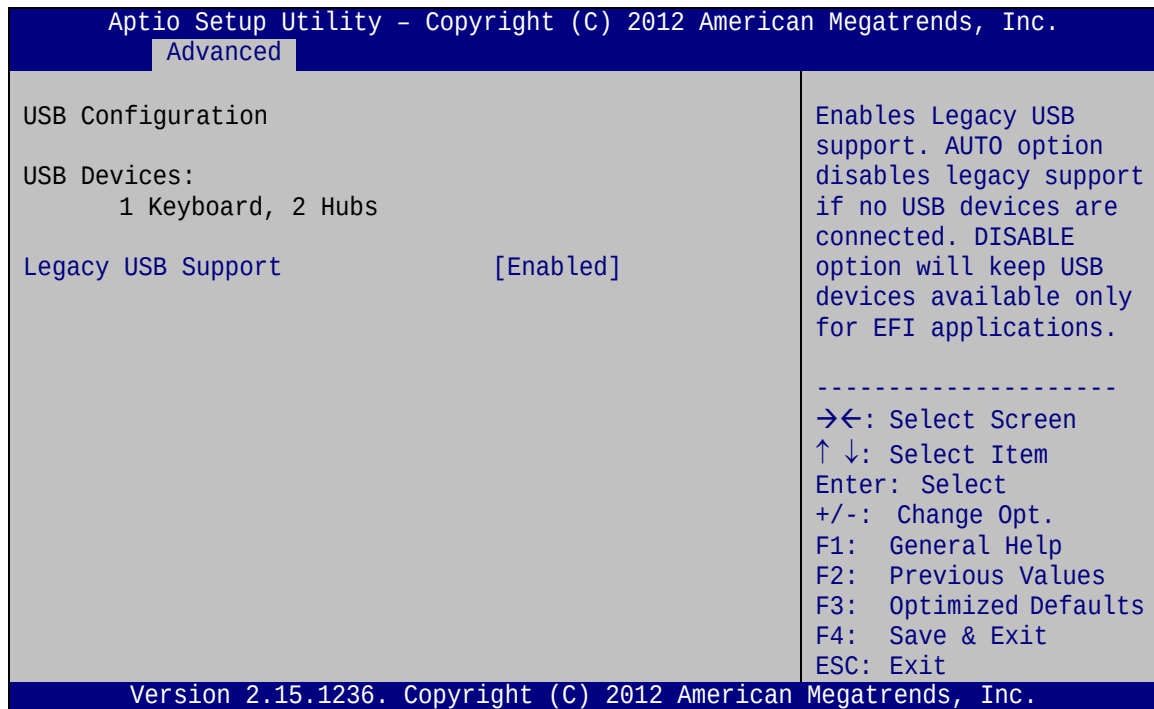
- ➔ Disabled **DEFAULT** Not perform ME unconfigure
- ➔ Enabled To perform ME unconfigure



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5.3.8 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 10**) to read USB configuration information and configure the USB settings.

**BIOS Menu 10: USB Configuration****➔ USB Devices**

The **USB Devices** 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.

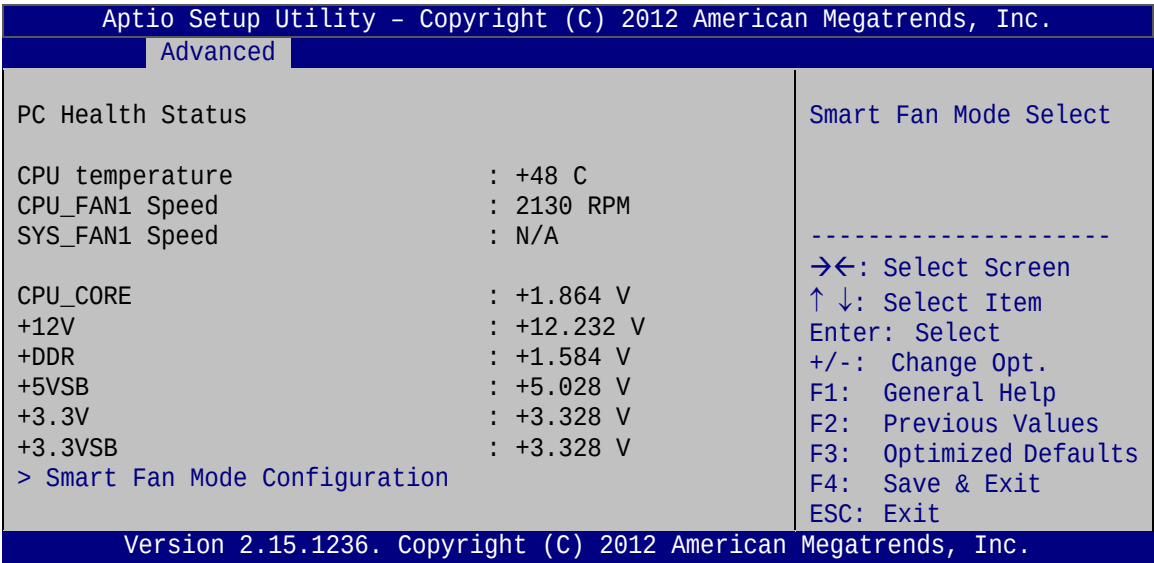
Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no 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

5.3.9 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 11**) displays the CPU temperature and CPU fan speed, and contains the fan configuration submenu.



BIOS Menu 11: iWDD H/W Monitor

➔ PC Health Status

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

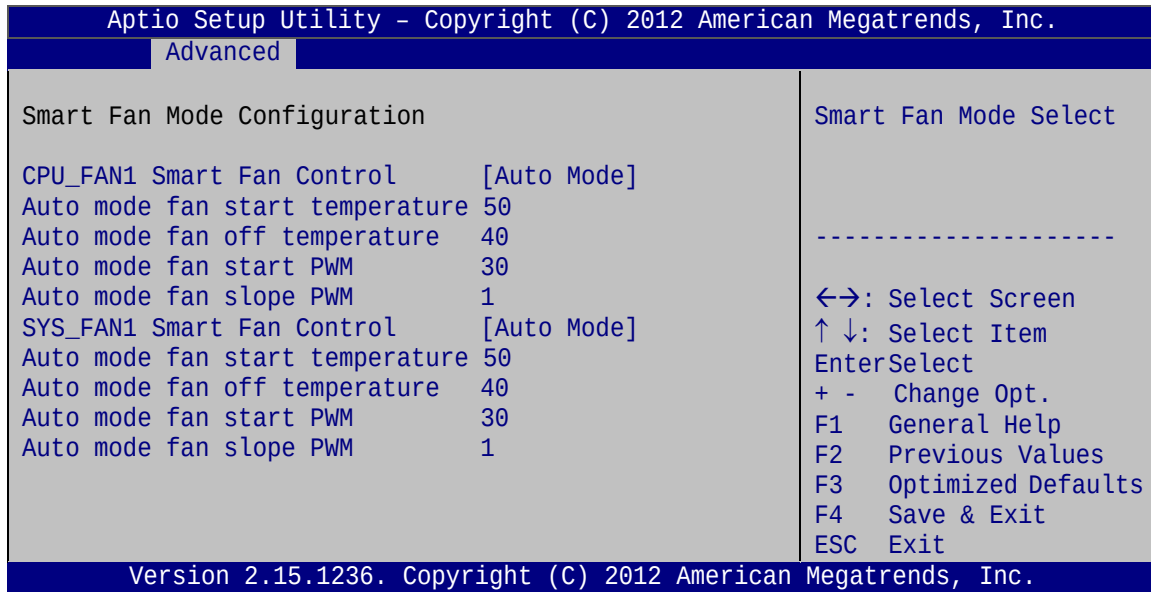
- CPU Temperature
- CPU Fan Speed
- System Fan Speed

5.3.9.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 12**) to configure the smart fan temperature and speed settings.



