

**MODEL:  
NEX-971**

**ATX Motherboard Supports 8<sup>th</sup>/9<sup>th</sup> Gen. 14nm LGA1151 Intel® Core™ i9/i7/i5/i3, Celeron® and Pentium® Processor, DDR4, Triple Independent Displays, Dual GbE LAN, M.2, USB 3.2 Gen 2 (10Gb/s), SATA 6Gb/s, HD Audio and RoHS**

# User Manual

# Revision

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| Date              | Version | Changes                                                                                |
|-------------------|---------|----------------------------------------------------------------------------------------|
| November 19, 2020 | 1.02    | Modified the part number of the optional serial port cable in Table 2-2.               |
| July 8, 2019      | 1.01    | Added a new supported processor - 9 <sup>th</sup> generation Intel® Core™ i9 Processor |
| May 9, 2018       | 1.00    | Initial release                                                                        |

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# Manual Conventions

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## **WARNING**

Warnings appear where overlooked details may cause damage to the equipment or result in personal injury. Warnings should be taken seriously.



## **CAUTION**

Cautionary messages should be heeded to help reduce the chance of losing data or damaging the product.



## **NOTE**

These messages inform the reader of essential but non-critical information. These messages should be read carefully as any directions or instructions contained therein can help avoid making mistakes.

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# NEX-971 ATX Motherboard



Chapter

1

# Introduction

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## 1.1 Introduction



**Figure 1-1: NEX-971**

The NEX-971 is an ATX motherboard. It accepts a Socket LGA1151 Intel® Core™ i9/i7/i5/i3, Pentium® or Celeron® processor and supports four 288-pin 2666MHz dual-channel DDR4 DIMM modules up to 64 GB. The integrated Intel® Q370 chipset supports six SATA 6Gb/s drives. Moreover, the NEX-971 includes DP++, HDMI and VGA interfaces for triple independent display.

The NEX-971 provides two GbE interfaces through the Intel® I219LM (with Intel® AMT 11.0 support) and the Intel® I211AT PCIe controllers. Expansion and I/O include two PCI slots, two PCIe x8 slots, three PCIe x4 slots, two M.2 slots, two USB 3.2 Gen 1, two USB 3.2 Gen 2 and two USB 2.0 on the rear panel, four USB 2.0 via internal pin headers, two USB 3.2 Gen 1 via internal box header and six COM ports.

# NEX-971 ATX Motherboard



## 1.2 Features

Some of the NEX-971 motherboard features are listed below:

- ATX form factor
- 8<sup>th</sup>/9<sup>th</sup> generation LGA1151 Intel® Core™ i9/i7/i5/i3, Pentium® or Celeron® processor supported
- Intel® Q370 chipset
- Four 288-pin 2666/2400 MHz dual-channel DDR4 DIMMs support up to 64 GB
- Two Intel® PCIe GbE connectors (LAN1 with Intel® AMT 11.0 support)
- Supports PCI Express Generation 3.0
- Triple independent display by DP++, HDMI and VGA interfaces
- Six SATA 6Gb/s connectors support RAID 0, 1, 5, 10
- Two USB 3.2 Gen 2 ports and two USB 3.2 Gen 1 ports on the rear panel
- One M.2 A-key slot for WLAN expansion; one M.2 M-key slot for storage
- Two PCIe x8 slots
- Three PCIe x4 slots
- Two PCI slots
- Six serial ports
- The optional expansion cards provide more choices to meet user's demand
- TPM 2.0 hardware security function supported by TPM module
- High Definition Audio
- RoHS compliant

## 1.3 Connectors

The connectors on the NEX-971 are shown in the figure below.

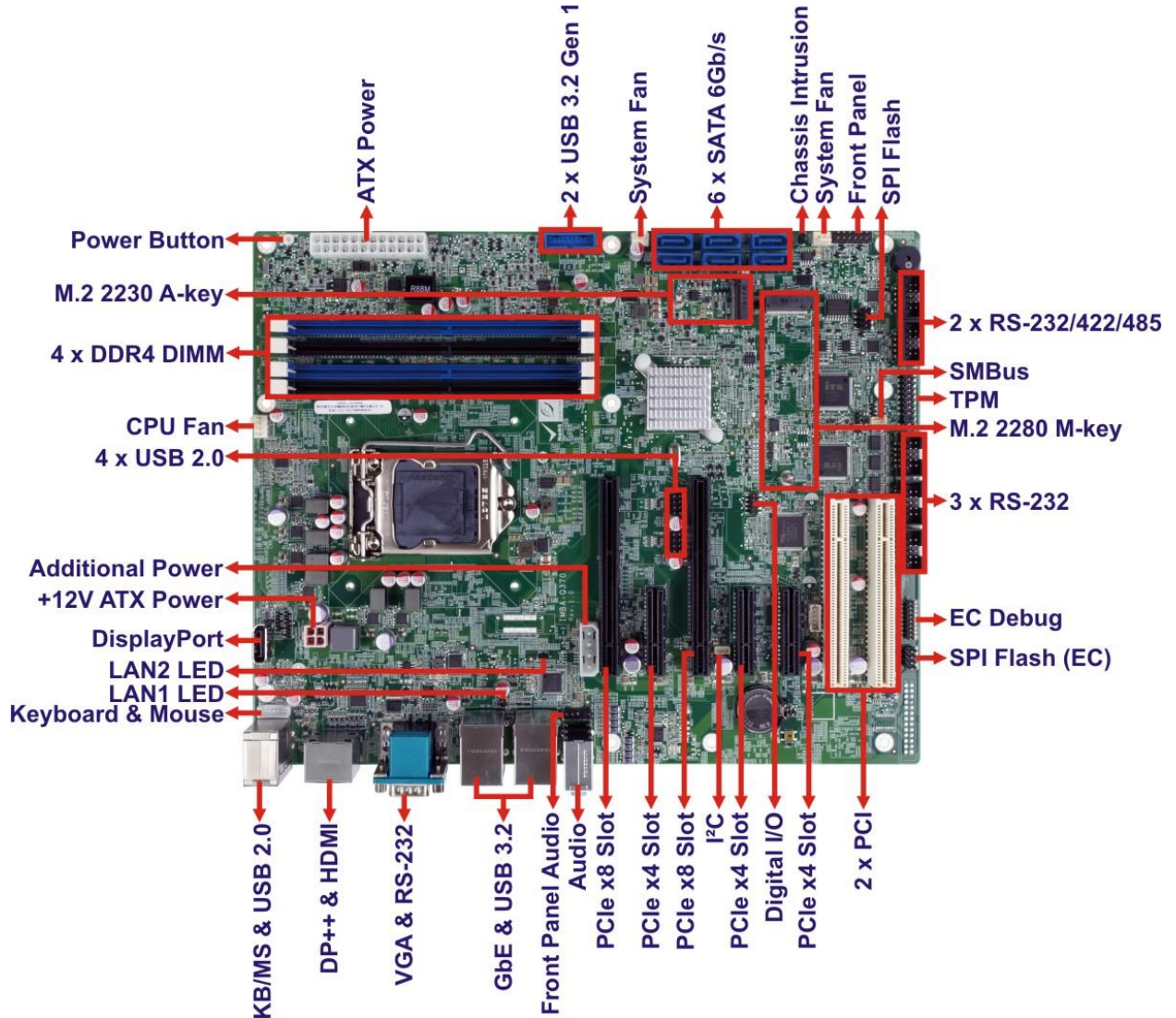


Figure 1-2: Connectors

# NEX-971 ATX Motherboard

## 1.4 Dimensions

The main dimensions of the NEX-971 are shown in the diagram below.

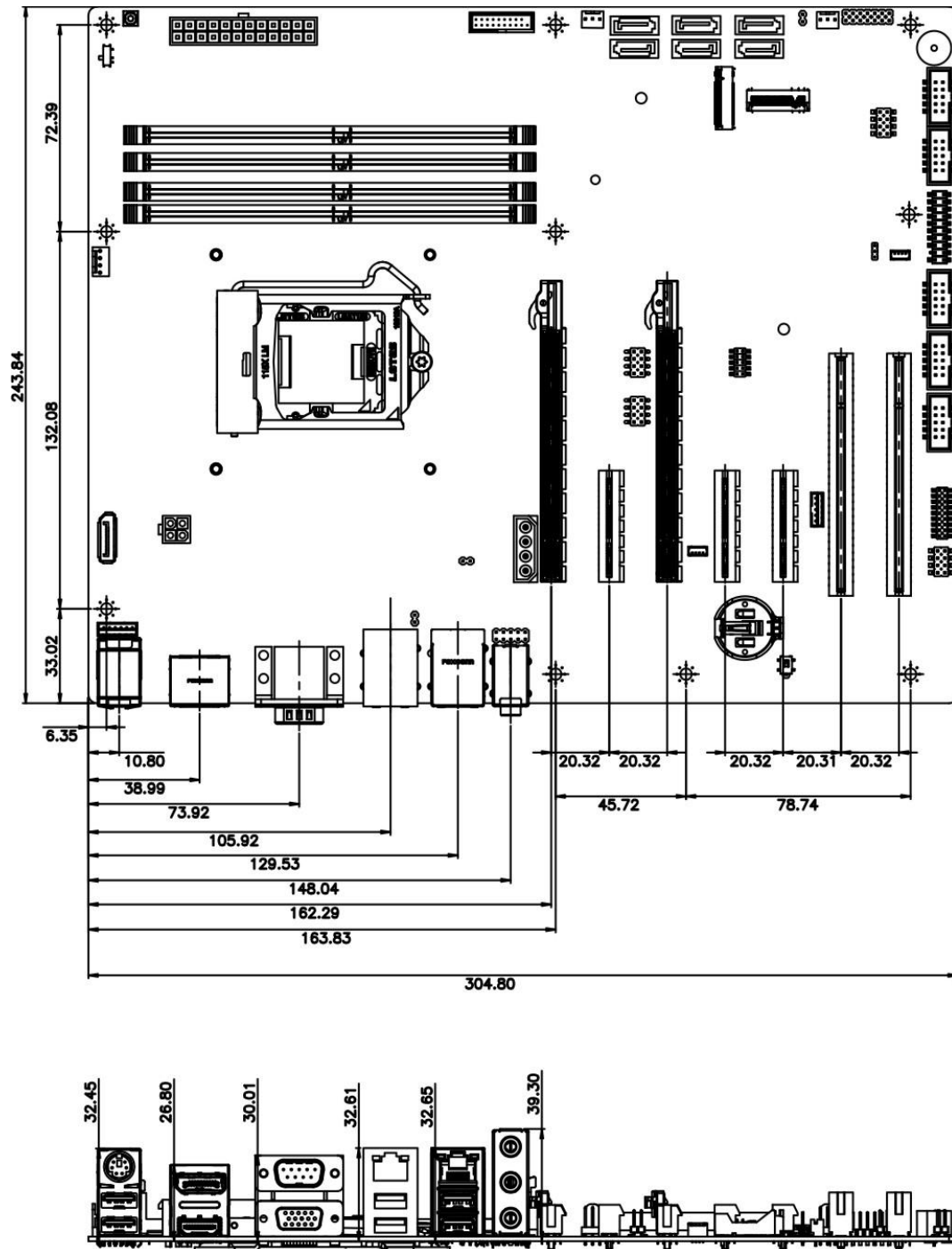


Figure 1-3: NEX-971 Dimensions (mm)

## 1.5 Data Flow

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

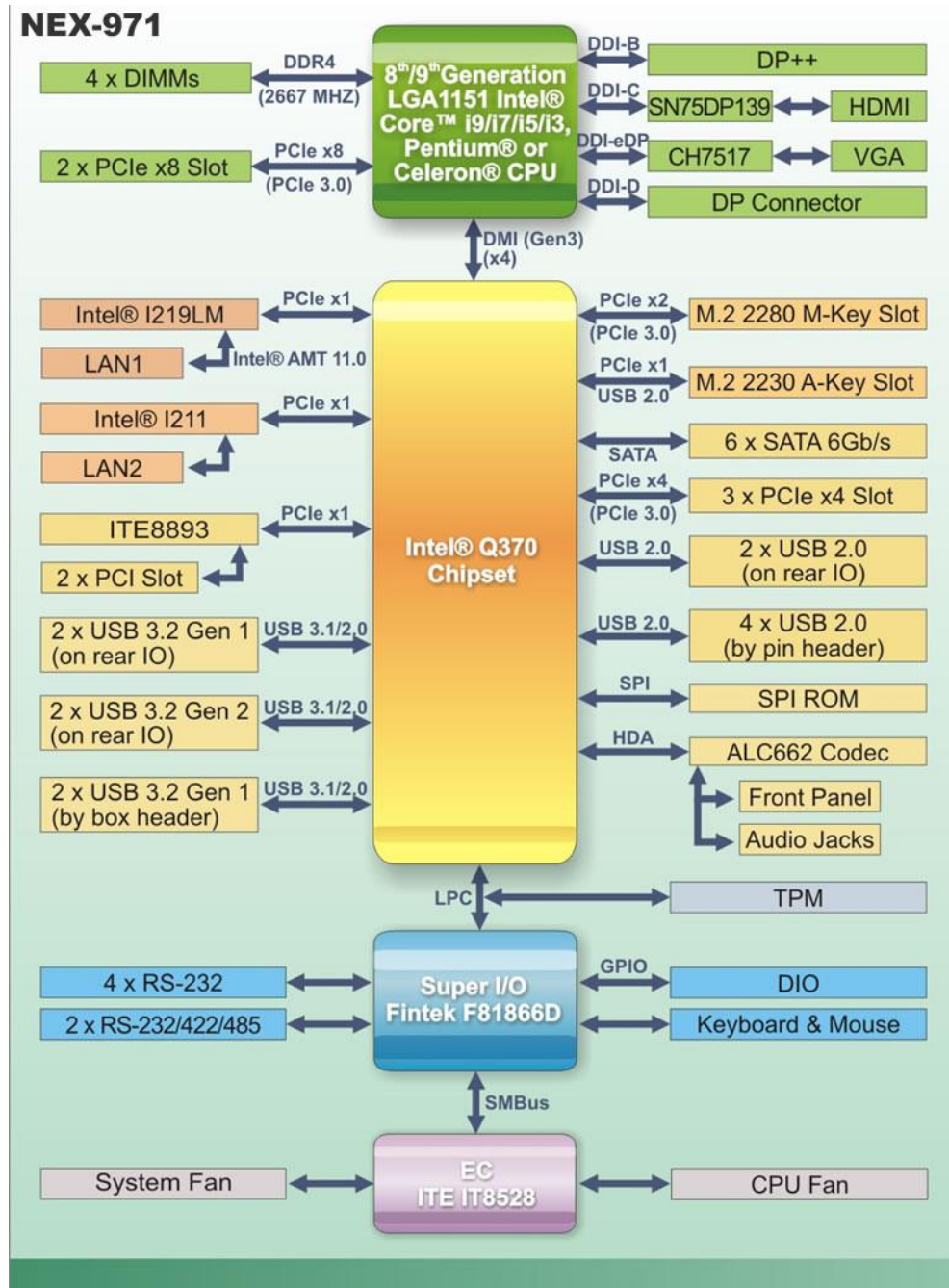


Figure 1-4: Data Flow Diagram



# NEX-971 ATX Motherboard



## 1.6 Technical Specifications

The NEX-971 technical specifications are listed below.

| Specification/Model  | NEX-971                                                                                                                                                                                  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Form Factor          | ATX                                                                                                                                                                                      |
| CPU Supported        | 8 <sup>th</sup> /9 <sup>th</sup> generation LGA1151 Intel® Core™ i9/i7/i5/i3, Pentium® or Celeron® CPU                                                                                   |
| Chipset              | Intel® Q370                                                                                                                                                                              |
| Memory               | Four 288-pin 2666/2400 MHz dual-channel unbuffered DDR4 SDRAM DIMMs supported (system max. 64 GB)                                                                                        |
| Graphics Engine      | Intel® HD Graphics Gen9 engine with 16 low-power execution units, supporting DirectX 11.3/12, OpenGL 4.3/4.4/4.5 and OpenCL 1.2/2.0/2.1                                                  |
| Display Output       | Triple independent display<br>One VGA (up to 1920x1080@60Hz)<br>One DP++ (up to 4096x2304@60Hz)<br>One HDMI (up to 4096x2304@30Hz)<br>One DisplayPort (internal, up to 4096x2304@60Hz)   |
| Ethernet Controllers | <b>LAN1:</b> Intel® I219LM PCIe GbE controller with Intel® AMT 11.0 support (LAN1_USB1)<br><b>LAN2:</b> Intel® I211AT PCIe GbE controller (LAN2_USB2)                                    |
| Audio                | Realtek ALC662 HD Audio codec supports 5.1 channels                                                                                                                                      |
| BIOS                 | UEFI BIOS                                                                                                                                                                                |
| Super I/O Controller | Fintek F81866D                                                                                                                                                                           |
| Watchdog Timer       | Software programmable supports 1~255 sec. system reset                                                                                                                                   |
| Expansions           | 2 x PCIe x8 (PCIe x16 connector interface)<br>3 x PCIe x4<br>2 x PCI<br>1 x M.2 2230 slot (A key, PCIe x1 + USB 2.0 signal)<br>1 x M.2 2280 slot (M key, PCIe x2 only, support NVMe SSD) |

| I/O Interface Connectors               |                                                                                                                                                                                                                    |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Audio Connectors</b>                | Line-in, line-out and mic-in audio jacks on rear panel<br>One internal front panel audio connector (10-pin header)                                                                                                 |
| <b>Chassis Intrusion</b>               | One 2-pin header                                                                                                                                                                                                   |
| <b>Digital I/O</b>                     | 8-bit digital I/O                                                                                                                                                                                                  |
| <b>Ethernet</b>                        | Two RJ-45 GbE ports                                                                                                                                                                                                |
| <b>Fan</b>                             | One 4-pin CPU smart fan connector<br>One 3-pin system smart fan connector (SYS_FAN1)<br>One 3-pin system fan connector                                                                                             |
| <b>Front Panel</b>                     | One 14-pin header (power LED, HDD LED, speaker, power button, reset button)                                                                                                                                        |
| <b>I<sup>2</sup>C</b>                  | One 4-pin wafer connector                                                                                                                                                                                          |
| <b>Keyboard and Mouse</b>              | One PS/2 keyboard/mouse connector<br>One internal keyboard and mouse connector (6-pin wafer)                                                                                                                       |
| <b>LAN LED</b>                         | Two 2-pin headers for LAN1 LED and LAN2 LED                                                                                                                                                                        |
| <b>Serial ATA</b>                      | Six SATA 6Gb/s connectors (support RAID 0, 1, 5, 10)                                                                                                                                                               |
| <b>Serial Ports</b>                    | One RS-232 via DB-9<br>Three RS-232 via internal box header<br>Two RS-232/422/485 via internal box header                                                                                                          |
| <b>SMBus</b>                           | One 4-pin wafer connector                                                                                                                                                                                          |
| <b>TPM</b>                             | One via 20-pin header                                                                                                                                                                                              |
| <b>USB Ports</b>                       | Two USB 3.2 Gen 2 ports on rear panel<br>Two USB 3.2 Gen 1 ports on rear panel<br>Two USB 2.0 ports on rear panel<br>Four USB 2.0 ports via internal pin header<br>Two USB 3.2 Gen 1 ports via internal box header |
| Environmental and Power Specifications |                                                                                                                                                                                                                    |
| <b>Power Supply</b>                    | AT/ATX power supply                                                                                                                                                                                                |



## NEX-971 ATX Motherboard



|                                |                                                                                                               |
|--------------------------------|---------------------------------------------------------------------------------------------------------------|
| <b>Power Consumption</b>       | 3.3V@1.65A, 5V@3.4A, 12V@8.58A, 5VSB@3.4A (4.0 GHz Intel® Core™ i7-8700K CPU with 32 GB 2600 MHz DDR4 memory) |
| <b>Operating Temperature</b>   | -20°C ~ 60°C                                                                                                  |
| <b>Storage Temperature</b>     | -30°C ~ 70°C                                                                                                  |
| <b>Operating Humidity</b>      | 5% ~ 95% (non-condensing)                                                                                     |
| <b>Physical Specifications</b> |                                                                                                               |
| <b>Dimensions</b>              | 244 mm x 305 mm                                                                                               |
| <b>Weight (GW/NW)</b>          | 1200 g/700 g                                                                                                  |

Table 1-1: NEX-971 Specifications

Chapter

**2**

# Packing List

---

# NEX-971 ATX Motherboard



## 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 NEX-971 is unpacked, please do the following:

- Follow the anti-static 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 NEX reseller or vendor the NEX-971 was purchased from or contact an NEX sales representative directly by sending an email to [sales@NEXworld.com](mailto:sales@NEXworld.com).

The NEX-971 is shipped with the following components:

| Quantity | Item and Part Number          | Image                                                                                 |
|----------|-------------------------------|---------------------------------------------------------------------------------------|
| 1        | NEX-971 single board computer |   |
| 2        | SATA cable                    |  |
| 1        | I/O shielding                 |  |
| 1        | Quick installation guide      |  |

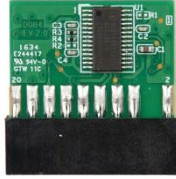
**Table 2-1: Packing List**

# NEX-971 ATX Motherboard

## 2.4 Optional Items

The following are optional components which may be separately purchased:

| Item and Part Number                                                                            | Image                                                                                 |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| PS/2 KB/MS Y-cable with bracket<br>(P/N: 19800-000075-RS)                                       |    |
| Dual-port USB cable with bracket<br>(P/N: 19800-003100-100-RS)                                  |    |
| USB 3.2 cable with bracket, 457 mm<br>(P/N: 19800-010500-200-RS)                                |    |
| SATA power cable<br>(P/N: 32102-000100-200-RS)                                                  |    |
| Serial port cable, P=2.54, 230 mm<br>(P/N: 32205-000702-200-RS)                                 |  |
| High-performance LGA1155/LGA1156 cooler kit (1U chassis compatible, 45W)<br>(P/N: CF-115XC-R10) |  |
| High-performance LGA1155/LGA1156 cooler kit (1U chassis compatible, 65W)<br>(P/N: CF-115XD-R10) |  |
| High-performance LGA1155/LGA1156 cooler kit (95W)<br>(P/N: CF-115XE-R10)                        |  |

| Item and Part Number                                                                                      | Image                                                                               |
|-----------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <p>20-pin Infineon TPM 2.0 module, software management tool, firmware v5.5</p> <p>(P/N: TPM-IN02-R20)</p> |  |

**Table 2-2: Optional Items**

# Connectors

---

## 3.1 Peripheral Interface Connectors

This chapter details all the peripheral interface connectors.

### 3.1.1 NEX-971 Layout

The figures below show all the peripheral interface connectors.

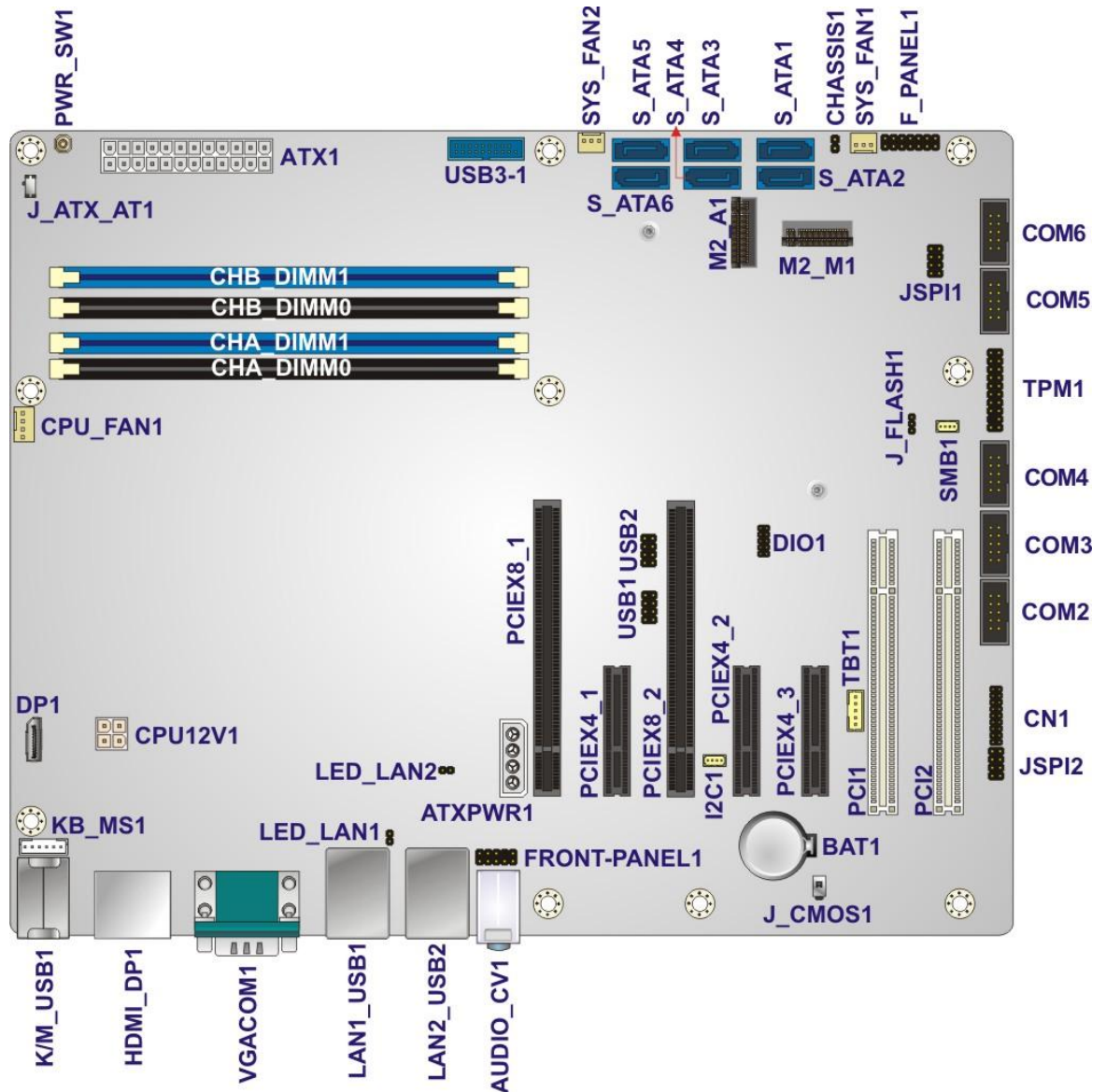


Figure 3-1: Peripheral Interface Connectors



# NEX-971 ATX Motherboard



## 3.1.2 Peripheral Interface Connectors

The table below lists all the connectors on the board.

| Connector                    | Type                        | Label                                               |
|------------------------------|-----------------------------|-----------------------------------------------------|
| +12V ATX power connector     | 4-pin Molex power connector | CPU12V1                                             |
| Additional power connector   | 4-pin connector             | ATXPWR1                                             |
| ATX power connector          | 24-pin connector            | ATX1                                                |
| Battery connector            | Battery holder              | BAT1                                                |
| Chassis intrusion connector  | 2-pin header                | CHASSIS1                                            |
| DDR4 DIMM sockets            | 288-pin socket              | CHA_DIMM0,<br>CHA_DIMM1,<br>CHB_DIMM0,<br>CHB_DIMM1 |
| Digital I/O connector        | 10-pin header               | DIO1                                                |
| DisplayPort connector        | 180° DisplayPort            | DP1                                                 |
| EC debug connector           | 18-pin header               | CN1                                                 |
| Fan connector (CPU)          | 4-pin wafer                 | CPU_FAN1                                            |
| Fan connectors (system)      | 3-pin wafer                 | SYS_FAN1,<br>SYS_FAN2                               |
| Front panel audio connector  | 10-pin header               | FRONT-PANEL1                                        |
| Front panel connector        | 14-pin header               | F_PANEL1                                            |
| I <sup>2</sup> C connector   | 4-pin wafer                 | I2C1                                                |
| Keyboard and mouse connector | 6-pin wafer                 | KB_MS1                                              |
| LAN1 LED connector           | 2-pin header                | LED_LAN1                                            |
| LAN2 LED connector           | 2-pin header                | LED_LAN2                                            |
| M.2 2230 slot                | A-key slot                  | M2_A1                                               |
| M.2 2280 slot                | M-key slot                  | M2_M1                                               |

| Connector                    | Type                 | Label                                                |
|------------------------------|----------------------|------------------------------------------------------|
| PCI slots                    | PCI slot             | PCI1, PCI2                                           |
| PCIe x4 slots                | PCIe x4 slot         | PCIEX4_1,<br>PCIEX4_2,<br>PCIEX4_3                   |
| PCIe x8 slots                | PCIe x8 slot         | PCIEX8_1,<br>PCIEX8_2                                |
| Power button                 | Push button          | PWR_SW1                                              |
| SATA 6Gb/s drive connectors  | 7-pin SATA connector | S_ATA1, S_ATA2,<br>S_ATA3, S_ATA4,<br>S_ATA5, S_ATA6 |
| Serial ports, RS-232         | 10-pin box header    | COM2, COM3,<br>COM4                                  |
| Serial ports, RS-232/422/485 | 10-pin box header    | COM5, COM6                                           |
| SMBus connector              | 4-pin wafer          | SMB1                                                 |
| SPI flash connector          | 8-pin header         | JSPI1                                                |
| SPI flash connector, EC      | 8-pin header         | JSPI2                                                |
| TPM connector                | 20-pin header        | TPM1                                                 |
| USB 2.0 connectors           | 8-pin header         | USB1, USB2                                           |
| USB 3.2 Gen 1 connector      | 19-pin box header    | USB3-1                                               |

**Table 3-1: Peripheral Interface Connectors**

### 3.1.3 External Interface Panel Connectors

The table below lists the connectors on the external I/O panel.

| Connector               | Type              | Label     |
|-------------------------|-------------------|-----------|
| Audio connectors        | Audio jacks       | AUDIO_CV1 |
| DP++ and HDMI connector | DisplayPort, HDMI | HDMI_DP1  |

# NEX-971 ATX Motherboard

| Connector                        | Type                         | Label     |
|----------------------------------|------------------------------|-----------|
| Ethernet and USB 3.2 Gen 2 ports | RJ-45, USB 3.2 Gen 2 Type A  | LAN1_USB1 |
| Ethernet and USB 3.2 Gen 1 ports | RJ-45, USB 3.2 Gen 1 Type A  | LAN2_USB2 |
| Keyboard/mouse and USB 2.0 ports | PS/2, USB 2.0                | K/M_USB1  |
| VGA and RS-232 connectors        | 15-pin female,<br>9-pin male | VGACOM1   |

**Table 3-2: Rear Panel Connectors**

## 3.2 Internal Peripheral Connectors

The section describes all of the connectors on the NEX-971.

