



**NEXCOM International Co., Ltd.**

**Intelligent Platform & Services Business Unit**  
**Embedded Computing (Industrial Motherboard)**

**NEX 650**

User Manual

# CONTENTS

## Preface

Copyright .....	iv
Disclaimer .....	iv
Acknowledgements .....	iv
Regulatory Compliance Statements .....	iv
Declaration of Conformity .....	iv
RoHS Compliance .....	v
Warranty and RMA .....	vi
Safety Information .....	viii
Installation Recommendations .....	viii
Safety Precautions .....	ix
Technical Support and Assistance .....	x
Conventions Used in this Manual .....	x
Global Service Contact Information .....	xi
Package Contents .....	xiii
Ordering Information .....	xiv

## Chapter 1: Product Introduction

Overview .....	1
Key Features .....	1
Hardware Specifications .....	2
Knowing Your NEX 650 .....	4
Top View .....	4
Rear I/O View .....	5

## Chapter 2: Jumpers and Connectors

Before You Begin .....	6
Precautions .....	6
Jumper Settings .....	7
Locations of the Jumpers and Connectors .....	8
Jumpers .....	9
ATX/AT Mode Jumper .....	9
Backlight Control Level .....	9
Panel Power Selection (LCD_VCC) .....	10
Backlight Power Selection (LCD_BLT_VCC) .....	10
COM1 Power Select .....	11
COM2 Power Select .....	11
mSATA Select .....	12
CMOS Clear Select .....	12
Digital Input/Output Power Select .....	13
JGPIO_JP Jumper .....	13
Connector Pin Definitions .....	14
External Connectors .....	14
HDMI Port .....	14
PS/2 Keyboard and Mouse .....	14
COM1 Port .....	15
VGA Port .....	15
LAN2 and USB 2.0 Ports .....	16
LAN1 and USB 3.0 Ports .....	17
Audio Connectors .....	18

- Internal Connectors ..... 19
  - SATA Connectors ..... 19
  - USB 2.0 Headers ..... 19
  - System Panel Header ..... 20
  - 2W Audio AMP Output Wafer ..... 20
  - Front Panel Audio Header ..... 21
  - CPU FAN Connector ..... 21
  - DC-In Power Connector ..... 22
  - Printer Port Box Header ..... 22
  - LVDS Connector ..... 23
  - Digital Input/Output Pin Header ..... 23
  - Backlight Volume Control ..... 24
  - Backlight Power Connector ..... 24
  - SATA Power Output Connector ..... 25
  - Chassis Intrusion Pin Headers ..... 25
  - COM4 and COM6 Pin Headers ..... 26
  - USB 3.0 + USB 2.0 Connector ..... 26
  - TPM Connector ..... 27
  - System Fan Connector ..... 27
  - Mini-PCIe/mSATA Connector ..... 28
- Block Diagram ..... 29

- Chipset ..... 43
- Security ..... 46
- Boot ..... 46
- Save & Exit ..... 47

**Appendix A: Power Consumption .....48**

**Chapter 3: BIOS Setup**

- About BIOS Setup ..... 30
- When to Configure the BIOS ..... 30
- Default Configuration ..... 31
- Entering Setup ..... 31
- Legends ..... 31
- BIOS Setup Utility ..... 33
  - Main ..... 33
  - Advanced ..... 34

# PREFACE

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## Acknowledgements

NEX 650 is a trademark of NEXCOM International Co., Ltd. All other product names mentioned herein are registered trademarks of their respective owners.

## Regulatory Compliance Statements

This section provides the FCC compliance statement for Class B devices and describes how to keep the system CE compliant.

## Declaration of Conformity

### FCC

This equipment has been tested and verified to comply with the limits for a Class B digital device, pursuant to Part 15 of 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 instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area (domestic environment) is likely to cause harmful interference, in which case the user will be required to correct the interference (take adequate measures) at their own expense.

### CE

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

## RoHS Compliance



### **NEXCOM RoHS Environmental Policy and Status Update**

NEXCOM is a global citizen for building the digital infrastructure. We are committed to providing green products and services, which are compliant with European Union RoHS (Restriction on Use of Hazardous Substance in Electronic Equipment) directive 2011/65/EU, to be your trusted green partner and to protect our environment.

RoHS restricts the use of Lead (Pb) < 0.1% or 1,000ppm, Mercury (Hg) < 0.1% or 1,000ppm, Cadmium (Cd) < 0.01% or 100ppm, Hexavalent Chromium (Cr6+) < 0.1% or 1,000ppm, Polybrominated biphenyls (PBB) < 0.1% or 1,000ppm, and Polybrominated diphenyl Ethers (PBDE) < 0.1% or 1,000ppm.