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BIOS Menu 12: Smar Fan Mode Configuration

➔ CPU_FAN1/SYS_FAN1 Smart Fan Control [Auto Mode]

Use the **CPU_FAN1/SYS_FAN1 Smart Fan Control** option to configure the CPU/System Smart Fan.

➔ **Manual Mode** The fan spins at the speed set in Manual Mode settings

➔ **Auto Mode** **DEFAULT** The fan adjusts its speed using Auto by Duty-Cycle settings

➔ Auto mode fan start/off temperature

Use the + or – key to change the **Auto mode fan start/off temperature** value. Enter a decimal number between 1 and 100.

➔ Auto mode fan start PWM

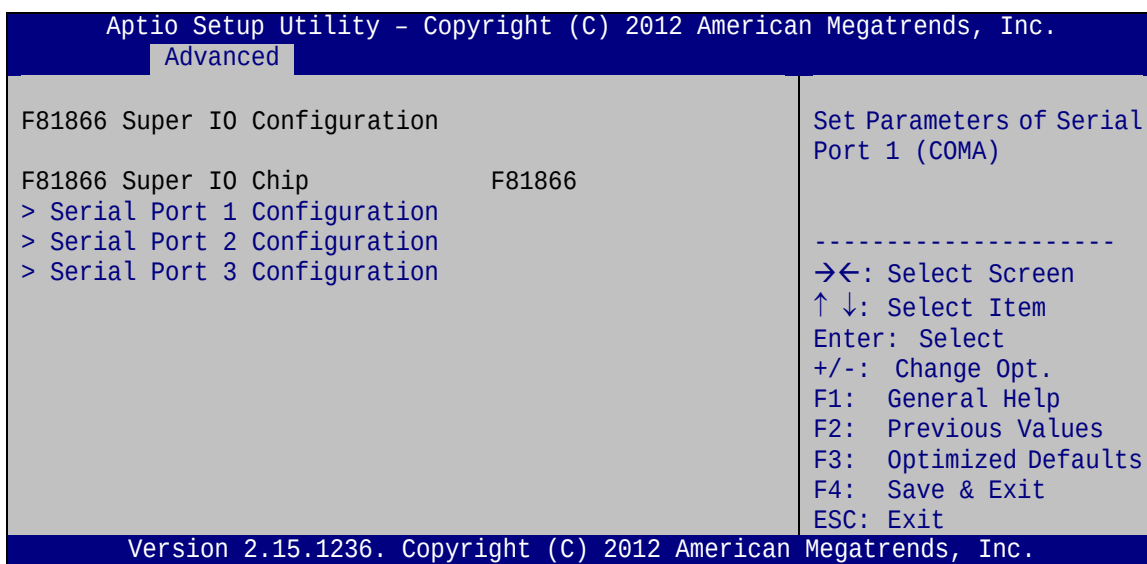
Use the + or – key to change the **Auto mode fan start PWM** value. Enter a decimal number between 1 and 100.

➔ Auto mode fan slope PWM

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

5.3.10 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 13**) to set or change the configurations for the serial ports.

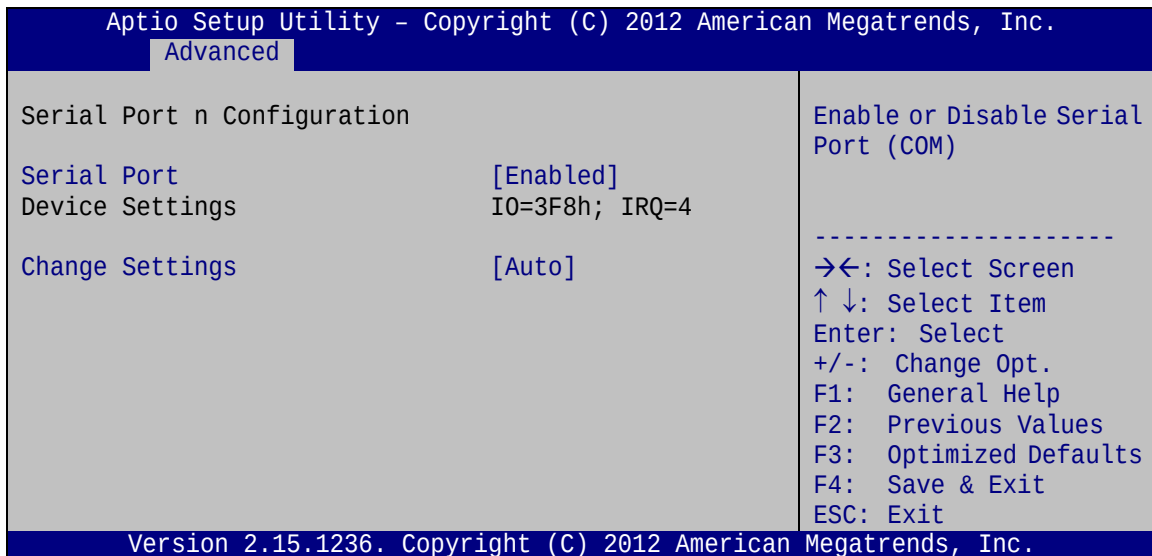


BIOS Menu 13: F81866 Super IO Configuration

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5.3.10.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 14**) to configure the serial port n.