### 3.2.1 +12V ATX Power Connector

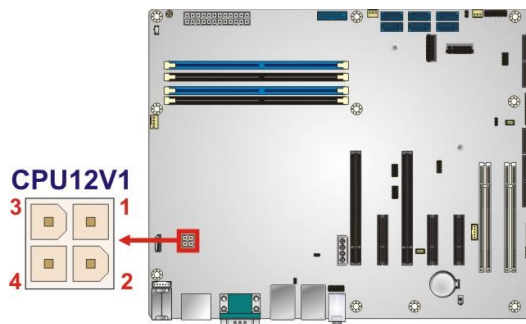
**CN Label:** CPU12V1

**CN Type:** 4-pin Molex power connector, p=4.2 mm

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

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

This connector provides power to the CPU.



**Figure 3-2: +12V ATX Power Connector Pinout Location**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | GND         | 2   | GND         |
| 3   | +12V        | 4   | +12V        |

Table 3-3: +12V ATX Power Connector Pinouts

## 3.2.2 Additional Power Connector

- CN Label:** ATXPWR1
- CN Type:** 4-pin connector, p=5.08 mm
- CN Location:** See Figure 3-3
- CN Pinouts:** See Table 3-4

The additional power connector provides extra +12V and +5V power to the system.

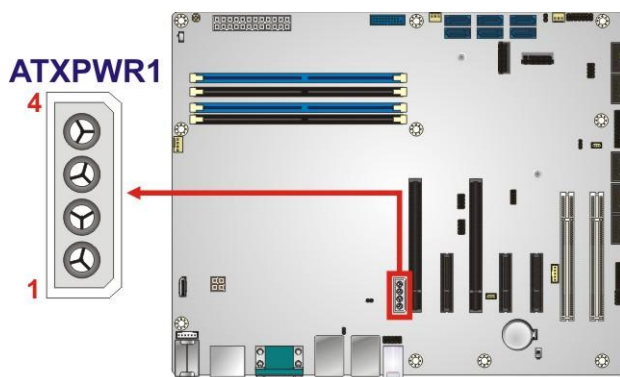


Figure 3-3: Additional Power Connector Location

| Pin | Description |
|-----|-------------|
| 1   | +12V        |
| 2   | GND         |
| 3   | GND         |
| 4   | VCC         |

Table 3-4: Additional Power Connector Pinouts

## 3.2.3 ATX Power Connector

- CN Label:** ATX1

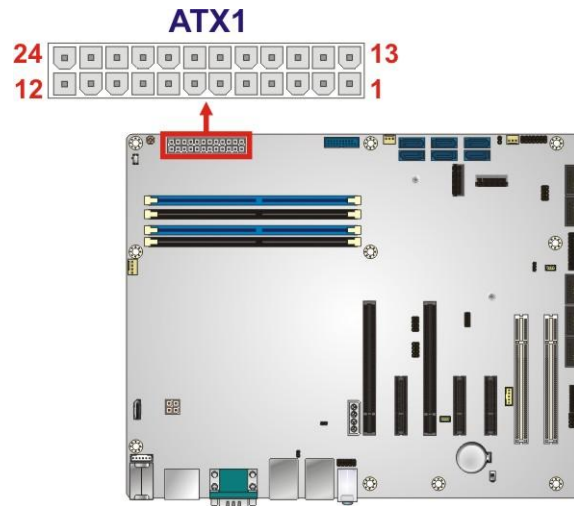
# NEX-971 ATX Motherboard

**CN Type:** 24-pin connector, p=4.2 mm

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

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

The ATX power connector connects to an ATX power supply.



**Figure 3-4: ATX Power Connector Location**

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

**Table 3-5: ATX Power Connector Pinouts**

### 3.2.4 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.



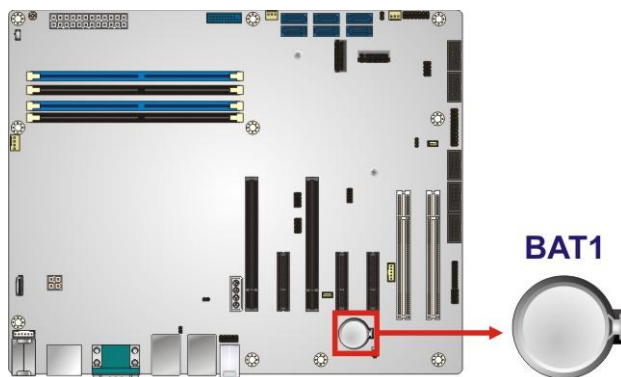
#### NOTE:

It is recommended to attach the RTC battery onto the system chassis in which the NEX-971 is installed.

---

**CN Label:**            **BAT1**  
**CN Type:**            Battery holder  
**CN Location:**      See **Figure 3-5**

A system battery is placed in the battery holder. The battery provides power to the system clock to retain the time when power is turned off.



**Figure 3-5: Battery Connector Location**

# NEX-971 ATX Motherboard

## 3.2.5 Chassis Intrusion Connector

- CN Label:** CHASSIS1
- CN Type:** 2-pin header, p=2.54 mm
- CN Location:** See Figure 3-6
- CN Pinouts:** See Table 3-6

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

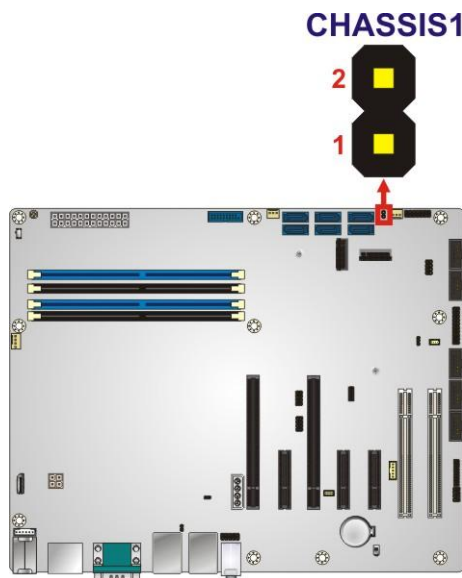


Figure 3-6: Chassis Intrusion Connector Location

| Pin | Description  |
|-----|--------------|
| 1   | +3.3VSB      |
| 2   | CHASSIS OPEN |

Table 3-6: Chassis Intrusion Connector Pinouts

### 3.2.6 DDR4 DIMM Slots

**CN Label:** CHA\_DIMM0, CHA\_DIMM1, CHB\_DIMM0, CHB\_DIMM1

**CN Type:** DDR4 DIMM slot

**CN Location:** See Figure 3-7

The DIMM slots are for DDR4 DIMM memory modules.

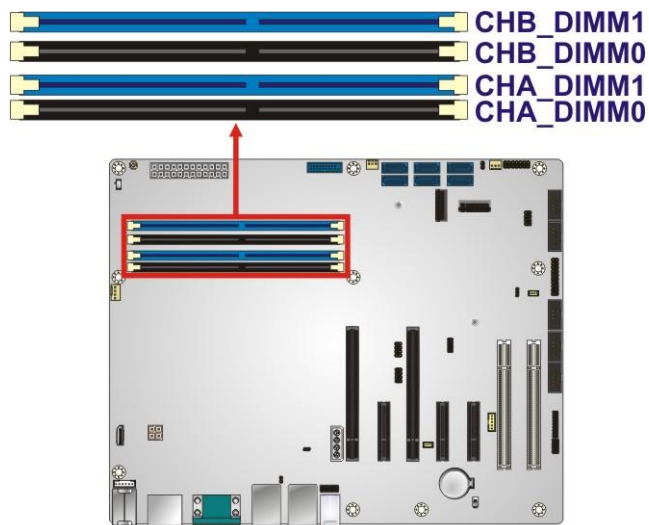


Figure 3-7: DDR4 DIMM Slot Locations

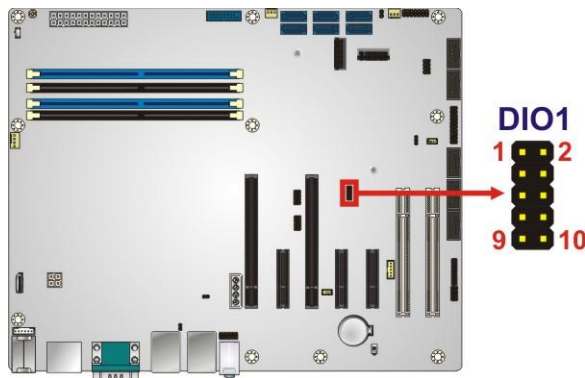


# NEX-971 ATX Motherboard

## 3.2.7 Digital I/O Connector

|                     |                       |
|---------------------|-----------------------|
| <b>CN Label:</b>    | <b>DIO1</b>           |
| <b>CN Type:</b>     | 10-pin header, p=2 mm |
| <b>CN Location:</b> | See <b>Figure 3-8</b> |
| <b>CN Pinouts:</b>  | See <b>Table 3-7</b>  |

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



**Figure 3-8: Digital I/O Connector Location**

| <b>Pin</b> | <b>Description</b> | <b>Pin</b> | <b>Description</b> |
|------------|--------------------|------------|--------------------|
| 1          | GND                | 2          | VCC                |
| 3          | Output 3           | 4          | Output 2           |
| 5          | Output 1           | 6          | Output 0           |
| 7          | Input 3            | 8          | Input 2            |
| 9          | Input 1            | 10         | Input 0            |

**Table 3-7: Digital I/O Connector Pinouts**

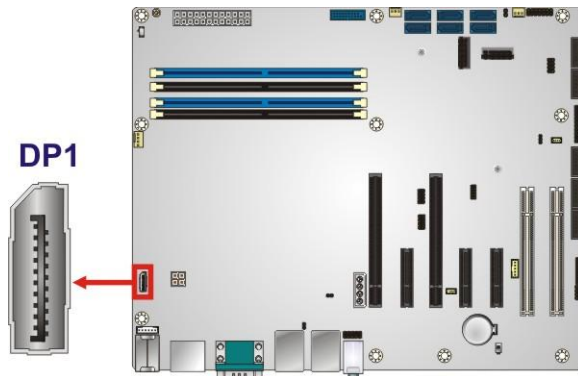
### 3.2.1 DisplayPort Connector

**CN Label:** DP1

**CN Type:** 180° DisplayPort

**CN Location:** See Figure 3-9

The internal DisplayPort connector supports DisplayPort graphics interfaces.



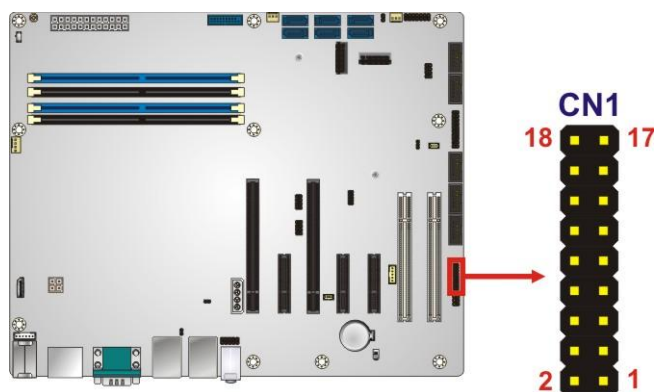
**Figure 3-9: DisplayPort Connector Location**

# NEX-971 ATX Motherboard

## 3.2.2 EC Debug Connector

|                     |                        |
|---------------------|------------------------|
| <b>CN Label:</b>    | <b>CN1</b>             |
| <b>CN Type:</b>     | 18-pin header, p=2 mm  |
| <b>CN Location:</b> | See <b>Figure 3-10</b> |
| <b>CN Pinouts:</b>  | See <b>Table 3-8</b>   |

The EC debug connector is used for EC debug.



**Figure 3-10: EC Debug Connector Location**

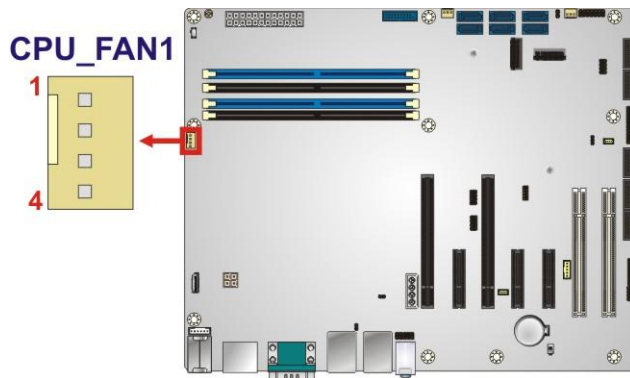
| Pin | Description | Pin | Description  |
|-----|-------------|-----|--------------|
| 1   | EC_EPP_STB# | 2   | EC_EPP_AFD#  |
| 3   | EC_EPP_PD0  | 4   | NC           |
| 5   | EC_EPP_PD1  | 6   | EC_EPP_INIT# |
| 7   | EC_EPP_PD2  | 8   | EC_EPP_SLIN# |
| 9   | EC_EPP_PD3  | 10  | GND          |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

**Table 3-8: EC Debug Connector Pinouts**

## 3.2.3 Fan Connector (CPU)

|                     |                        |
|---------------------|------------------------|
| <b>CN Label:</b>    | <b>CPU_FAN1</b>        |
| <b>CN Type:</b>     | 4-pin wafer, p=2.54 mm |
| <b>CN Location:</b> | See <b>Figure 3-11</b> |
| <b>CN Pinouts:</b>  | See <b>Table 3-9</b>   |

The fan connector attaches to a CPU cooling fan.



**Figure 3-11: CPU Fan Connector Location**

| Pin | Description |
|-----|-------------|
| 1   | GND         |
| 2   | +12V        |
| 3   | FANIO       |
| 4   | PWM         |

**Table 3-9: CPU Fan Connector Pinouts**

# NEX-971 ATX Motherboard

## 3.2.4 Fan Connectors (System)

- CN Label:** SYS\_FAN1, SYS\_FAN2
- CN Type:** 3-pin wafer, p=2.54 mm
- CN Location:** See Figure 3-12
- CN Pinouts:** See Table 3-10 and Table 3-11

Each fan connector attaches to a system cooling fan. The SYS\_FAN1 provides smart fan function.

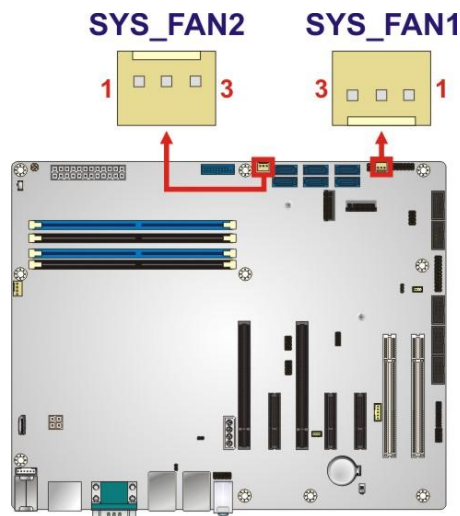


Figure 3-12: System Fan Connector Locations

| Pin | Description |
|-----|-------------|
| 1   | FANIO       |
| 2   | PWM         |
| 3   | GND         |

Table 3-10: System Fan (SYS\_FAN1) Connector Pinouts

| Pin | Description |
|-----|-------------|
| 1   | NC          |
| 2   | +12V        |
| 3   | GND         |

Table 3-11: System Fan (SYS\_FAN2) Connector Pinouts

## 3.2.5 Front Panel Audio Connector

- CN Label:** FRONT-PANEL1
- CN Type:** 10-pin header, p=2.54 mm
- CN Location:** See Figure 3-13
- CN Pinouts:** See Table 3-12

This connector connects to speakers, a microphone and an audio input.

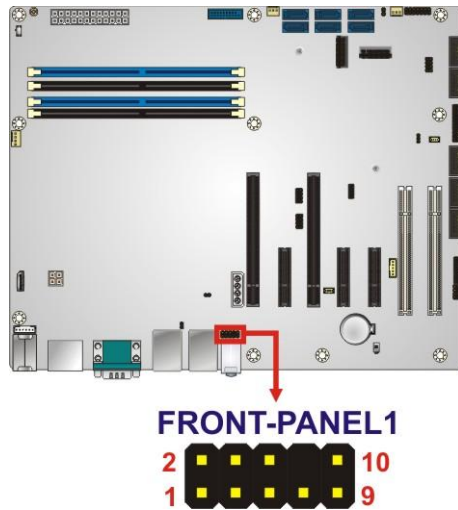


Figure 3-13: Front Panel Audio Connector Location

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | MIC2-L      | 2   | GND         |
| 3   | MIC2-R      | 4   | Presence#   |
| 5   | LINE2-R     | 6   | MIC2-JD     |
| 7   | FRONT-IO    | 8   | NC          |
| 9   | LINE2-L     | 10  | LINE2-JD    |

Table 3-12: Front Panel Audio Connector Pinouts

# NEX-971 ATX Motherboard

## 3.2.6 Front Panel Connector

- CN Label:

F\_PANEL1
- CN Type:

14-pin header, p=2.54 mm
- CN Location:

See Figure 3-14
- CN Pinouts:

See Table 3-13

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

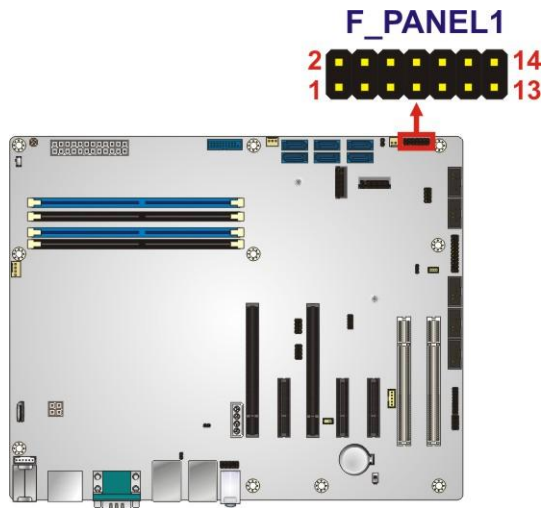


Figure 3-14: Front Panel Connector Location

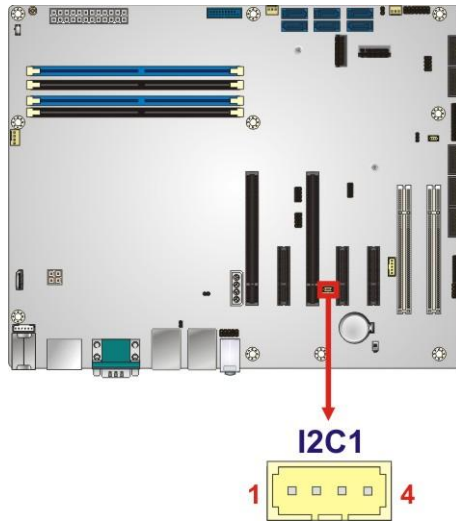
| Function      | Pin | Description | Function | Pin | Description |
|---------------|-----|-------------|----------|-----|-------------|
| Power/QTS LED | 1   | PWR_LED+    | Speaker  | 2   | SPKR+       |
|               | 3   | NC          |          | 4   | -           |
|               | 5   | PWR_LED-    |          | 6   | -           |
| Power Button  | 7   | PWR_BTN+    | Speaker  | 8   | SPKR-       |
|               | 9   | PWR_BTN-    |          | 10  | NC          |
| HDD LED       | 11  | HDD_LED+    | Reset    | 12  | RESET+      |
|               | 13  | HDD_LED-    |          | 14  | RESET-      |

Table 3-13: Front Panel Connector Pinouts

## 3.2.7 I<sup>2</sup>C Connector

|                     |                        |
|---------------------|------------------------|
| <b>CN Label:</b>    | <b>I2C1</b>            |
| <b>CN Type:</b>     | 4-pin wafer, p=1.25 mm |
| <b>CN Location:</b> | See <b>Figure 3-15</b> |
| <b>CN Pinouts:</b>  | See <b>Table 3-14</b>  |

The I<sup>2</sup>C connector is used to connect I<sup>2</sup>C-bus devices to the mainboard.



**Figure 3-15: I<sup>2</sup>C Connector Location**

| Pin | Description |
|-----|-------------|
| 1   | GND         |
| 2   | I2C_DAT     |
| 3   | I2C_CLK     |
| 4   | +5V         |

**Table 3-14: I<sup>2</sup>C Connector Pinouts**

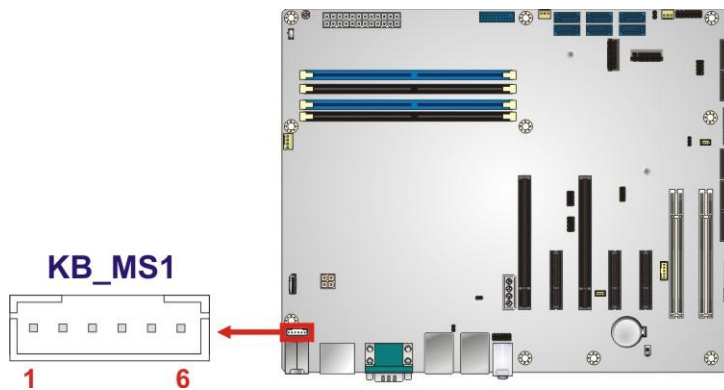


# NEX-971 ATX Motherboard

## 3.2.8 Keyboard and Mouse Connector

|                     |                        |
|---------------------|------------------------|
| <b>CN Label:</b>    | <b>KB_MS1</b>          |
| <b>CN Type:</b>     | 6-pin wafer, p=2 mm    |
| <b>CN Location:</b> | See <b>Figure 3-16</b> |
| <b>CN Pinouts:</b>  | See <b>Table 3-15</b>  |

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



**Figure 3-16: Keyboard and Mouse Connector Location**

| Pin | Description    |
|-----|----------------|
| 1   | VCC            |
| 2   | Mouse Data     |
| 3   | Mouse Clock    |
| 4   | Keyboard Data  |
| 5   | Keyboard Clock |
| 6   | GND            |

**Table 3-15: Keyboard and Mouse Connector Pinouts**

## 3.2.9 LAN LED Connectors

**CN Label:** LED\_LAN1, LED\_LAN2

**CN Type:** 2-pin header, p=2.54 mm

**CN Location:** See Figure 3-17

**CN Pinouts:** See Table 3-16 and Table 3-17

The LAN LED connectors are used to connect to the LAN LED indicators on the chassis to indicate users the link activities of the two LAN ports.

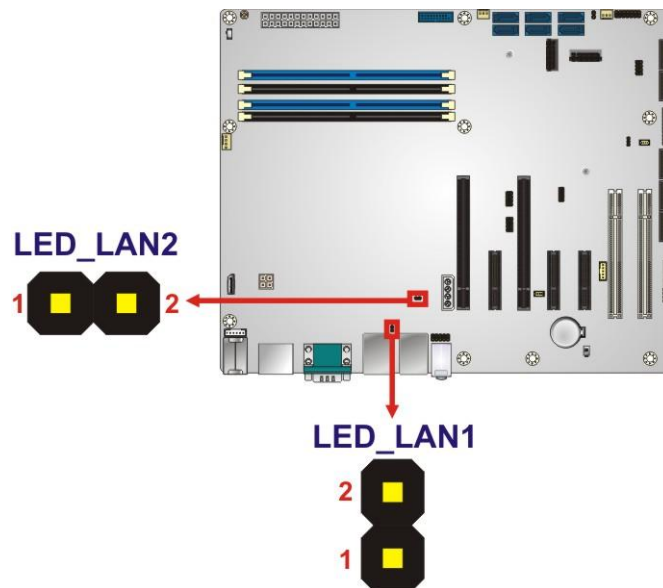


Figure 3-17: LAN LED Connector Locations

| Pin | Description        |
|-----|--------------------|
| 1   | +3.3V              |
| 2   | LAN1_LED_LINK#_ACT |

Table 3-16: LAN1 LED Connector (LED\_LAN1) Pinouts

| Pin | Description        |
|-----|--------------------|
| 1   | +3.3V              |
| 2   | LAN2_LED_LINK#_ACT |

Table 3-17: LAN2 LED Connector (LED\_LAN2) Pinouts

# NEX-971 ATX Motherboard

## 3.2.10 M.2 2230 Slot, A-Key

**CN Label:** M2\_A1

**CN Type:** M.2 A-key slot

**CN Location:** See Figure 3-18

**CN Pinouts:** See Table 3-18

The M.2 2230 slot is keyed in the A position. The M.2 slot supports PCIe x1 and USB 2.0 interfaces.