BIOS Menu 14: Serial Port n Configuration Menu

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



- | | | |
|---|----------------------|---|
| ➔ | 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=2C0h;
IRQ=3, 4 | Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4 |
| ➔ | IO=2C8h;
IRQ=3, 4 | Serial Port I/O port address is 2C8h 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=2F8h;
IRQ=3, 4 | | Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4 |
| ➔ | IO=2C0h;
IRQ=3, 4 | | Serial Port I/O port address is 2C0h and the interrupt address is IRQ3, 4 |



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- ➔ **IO=2C8h;**
IRQ=3, 4 Serial Port I/O port address is 2C8h 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]**

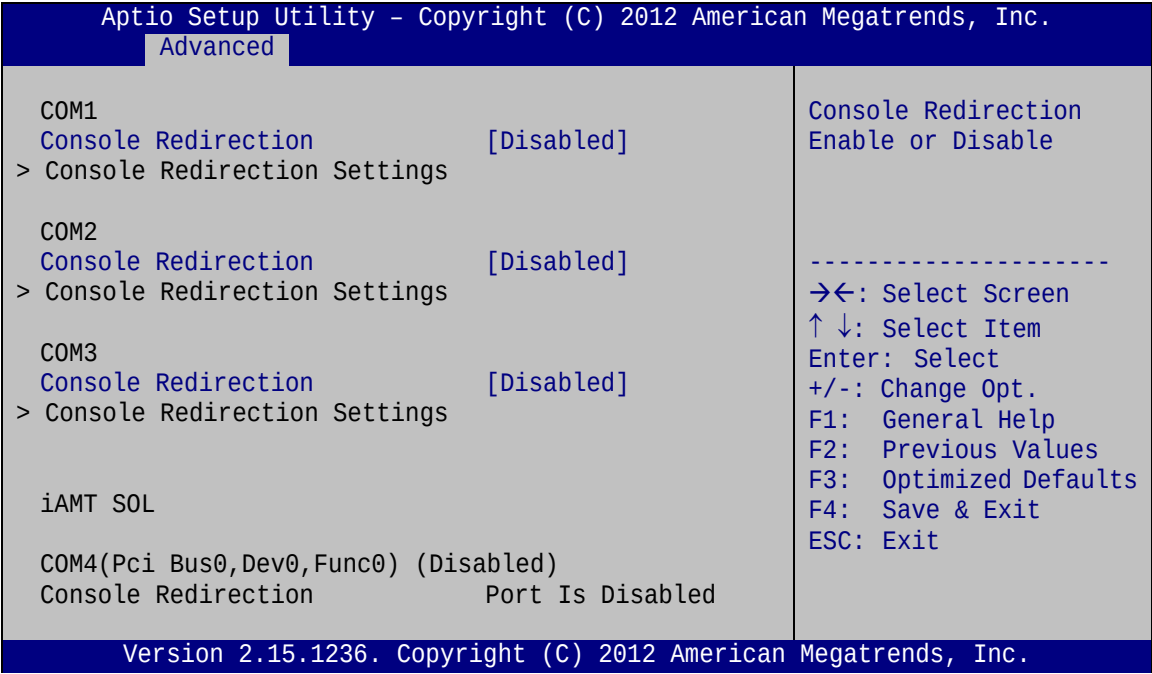
Use the **Change Settings** option to change the serial port IO port address and interrupt address.

- ➔ **Auto** **DEFAULT** The serial port IO port address and interrupt address are automatically detected.
- ➔ **IO=3E8h;**
IRQ=11 Serial Port I/O port address is 3E8h and the interrupt address is IRQ11
- ➔ **IO=3E8h;**
IRQ=10, 11 Serial Port I/O port address is 3E8h and the interrupt address is IRQ10, 11
- ➔ **IO=2E8h;**
IRQ=10, 11 Serial Port I/O port address is 2E8h and the interrupt address is IRQ10, 11
- ➔ **IO=2D0h;**
IRQ=10, 11 Serial Port I/O port address is 2D0h and the interrupt address is IRQ10, 11
- ➔ **IO=2D8h;**
IRQ=10, 11 Serial Port I/O port address is 2D8h and the interrupt address is IRQ10, 11



5.3.11 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 15**) 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 15: 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



NOTE:

The following five options appear when the **Console Redirection** option is enabled.



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➔ Terminal Type [ANSI]

Use the **Terminal Type** option to specify the remote terminal type.

- | | | | |
|---|---------|---------|-------------------------------------|
| ➔ | VT100 | | The target terminal type is VT100 |
| ➔ | VT100+ | | The target terminal type is VT100+ |
| ➔ | VT-UTF8 | | The target terminal type is VT-UTF8 |
| ➔ | ANSI | DEFAULT | The target terminal type is ANSI |

➔ Bits per second [115200]

Use the **Bits per second** option to specify the serial port transmission speed. The speed must match the other side. Long or noisy lines may require lower speeds.

- | | | | |
|---|--------|---------|--|
| ➔ | 9600 | | Sets the serial port transmission speed at 9600. |
| ➔ | 19200 | | Sets the serial port transmission speed at 19200. |
| ➔ | 38400 | | Sets the serial port transmission speed at 38400. |
| ➔ | 57600 | | Sets the serial port transmission speed at 57600. |
| ➔ | 115200 | DEFAULT | Sets the serial port transmission speed at 115200. |

➔ Data Bits [8]

Use the **Data Bits** option to specify the number of data bits.

- | | | | |
|---|---|---------|--------------------------|
| ➔ | 7 | | Sets the data bits at 7. |
| ➔ | 8 | DEFAULT | Sets the data bits at 8. |

➔ Parity [None]

Use the **Parity** option to specify the parity bit that can be sent with the data bits for detecting the transmission errors.

- | | | | |
|---|------|---------|---|
| ➔ | None | DEFAULT | No parity bit is sent with the data bits. |
|---|------|---------|---|

- ➔ **Even** The parity bit is 0 if the number of ones in the data bits is even.
- ➔ **Odd** The parity bit is 0 if the number of ones in the data bits is odd.
- ➔ **Mark** The parity bit is always 1. This option does not provide error detection.
- ➔ **Space** The parity bit is always 0. This option does not provide error detection.

➔ **Stop Bits [1]**

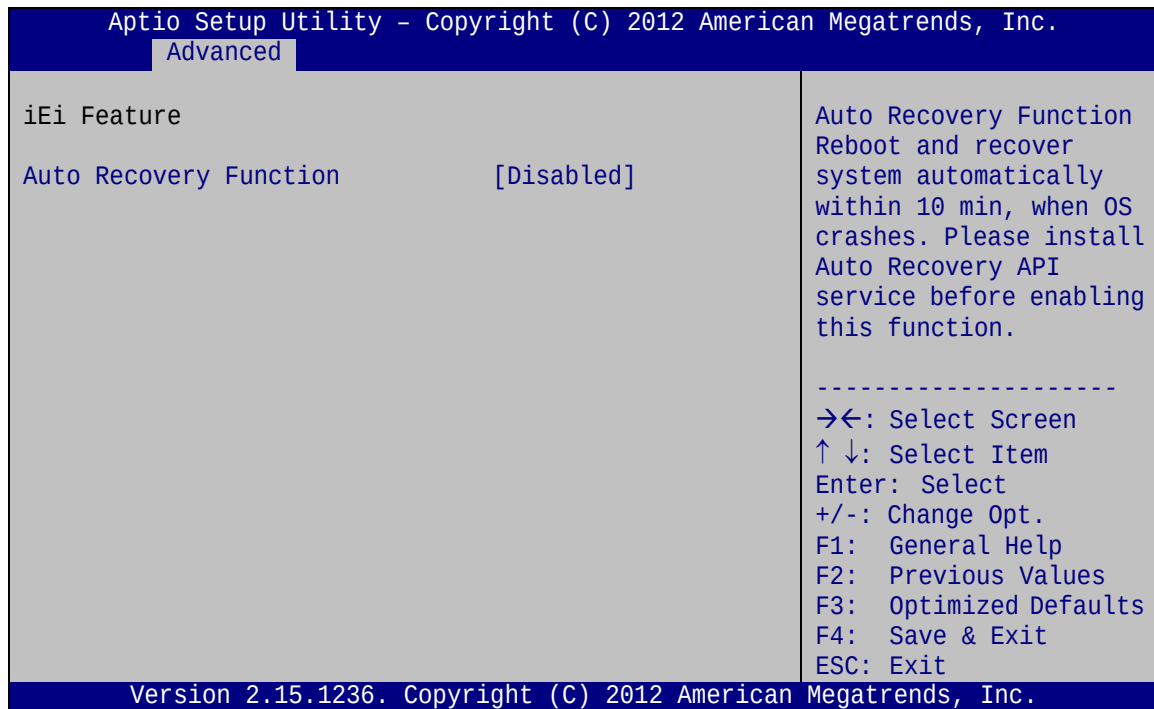
Use the **Stop Bits** option to specify the number of stop bits used to indicate the end of a serial data packet. Communication with slow devices may require more than 1 stop bit.

- ➔ **1** **DEFAULT** Sets the number of stop bits at 1.
- ➔ **2** Sets the number of stop bits at 2.

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5.3.12 iEi Feature

Use the **iEi Feature** menu (**BIOS Menu 16**) to configure One Key Recovery function.



BIOS Menu 16: 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 17**) to access the PCH IO and System Agent (SA) configuration menus.



WARNING!

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

```
Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.
Main      Advanced  Chipset      Boot      Security  Save & Exit
> PCH-IO Configuration
> System Agent (SA) Configuration

PCH Parameters
-----
-><: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

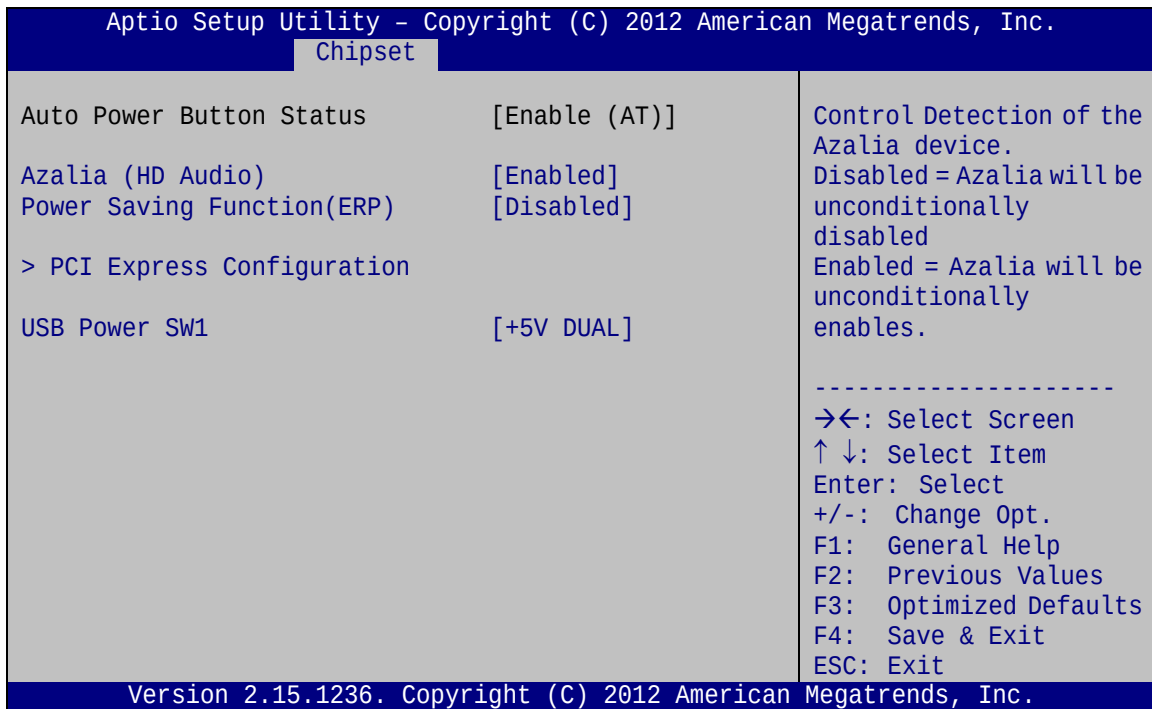
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.
```

BIOS Menu 17: Chipset

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5.4.1 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 18**) to configure the PCH parameters.



BIOS Menu 18: PCH-IO Configuration

➔ Azalia (HD Audio) [Enabled]

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

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

➔ Power Saving Function [Disabled]

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

- ➔ **Disabled DEFAULT** Power saving function is disabled
- ➔ **Enabled** Enable to reduce power consumption in system off state.



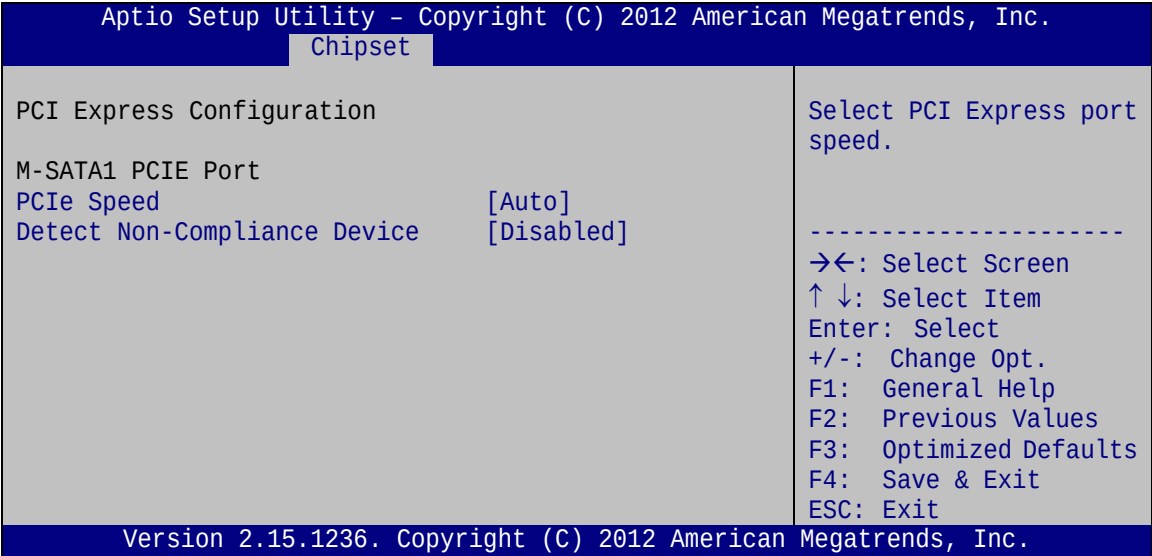
➔ USB Power SW1 [+5V DUAL]

Use the **USB Power SW1** BIOS option to configure the power of USB port by software.