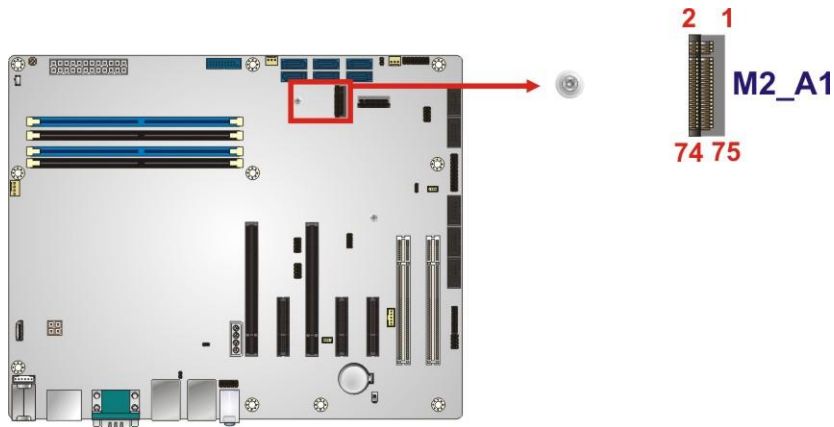


Figure 3-18: M.2 2230 Slot Location

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | GND         | 2   | +3.3V       |
| 3   | USB2_DP     | 4   | +3.3V       |
| 5   | USB2_DN     | 6   | NC          |
| 7   | GND         | 8   | NC          |
| 9   | NC          | 10  | NC          |
| 11  | NC          | 12  | NC          |
| 13  | NC          | 14  | NC          |
| 15  | NC          | 16  | NC          |
| 17  | NC          | 18  | GND         |
| 19  | NC          | 20  | NC          |
| 21  | NC          | 22  | NC          |

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 23  | GND         | 24  | GND         |
| 25  | NC          | 26  | NC          |
| 27  | NC          | 28  | NC          |
| 29  | GND         | 30  | GND         |
| 31  | NC          | 32  | NC          |
| 33  | GND         | 34  | NC          |
| 35  | PETP0       | 36  | GND         |
| 37  | PETN0       | 38  | NC          |
| 39  | GND         | 40  | NC          |
| 41  | PERP0       | 42  | NC          |
| 43  | PERN0       | 44  | NC          |
| 45  | GND         | 46  | NC          |
| 47  | PCIE_CLK+   | 48  | NC          |
| 49  | PCIE_CLK-   | 50  | NC          |
| 51  | GND         | 52  | PLT_RST     |
| 53  | NC          | 54  | NC          |
| 55  | PCIE_WAKE   | 56  | W_DIS       |
| 57  | GND         | 58  | NC          |
| 59  | NC          | 60  | NC          |
| 61  | NC          | 62  | NC          |
| 63  | GND         | 64  | NC          |
| 65  | NC          | 66  | NC          |
| 67  | NC          | 68  | CLK_REQ     |
| 69  | GND         | 70  | +3.3V       |
| 71  | NC          | 72  | +3.3V       |
| 73  | NC          | 74  | +3.3V       |
| 75  | GND         |     |             |

**Table 3-18: M.2 2230 Connector Pinouts**

# NEX-971 ATX Motherboard

## 3.2.11 M.2 2280 Slot, M-Key

**CN Label:** M2\_M1  
**CN Type:** M.2 M-key slot  
**CN Location:** See Figure 3-19  
**CN Pinouts:** See Table 3-19

The M.2 2280 slot is keyed in the B position. The M.2 slot supports PCIe x2 interfaces.

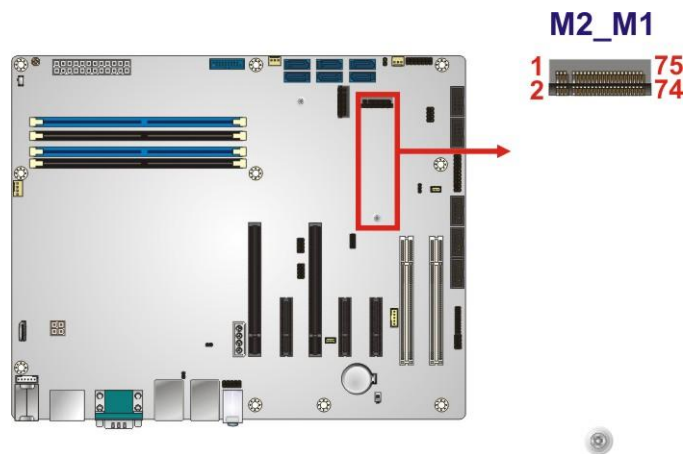


Figure 3-19: M.2 2280 Slot Location

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | GND         | 2   | +3.3V       |
| 3   | USB2_DP     | 4   | +3.3V       |
| 5   | USB2_DN     | 6   | NC          |
| 7   | GND         | 8   | NC          |
| 9   | NC          | 10  | NC          |
| 11  | NC          | 12  | NC          |
| 13  | NC          | 14  | NC          |
| 15  | NC          | 16  | NC          |
| 17  | NC          | 18  | GND         |
| 19  | NC          | 20  | NC          |
| 21  | NC          | 22  | NC          |

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 23  | GND         | 24  | GND         |
| 25  | NC          | 26  | NC          |
| 27  | NC          | 28  | NC          |
| 29  | GND         | 30  | GND         |
| 31  | NC          | 32  | NC          |
| 33  | GND         | 34  | NC          |
| 35  | PETP0       | 36  | GND         |
| 37  | PETN0       | 38  | NC          |
| 39  | GND         | 40  | NC          |
| 41  | PERP0       | 42  | NC          |
| 43  | PERN0       | 44  | NC          |
| 45  | GND         | 46  | NC          |
| 47  | PCIE_CLK+   | 48  | NC          |
| 49  | PCIE_CLK-   | 50  | NC          |
| 51  | GND         | 52  | PLT_RST     |
| 53  | NC          | 54  | NC          |
| 55  | PCIE_WAKE   | 56  | W_DIS       |
| 57  | GND         | 58  | NC          |
| 59  | NC          | 60  | NC          |
| 61  | NC          | 62  | NC          |
| 63  | GND         | 64  | NC          |
| 65  | NC          | 66  | NC          |
| 67  | NC          | 68  | CLK_REQ     |
| 69  | GND         | 70  | +3.3V       |
| 71  | NC          | 72  | +3.3V       |
| 73  | NC          | 74  | +3.3V       |
| 75  | GND         |     |             |

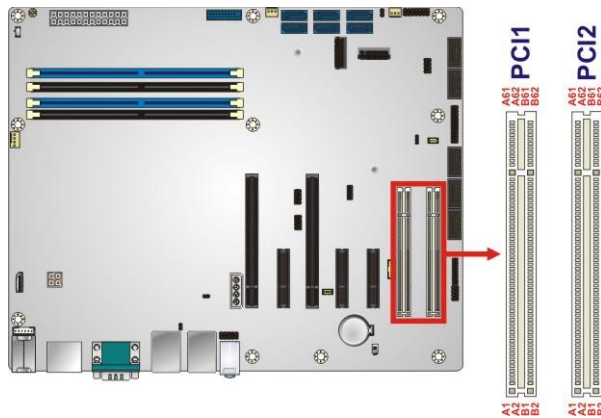
**Table 3-19: M.2 2280 Connector Pinouts**

# NEX-971 ATX Motherboard

## 3.2.12 PCI Slots

|                     |                        |
|---------------------|------------------------|
| <b>CN Label:</b>    | <b>PCI1, PCI2</b>      |
| <b>CN Type:</b>     | PCI Slot               |
| <b>CN Location:</b> | See <b>Figure 3-20</b> |

The PCI slot enables a PCI expansion module to be connected to the board.



**Figure 3-20: PCI Slot Locations**

## 3.2.13 PCIe x4 Slots

|                     |                                     |
|---------------------|-------------------------------------|
| <b>CN Label:</b>    | <b>PCIEX4_1, PCIEX4_2, PCIEX4_3</b> |
| <b>CN Type:</b>     | PCIe x4 slot                        |
| <b>CN Location:</b> | See <b>Figure 3-21</b>              |

The PCIe x4 expansion card slots are for PCIe x4 expansion cards.

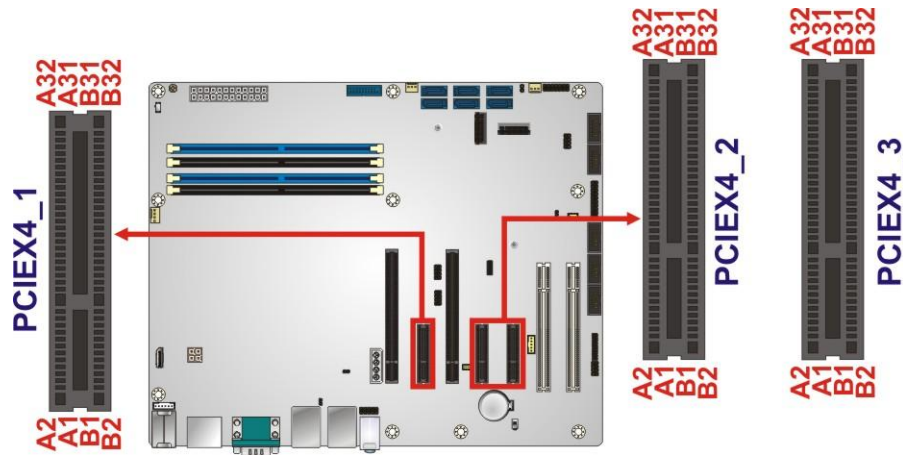


Figure 3-21: PCIe x4 Slot Locations

### 3.2.14 PCIe x8 Slots

**CN Label:** PCIEX8\_1, PCIEX8\_2  
**CN Type:** PCIe x16 slot (x8 mode)  
**CN Location:** See Figure 3-22

The PCIe x8 expansion card slots are for PCIe x8 expansion cards.

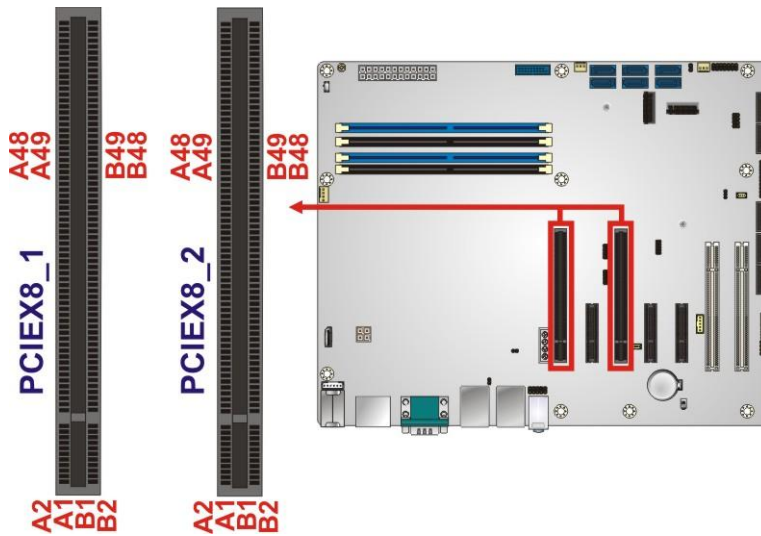


Figure 3-22: PCIe x8 Slot Locations



# NEX-971 ATX Motherboard

## 3.2.15 Power Button

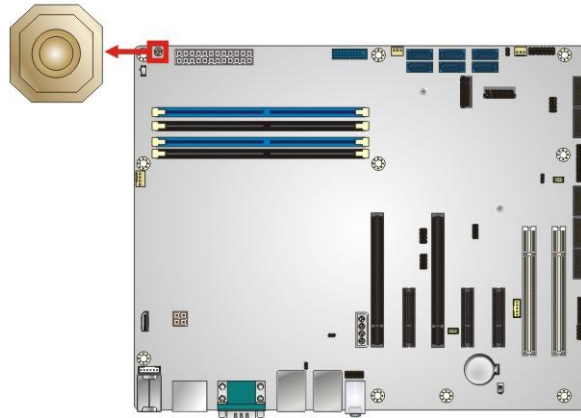
**CN Label:** PWR\_SW1

**CN Type:** Push button

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

The on-board power button controls system power.

**PWR\_SW1**



**Figure 3-23: Power Button Location**

## 3.2.16 SATA 6Gb/s Drive Connector

**CN Label:** S\_ATA1, S\_ATA2, S\_ATA3, S\_ATA4, S\_ATA5, S\_ATA6

**CN Type:** 7-pin SATA drive connector

**CN Location:** See Figure 3-24

**CN Pinouts:** See Table 3-20

The SATA drive connectors can be connected to SATA drives and support up to 6Gb/s data transfer rate.



**Figure 3-24: SATA 6Gb/s Drive Connector Locations**

| Pin | Description |
|-----|-------------|
| 1   | GND         |
| 2   | SATA_TX+    |
| 3   | SATA_TX-    |
| 4   | GND         |
| 5   | SATA_RX-    |
| 6   | SATA RX+    |
| 7   | GND         |

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

# NEX-971 ATX Motherboard

## 3.2.17 Serial Port Connectors, RS-232

- CN Label:** COM2, COM3, COM4
- CN Type:** 10-pin box header, p=2.54 mm
- CN Location:** See Figure 3-25
- CN Pinouts:** See Table 3-21

Each of these connectors provides RS-232 connections.

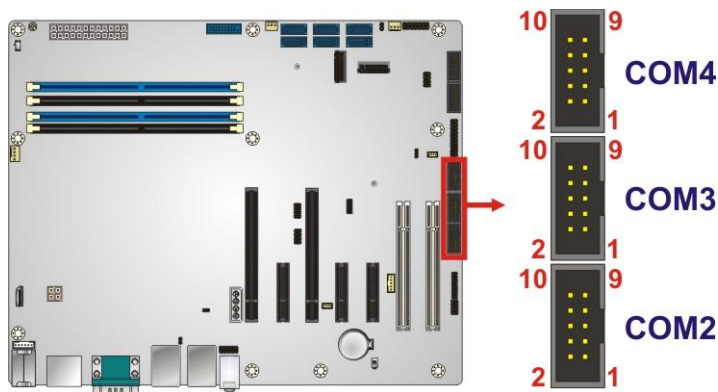


Figure 3-25: RS-232 Serial Port Connector Location

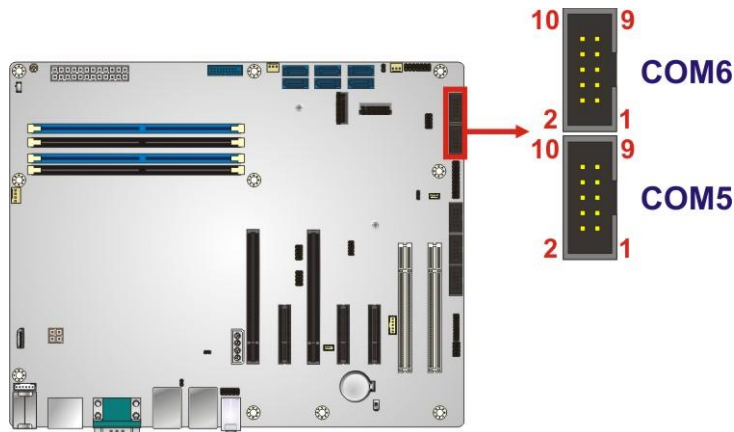
| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | DCD         | 2   | DSR         |
| 3   | RXD         | 4   | RTS         |
| 5   | TXD         | 6   | CTS         |
| 7   | DTR         | 8   | RI          |
| 9   | GND         | 10  | GND         |

Table 3-21: RS-232 Serial Port Connector Pinouts

## 3.2.18 Serial Port Connectors, RS-232/422/485

|                     |                              |
|---------------------|------------------------------|
| <b>CN Label:</b>    | <b>COM5, COM6</b>            |
| <b>CN Type:</b>     | 10-pin box header, p=2.54 mm |
| <b>CN Location:</b> | See <b>Figure 3-26</b>       |
| <b>CN Pinouts:</b>  | See <b>Table 3-22</b>        |

Each of these connectors provides RS-232, RS-422 or RS-485 communications. The communication protocol of the serial ports is set through the BIOS menu in “**Advanced → F81866 Super IO Configuration → Serial Port 5/6 Configuration**”. Use the Transfer Mode BIOS option to configure the correspondent serial ports (refer to **Sections 5.3.6.6** and **5.3.6.7** for detailed information).



**Figure 3-26: RS-232/422/485 Connector Location**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | DCD         | 2   | DSR         |
| 3   | RXD         | 4   | RTS         |
| 5   | TXD         | 6   | CTS         |
| 7   | DTR         | 8   | RI          |
| 9   | GND         | 10  | GND         |

**Table 3-22: RS-232/422/485 Connector Pinouts**

# NEX-971 ATX Motherboard



Use the optional RS-232/422/485 cable to connect to a serial device. The pinouts of the DB-9 connector are listed below.

| RS-232 Pinouts                                                                                                                                                                                                     | RS-422 Pinouts                                                                                                                                                                               | RS-485 Pinouts                                                                                                                                           |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div><div>DSR(6)<br/>RTS(7)<br/>CTS(8)<br/>RI(9)</div><div><div>6<br/>7<br/>8<br/>9</div><div>1<br/>2<br/>3<br/>4<br/>5</div></div><div><div>DCD(1)<br/>SIN(2)<br/>SOUT(3)<br/>DTR(4)<br/>GND(5)</div></div></div> | <div><div></div><div><div>6<br/>7<br/>8<br/>9</div><div>1<br/>2<br/>3<br/>4<br/>5</div></div><div><div>TX- (TXD485#)<br/>TX+ (TXD485+)<br/>RX+ (RXD485+)<br/>RX- (RXD485#)</div></div></div> | <div><div></div><div><div>6<br/>7<br/>8<br/>9</div><div>1<br/>2<br/>3<br/>4<br/>5</div></div><div><div>TX- (TXD485#)<br/>TX+ (TXD485+)</div></div></div> |

Table 3-23: DB-9 RS-232/422/485 Pinouts

### 3.2.19 SMBus Connector

- CN Label: SMB1
- CN Type: 4-pin wafer, p=1.25 mm
- CN Location: See Figure 3-27
- CN Pinouts: See Table 3-24

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

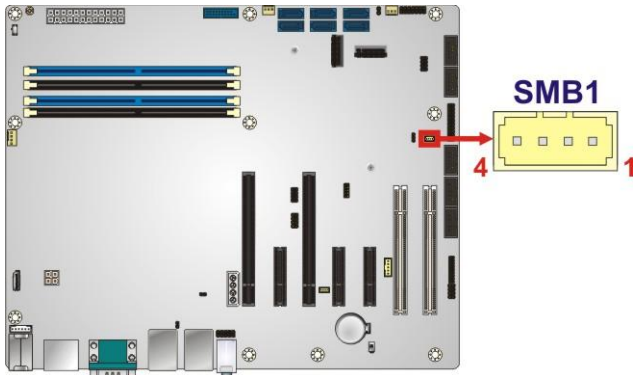


Figure 3-27: SMBus Connector Location

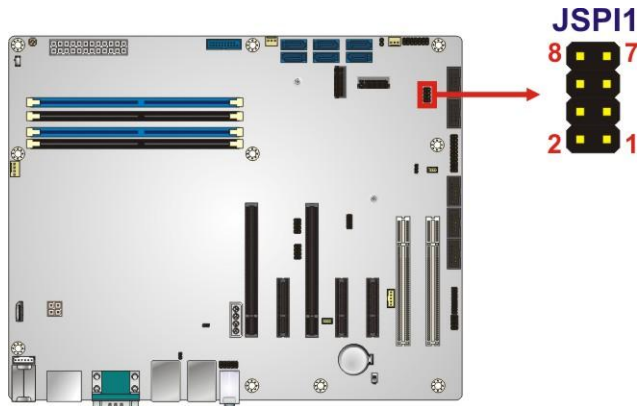
| Pin | Description |
|-----|-------------|
| 1   | GND         |
| 2   | SMB_DATA    |
| 3   | SMB_CLK     |
| 4   | +5V         |

**Table 3-24: SMBus Connector Pinouts**

## 3.2.20 SPI Flash Connector

- CN Label:** JSPI1
- CN Type:** 8-pin header, p=2.54 mm
- CN Location:** See **Figure 3-28**
- CN Pinouts:** See **Table 3-25**

The SPI flash connector is used to flash the SPI ROM.



**Figure 3-28: SPI Flash Connector Location**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | +3.3V       | 2   | GND         |
| 3   | SPI_CS      | 4   | SPI_CLK     |
| 5   | SPI_SO      | 6   | SPI_SI      |
| 7   | NC          | 8   | NC          |

**Table 3-25: SPI Flash Connector Pinouts**

# NEX-971 ATX Motherboard

## 3.2.21 SPI Flash Connector, EC

- CN Label:

JSPI2
- CN Type:

8-pin header, p=2.54 mm
- CN Location:

See Figure 3-29
- CN Pinouts:

See Table 3-26

The SPI flash connector is used to flash the EC ROM.

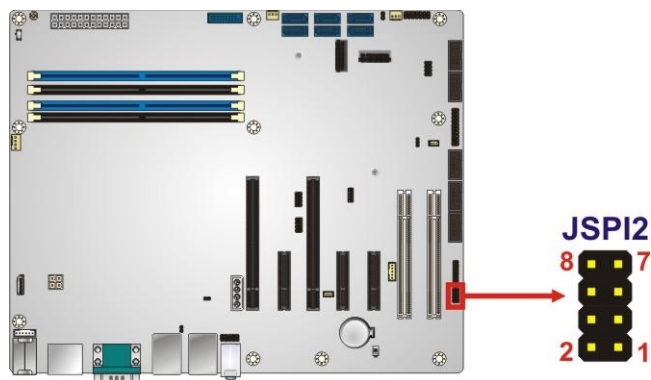


Figure 3-29: SPI EC Flash Connector Location

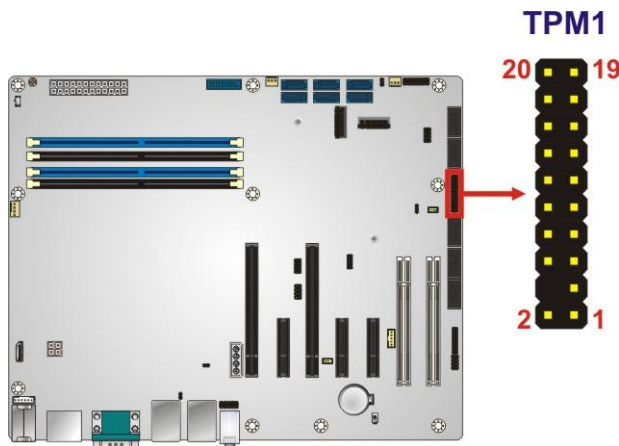
| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | +3.3V       | 2   | GND         |
| 3   | SPI_CS      | 4   | SPI_CLK     |
| 5   | SPI_SO      | 6   | SPI_SI      |
| 7   | NC          | 8   | NC          |

Table 3-26: SPI EC Flash Connector Pinouts

## 3.2.22 TPM Connector

|                     |                          |
|---------------------|--------------------------|
| <b>CN Label:</b>    | <b>TPM1</b>              |
| <b>CN Type:</b>     | 20-pin header, p=2.54 mm |
| <b>CN Location:</b> | See <b>Figure 3-30</b>   |
| <b>CN Pinouts:</b>  | See <b>Table 3-27</b>    |

The TPM connector connects to a TPM module.



**Figure 3-30: TPM Connector Location**

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | LCLK        | 2   | GND         |
| 3   | LFRAME#     | 4   | KEY         |
| 5   | LRERST#     | 6   | +5V         |
| 7   | LAD3        | 8   | LAD2        |
| 9   | +3.3V       | 10  | LAD1        |
| 11  | LAD0        | 12  | GND         |
| 13  | SCL         | 14  | SDA         |
| 15  | SB3V        | 16  | SERIRQ      |
| 17  | GND         | 18  | GLKRUN#     |
| 19  | LPCPD#      | 20  | LDRQ#       |

**Table 3-27: TPM Connector Pinouts**



# NEX-971 ATX Motherboard

## 3.2.23 USB 2.0 Connectors

- CN Label:** USB1, USB2
- CN Type:** 8-pin header, p=2.54 mm
- CN Location:** See Figure 3-31
- CN Pinouts:** See Table 3-28

The USB 2.0 connectors connect to USB 2.0 devices. Each pin header provides two USB 2.0 ports.

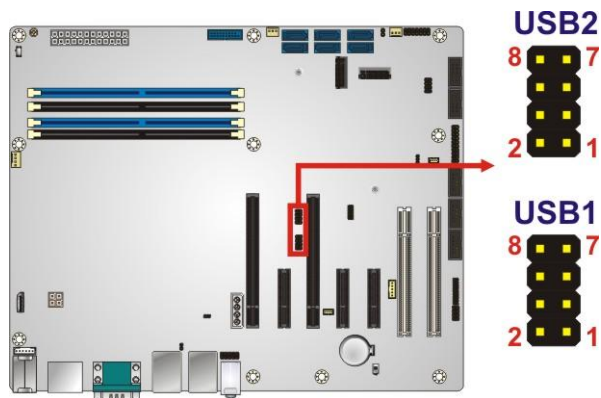


Figure 3-31: USB 2.0 Connector Pinout Locations

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

Table 3-28: USB 2.0 Connector Pinouts

## 3.2.24 USB 3.2 Gen 1 Connector

- CN Label:** USB3-1
- CN Type:** 19-pin box header, p=2 mm
- CN Location:** See Figure 3-32
- CN Pinouts:** See Table 3-29

The USB 3.2 Gen 1 (5Gb/s) connector connects to USB 3.2 devices. This connector provides two USB 3.2 Gen 1 (5Gb/s) ports.