- ➔ +5V Sets to +5V
- ➔ +5V DUAL **DEFAULT** Sets to +5V DUAL

5.4.1.1 PCI Express Configuration

Use the **PCI Express Configuration** menu (**BIOS Menu 19**) to select the support type of the PCI Express or PCIe Mini slots.



BIOS Menu 19: PCI Express Configuration

➔ PCIe Speed [Auto]

Use PCIe Speed option to select the speed type of the PCI Express or PCIe Mini slots.
The following options are available:

- Auto **Default**
- Gen1
- Gen2



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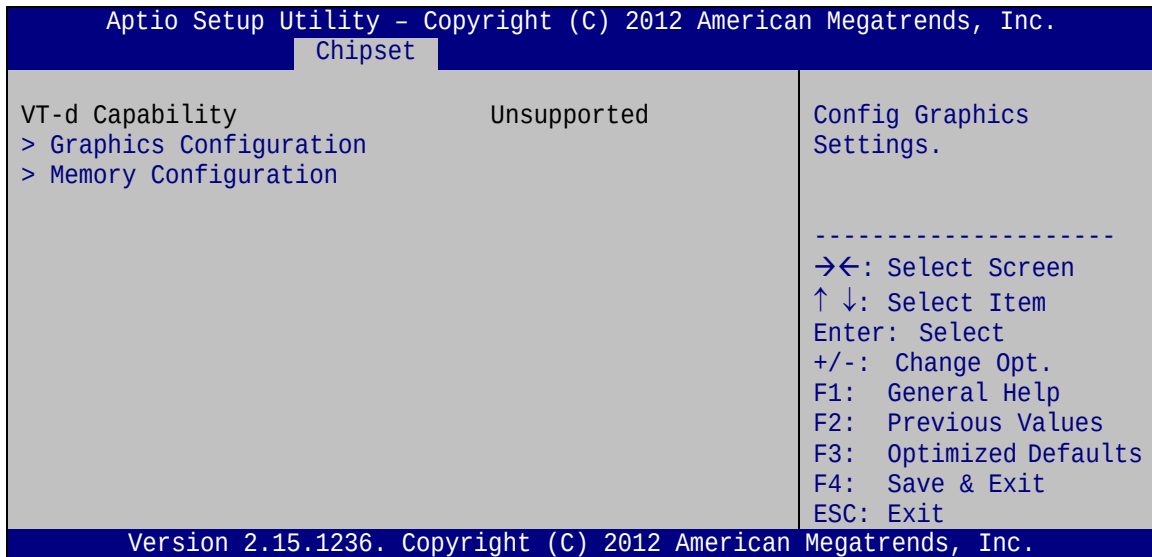
➔ Detect Non-Compliance Device [Disabled]

Use the **Detect Non-Compliance Device** option to enable or disable the “detect no-compliance PCIe device” function.

- ➔ **Disabled** **DEFAULT** Detect no-compliance PCIe device function is disabled
- ➔ **Enabled** Detect no-compliance PCIe device function is enabled. If will take more time at POST if it is enabled.

5.4.2 System Agent (SA) Configuration

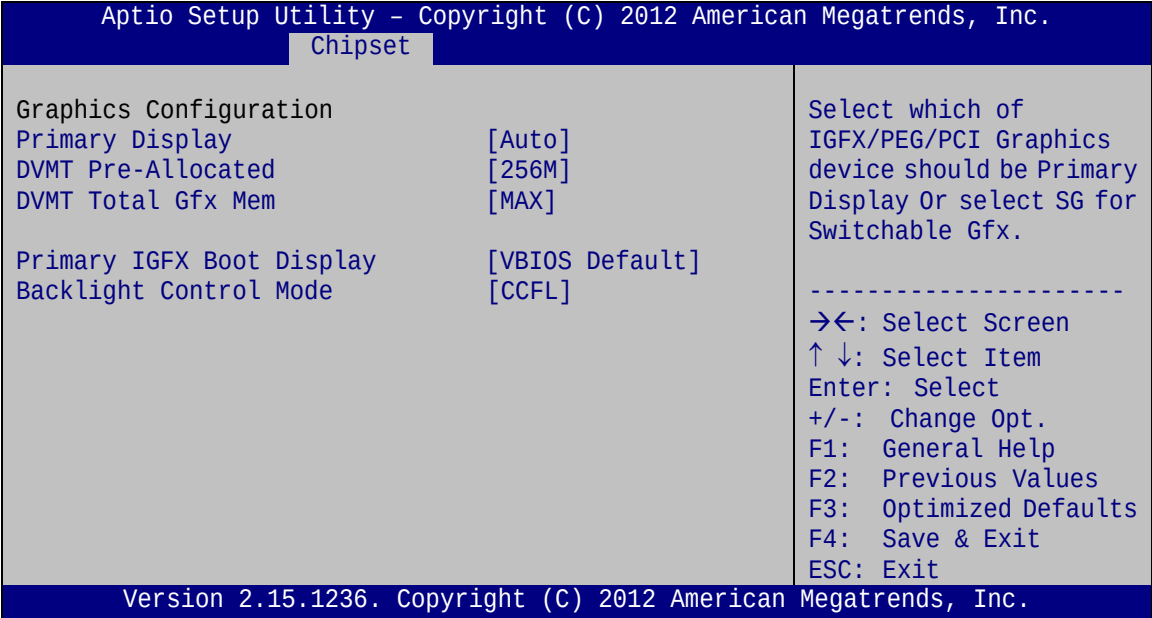
Use the **System Agent (SA) Configuration** menu (**BIOS Menu 20**) to configure the System Agent (SA) parameters.



BIOS Menu 20: System Agent (SA) Configuration

5.4.2.1 Graphics Configuration

Use the **Graphics Configuration** (**BIOS Menu 21**) menu to configure the video device connected to the system.



BIOS Menu 21: Graphics Configuration

➔ Primary Display [Auto]

Use the **Primary Display** option to select the primary graphics controller the system uses. The following options are available:

- Auto **Default**
- IGFX
- PCIE

➔ DVMT Pre-Allocated [256M]

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
- 128M
- 256M **Default**
- 512M



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➔ 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**
- CRT
- LVDS
- HDMI 1
- HDMI 2