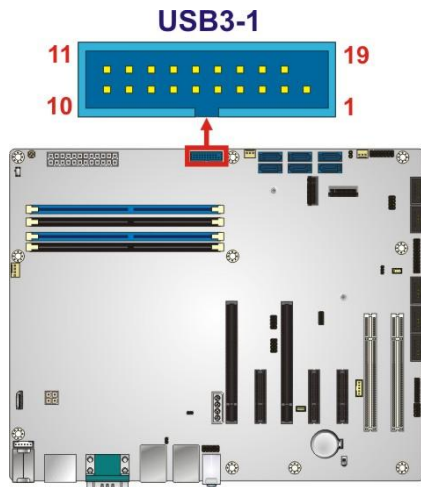


Figure 3-32: USB 3.2 Gen 1 Connector Location

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | VCC         | 11  | USB_DATA+   |
| 2   | USB3_RX-    | 12  | USB_DATA-   |
| 3   | USB3_RX+    | 13  | GND         |
| 4   | GND         | 14  | USB3_TX+    |
| 5   | USB3_TX-    | 15  | USB3_TX-    |
| 6   | USB3_TX+    | 16  | GND         |
| 7   | GND         | 17  | USB3_RX+    |
| 8   | USB_DATA-   | 18  | USB3_RX-    |
| 9   | USB_DATA+   | 19  | VCC         |
| 10  | NC          |     |             |

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| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
|-----|-------------|-----|-------------|

Table 3-29: USB 3.2 Gen 1 Connector Pinouts

### 3.3 External Peripheral Interface Connector Panel

The figure below shows the external peripheral interface connector (EPIC) panel. The EPIC panel consists of the following:

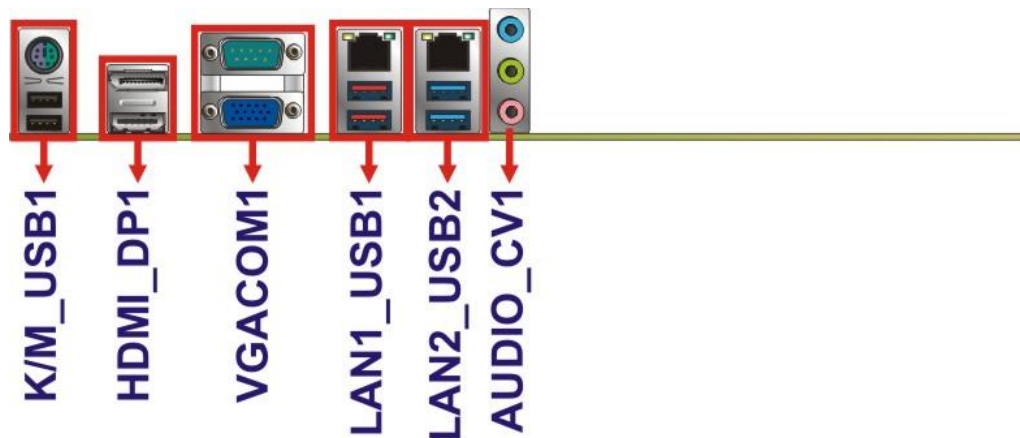


Figure 3-33: External Peripheral Interface Connector

#### 3.3.1 Audio Connector

**CN Label:** AUDIO\_CV1  
**CN Type:** Audio jack  
**CN Location:** See Figure 3-33

The audio jacks connect to external audio devices.

- **Line In port (Light Blue):** Connects a CD-ROM, DVD player, or other audio devices.
- **Line Out port (Lime):** Connects to a headphone or a speaker. With multi-channel configurations, this port can also connect to front speakers.
- **Microphone (Pink):** Connects a microphone.

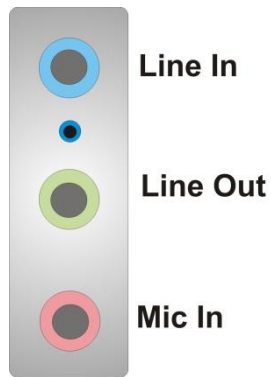


Figure 3-34: Audio Connector

### 3.3.2 Ethernet and USB 3.2 Connectors

- CN Label:** LAN1\_USB1, LAN2\_USB2
- CN Type:** RJ-45, USB 3.2 Type A
- CN Location:** See Figure 3-33
- CN Pinouts:** See Table 3-30 and Table 3-31

There are four external USB 3.2 connectors on the NEX-971. The LAN1\_USB1 connector supports USB 3.2 Gen 2 (10Gb/s) connection while the LAN2\_USB2 connector supports USB 3.2 Gen 1 (5Gb/s) connection.

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | VCC         | 10  | VCC         |
| 2   | USB_DATA-   | 11  | USB_DATA-   |
| 3   | USB_DATA+   | 12  | USB_DATA+   |
| 4   | GND         | 13  | GND         |
| 5   | USB3_RX-    | 14  | USB3_RX-    |
| 6   | USB3_RX+    | 15  | USB3_RX+    |
| 7   | GND         | 16  | GND         |
| 8   | USB3_TX-    | 17  | USB3_TX-    |
| 9   | USB3_TX+    | 18  | USB3_TX+    |

Table 3-30: USB 3.2 Port Pinouts

# NEX-971 ATX Motherboard



Each LAN connector connects to a local network

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 20  | LAN1_MDI0P  | 24  | LAN1_MDI2P  |
| 21  | LAN1_MDI0N  | 25  | LAN1_MDI2N  |
| 22  | LAN1_MDI1P  | 26  | LAN1_MDI3P  |
| 23  | LAN1_MDI1N  | 27  | LAN1_MDI3N  |

**Table 3-31: LAN Pinouts**

## 3.3.3 HDMI and DP++ Connector

**CN Label:** HDMI\_DP1

**CN Type:** HDMI, DisplayPort

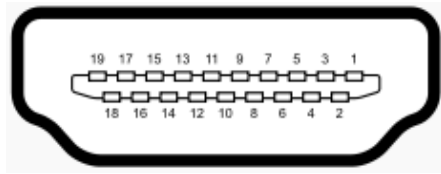
**CN Location:** See **Figure 3-33**

**CN Pinouts:** See **Table 3-32** and **Table 3-33**

The HDMI connector can connect to an HDMI device.

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | HDMI_DATA2  | 2   | GND         |
| 3   | HDMI_DATA2# | 4   | HDMI_DATA1  |
| 5   | GND         | 6   | HDMI_DATA1# |
| 7   | HDMI_DATA0  | 8   | GND         |
| 9   | HDMI_DATA0# | 10  | HDMI_CLK    |
| 11  | GND         | 12  | HDMI_CLK#   |
| 13  | N/C         | 14  | N/C         |
| 15  | HDMI_SCL    | 16  | HDMI_SDA    |
| 17  | GND         | 18  | +5V         |
| 19  | HDMI_HPD    | 20  | HDMI_GND    |
| 21  | HDMI_GND    | 22  | HDMI_GND    |
| 23  | HDMI_GND    |     |             |

**Table 3-32: HDMI Connector Pinouts**

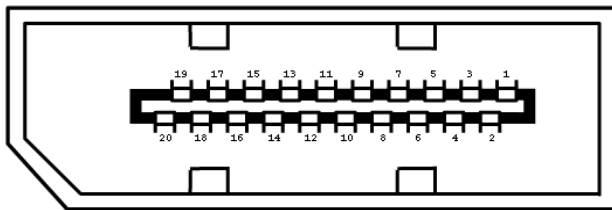


**Figure 3-35: HDMI Connector**

The DP++ connector connects to a display device with DisplayPort interface.

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | HDMI_DATA2  | 13  | NC          |
| 2   | GND         | 14  | NC          |
| 3   | HDMI_DATA2# | 15  | HDMI_SCL    |
| 4   | HDMI_DATA1  | 16  | HDMI_SDA    |
| 5   | GND         | 17  | GND         |
| 6   | HDMI_DATA1# | 18  | +5V         |
| 7   | HDMI_DATA0  | 19  | HDMI_HPD    |
| 8   | GND         | 20  | HDMI_GND    |
| 9   | HDMI_DATA0# | 21  | HDMI_GND    |
| 10  | HDMI_CLK    | 22  | HDMI_GND    |
| 11  | GND         | 23  | HDMI_GND    |
| 12  | HDMI_CLK#   |     |             |

**Table 3-33: DP++ Connector Pinouts**



**Figure 3-36: HDMI Connector**

# NEX-971 ATX Motherboard

## 3.3.4 Keyboard/Mouse and USB 2.0 Connectors

- CN Label:** K/M\_USB1
- CN Type:** PS/2, USB 2.0
- CN Location:** See **Figure 3-33**
- CN Pinouts:** See **Table 3-34** and **Table 3-35**

The USB 2.0 connector can be connected to a USB 2.0/1.1 device.

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

**Table 3-34: USB 2.0 Port Pinouts**

The PS/2 port is for connecting a PS/2 mouse or keyboard.

| Pin | Description    |
|-----|----------------|
| 9   | GND            |
| 10  | Keyboard Data  |
| 11  | Mouse Data     |
| 12  | VCC            |
| 13  | Keyboard Clock |
| 14  | Mouse Clock    |

**Table 3-35: PS/2 Connector Pinouts**

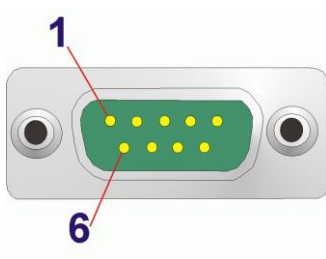
## 3.3.5 VGA and RS-232 Connectors

- CN Label:** VGACOM1
- CN Type:** 15-pin VGA and 9-pin COM
- CN Location:** See **Figure 3-33**
- CN Pinouts:** See **Table 3-36** and **Table 3-37**

The COM connector (COM1) connects to a serial device that supports RS-232 communication.

| Pin | Description | Pin | Description |
|-----|-------------|-----|-------------|
| 1   | DCD         | 6   | DSR         |
| 2   | RX          | 7   | RTS         |
| 3   | TX          | 8   | CTS         |
| 4   | DTR         | 9   | RI          |
| 5   | GND         |     |             |

**Table 3-36: COM1 Connector Pinouts**



**Figure 3-37: COM1 Serial Port Pinout Locations**



# NEX-971 ATX Motherboard

The 15-pin VGA connector connects to a monitor that accepts a standard VGA input.

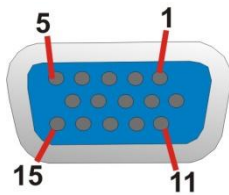


## NOTE:

The user has to connect the VGA connector to the monitor before system booting as the VGA output function is supported via the eDP to VGA converter.

| Pin | Description | Pin | Description     |
|-----|-------------|-----|-----------------|
| 1   | RED         | 2   | GREEN           |
| 3   | BLUE        | 4   | NC              |
| 5   | GND         | 6   | HOT PLUG DETECT |
| 7   | GND         | 8   | GND             |
| 9   | VCC         | 10  | GND             |
| 11  | NC          | 12  | DDCDA           |
| 13  | HSYNC       | 14  | VSYNC           |
| 15  | DDCCLK      |     |                 |

**Table 3-37: VGA Connector Pinouts**



**Figure 3-38: VGA Connector**

Chapter

4

# Installation

---

# NEX-971 ATX Motherboard

## 4.1 Anti-static Precautions

---



### WARNING:

Failure to take ESD precautions during the installation of the NEX-971 may result in permanent damage to the NEX-971 and severe injury to the user.

---

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the NEX-971. Dry climates are especially susceptible to ESD. It is therefore critical that whenever the NEX-971 or any other electrical component is handled, the following anti-static precautions are strictly adhered to.

- ***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 NEX-971, place it on an anti-static pad. This reduces the possibility of ESD damaging the NEX-971.
- ***Only handle the edges of the PCB:-:*** When handling the PCB, hold the PCB by the edges.

## 4.2 Installation Considerations

---



### NOTE:

The following installation notices and installation considerations should be read and understood before installation. All installation notices must be strictly adhered to. Failing to adhere to these precautions may lead to severe damage and injury to the person performing the installation.

---



### WARNING:

The installation instructions described in this manual should be carefully followed in order to prevent damage to the 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 NEX-971 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 the NEX-971 on an anti-static pad:
  - When installing or configuring the motherboard, place it on an anti-static pad. This helps to prevent potential ESD damage.
- Turn all power to the NEX-971 off:
  - When working with the NEX-971, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the NEX-971, **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.

# NEX-971 ATX Motherboard

## 4.3 Socket LGA1151 CPU Installation



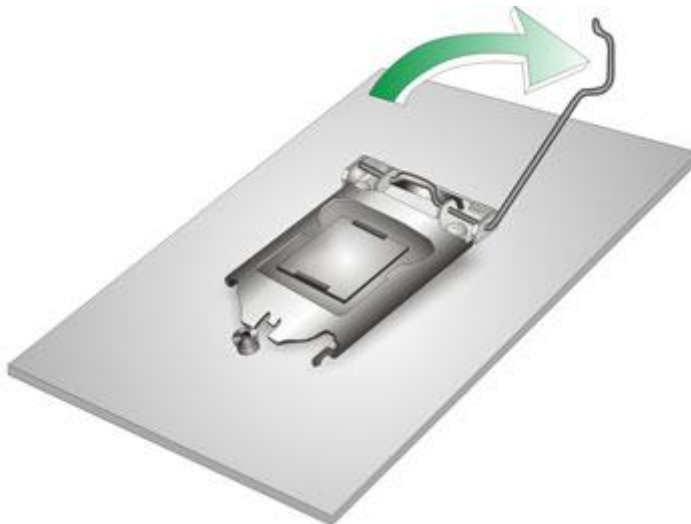
### WARNING:

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

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

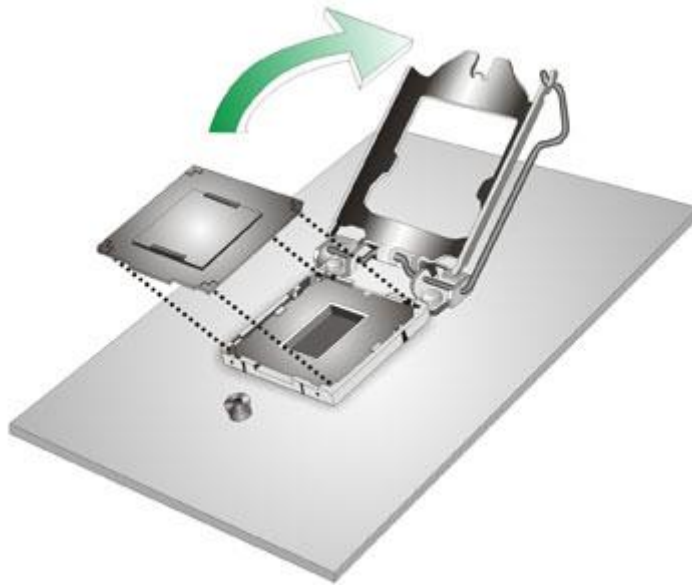
To install the CPU, follow the steps below.

**Step 1:** Disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Fully open the lever. See **Figure 4-1**.



**Figure 4-1: Disengage the CPU Socket Load Lever**

**Step 2:** Open the socket and remove the protective cover. The black protective cover can be removed by pulling up on the tab labeled "Remove". See **Figure 4-2**.



**Figure 4-2: Remove Protective Cover**

**Step 3: Inspect the CPU socket.** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

**Step 4: Orientate the CPU properly.** The contact array should be facing the CPU socket.



---

**WARNING:**

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

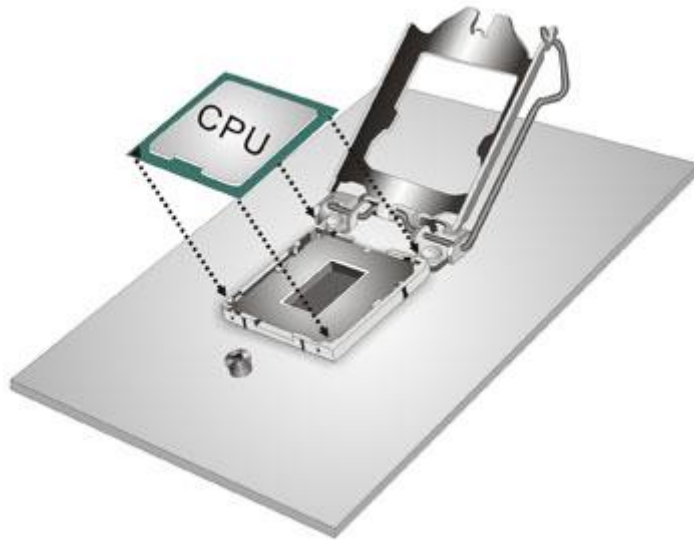
---

**Step 5: Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket.

**Step 6: Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

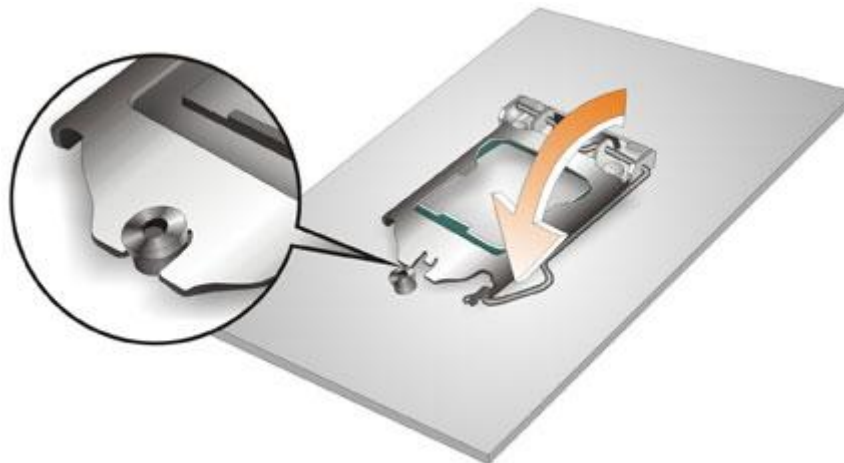
# NEX-971 ATX Motherboard

**Step 7: Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly. See **Figure 4-3**.



**Figure 4-3: Insert the Socket LGA1151 CPU**

**Step 8: Close the CPU socket.** Close the load plate and pull the load lever back a little to have the load plate be able to secure to the knob. Engage the load lever by pushing it back to its original position (**Figure 4-4**). There will be some resistance, but will not require extreme pressure.



**Figure 4-4: Close the Socket LGA1151**

**Step 9:** Connect the 12 V power to the board. Connect the 12 V power from the power supply to the board.

### 4.4 Socket LGA1151 Cooling Kit Installation



**WARNING:**

**DO NOT** attempt to install a push-pin cooling fan.

The pre-installed support bracket prevents the board from bending and is **ONLY** compatible with captive screw type cooling fans.

---

The cooling kit can be bought from NEX. The cooling kit has a heat sink and 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.

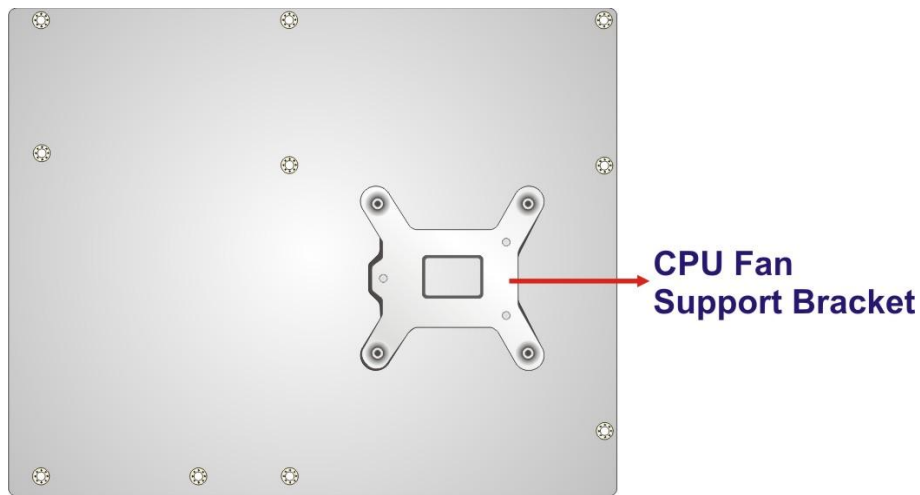
---

To install the cooling kit, follow the instructions below.

**Step 1:** A cooling kit bracket is pre-installed on the rear of the motherboard. See **Figure 4-5**.



# NEX-971 ATX Motherboard

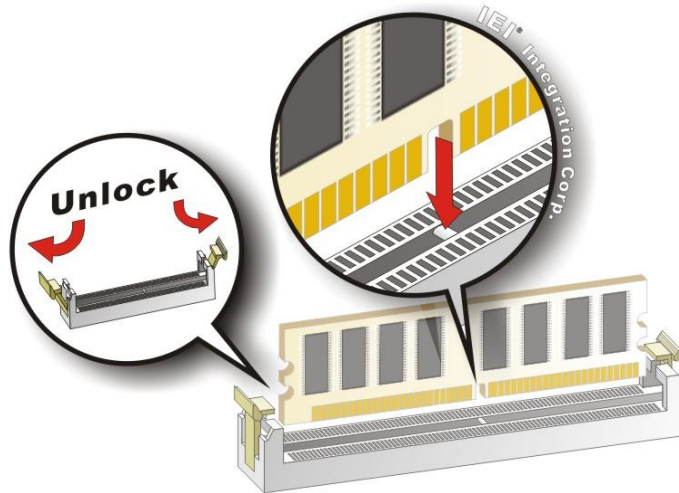


**Figure 4-5: Cooling Kit Support Bracket**

- Step 2:** Place the cooling kit onto the socket LGA1151 CPU. Make sure the CPU cable can be properly routed when the cooling kit is installed.
- Step 3:** Mount the cooling kit. Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the holes of the cooling kit bracket.
- Step 4:** 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.
- Step 5:** Connect the fan cable. Connect the cooling kit fan cable to the CPU fan connector on the NEX-971. Carefully route the cable and avoid heat generating chips and fan blades.

### 4.5 DIMM Installation

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



**Figure 4-6: DIMM Installation**

- Step 1:** **Open the DIMM socket handles.** Open the two handles outwards as far as they can. See **Figure 4-6**.
- Step 2:** **Align the DIMM with the socket.** Align the DIMM so the notch on the memory lines up with the notch on the memory socket. See **Figure 4-6**.
- Step 3:** **Insert the DIMM.** Once aligned, press down until the DIMM is properly seated. Clip the two handles into place. See **Figure 4-6**.
- Step 4:** **Removing a DIMM.** To remove a DIMM, push both handles outward. The memory module is ejected by a mechanism in the socket.



#### **CAUTION:**

For quad channel configuration, install four identical memory modules that feature the same capacity, timings, voltage, number of ranks and the same brand.

---

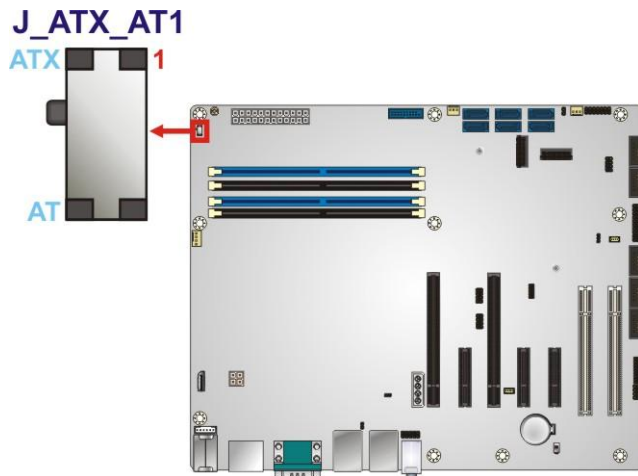
# NEX-971 ATX Motherboard

## 4.6 System Configuration

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

### 4.6.1 AT/ATX Power Mode Setting

The AT and ATX power mode selection is made through the AT/ATX power mode switch which is shown in **Figure 4-7**.



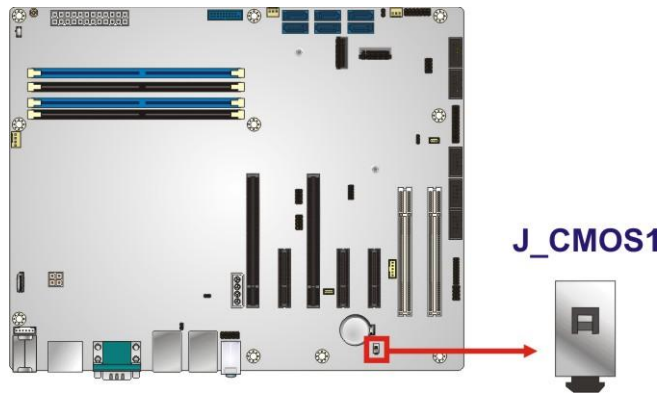
**Figure 4-7: AT/ATX Power Mode Switch Location**

| Setting | Description              |
|---------|--------------------------|
| 1-2     | ATX power mode (default) |
| 2-3     | AT power mode            |

**Table 4-1: AT/ATX Power Mode Switch Settings**

## 4.6.2 Clearing CMOS

To reset the BIOS, remove the on-board battery and press the **J\_CMOS1** button for three seconds or more. The clear CMOS button is shown in **Figure 4-8**.



**Figure 4-8: Clear CMOS Button and Header Locations**

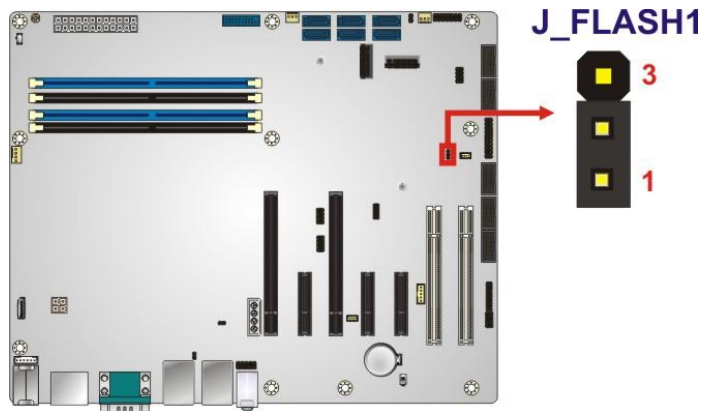
## 4.6.3 Flash Descriptor Security Override Jumper

The flash descriptor security override jumper (J\_FLASH1) allows to enable or disable the ME firmware update. Refer to **Table 4-2** and **Figure 4-9** for the jumper location and settings.

| Setting   | Description        |
|-----------|--------------------|
| Short 1-2 | Disabled (default) |
| Short 2-3 | Enabled            |

**Table 4-2: Flash Descriptor Security Override Jumper Settings**

# NEX-971 ATX Motherboard



**Figure 4-9: Flash Descriptor Security Override Jumper Location**

To update the ME firmware, please follow the steps below.

- Step 1:** Before turning on the system power, short pin 2-3 of the flash descriptor security override jumper.
- Step 2:** Update the BIOS and ME firmware, and then turn off the system power.
- Step 3:** Remove the metal clip on the flash descriptor security override jumper or return to its default setting (short pin 1-2).
- Step 4:** Restart the system. The system will reboot 2 ~ 3 times to complete the ME firmware update.

## 4.6.4 USB Power Selection

The USB power selection is made through the BIOS menu in “Chipset → PCH-IO Configuration”. Use the **USB Power SW1** and the **USB Power SW2** BIOS options to configure the correspondent USB ports (see **Table 4-3**) and refer to **Table 4-4** to select the USB power source.

| BIOS Options  | Configured USB Ports                                                                                                      |
|---------------|---------------------------------------------------------------------------------------------------------------------------|
| USB Power SW1 | K/M_USB1 (external USB 2.0 ports)<br>LAN1_USB1 (external USB 3.2 Gen 2 ports)<br>LAN2_USB2 (external USB 3.2 Gen 1 ports) |
| USB Power SW2 | USB1 (internal USB 2.0 ports)<br>USB2 (internal USB 2.0 ports)<br>USB3-1 (internal USB 3.2 Gen 1 ports)                   |

**Table 4-3: BIOS Options and Configured USB Ports**

| Options  | Description        |
|----------|--------------------|
| +5V DUAL | +5V dual (default) |
| +5V      | +5V                |

**Table 4-4: USB Power Source Setup**

Please refer to **Section 5.4.1.3.1** for BIOS setup.