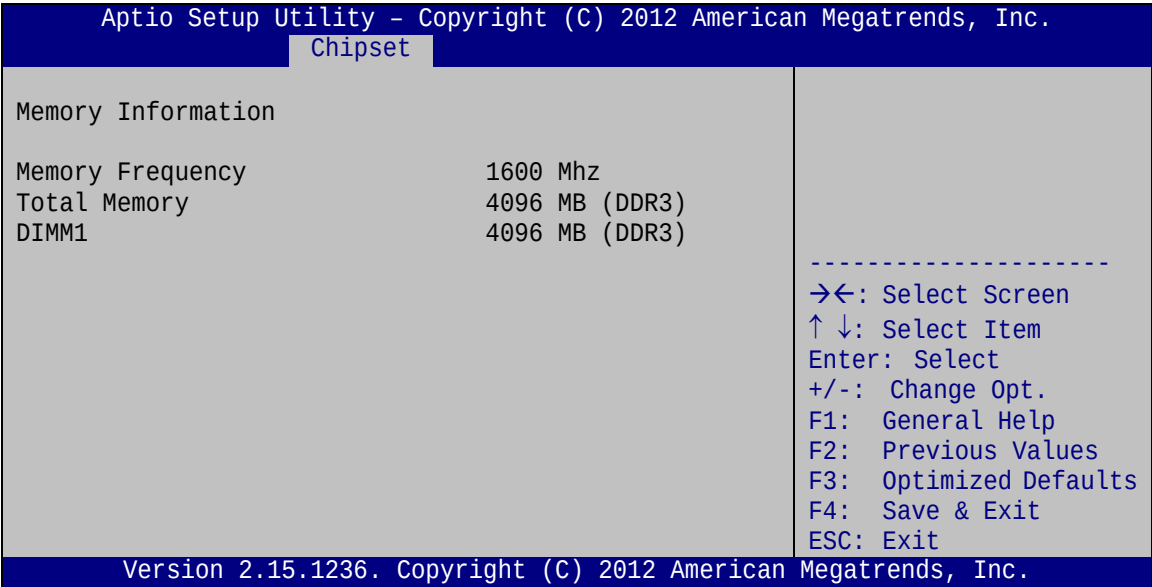
➔ Backlight Control Mode [CCFL]

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

- ➔ **LED** The LVDS backlight is brighter at high voltage level.
- ➔ **CCFL** **DEFAULT** The LVDS backlight is brighter at low voltage level.

5.4.2.2 Memory Configuration

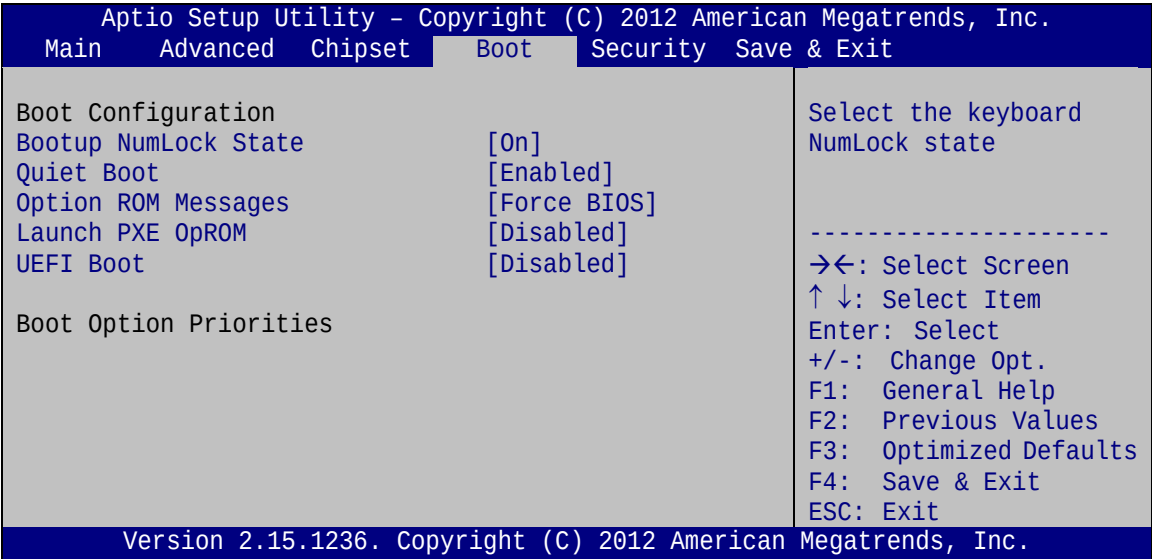
Use the **Memory Configuration** submenu (**BIOS Menu 22**) to view memory information.



BIOS Menu 22: Memory Configuration

5.5 Boot

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



BIOS Menu 23: Boot

➔ **Bootup NumLock State [On]**

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



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- ➔ **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

➔ **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.

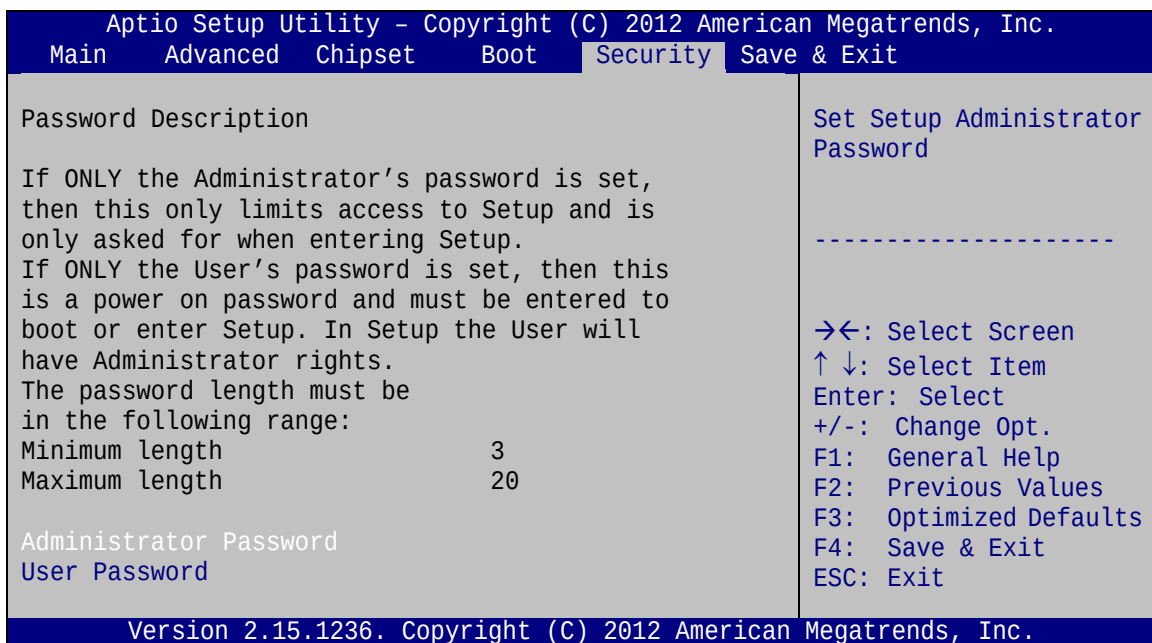
➔ UEFI Boot [Disabled]

Use the **UEFI Boot** BIOS option to allow the system to boot from the UEFI devices.

- ➔ **Disabled** **DEFAULT** Disables to boot from the UEFI devices.
- ➔ **Enabled** Enables to boot from the UEFI devices.

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 an administrator password.

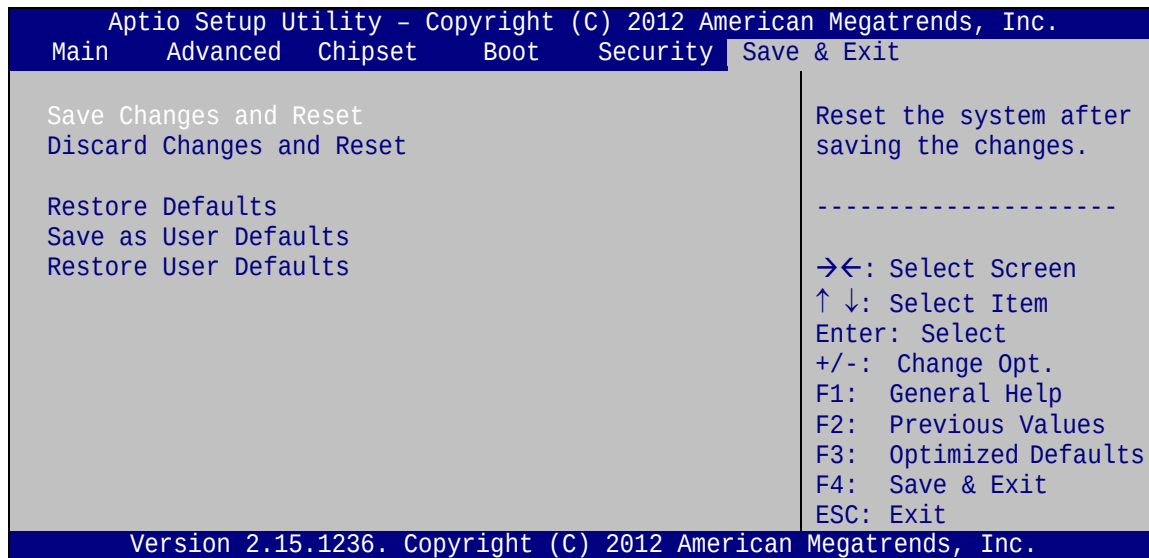
➔ User Password

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

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5.7 Save & Exit

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

**BIOS Menu 25: Save & Exit**➔ **Save Changes and Reset**

Use the **Save Changes and Reset** option to save the changes made to the BIOS options and reset the system.

➔ **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

NANO-QM871-i1 EPIC SBC

6.1 Available Drivers

All the drivers for the NANO-QM871-i1 are available on IEI Resource Download Center (<https://download.ieiworld.com>). Type NANO-QM871-i1 and press Enter to find all the relevant software, utilities, and documentation.

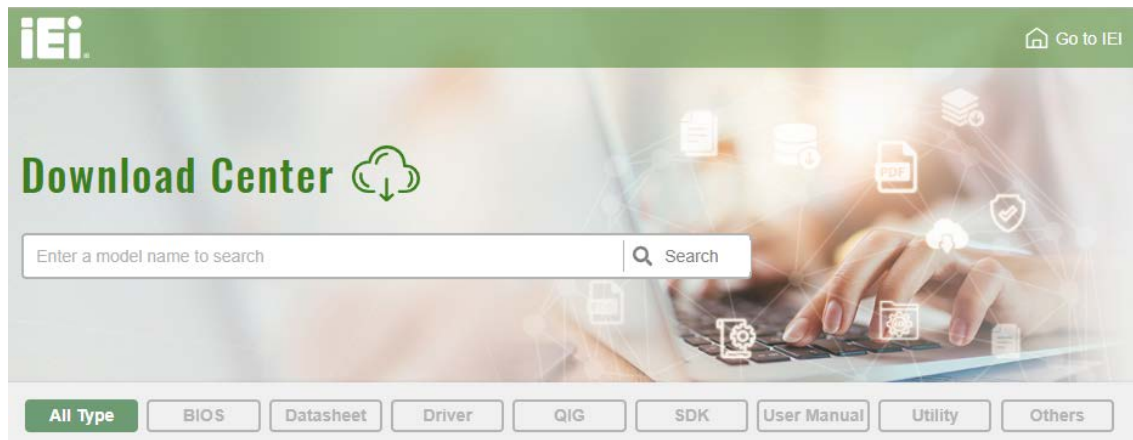
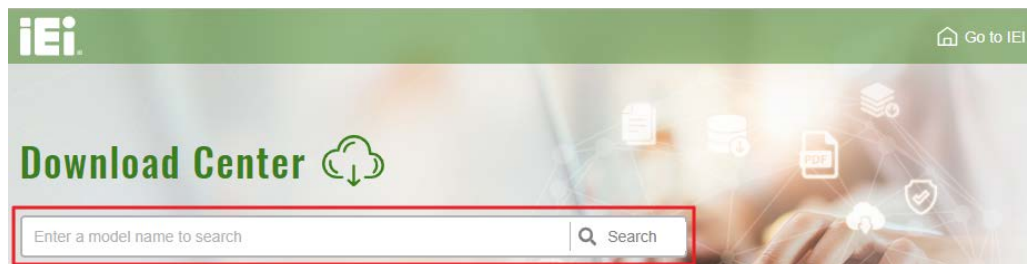


Figure 6-1: IEI Resource Download Center

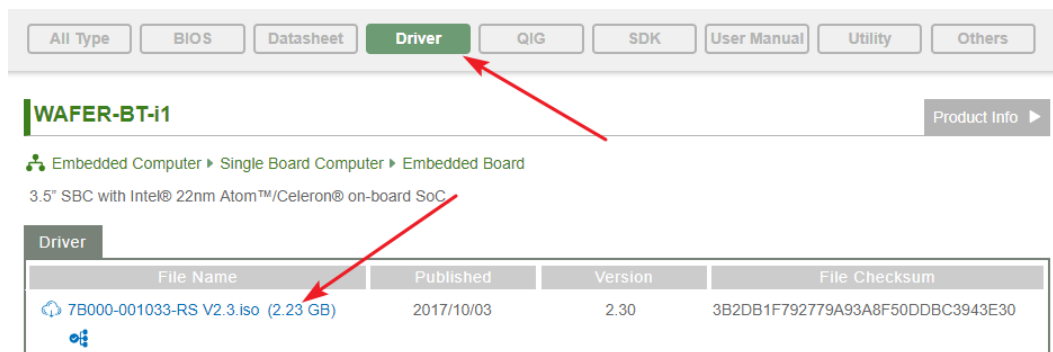
6.2 Driver Download

To download drivers from IEI Resource Download Center, follow the steps below.

Step 5: Go to <https://download.ieiworld.com>. Type NANO-QM871-i1 and press Enter.



Step 6: All product-related software, utilities, and documentation will be listed. You can choose **Driver** to filter the result.