## 4.7 Internal Peripheral Device Connections

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

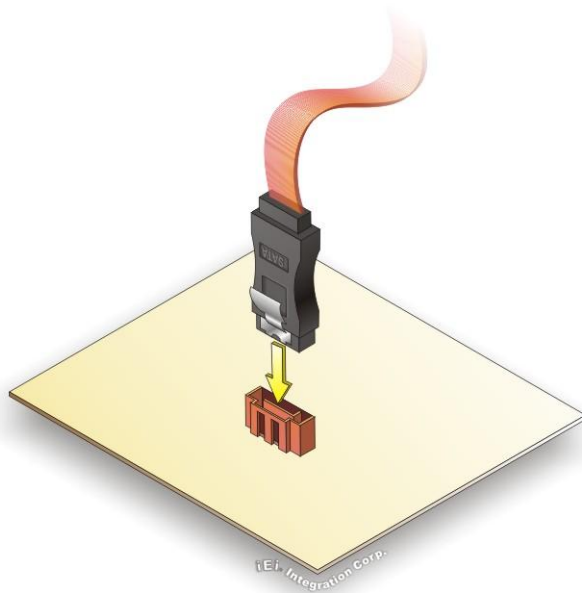
### 4.7.1 SATA Drive Connection

The NEX-971 is shipped with two SATA drive cables. To connect the SATA drives to the connectors, please follow the steps below.

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

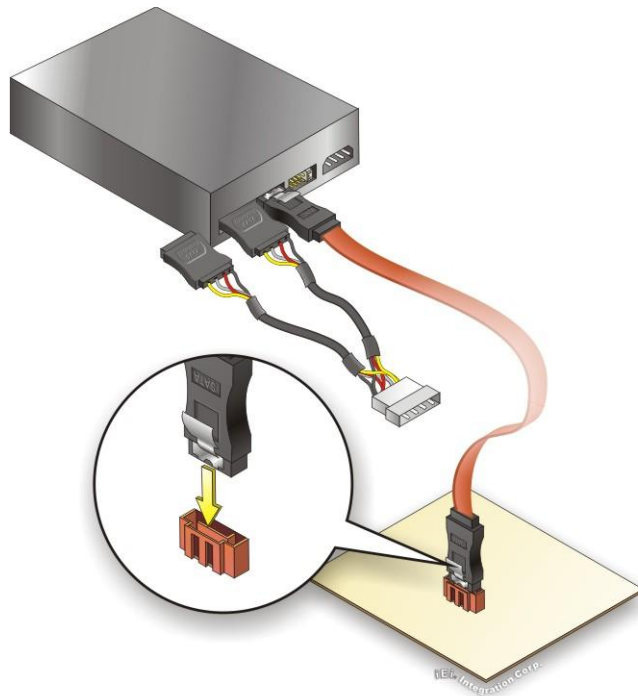
**Step 2: Insert the cable connector.** Insert the cable connector into the on-board SATA drive connector until it clips into place. See **Figure 4-10**.

# NEX-971 ATX Motherboard



**Figure 4-10: 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 4-11**.
- Step 4:** Connect the SATA power cable. Connect the SATA power connector to the back of the SATA drive. See **Figure 4-11**.



**Figure 4-11: SATA Power Drive Connection**

The SATA power cable can be bought from NEX. See Optional Items in Section 2.4.



# NEX-971 ATX Motherboard



## 4.8 Software Installation

All the drivers for the NEX-971 are available on NEX Resource Download Center (<https://download.NEXworld.com>). Type NEX-971 and press Enter to find all the relevant software, utilities, and documentation.

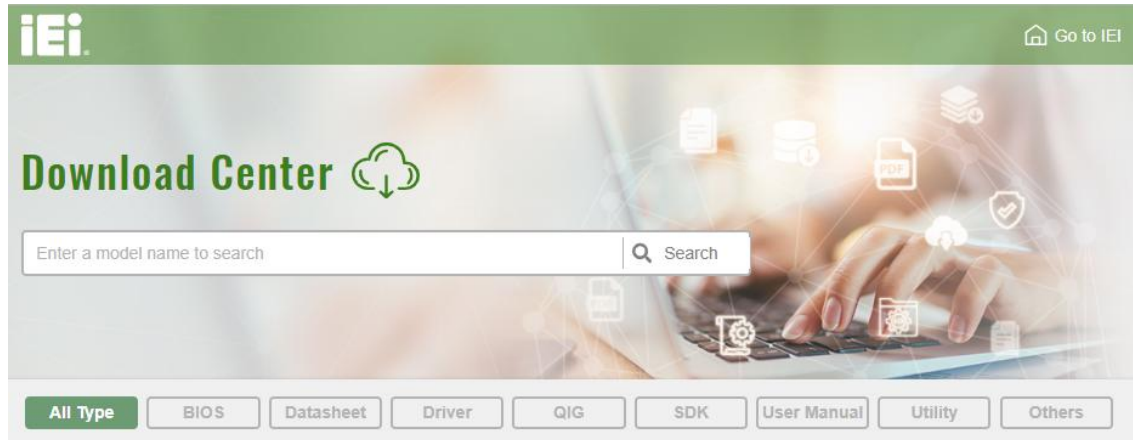
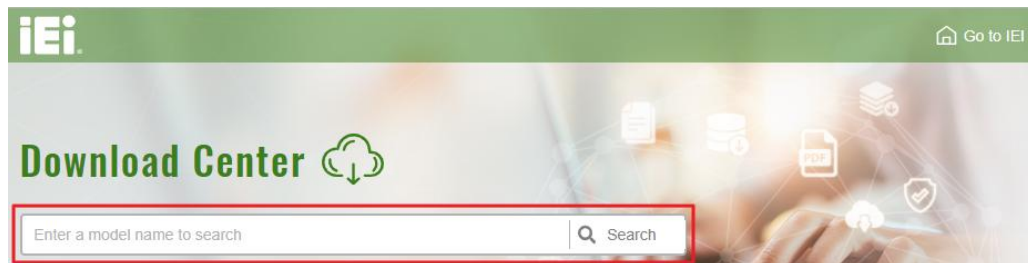


Figure 4-12: NEX Resource Download Center

## 4.9 Driver Download

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

**Step 5:** Go to <https://download.NEXworld.com>. Type NEX-971 and press Enter.



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

Navigation tabs: All Type | BIOS | Datasheet | **Driver** | QIG | SDK | User Manual | Utility | Others

**WAFER-BT-i1** Product Info ►

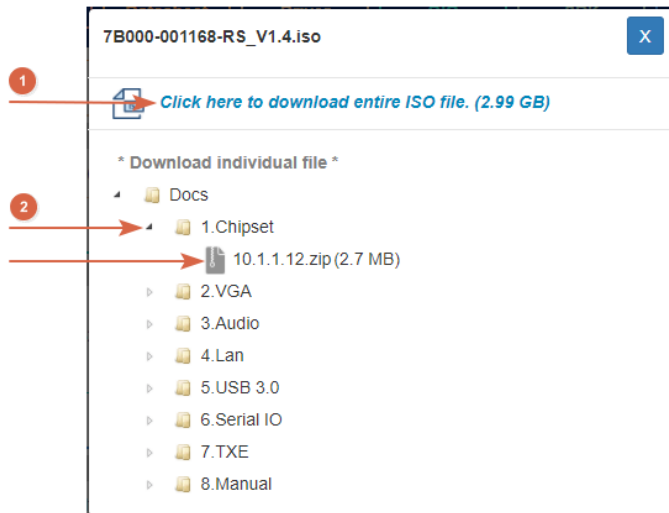
Embedded Computer ► Single Board Computer ► Embedded Board

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

**Driver**

| File Name                                          | Published  | Version | File Checksum                    |
|----------------------------------------------------|------------|---------|----------------------------------|
| <a href="#">7B000-001033-RS V2.3.iso (2.23 GB)</a> | 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 click the small arrow to find an individual driver 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.

# NEX-971 ATX Motherboard



## 4.10 Intel® AMT Setup Procedure

The NEX-971 is featured with the Intel® Active Management Technology (AMT). To enable the Intel® AMT function, follow the steps below.

- Step 1:** Make sure at least one of the memory sockets is installed with a DDR4 DIMM.
- Step 2:** Connect an Ethernet cable to the RJ-45 connector labeled **LAN1\_USB1**.
- Step 3:** The AMI BIOS options regarding the Intel® ME or Intel® AMT must be enabled,
- Step 4:** Properly install the Intel® Management Engine Components drivers from the iAMT Driver & Utility directory in the driver CD.
- 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**

---

# NEX-971 ATX Motherboard



## 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 **Table 5-1**.

| 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 | Move to the previous page                                                                                                                            |
| Page Dn | Move to the next page                                                                                                                                |
| Esc     | Main Menu – Quit and not save changes into CMOS<br>Status Page Setup Menu and Option Page Setup Menu --<br>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 the **Esc** key.

### 5.1.4 Unable to Reboot after Configuration Changes

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

# NEX-971 ATX Motherboard



## 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.
- Security – Sets User and Supervisor Passwords.
- Boot – Changes the system boot configuration.
- Save & Exit – Selects exit options and loads default settings
- Server Mgmt – Configures system event log and BMC network parameters

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.



## BIOS Menu 1: Main

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# NEX-971 ATX Motherboard



## → System Time [xx:xx:xx]

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

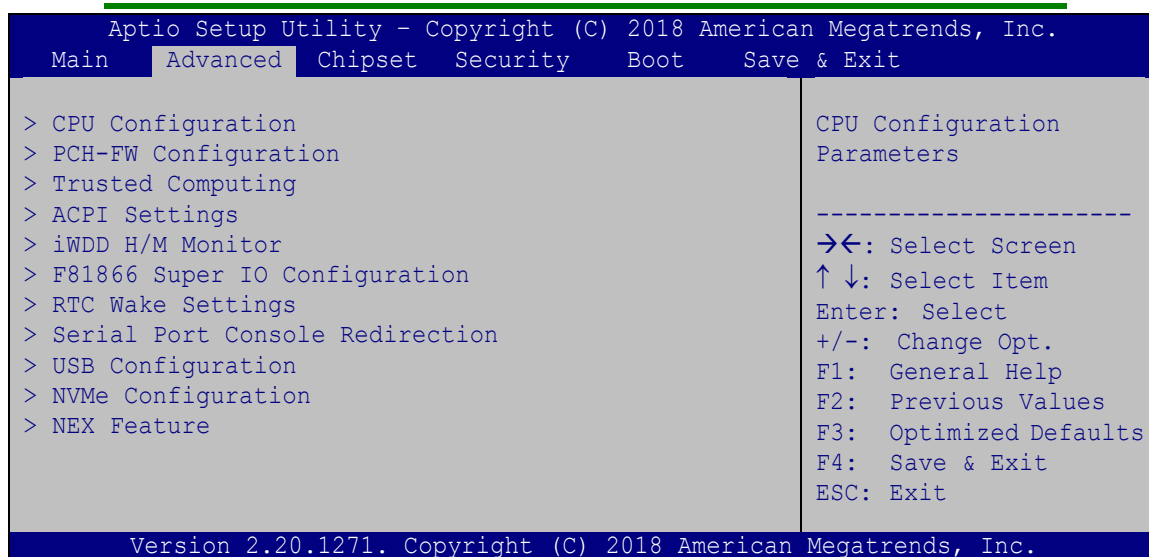
## 5.3 Advanced

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 CPU Configuration

Use the **CPU Configuration** menu (**BIOS Menu 3**) to view detailed CPU specifications or enable the Intel Virtualization Technology.

| Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc. |                                              |                                                                                                                                                                                         |
|--------------------------------------------------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advanced                                                           |                                              |                                                                                                                                                                                         |
| CPU Configuration                                                  |                                              | When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.                                                                                 |
| Type                                                               | Intel(R) Core(TM) CPU i3-8100T CPU @ 3.10GHz |                                                                                                                                                                                         |
| ID                                                                 | 0x906E8                                      |                                                                                                                                                                                         |
| Speed                                                              | 3100 MHz                                     |                                                                                                                                                                                         |
| L1 Data Cache                                                      | 32 kB x 4                                    |                                                                                                                                                                                         |
| L1 Instruction Cache                                               | 32 kB x 4                                    |                                                                                                                                                                                         |
| L2 Cache                                                           | 256 kB x 4                                   |                                                                                                                                                                                         |
| L3 Cache                                                           | 6 MB                                         |                                                                                                                                                                                         |
| L4 Cache                                                           | N/A                                          |                                                                                                                                                                                         |
| VMX                                                                | Supported                                    |                                                                                                                                                                                         |
| SMX/TXT                                                            | Not Supported                                |                                                                                                                                                                                         |
| Intel (VMX) Virtualization Technology                              | [Disabled]                                   | -----<br>→←: Select Screen<br>↑↓: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>ESC: Exit |
| Active Processor Cores                                             | [All]                                        |                                                                                                                                                                                         |
| Intel(R) SpeedStep(tm)                                             | [Enabled]                                    |                                                                                                                                                                                         |
| C states                                                           | [Disabled]                                   |                                                                                                                                                                                         |
| Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.    |                                              |                                                                                                                                                                                         |

### BIOS Menu 3: CPU Configuration

#### → Intel (VMX) Virtualization Technology [Disabled]

Use the **Intel (VMX) 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.

# NEX-971 ATX Motherboard



## → Active Processor Cores [All]

Use the **Active Processor Cores** BIOS option to enable numbers of cores in the processor package.

- **All**                      **DEFAULT**      Enable all cores in the processor package.
- **1**                                      Enable one core in the processor package.
- **2**                                      Enable two cores in the processor package.
- **3**                                      Enable three cores in the processor package.

## → Intel(R) SpeedStep(tm) [Enabled]

Use the **Intel(R) SpeedStep(tm)** option to enable or disable the Intel® SpeedStep Technology which allows more than two frequency ranges to be supported.

- **Disabled**                                      Disables Intel® SpeedStep Technology
- **Enabled**                                      **DEFAULT**      Enables Intel® SpeedStep Technology

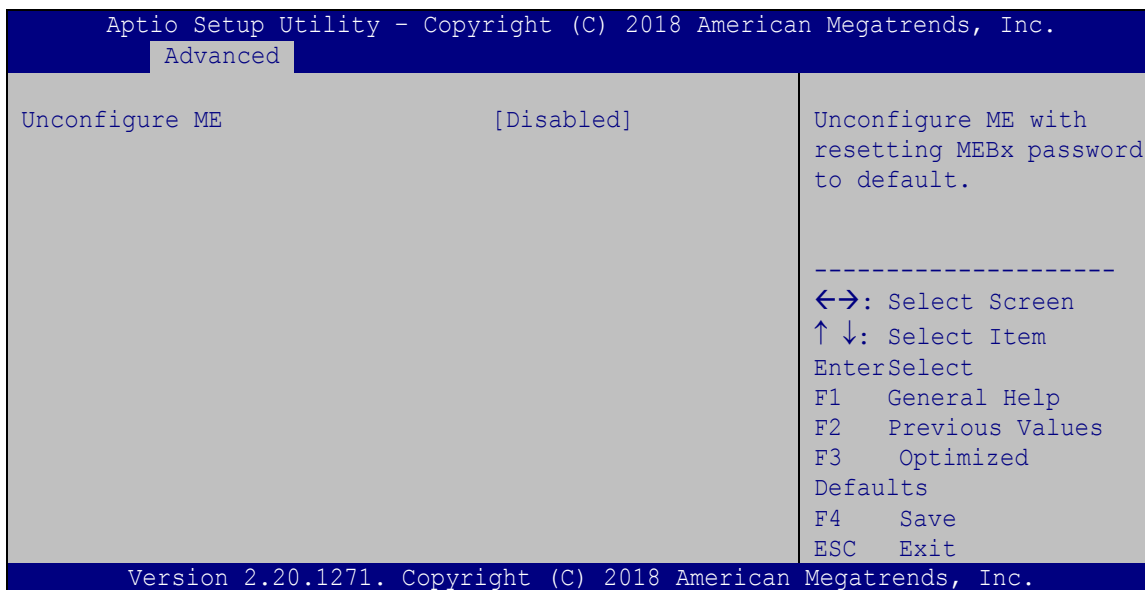
## → C states [Disabled]

Use the **C states** option to enable or disable CPU power management which allows CPU to go to C states when it is not 100% utilized.

- **Disabled**                                      **DEFAULT**      Disables CPU power management
- **Enabled**                                      Enables CPU power management

### 5.3.2 PCH-FW Configuration

The **PCH-FW Configuration** menu (**BIOS Menu 4**) allows Intel® Active Management Technology (AMT) options to be configured.



## BIOS Menu 4: PCH-FW Configuration

### ➔ Unconfigure ME [Disabled]

Use the **Unconfigure ME** option to unconfigure ME with resetting MEBx password to default.

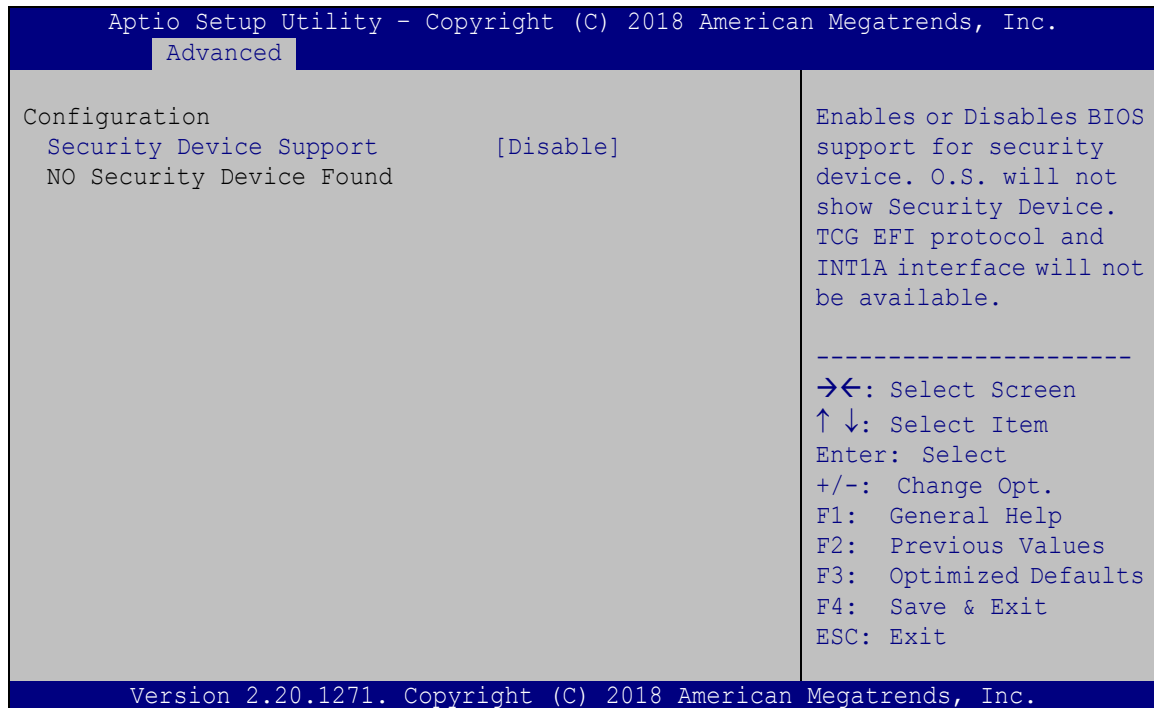
- |   |                 |                |                                                            |
|---|-----------------|----------------|------------------------------------------------------------|
| ➔ | <b>Disabled</b> | <b>DEFAULT</b> | Not unconfigure ME with resetting MEBx password to default |
| ➔ | <b>Enabled</b>  |                | Unconfigure ME with resetting MEBx password to default     |

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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]

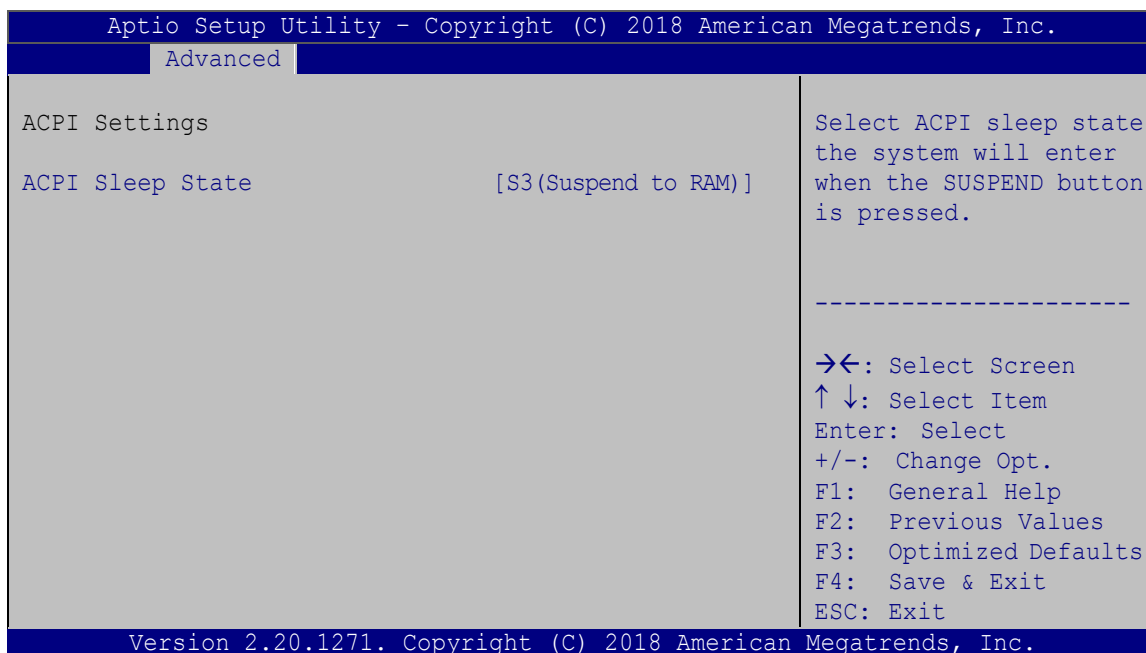
Use the **Security Device Support** option to configure support for the TPM.

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

→ **Enable** TPM support is enabled.

## 5.3.4 ACPI Settings

The **ACPI Settings** menu (**BIOS Menu 6**) configures the Advanced Configuration and Power Interface (ACPI) options.



### BIOS Menu 6: ACPI Configuration

#### → ACPI Sleep State [S3 (Suspend to RAM)]

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

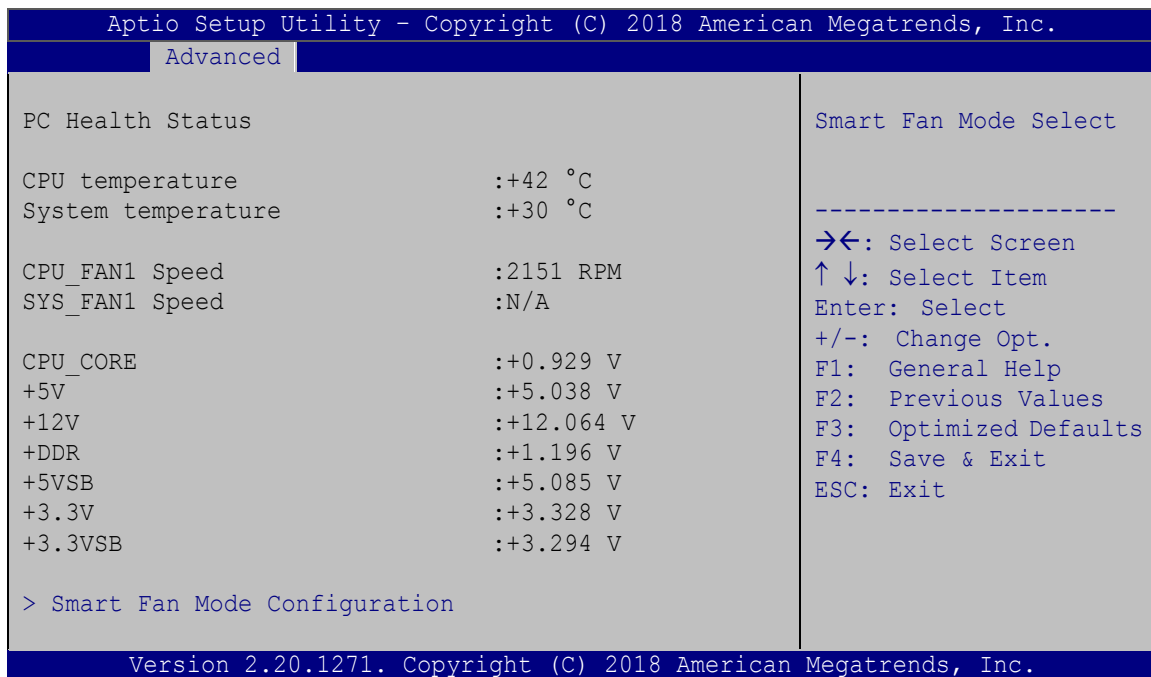
- |   |                            |                |                                                                                                                                                             |
|---|----------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| → | <b>S3 (Suspend to RAM)</b> | <b>DEFAULT</b> | The caches are flushed and the CPU is powered off. Power to the RAM is maintained. The computer returns slower to a working state, but more power is saved. |
|---|----------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|

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## 5.3.5 iWDD H/W Monitor

The **iWDD H/W Monitor** menu (**BIOS Menu 7**) contains the fan configuration submenu, and displays the system temperature and CPU fan speed.



### BIOS Menu 7: iWDD H/W Monitor

#### → PC Health Status

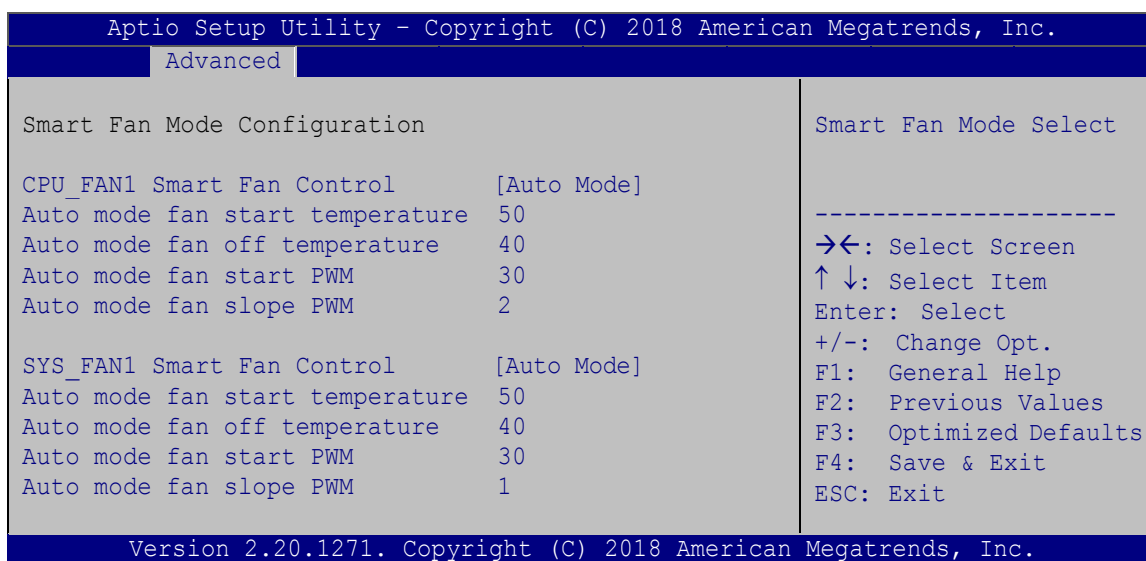
The following system parameters and values are shown. The system parameters that are monitored are:

- System Temperatures:
  - CPU Temperature
  - System Temperature
- Fan Speeds:
  - CPU Fan Speed
  - System Fan Speed
- Voltages:
  - CPU\_CORE
  - +5V

- +12V
- DDR
- +5VSB
- +3.3V
- +3.3VSB

### 5.3.5.1 Smart Fan Mode Configuration

Use the **Smart Fan Mode Configuration** submenu (**BIOS Menu 8**) to configure the CPU/system fan temperature and speed settings.