WAFAER-BT-i1

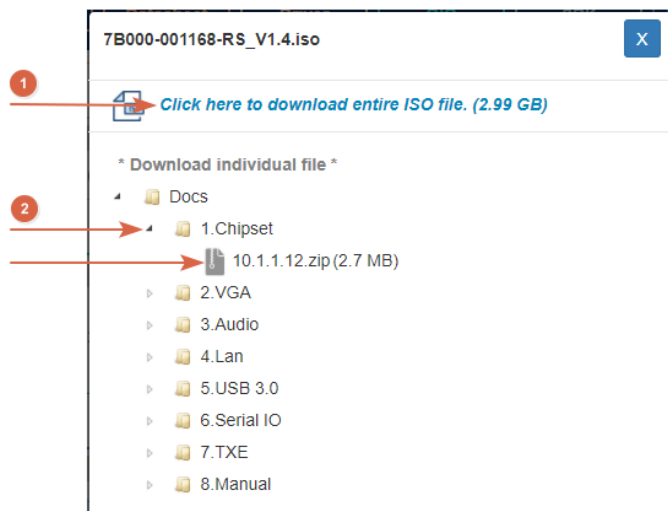
Embedded Computer ▶ Single Board Computer ▶ Embedded Board

3.5" SBC with Intel® 22nm Atom™/Celeron® on-board SoC

Driver

File Name	Published	Version	File Checksum
7B000-001033-RS V2.3.iso (2.23 GB)	2017/10/03	2.30	3B2DB1F792779A93A8F50DDBC3943E30

Step 7: Click the driver file name on the page and you will be prompted with the following window. You can download the entire ISO file (❶), or double click an individual item to find its driver file and click the file name to download (❷).

**NOTE:**

To install software from the downloaded ISO image file in Windows 8, 8.1 or 10, double-click the ISO file to mount it as a virtual drive to view its content. On Windows 7 system, an additional tool (such as Virtual CD-ROM Control Panel from Microsoft) is needed to mount the file.

Appendix

A

Regulatory Compliance

DECLARATION OF CONFORMITY

This equipment has been tested and found to comply with specifications for CE marking. If the user modifies and/or installs other devices in the equipment, the CE conformity declaration may no longer apply.

FCC WARNING

This equipment complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

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

Appendix

B

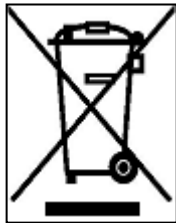
Product Disposal

**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.

- Outside the European Union – If you wish to dispose of used electrical and electronic products outside the European Union, please contact your local authority so as to comply with the correct disposal method.
- Within the European Union – The device that produces less waste and is easier to recycle is classified as electronic device in terms of the European Directive 2012/19/EU (WEEE), and must not be disposed of as domestic garbage.



EU-wide legislation, as implemented in each Member State, requires that waste electrical and electronic products carrying the mark (left) must be disposed of separately from normal household waste. This includes monitors and electrical accessories, such as signal cables or power cords. When you need to dispose of your device, please follow the guidance of your local authority, or ask the shop where you purchased the product. The mark on electrical and electronic products only applies to the current European Union Member States.

Please follow the national guidelines for electrical and electronic product disposal.

Appendix

C

BIOS Options



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

☐ System Overview	75
☐ System Date [xx/xx/xx]	75
☐ System Time [xx:xx:xx]	75
☐ ACPI Sleep State [S1 only (CPU Stop Clock)]	77
☐ Wake system with Fixed Time [Disabled]	78
☐ Security Device Support [Disable]	79
☐ Active Processor Cores [All]	81
☐ Intel Virtualization Technology [Disabled]	81
☐ EIST [Enabled]	81
☐ SATA Controller(s) [Enabled]	82
☐ SATA Mode Selection [IDE]	82
☐ Intel(R) Rapid Start Technology [Disabled]	83
☐ Intel AMT [Enabled]	84
☐ Un-Configure ME [Disabled]	84
☐ USB Devices	85
☐ Legacy USB Support [Enabled]	85
☐ PC Health Status	86
☐ CPU_FAN1/SYS_FAN1 Smart Fan Control [Auto Mode]	87
☐ Auto mode fan start/off temperature	87
☐ Auto mode fan start PWM	87
☐ Auto mode fan slope PWM	88
☐ Serial Port [Enabled]	89
☐ Change Settings [Auto]	89
☐ Serial Port [Enabled]	90
☐ Change Settings [Auto]	90
☐ Serial Port [Enabled]	91
☐ Change Settings [Auto]	91
☐ Console Redirection [Disabled]	92
☐ Terminal Type [ANSI]	93
☐ Bits per second [115200]	93
☐ Data Bits [8]	93
☐ Parity [None]	93
☐ Stop Bits [1]	94



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☐ Auto Recovery Function [Disabled]	95
☐ Azalia (HD Audio) [Enabled]	97
☐ Power Saving Function [Disabled]	97
☐ USB Power SW1 [+5V DUAL]	98
☐ PCIe Speed [Auto]	98
☐ Detect Non-Compliance Device [Disabled]	99
☐ Primary Display [Auto]	100
☐ DVMT Pre-Allocated [256M]	100
☐ DVMT Total Gfx Mem [MAX]	101
☐ Primary IGFX Boot Display [VBIOS Default]	101
☐ Backlight Control Mode [CCFL]	101
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Appendix

D

Digital I/O Interface

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The DIO connector on the NANO-QM871-i1 is interfaced to GPIO ports on the Super I/O chipset. 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

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 output value

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

E

Error Beep Code



E.1 PEI Beep Codes

Number of Beeps	Description
1	Memory not Installed
1	Memory was installed twice (InstallPeiMemory routine in PEI Core called twice)
2	Recovery started
3	DXE IPL was not found
3	DXE Core Firmware Volume was not found
4	Recovery failed
4	S3 Resume failed
7	Reset PPI is not available

E.2 DXE Beep Codes

Number of Beeps	Description
1	Invalid password
4	Some of the Architectural Protocols are not available
5	No Console Output Devices are found
5	No Console Input Devices are found
6	Flash update is failed
7	Reset protocol is not available
8	Platform PCI resource requirements cannot be met



NOTE:

If you have any question, please contact IEI for further assistance.



Appendix

F

Hazardous Materials Disclosure



F.1 RoHS II Directive (2015/863/EU)

The details provided in this appendix are to ensure that the product is compliant with the RoHS II Directive (2015/863/EU). The table below acknowledges the presences of small quantities of certain substances in the product, and is applicable to RoHS II Directive (2015/863/EU).

Please refer to the following table.

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)	Bis(2-ethylhexyl) phthalate (DEHP)	Butyl benzyl phthalate (BBP)	Dibutyl phthalate (DBP)	Diisobutyl phthalate (DIBP)
Housing	O	O	O	O	O	O	O	O	O	O
Display	O	O	O	O	O	O	O	O	O	O
Printed Circuit Board	O	O	O	O	O	O	O	O	O	O
Metal Fasteners	O	O	O	O	O	O	O	O	O	O
Cable Assembly	O	O	O	O	O	O	O	O	O	O
Fan Assembly	O	O	O	O	O	O	O	O	O	O
Power Supply Assemblies	O	O	O	O	O	O	O	O	O	O
Battery	O	O	O	O	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 Directive (EU) 2015/863.										
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 Directive (EU) 2015/863.										



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F.2 China RoHS

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/T11364-2014 與 GB/T26572-2011 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/T11364-2014 與 GB/T26572-2011 标准规定的限量要求。						