#### BIOS Menu 8: Smart Fan Mode Configuration

#### → CPU\_FAN1 Smart Fan Control/SYS\_FAN1 Smart Fan Control [Auto Mode]

Use the **CPU\_FAN1 Smart Fan Control/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 Mode settings.



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## → 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

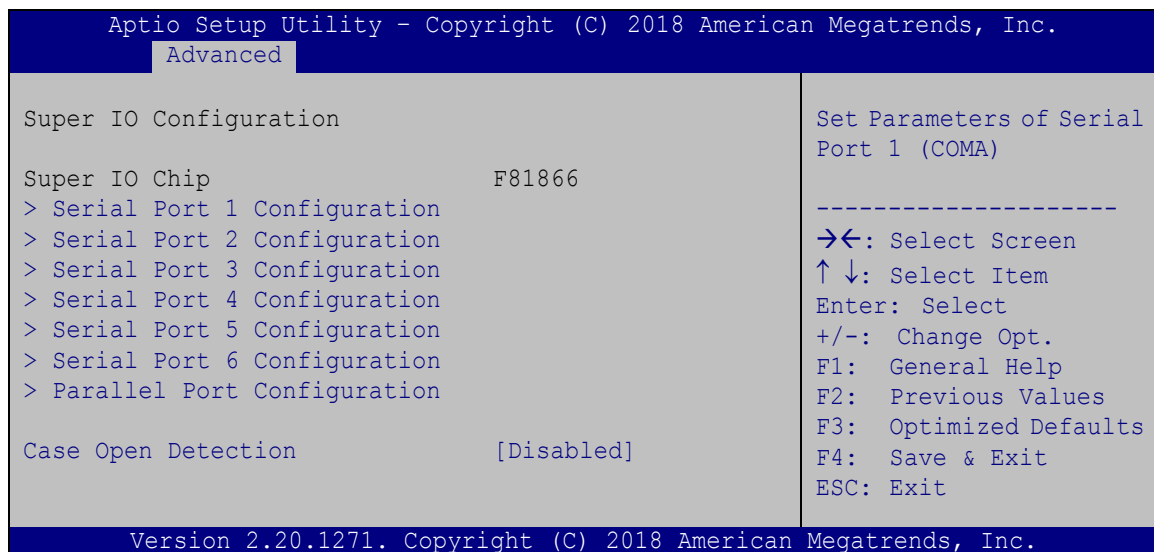
Use the + or – key to change the **Auto mode fan start PWM** value. Enter a decimal number between 1 and 100.

## → 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 8.

## 5.3.6 F81866 Super IO Configuration

Use the **F81866 Super IO Configuration** menu (**BIOS Menu 9**) to set or change the configurations for the parallel ports and serial ports.



### BIOS Menu 9: F81866 Super IO Configuration

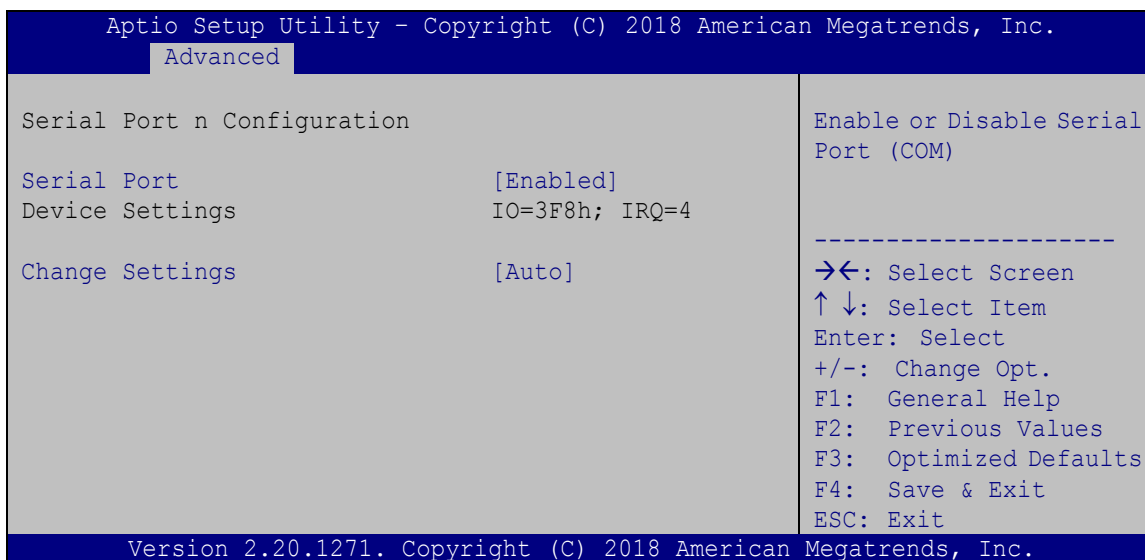
## → Case Open Beep [Disabled]

Use the **Case Open Beep** option to enable or disable the case open beep function.

- ➔ **Disabled**      **DEFAULT**      Disable the case open beep function
- ➔ **Enabled**                      Enable the case open beep function

### 5.3.6.1 Serial Port n Configuration

Use the **Serial Port n Configuration** menu (**BIOS Menu 10**) to configure the serial port n.



**BIOS Menu 10: Serial Port n Configuration Menu**

### 5.3.6.2 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.

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- **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, 5, 6,**  
**7, 9, 10, 11, 12**      Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- **IO=2F8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**      Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- **IO=3E8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**      Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- **IO=2E8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**      Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

## 5.3.6.3 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.

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- **IO=2F8h;**  
**IRQ=3**      Serial Port I/O port address is 2F8h and the interrupt address is IRQ3
- **IO=3F8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**      Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- **IO=2F8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**      Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- **IO=3E8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**      Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- **IO=2E8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**      Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

### 5.3.6.4 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=7**      Serial Port I/O port address is 3E8h and the interrupt address is IRQ7

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- ➔ **IO=3F8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**  
Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=2F8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**  
Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=3E8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**  
Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=2E8h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**  
Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=220h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**  
Serial Port I/O port address is 220h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=228h;**  
**IRQ=3, 4, 5, 6,**  
**7, 9, 10, 11, 12**  
Serial Port I/O port address is 228h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

### 5.3.6.5 Serial Port 4 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.

- |   |                                                                      |                |                                                                                                   |
|---|----------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------|
| ➔ | <b>Auto</b>                                                          | <b>DEFAULT</b> | The serial port IO port address and interrupt address are automatically detected.                 |
| ➔ | <b>IO=2E8h;</b><br><b>IRQ=7</b>                                      |                | Serial Port I/O port address is 2E8h and the interrupt address is IRQ7                            |
| ➔ | <b>IO=3F8h;</b><br><b>IRQ=3, 4, 5, 6,</b><br><b>7, 9, 10, 11, 12</b> |                | Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |
| ➔ | <b>IO=2F8h;</b><br><b>IRQ=3, 4, 5, 6,</b><br><b>7, 9, 10, 11, 12</b> |                | Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |
| ➔ | <b>IO=3E8h;</b><br><b>IRQ=3, 4, 5, 6,</b><br><b>7, 9, 10, 11, 12</b> |                | Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |
| ➔ | <b>IO=2E8h;</b><br><b>IRQ=3, 4, 5, 6,</b><br><b>7, 9, 10, 11, 12</b> |                | Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |
| ➔ | <b>IO=220h;</b><br><b>IRQ=3, 4, 5, 6,</b><br><b>7, 9, 10, 11, 12</b> |                | Serial Port I/O port address is 220h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |
| ➔ | <b>IO=228h;</b><br><b>IRQ=3, 4, 5, 6,</b><br><b>7, 9, 10, 11, 12</b> |                | Serial Port I/O port address is 228h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |

### 5.3.6.6 Serial Port 5 Configuration

#### ➔ Serial Port [Enabled]

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

- |   |                 |                |                         |
|---|-----------------|----------------|-------------------------|
| ➔ | <b>Disabled</b> |                | Disable the serial port |
| ➔ | <b>Enabled</b>  | <b>DEFAULT</b> | Enable the serial port  |

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## → Change Settings [Auto]

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

|   |                                                                                |                |                                                                                                   |
|---|--------------------------------------------------------------------------------|----------------|---------------------------------------------------------------------------------------------------|
| → | <b>Auto</b>                                                                    | <b>DEFAULT</b> | The serial port IO port address and interrupt address are automatically detected.                 |
| → | <b>IO=220h;</b><br><b>IRQ=10</b>                                               |                | Serial Port I/O port address is 220h and the interrupt address is IRQ10                           |
| → | <b>IO=3F8h;</b><br><b>IRQ=3, 4,</b><br><b>5, 6, 7, 9,</b><br><b>10, 11, 12</b> |                | Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |
| → | <b>IO=2F8h;</b><br><b>IRQ=3, 4,</b><br><b>5, 6, 7, 9,</b><br><b>10, 11, 12</b> |                | Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |
| → | <b>IO=3E8h;</b><br><b>IRQ=3, 4,</b><br><b>5, 6, 7, 9,</b><br><b>10, 11, 12</b> |                | Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |
| → | <b>IO=2E8h;</b><br><b>IRQ=3, 4,</b><br><b>5, 6, 7, 9,</b><br><b>10, 11, 12</b> |                | Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |
| → | <b>IO=220h;</b><br><b>IRQ=3, 4,</b><br><b>5, 6, 7, 9,</b><br><b>10, 11, 12</b> |                | Serial Port I/O port address is 220h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12 |

- **IO=228h;**                      Serial Port I/O port address is 228h and the interrupt  
**IRQ=3, 4,**                      address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12  
**5, 6, 7, 9,**  
**10, 11, 12**

### → Transfer Mode [RS232]

Use the **Transfer Mode** option to select the Serial Port 5 signaling mode.

- **RS422**                      Serial Port 5 signaling mode is RS-422
- **RS485**                      Serial Port 5 signaling mode is RS-485
- **RS232**                      **DEFAULT**                      Serial Port 5 signaling mode is RS-232

### 5.3.6.7 Serial Port 6 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=228h;**                      Serial Port I/O port address is 228h and the interrupt  
**IRQ=10**                      address is IRQ10



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- ➔ **IO=3F8h;**  
**IRQ=3, 4,**  
**5, 6, 7, 9,**  
**10, 11, 12**  
Serial Port I/O port address is 3F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=2F8h;**  
**IRQ=3, 4,**  
**5, 6, 7, 9,**  
**10, 11, 12**  
Serial Port I/O port address is 2F8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=3E8h;**  
**IRQ=3, 4,**  
**5, 6, 7, 9,**  
**10, 11, 12**  
Serial Port I/O port address is 3E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=2E8h;**  
**IRQ=3, 4,**  
**5, 6, 7, 9,**  
**10, 11, 12**  
Serial Port I/O port address is 2E8h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=220h;**  
**IRQ=3, 4,**  
**5, 6, 7, 9,**  
**10, 11, 12**  
Serial Port I/O port address is 220h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12
- ➔ **IO=228h;**  
**IRQ=3, 4,**  
**5, 6, 7, 9,**  
**10, 11, 12**  
Serial Port I/O port address is 228h and the interrupt address is IRQ3, 4, 5, 6, 7, 9, 10, 11, 12

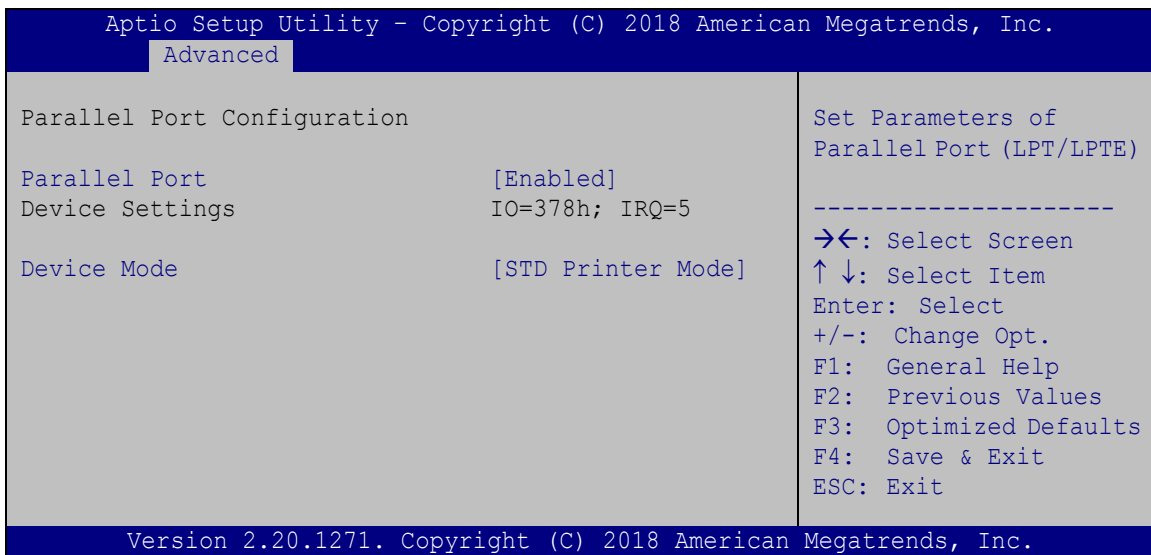
## → Transfer Mode [RS232]

Use the **Transfer Mode** option to select the Serial Port 6 signaling mode.

- **RS422**                      Serial Port 6 signaling mode is RS-422
- **RS485**                      Serial Port 6 signaling mode is RS-485
- **RS232**              **DEFAULT**      Serial Port 6 signaling mode is RS-232

### 5.3.6.8 Parallel Port Configuration

Use the **Parallel Port Configuration** menu (**BIOS Menu 11**) to configure the parallel port.



#### BIOS Menu 11: Parallel Port Configuration Menu

## → Parallel Port [Enabled]

Use the **Parallel Port** option to enable or disable the parallel port.

- **Disabled**                      Disable the parallel port
- **Enabled**              **DEFAULT**      Enable the parallel port

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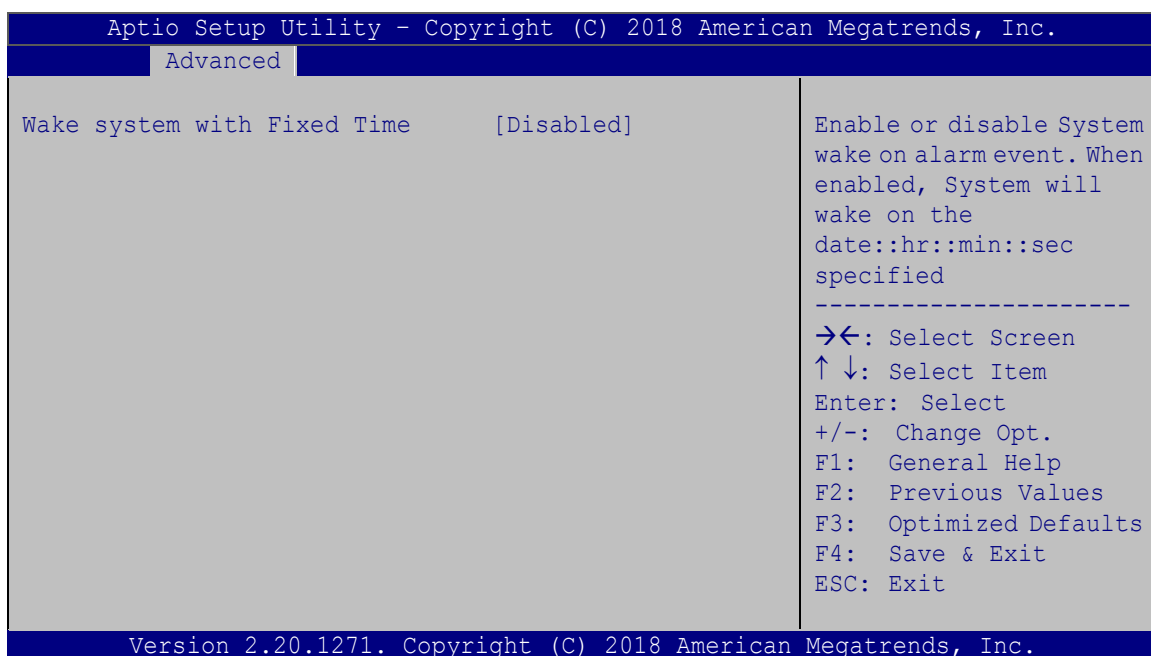
## → Device Mode [STD Printer Mode]

Use the **Device Mode** option to select the mode the parallel port operates in. Configuration options are listed below.

- STD Printer Mode **Default**
- SPP Mode
- EPP-1.9 and SPP Mode
- EPP-1.7 and SPP Mode
- ECP Mode
- ECP and EPP 1.9 Mode
- ECP and EPP 1.7 Mode

### 5.3.7 RTC Wake Settings

The **RTC Wake Settings** menu (**BIOS Menu 12**) enables the system to wake at the specified time.



**BIOS Menu 12: 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 date

Wake up hour

Wake up minute

Wake up second

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

### 5.3.8 Serial Port Console Redirection

The **Serial Port Console Redirection** menu (**BIOS Menu 13**) 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.

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| Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc. |            |                                                                                                                                                                                          |
|--------------------------------------------------------------------|------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Advanced                                                           |            |                                                                                                                                                                                          |
| COM1                                                               |            | Console Redirection                                                                                                                                                                      |
| Console Redirection                                                | [Disabled] | Enable or Disable                                                                                                                                                                        |
| > Console Redirection Settings                                     |            |                                                                                                                                                                                          |
| COM2                                                               |            |                                                                                                                                                                                          |
| Console Redirection                                                | [Disabled] |                                                                                                                                                                                          |
| > Console Redirection Settings                                     |            |                                                                                                                                                                                          |
| COM3                                                               |            |                                                                                                                                                                                          |
| Console Redirection                                                | [Disabled] |                                                                                                                                                                                          |
| > Console Redirection Settings                                     |            |                                                                                                                                                                                          |
| COM4                                                               |            |                                                                                                                                                                                          |
| Console Redirection                                                | [Disabled] |                                                                                                                                                                                          |
| > Console Redirection Settings                                     |            |                                                                                                                                                                                          |
| COM5                                                               |            |                                                                                                                                                                                          |
| Console Redirection                                                | [Disabled] |                                                                                                                                                                                          |
| > Console Redirection Settings                                     |            |                                                                                                                                                                                          |
| COM6                                                               |            |                                                                                                                                                                                          |
| Console Redirection                                                | [Disabled] |                                                                                                                                                                                          |
| > Console Redirection Settings                                     |            |                                                                                                                                                                                          |
| iAMT SOL                                                           |            |                                                                                                                                                                                          |
| COM7 (Pci Bus0,Dev22,Func3)                                        |            |                                                                                                                                                                                          |
| Console Redirection                                                | [Disabled] |                                                                                                                                                                                          |
| > Console Redirection Settings                                     |            |                                                                                                                                                                                          |
| Legacy Console Redirection                                         |            |                                                                                                                                                                                          |
| > Legacy Console Redirection Settings                              |            |                                                                                                                                                                                          |
|                                                                    |            | -----<br>→←: Select Screen<br>↑ ↓: Select Item<br>Enter: Select<br>+/-: Change Opt.<br>F1: General Help<br>F2: Previous Values<br>F3: Optimized Defaults<br>F4: Save & Exit<br>ESC: Exit |
| Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.    |            |                                                                                                                                                                                          |

## BIOS Menu 13: 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

The following options are available in the **Console Redirection Settings** submenu when the **Console Redirection** option is enabled.

### → 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.  |
| → | 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. |

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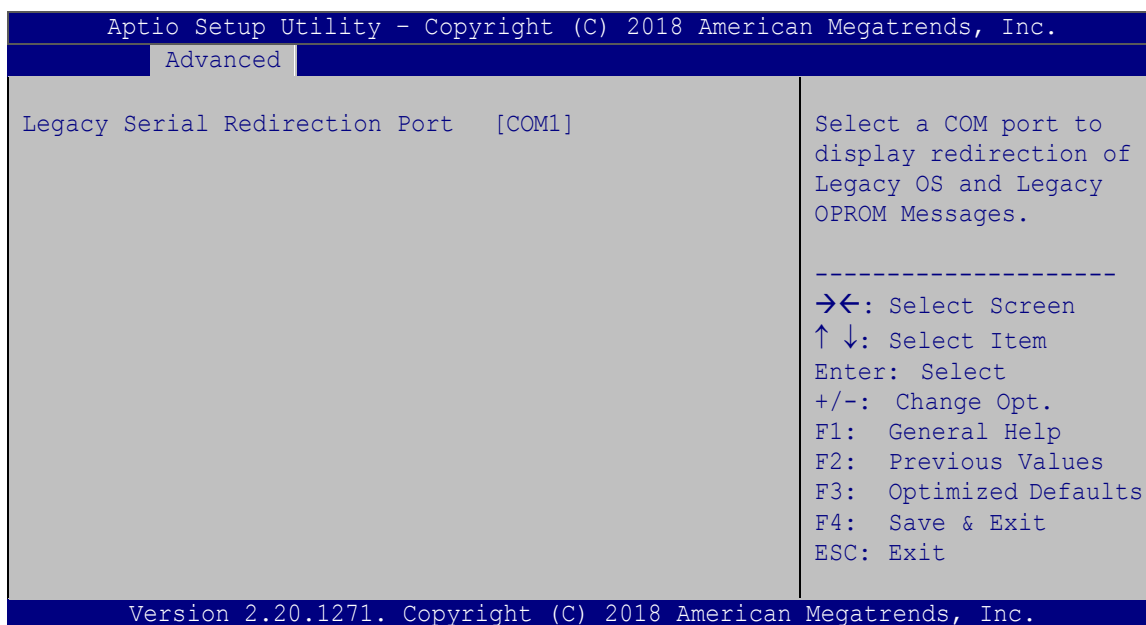
- ➔ **Odd**                      The parity bit is 0 if the number of ones in the data bits is odd.
- ➔ **Mark**                     The parity bit is always 1. This option does not provide error detection.
- ➔ **Space**                    The parity bit is always 0. This option does not provide error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

### 5.3.8.1 Legacy Console Redirection Settings



**BIOS Menu 14: Legacy Console Redirection Settings**

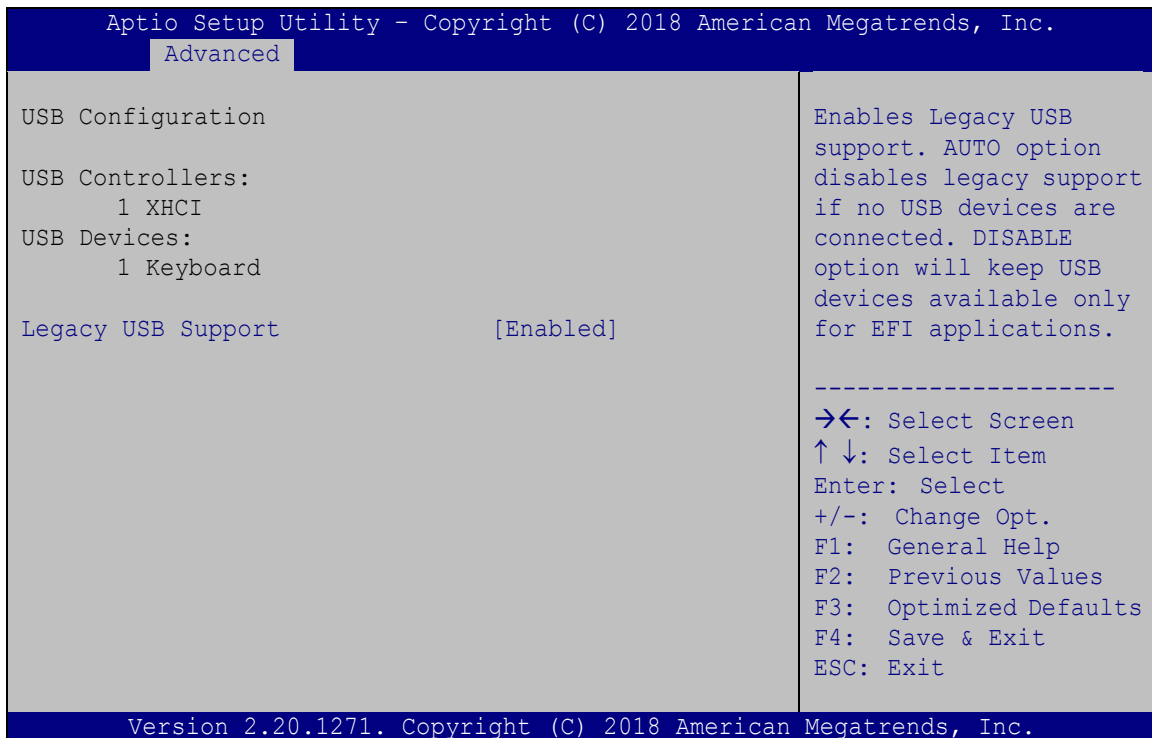
## → Legacy Serial Redirection Port [COM1]

Use the **Legacy Serial Redirection Port** option to select a COM port to display redirection of legacy OS and legacy OPRM messages. Configuration options are listed below.

- COM1 **Default**
- COM2
- COM3
- COM4
- COM5
- COM6
- COM7 (Pci Bus0,Dev22,Func3)

### 5.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 15**) to read USB configuration information and configure the USB settings.



**BIOS Menu 15: USB Configuration**



# NEX-971 ATX Motherboard



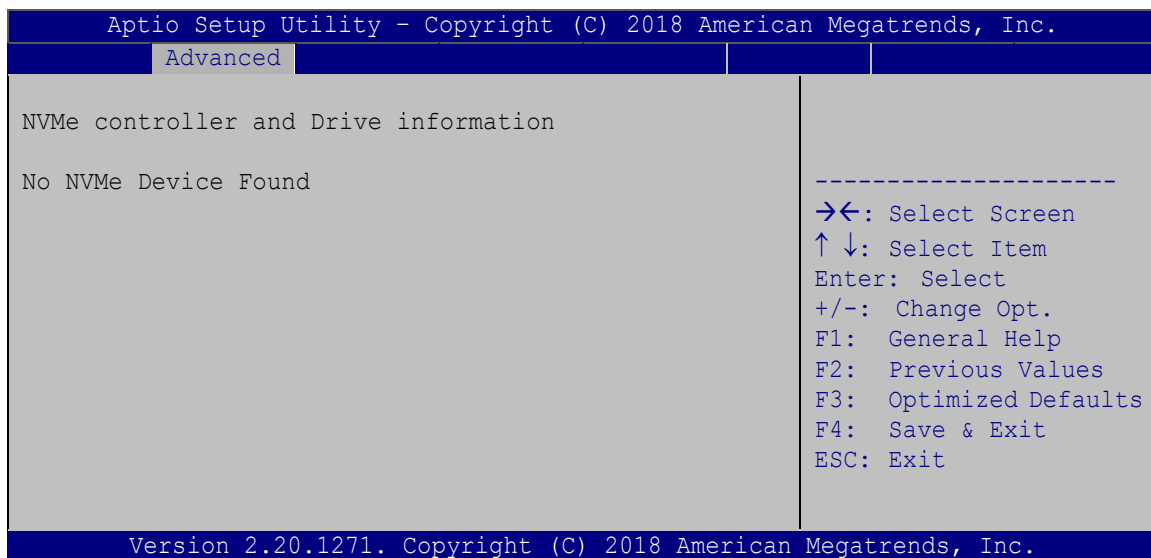
## → Legacy USB Support [Enabled]

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.

- |   |                 |                |                                                             |
|---|-----------------|----------------|-------------------------------------------------------------|
| → | <b>Enabled</b>  | <b>DEFAULT</b> | Legacy USB support enabled                                  |
| → | <b>Disabled</b> |                | Legacy USB support disabled                                 |
| → | <b>Auto</b>     |                | Legacy USB support disabled if no USB devices are connected |

### 5.3.10 NVMe Configuration

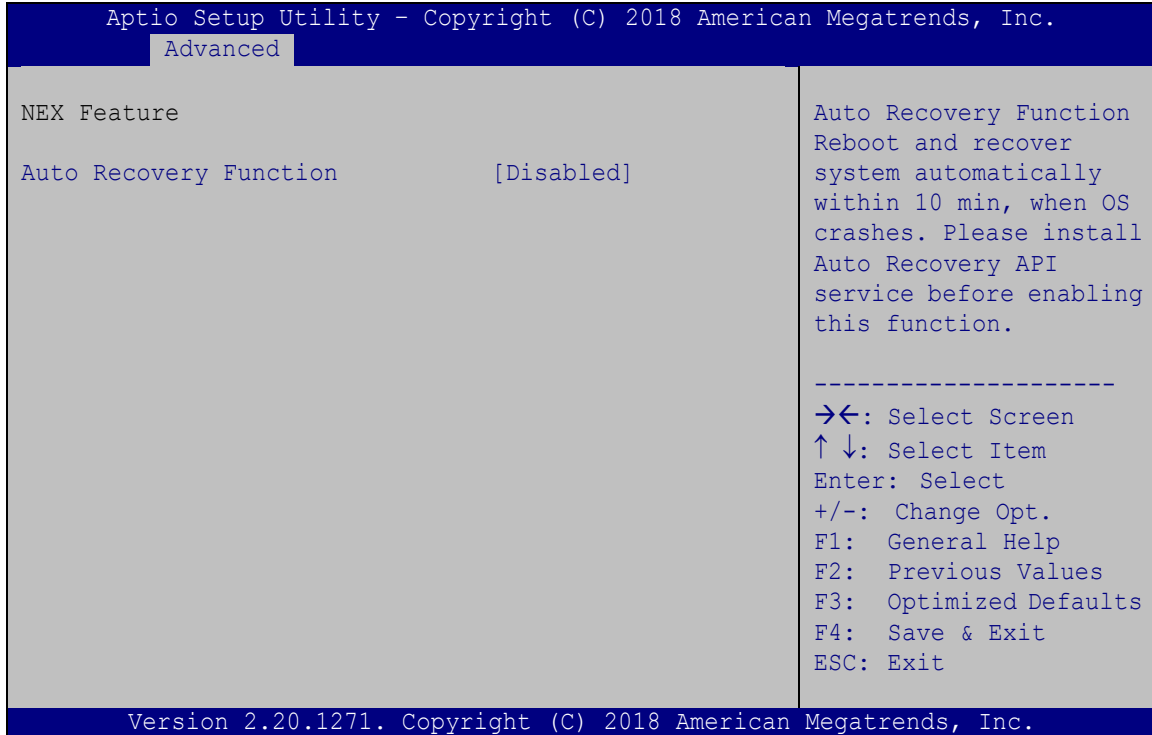
Use the **NVMe Configuration (BIOS Menu 16)** menu to display the NVMe controller and device information.



**BIOS Menu 16: NVMe Configuration**

## 5.3.11 NEX Feature

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



### BIOS Menu 17: NEX Feature

#### → Auto Recovery Function [Disabled]

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

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

# NEX-971 ATX Motherboard

## 5.4 Chipset

Use the **Chipset** menu (**BIOS Menu 18**) 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) 2018 American Megatrends, Inc.
Main    Advanced    Chipset    Security    Boot    Save & Exit

> System Agent (SA) Configuration
> PCH-IO Configuration

System Agent (SA)
Parameters

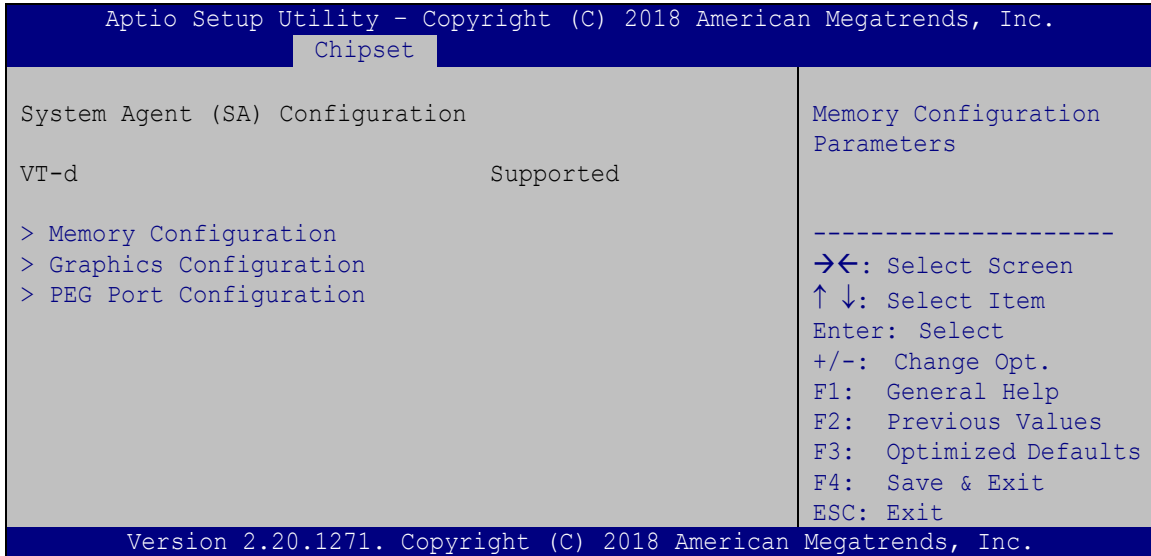
-----
-><: Select Screen
↑↓: Select Item
Enter: Select
+/-: Change Opt.
F1: General Help
F2: Previous Values
F3: Optimized Defaults
F4: Save & Exit
ESC: Exit

Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.
```

**BIOS Menu 18: Chipset**

## 5.4.1 System Agent (SA) Configuration

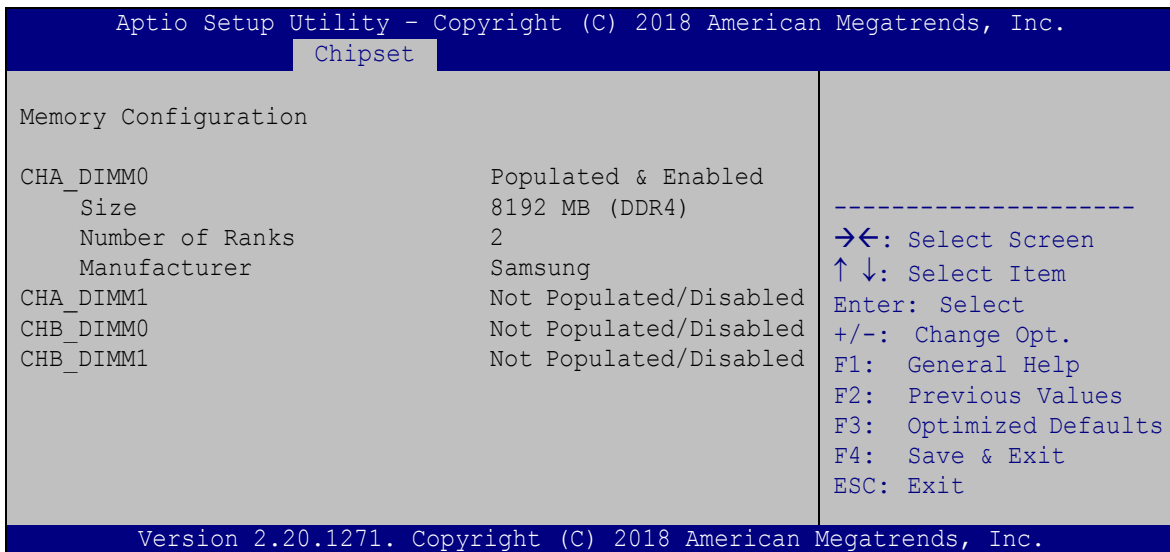
Use the **System Agent (SA) Configuration** menu (**BIOS Menu 19**) to configure the System Agent (SA) parameters.



**BIOS Menu 19: System Agent (SA) Configuration**

### 5.4.1.1 Memory Configuration

Use the **Memory Configuration** submenu (**BIOS Menu 20**) to view memory information.



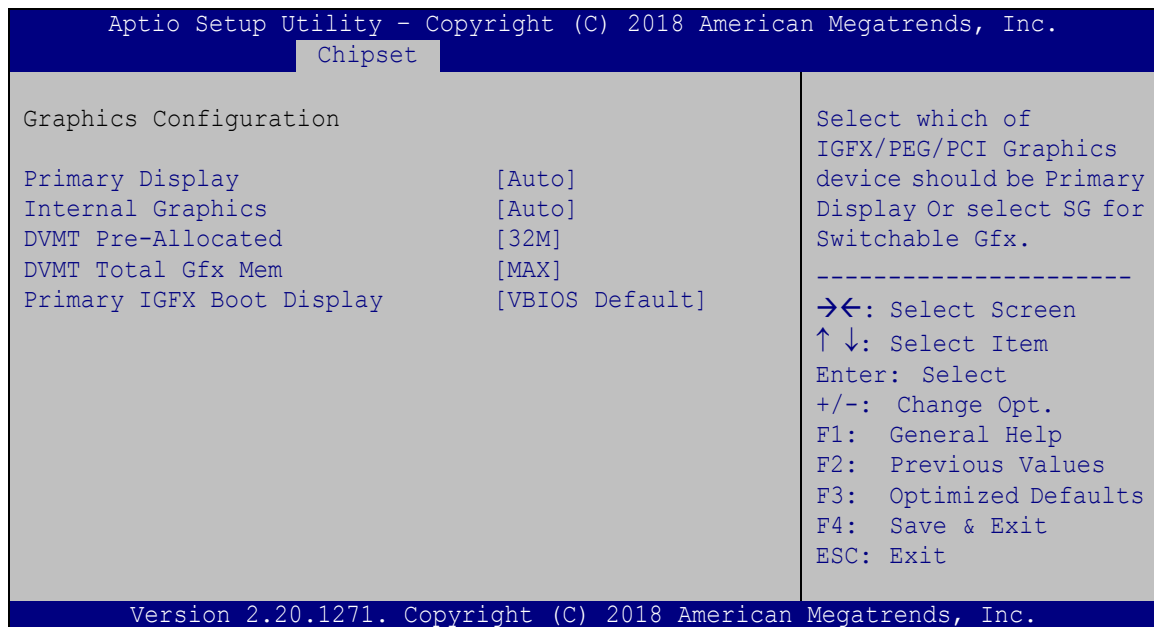
**BIOS Menu 20: Memory Configuration**

# NEX-971 ATX Motherboard



## 5.4.1.2 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
- PEG
- PCIe

## → Internal Graphics [Auto]

Use the **Internal Graphics** option to configure whether to keep IGFX enabled. If user wants to support dual display by internal graphics and external graphics, this Internal Graphics option should be set to Enabled and the above Primary Display option should be set to IGFX.

- **Auto**                      **DEFAULT**      Auto mode
- **Disabled**                                      Disables IGFX.
- **Enabled**                                      Enables IGFX.

## → DVM T Pre-Allocated [32M]

Use the **DVM T 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                      **Default**
- 64M

## → DVM T Total Gfx Mem [MAX]

Use the **DVM T Total Gfx Mem** option to select DVM T5.0 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]

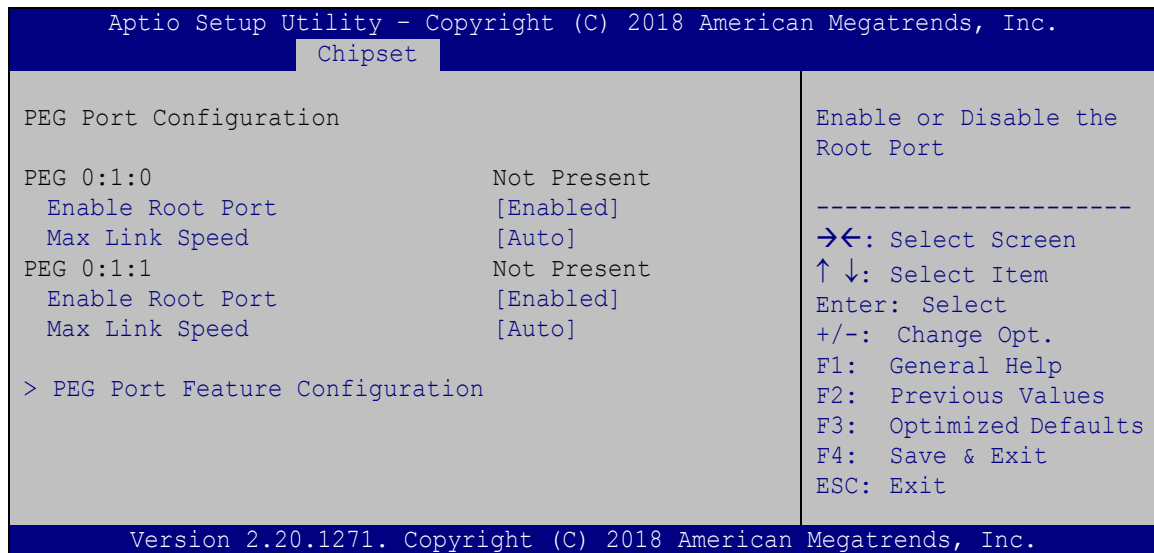
Use the **Primary IGFX Boot Display** option to select the display device used by the system when it boots. Configuration options are listed below.

- VBIOS Default              **DEFAULT**
- DP++
- CRT
- DP1
- HDMI

# NEX-971 ATX Motherboard



## 5.4.1.3 PEG Port Configuration



### BIOS Menu 22: PEG Port Configuration

#### ➔ Enable Root Port [Enabled]

Use the **Enable Root Port** option to enable or disable the PCI Express (PEG) controller.

- ➔ **Disabled** Disables the PCI Express (PEG) controller.
- ➔ **Enabled** **DEFAULT** Enables the PCI Express (PEG) controller.

#### ➔ Max Link Speed [Auto]

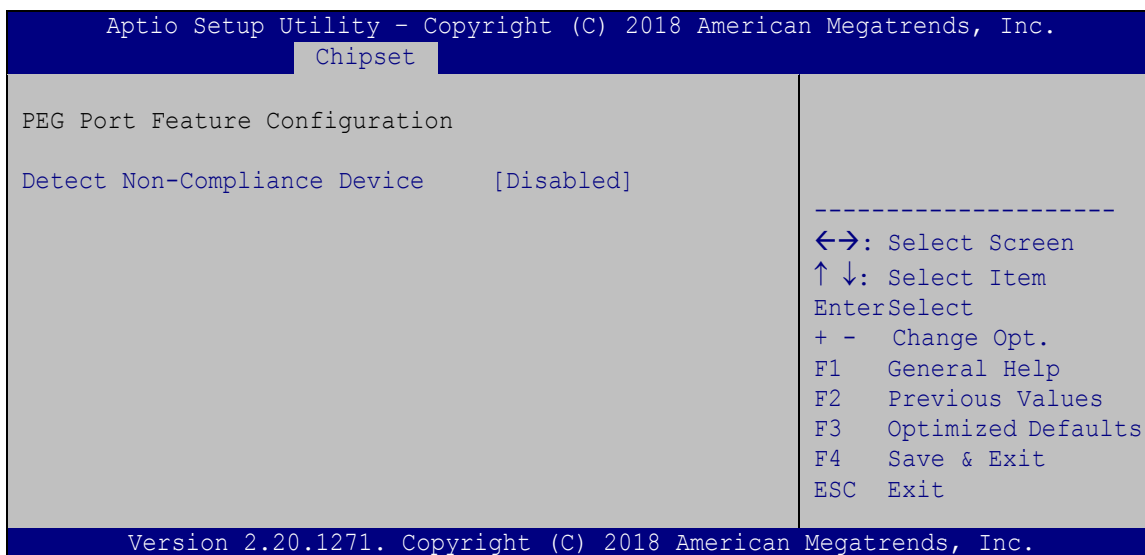
Use the **Max Link Speed** option to select the maximum link speed of the PCI Express slot.

The following options are available:

- Auto **Default**
- Gen1
- Gen2
- Gen3

## 5.4.1.3.1 PEG Port Feature Configuration

Use the **PEG Port Feature Configuration** submenu (**BIOS Menu 23**) to configure the SA PCIe settings.



### BIOS Menu 23: PEG Port Feature Configuration

#### ➔ Detect Non-Compliance Device [Disabled]

Use the **Detect Non-Compliance Device** option to detect non-compliance PCIe device in PEG.

- |   |                 |                |                                                 |
|---|-----------------|----------------|-------------------------------------------------|
| ➔ | <b>Disabled</b> | <b>DEFAULT</b> | Do not detect non-compliance PCIe device in PEG |
| ➔ | <b>Enabled</b>  |                | Detect non-compliance PCIe device in PEG        |

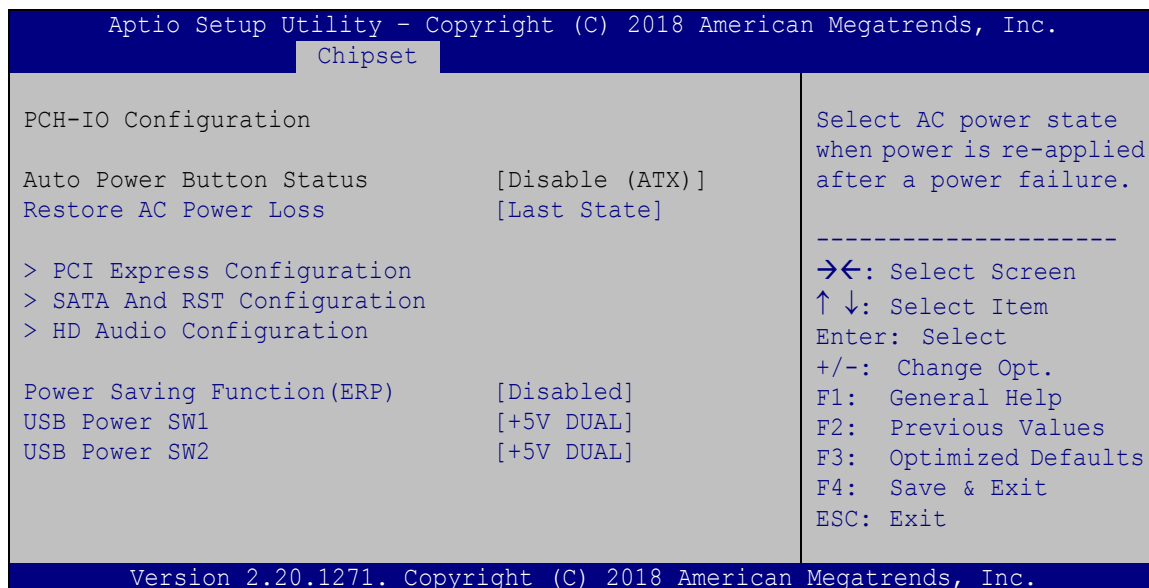


# NEX-971 ATX Motherboard



## 5.4.2 PCH-IO Configuration

Use the **PCH-IO Configuration** menu (**BIOS Menu 24**) to configure the PCH parameters.



### BIOS Menu 24: PCH-IO Configuration

#### → Restore AC Power Loss [Last State]

Use the **Restore AC Power Loss** BIOS option to specify what state the system returns to if there is a sudden loss of power to the system.

- **Power Off**                      The system remains turned off
- **Power On**                      The system turns on
- **Last State      DEFAULT**      The system returns to its previous state. If it was on, it turns itself on. If it was off, it remains off.

#### → Power Saving Function(ERP) [Disabled]

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

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

## → USB Power SW1 [+5V DUAL]

Use the **USB Power SW1** BIOS option to configure the USB power source for the corresponding USB connectors (Table 5-2).

→ **+5V DUAL**    **DEFAULT**    Sets the USB power source to +5V dual

→ **+5V**    Sets the USB power source to +5V

## → USB Power SW2 [+5V DUAL]

Use the **USB Power SW2** BIOS option to configure the USB power source for the corresponding USB connectors (Table 5-2).

→ **+5V DUAL**    **DEFAULT**    Sets the USB power source to +5V dual

→ **+5V**    Sets the USB power source to +5V

| BIOS Options  | Configured USB Ports                                                                                                      |
|---------------|---------------------------------------------------------------------------------------------------------------------------|
| USB Power SW1 | K/M_USB1 (external USB 2.0 ports)<br>LAN1_USB1 (external USB 3.2 Gen 2 ports)<br>LAN2_USB2 (external USB 3.2 Gen 1 ports) |
| USB Power SW2 | USB1 (internal USB 2.0 ports)<br>USB2 (internal USB 2.0 ports)<br>USB3-1 (internal USB 3.2 Gen 1 ports)                   |

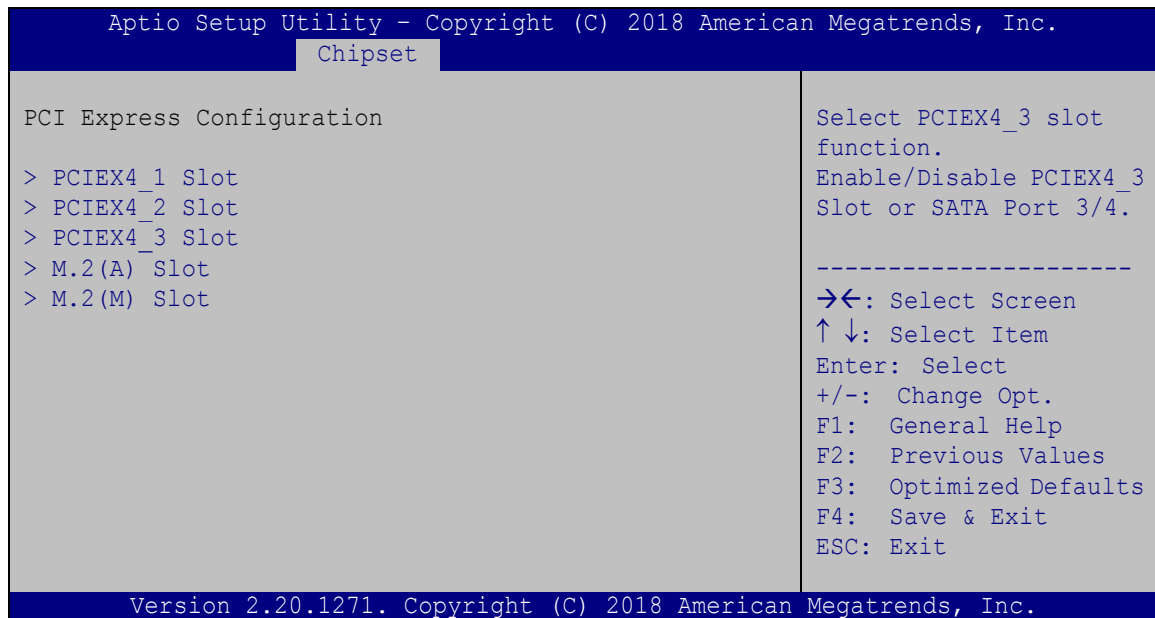
**Table 5-2: BIOS Options and Configured USB Ports**

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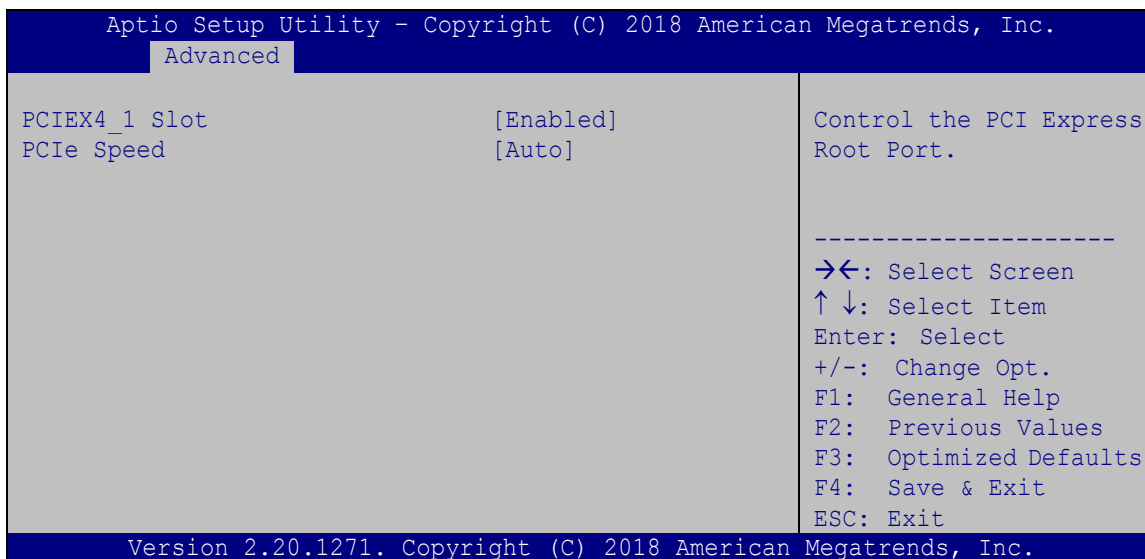
## 5.4.2.1 PCI Express Configuration

Use the **PCI Express Configuration** menu (**BIOS Menu 25**) to configure the PCI Express and M.2 slots.



**BIOS Menu 25: PCI Express Configuration**

## 5.4.2.1.1 PCIEX4\_1 Slot, PCIEX4\_2 Slot, PCIEX4\_3 Slot and M.2 Slots



### BIOS Menu 26: PCIe Slot Configuration Submenu

#### → PCIEX4\_1 Slot [Enabled]

Use the **PCIEX4\_1 Slot** option to enable or disable the PCIEX4\_1 PCI Express slot.

- **Disabled** Disables the PCIEX4\_1 PCI Express slot.
- **Enabled** **DEFAULT** Enables the PCIEX4\_1 PCI Express slot.

#### → PCIEX4\_2 Slot [Enabled]

Use the **PCIEX4\_2 Slot** option to enable or disable the PCIEX4\_2 PCI Express slot.

- **Disabled** Disables the PCIEX4\_2 PCI Express slot.
- **Enabled** **DEFAULT** Enables the PCIEX4\_2 PCI Express slot.

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## → PCIEX4\_3 Slot [Enabled]

Use the **PCIEX4\_3 Slot** option to enable or disable the PCIEX4\_3 PCI Express slot.

- |   |                 |                |                                         |
|---|-----------------|----------------|-----------------------------------------|
| → | <b>Disabled</b> |                | Disables the PCIEX4_3 PCI Express slot. |
| → | <b>Enabled</b>  | <b>DEFAULT</b> | Enables the PCIEX4_3 PCI Express slot.  |

## → M.2(A) Slot [Enabled]

Use the **M.2(A) Slot** option to enable or disable the M.2 2230 A-key slot.

- |   |                 |                |                                   |
|---|-----------------|----------------|-----------------------------------|
| → | <b>Disabled</b> |                | Disables the M.2 2230 A-key slot. |
| → | <b>Enabled</b>  | <b>DEFAULT</b> | Enables the M.2 2230 A-key slot.  |

## → M.2(M) Slot [Enabled]

Use the **M.2(M) Slot** option to enable or disable the M.2 2280 M-key slot.

- |   |                 |                |                                   |
|---|-----------------|----------------|-----------------------------------|
| → | <b>Disabled</b> |                | Disables the M.2 2280 M-key slot. |
| → | <b>Enabled</b>  | <b>DEFAULT</b> | Enables the M.2 2280 M-key slot.  |

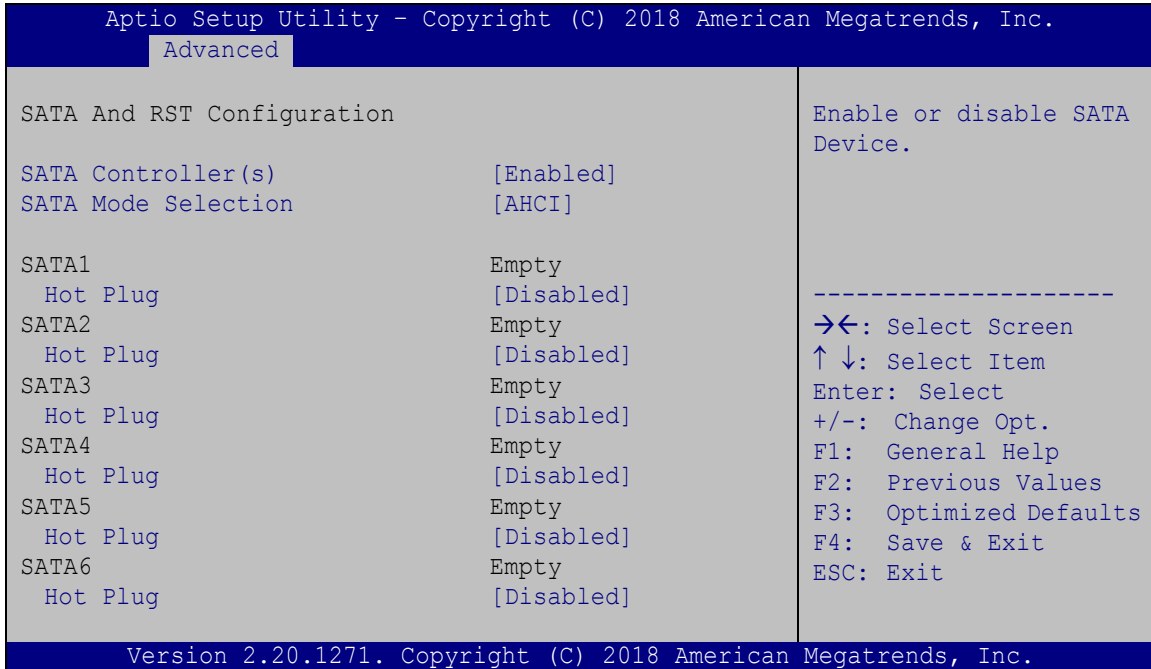
## → PCIe Speed [Auto]

Use this option to select the support type of the PCI Express slots. The following options are available:

- |        |                |
|--------|----------------|
| ▪ Auto | <b>Default</b> |
| ▪ Gen1 |                |
| ▪ Gen2 |                |
| ▪ Gen3 |                |

## 5.4.2.2 SATA Configuration

Use the **SATA Configuration** menu (**BIOS Menu 27**) to change and/or set the configuration of the SATA devices installed in the system.



### BIOS Menu 27: SATA Configuration

#### → SATA Controller(s) [Enabled]

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

- **Enabled**      **DEFAULT**      Enables the on-board SATA controller(s).
- **Disabled**                      Disables the on-board SATA controller(s).

#### → SATA Mode Selection [AHCI]

Use the **SATA Mode Selection** option to determine how the SATA devices operate.

- **AHCI**      **DEFAULT**      Configures SATA devices as AHCI device.

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- **Intel RST Premium With Intel Optane System Acceleration** Configures SATA devices to the Intel RST Premium With Intel Optane System Acceleration mode.

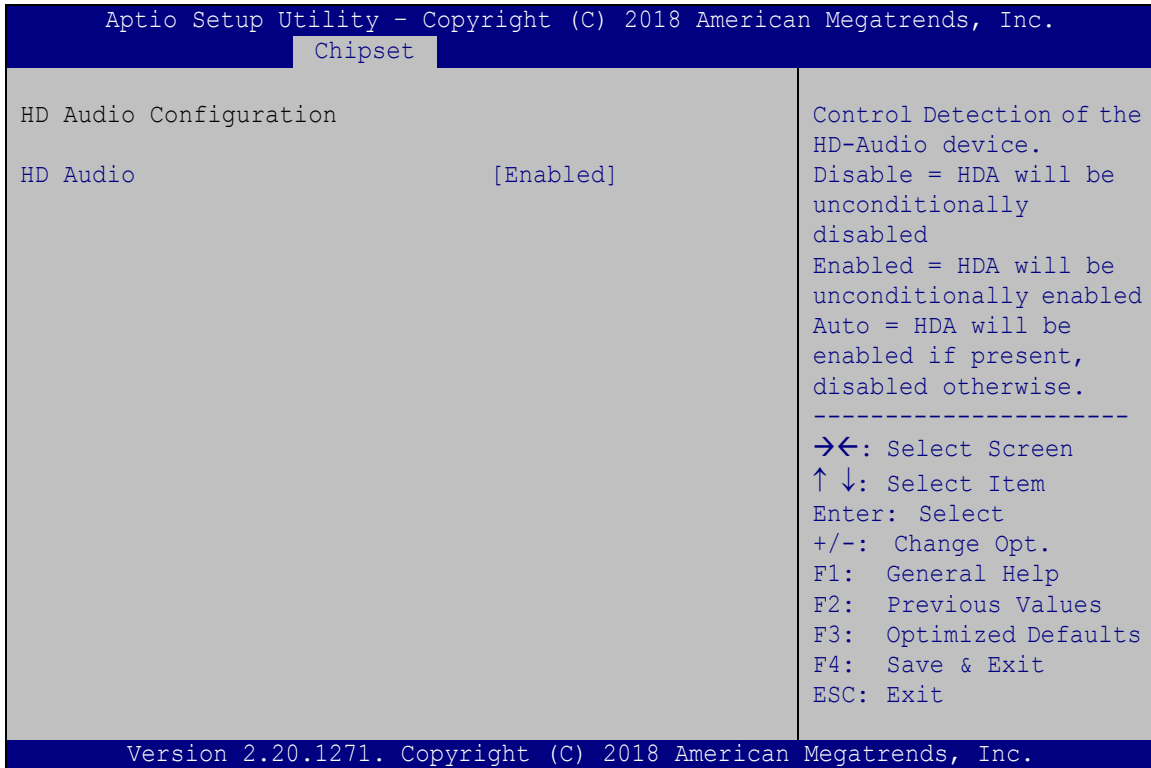
### → **Hot Plug [Disabled]**

Use the **Hot Plug** option to designate the correspondent SATA port as hot-pluggable.

- **Disabled**      **DEFAULT**      Disables the hot-pluggable function of the SATA port.
- **Enabled**      Designates the SATA port as hot-pluggable.

## 5.4.2.3 HD Audio Configuration

Use the **HD Audio Configuration** menu (**BIOS Menu 28**) to configure the PCH Azalia settings.



### BIOS Menu 28: HD Audio Configuration

#### → HD Audio [Auto]

Use the **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 is enabled.



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## 5.5 Security

Use the **Security** menu (**BIOS Menu 29**) to set system and user passwords.

| Aptio Setup Utility - Copyright (C) 2018 American Megatrends, Inc.                                                                                                 |                                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------|
| Main                                                                                                                                                               | Advanced Chipset Security Boot Save & Exit |
| Password Description                                                                                                                                               | Set Administrator Password                 |
| If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.                                      |                                            |
| If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. |                                            |
| The password length must be:                                                                                                                                       | -----                                      |
| Minimum length                                                                                                                                                     | 3                                          |
| Maximum length                                                                                                                                                     | 20                                         |
| Administrator Password                                                                                                                                             | →←: Select Screen                          |
| User Password                                                                                                                                                      | ↑↓: Select Item                            |
|                                                                                                                                                                    | Enter: Select                              |
|                                                                                                                                                                    | +/-: Change Opt.                           |
|                                                                                                                                                                    | F1: General Help                           |
|                                                                                                                                                                    | F2: Previous Values                        |
|                                                                                                                                                                    | F3: Optimized Defaults                     |
|                                                                                                                                                                    | F4: Save & Exit                            |
|                                                                                                                                                                    | ESC: Exit                                  |
| Version 2.20.1271. Copyright (C) 2018 American Megatrends, Inc.                                                                                                    |                                            |

### BIOS Menu 29: Security

#### → Administrator Password

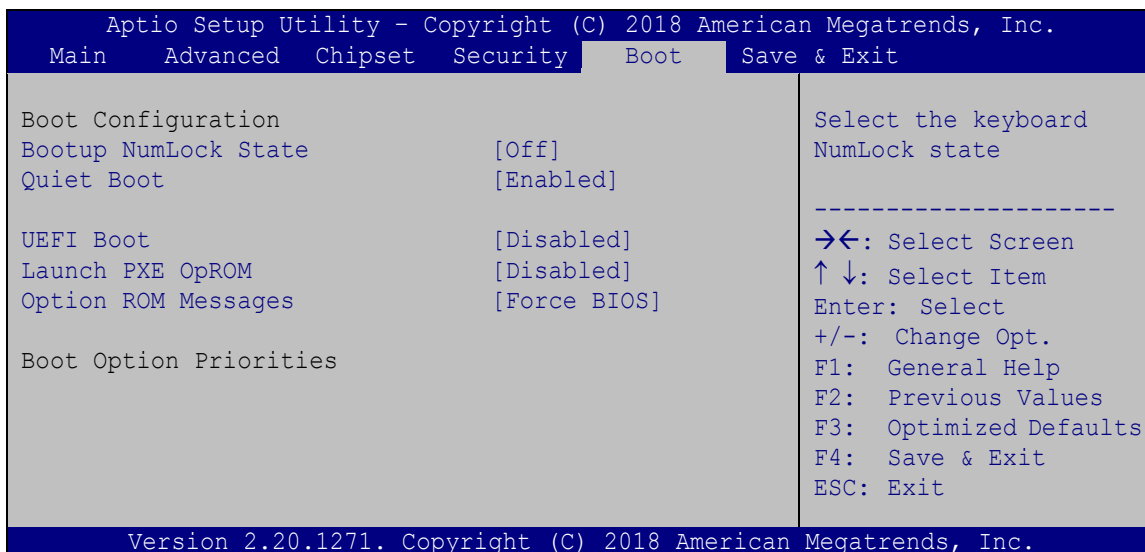
Use the **Administrator Password** to set or change a administrator password.

#### → User Password

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

## 5.6 Boot

Use the **Boot** menu (**BIOS Menu 30**) to configure system boot options.



### BIOS Menu 30: Boot

#### → Bootup NumLock State [Off]

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

#### → On

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 **DEFAULT**

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.

# NEX-971 ATX Motherboard



## → Quiet Boot [Enabled]

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

- |   |                 |                |                                             |
|---|-----------------|----------------|---------------------------------------------|
| → | <b>Disabled</b> |                | Normal POST messages displayed              |
| → | <b>Enabled</b>  | <b>DEFAULT</b> | OEM Logo displayed instead of POST messages |

## → UEFI Boot [Disabled]

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

- |   |                 |                |                                     |
|---|-----------------|----------------|-------------------------------------|
| → | <b>Disabled</b> | <b>DEFAULT</b> | Boot from UEFI devices is disabled. |
| → | <b>Enabled</b>  |                | Boot from UEFI devices is enabled.  |

## → Launch PXE OpROM [Disabled]

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

- |   |                 |                |                            |
|---|-----------------|----------------|----------------------------|
| → | <b>Disabled</b> | <b>DEFAULT</b> | Ignore all PXE Option ROMs |
| → | <b>Enabled</b>  |                | Load PXE Option ROMs.      |

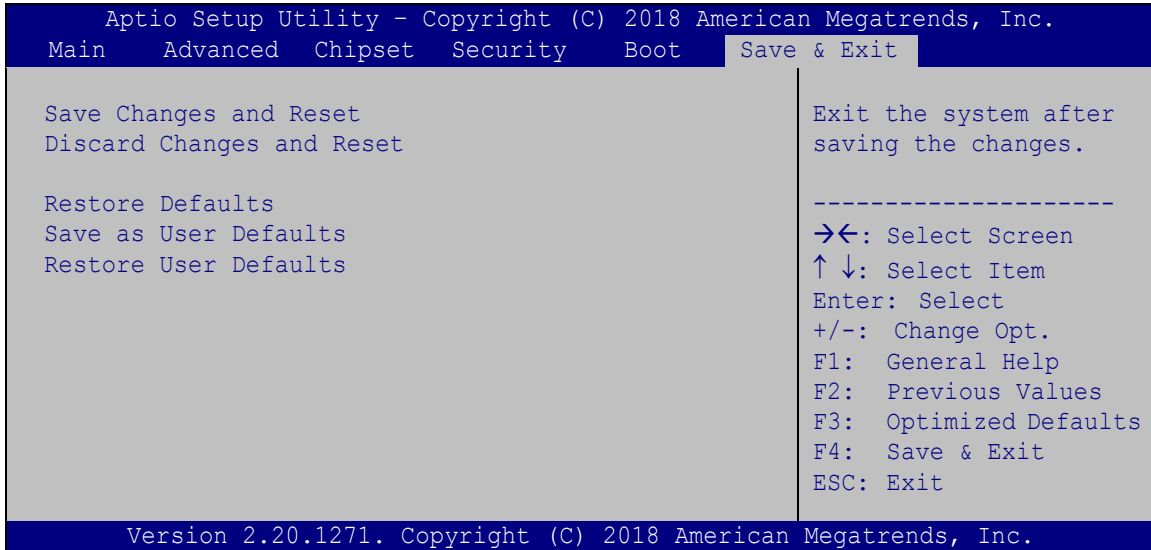
## → Option ROM Messages [Force BIOS]

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

- |   |                     |                |                                  |
|---|---------------------|----------------|----------------------------------|
| → | <b>Force BIOS</b>   | <b>DEFAULT</b> | Sets display mode to force BIOS. |
| → | <b>Keep Current</b> |                | Sets display mode to current.    |

## 5.7 Save & Exit

Use the **Safe & Exit** menu (**BIOS Menu 31**) to load default BIOS values, optimal failsafe values and to save configuration changes.



### BIOS Menu 31: 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.

**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

---

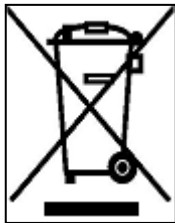


### CAUTION:

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 Date [xx/xx/xx] .....                                           | 80  |
| System Time [xx:xx:xx] .....                                           | 81  |
| Intel (VMX) Virtualization Technology [Disabled] .....                 | 82  |
| Active Processor Cores [All] .....                                     | 83  |
| Intel(R) SpeedStep(tm) [Enabled].....                                  | 83  |
| C states [Disabled].....                                               | 83  |
| Unconfigure ME [Disabled] .....                                        | 84  |
| Security Device Support [Disable] .....                                | 85  |
| ACPI Sleep State [S3 (Suspend to RAM)].....                            | 86  |
| PC Health Status .....                                                 | 87  |
| CPU_FAN1 Smart Fan Control/SYS_FAN1 Smart Fan Control [Auto Mode]..... | 88  |
| Auto mode fan start/off temperature .....                              | 89  |
| Auto mode fan start PWM .....                                          | 89  |
| Auto mode fan slope PWM.....                                           | 89  |
| Case Open Beep [Disabled] .....                                        | 89  |
| Serial Port [Enabled].....                                             | 90  |
| Change Settings [Auto] .....                                           | 90  |
| Serial Port [Enabled].....                                             | 91  |
| Change Settings [Auto] .....                                           | 91  |
| Serial Port [Enabled].....                                             | 92  |
| Change Settings [Auto] .....                                           | 92  |
| Serial Port [Enabled].....                                             | 93  |
| Change Settings [Auto] .....                                           | 93  |
| Serial Port [Enabled].....                                             | 94  |
| Change Settings [Auto] .....                                           | 95  |
| Transfer Mode [RS232].....                                             | 96  |
| Serial Port [Enabled].....                                             | 96  |
| Change Settings [Auto] .....                                           | 96  |
| Transfer Mode [RS232].....                                             | 98  |
| Parallel Port [Enabled].....                                           | 98  |
| Device Mode [STD Printer Mode] .....                                   | 99  |
| Wake system with Fixed Time [Disabled].....                            | 100 |
| Console Redirection [Disabled].....                                    | 101 |

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|                                                 |     |
|-------------------------------------------------|-----|
| Terminal Type [ANSI].....                       | 102 |
| Bits per second [115200].....                   | 102 |
| Data Bits [8] .....                             | 102 |
| Parity [None].....                              | 102 |
| Stop Bits [1] .....                             | 103 |
| Legacy Serial Redirection Port [COM1].....      | 104 |
| Legacy USB Support [Enabled].....               | 105 |
| Auto Recovery Function [Disabled] .....         | 106 |
| Primary Display [Auto] .....                    | 109 |
| Internal Graphics [Auto].....                   | 110 |
| DVMT Pre-Allocated [32M] .....                  | 110 |
| DVMT Total Gfx Mem [MAX].....                   | 110 |
| Primary IGFX Boot Display [VBIOS Default] ..... | 110 |
| Enable Root Port [Enabled] .....                | 111 |
| Max Link Speed [Auto] .....                     | 111 |
| Detect Non-Compliance Device [Disabled] .....   | 112 |
| Restore AC Power Loss [Last State] .....        | 113 |
| Power Saving Function(ERP) [Disabled].....      | 113 |
| USB Power SW1 [+5V DUAL] .....                  | 114 |
| USB Power SW2 [+5V DUAL] .....                  | 114 |
| PCIEX4_1 Slot [Enabled] .....                   | 116 |
| PCIEX4_2 Slot [Enabled] .....                   | 116 |
| PCIEX4_3 Slot [Enabled] .....                   | 117 |
| M.2(A) Slot [Enabled].....                      | 117 |
| M.2(M) Slot [Enabled] .....                     | 117 |
| PCIe Speed [Auto].....                          | 117 |
| SATA Controller(s) [Enabled] .....              | 118 |
| SATA Mode Selection [AHCI].....                 | 118 |
| Hot Plug [Disabled].....                        | 119 |
| HD Audio [Auto] .....                           | 120 |
| Administrator Password .....                    | 121 |
| User Password .....                             | 121 |
| Bootup NumLock State [Off].....                 | 122 |
| Quiet Boot [Enabled] .....                      | 123 |



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|                                       |     |
|---------------------------------------|-----|
| UEFI Boot [Disabled] .....            | 123 |
| Launch PXE OpROM [Disabled] .....     | 123 |
| Option ROM Messages [Force BIOS]..... | 123 |
| Save Changes and Reset .....          | 124 |
| Discard Changes and Reset .....       | 124 |
| Restore Defaults .....                | 124 |
| Save as User Defaults .....           | 124 |
| Restore User Defaults .....           | 124 |

**Appendix**

**D**

# Digital I/O Interface

---

## D.1 Introduction

The DIO connector on the NEX-971 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> |   |                               |
| <b>AL – 8</b>        | : | Set the digital port as INPUT |
| <b>AL</b>            | : | Digital I/O input value       |

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## D.2 Assembly Language Sample 1

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

**AL low byte = value**

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

## D.3 Assembly Language Sample 2

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

**Digital Output is 1001b**

**Appendix**

**E**

# Watchdog Timer

---





## NOTE:

The following discussion applies to DOS environment. Contact NEX support or visit the NEX website for specific drivers for other operating systems.

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMIs or a software bug. When the CPU stops working correctly, Watchdog Timer either performs a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

INT 15H:

| AH – 6FH Sub-function: |                                                                                                       |
|------------------------|-------------------------------------------------------------------------------------------------------|
| AL – 2:                | Sets the Watchdog Timer's period.                                                                     |
| BL:                    | Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup). |

**Table E-1: AH-6FH Sub-function**

Call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer starts counting down. When the timer value reaches zero, the system resets. To ensure that this reset condition does not occur, calling sub-function 2 must periodically refresh the Watchdog Timer. However, the watchdog timer is disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.



### NOTE:

When exiting a program it is necessary to disable the Watchdog Timer, otherwise the system resets.

---

### EXAMPLE PROGRAM:

**; INITIAL TIMER PERIOD COUNTER**

;

**W\_LOOP:**

;

```
MOV      AX, 6F02H      ;setting the time-out value
MOV      BL, 30          ;time-out value is 48 seconds
INT      15H
```

;

**; ADD THE APPLICATION PROGRAM HERE**

;

```
CMP      EXIT_AP, 1      ;is the application over?
JNE      W_LOOP          ;No, restart the application
```

```
MOV      AX, 6F02H      ;disable Watchdog Timer
MOV      BL, 0           ;
INT      15H
```

;

**; EXIT ;**

**Appendix**

**F**

# **Intel® Matrix Storage Manager**

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## F.1 Introduction

The NEX-971 can provide data protection for serial ATA (SATA) disks via the Intel® Matrix Storage Manager using one of three fault-tolerant RAID levels: RAID 1, 5 or 10. When using two hard drives, matrix RAID allows RAID 0 and RAID 1 functions to be combined, where critical files can be stored on RAID 1, and RAID 0 can be used for non-critical items such as software. RAID 5 and RAID 0 can be combined to provide higher performance, capacity, and fault tolerance.



### CAUTION!

A configured RAID volume (which may consist of multiple hard drives) appears to an operating system as a contingent storage space. The operating system will not be able to distinguish the physical disk drives contained in a RAID configuration.

---

### F.1.1 Precautions

One key benefit a RAID configuration brings is that a single hard drive can fail within a RAID array without damaging data. With RAID1 array, a failed drive can be replaced and the RAID configuration restored.



### WARNING!

Irrecoverable data loss occurs if a working drive is removed when trying to remove a failed drive. It is strongly recommended to mark the physical connections of all SATA disk drives. Drive locations can be identified by attaching stickers to the drive bays. If a drive member of a RAID array should fail, the failed drive can then be correctly identified.

---



## CAUTION!

Do not accidentally disconnect the SATA drive cables. Carefully route the cables within the chassis to avoid system down time.

---

## F.2 Features and Benefits

- Supports RAID levels 0, 1, 5 and 10
- Supports connectivity to two or more disk drives

## F.3 Accessing the Intel® Matrix Storage Manager

To access the Intel® Matrix Storage Manager, please follow the steps below.

**Step 1: Connect SATA drives to the system.** Connect two or more SATA drives to the system. Make sure the drives have the same capacity, are the same type and have the same speed.

---



## NOTE:

Make sure the SATA drives are EXACTLY the same when they are configured in a RAID configuration. If they are not the same size, disk drive capacity is sacrificed and overall performance affected.

---

**Step 2: Enable SATA drives in BIOS.** Start the computer and access the BIOS setup program. Enable RAID support for all SATA devices. Refer to the applicable BIOS configuration section in this user manual.

**Step 3: Configure “Option ROM Messages” BIOS option to Force BIOS.** This is to allow the “Press <CTRL+I> to enter Configuration Utility.....” message to appear during the POST. Refer to the applicable BIOS configuration section in this user manual.

- Step 4: Save and Exit BIOS.** After the SATA support option is enabled, save and exit the BIOS.
- Step 5: Reboot the system.** Reboot the system after saving and exiting the BIOS.
- Step 6: Press Ctrl+I. during the system boot process.** Press Ctrl+I when prompted to enter the RAID configuration software.
- Step 7: Configure the RAID settings.** Use the Intel® Matrix Storage Manager to configure the RAID array. Brief descriptions of configuration options are given below.

### F.4 Installing the Operating System to the RAID Array

To install the operating system to the RAID array some extra steps are necessary during the installation process.

- Step 1: Prepare a RAID driver floppy disk on another computer.** If installing on the RAID array a RAID driver floppy disk must be made. The RAID driver floppy disk utility is on the CD in the “8-RST” folder. The floppy disk will be formatted and the drivers installed.
- Step 2: Restart the system with a floppy drive attached.** Attach a normal floppy drive or USB floppy drive to the system.
- Step 3: Press F6 when prompted.** During the installation process, Windows OS prompts the user to press F6 to install the RAID drivers. Press F6 and choose from the drivers on the floppy disk.
- Step 4: Install the OS.** Continue with OS installation as usual.

**Appendix**

**G**

# Error Beep Code

---

## G.1 PEI Beep Codes

| Number of Beeps | Description                                                                       |
|-----------------|-----------------------------------------------------------------------------------|
| 1               | Memory not Installed                                                              |
| 1               | Memory was installed twice<br>(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                                                        |

## G.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 NEX for further assistance.

---



**Appendix**

**H**

# **Hazardous Materials Disclosure**

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## H.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                           |
| 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                           |
| <p>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.</p> <p>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.</p> |                                            |              |              |                              |                                |                                       |                                    |                              |                         |                             |

# NEX-971 ATX Motherboard



## H.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<br>(Pb) | 汞<br>(Hg) | 镉<br>(Cd) | 六价铬<br>(CR(VI)) | 多溴联苯<br>(PBB) | 多溴二苯醚<br>(PBDE) |
| 壳体                                                                                                                                                               | ○         | ○         | ○         | ○               | ○             | ○               |
| 印刷电路板                                                                                                                                                            | ○         | ○         | ○         | ○               | ○             | ○               |
| 金属螺帽                                                                                                                                                             | ○         | ○         | ○         | ○               | ○             | ○               |
| 电缆组装                                                                                                                                                             | ○         | ○         | ○         | ○               | ○             | ○               |
| 风扇组装                                                                                                                                                             | ○         | ○         | ○         | ○               | ○             | ○               |
| 电力供应组装                                                                                                                                                           | ○         | ○         | ○         | ○               | ○             | ○               |
| 电池                                                                                                                                                               | ○         | ○         | ○         | ○               | ○             | ○               |
| <p>○：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。</p> <p>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。</p> |           |           |           |                 |               |                 |