In order to meet the RoHS compliant directives, NEXCOM has established an engineering and manufacturing task force in to implement the introduction of green products. The task force will ensure that we follow the standard NEXCOM development procedure and that all the new RoHS components and new manufacturing processes maintain the highest industry quality levels for which NEXCOM are renowned.

The model selection criteria will be based on market demand. Vendors and suppliers will ensure that all designed components will be RoHS compliant.

### **How to recognize NEXCOM RoHS Products?**

For existing products where there are non-RoHS and RoHS versions, the suffix "(LF)" will be added to the compliant product name.

All new product models launched after January 2013 will be RoHS compliant. They will use the usual NEXCOM naming convention.

## Warranty and RMA

### NEXCOM Warranty Period

NEXCOM manufactures products that are new or equivalent to new in accordance with industry standard. NEXCOM warrants that products will be free from defect in material and workmanship for 2 years, beginning on the date of invoice by NEXCOM. HCP series products (Blade Server) which are manufactured by NEXCOM are covered by a three year warranty period.

### NEXCOM Return Merchandise Authorization (RMA)

- Customers shall enclose the “NEXCOM RMA Service Form” with the returned packages.
- Customers must collect all the information about the problems encountered and note anything abnormal or, print out any on-screen messages, and describe the problems on the “NEXCOM RMA Service Form” for the RMA number apply process.
- Customers can send back the faulty products with or without accessories (manuals, cable, etc.) and any components from the card, such as CPU and RAM. If the components were suspected as part of the problems, please note clearly which components are included. Otherwise, NEXCOM is not responsible for the devices/parts.
- Customers are responsible for the safe packaging of defective products, making sure it is durable enough to be resistant against further damage and deterioration during transportation. In case of damages occurred during transportation, the repair is treated as “Out of Warranty.”
- Any products returned by NEXCOM to other locations besides the customers’ site will bear an extra charge and will be billed to the customer.

### Repair Service Charges for Out-of-Warranty Products

NEXCOM will charge for out-of-warranty products in two categories, one is basic diagnostic fee and another is component (product) fee.

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NEXCOM will charge for out-of-warranty products in two categories, one is basic diagnostic fee and another is component (product) fee.

### System Level

- Component fee: NEXCOM will only charge for main components such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistor, capacitor.
- Items will be replaced with NEXCOM products if the original one cannot be repaired. Ex: motherboard, power supply, etc.
- Replace with 3rd party products if needed.
- If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

### Board Level

- Component fee: NEXCOM will only charge for main components, such as SMD chip, BGA chip, etc. Passive components will be repaired for free, ex: resistors, capacitors.
- If RMA goods can not be repaired, NEXCOM will return it to the customer without any charge.

## Warnings

Read and adhere to all warnings, cautions, and notices in this guide and the documentation supplied with the chassis, power supply, and accessory modules. If the instructions for the chassis and power supply are inconsistent with these instructions or the instructions for accessory modules, contact the supplier to find out how you can ensure that your computer meets safety and regulatory requirements.

## Cautions

Electrostatic discharge (ESD) can damage system components. Do the described procedures only at an ESD workstation. If no such station is available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the computer chassis.

## Safety Information

Before installing and using the device, note the following precautions:

- Read all instructions carefully.
- Do not place the unit on an unstable surface, cart, or stand.
- Follow all warnings and cautions in this manual.
- When replacing parts, ensure that your service technician uses parts specified by the manufacturer.
- Avoid using the system near water, in direct sunlight, or near a heating device.
- The load of the system unit does not solely rely for support from the rackmounts located on the sides. Firm support from the bottom is highly necessary in order to provide balance stability.
- The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

## Installation Recommendations

Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.

Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:

- A Philips screwdriver
- A flat-tipped screwdriver
- A grounding strap
- An anti-static pad

Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nose pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.



## Safety Precautions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection to protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
  - a. The power cord or plug is damaged.
  - b. Liquid has penetrated into the equipment.
  - c. The equipment has been exposed to moisture.
  - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
  - e. The equipment has been dropped and damaged.
  - f. The equipment has obvious signs of breakage.
15. Do not place heavy objects on the equipment.
16. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.
17. **CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.**

## Technical Support and Assistance

1. For the most updated information of NEXCOM products, visit NEXCOM's website at [www.nexcom.com](http://www.nexcom.com).
2. For technical issues that require contacting our technical support team or sales representative, please have the following information ready before calling:
  - Product name and serial number
  - Detailed information of the peripheral devices
  - Detailed information of the installed software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wordings of the error messages

### Warning!

1. Handling the unit: carry the unit with both hands and handle it with care.
2. Maintenance: to keep the unit clean, use only approved cleaning products or clean with a dry cloth.

## Conventions Used in this Manual



### Warning:

Information about certain situations, which if not observed, can cause personal injury. This will prevent injury to yourself when performing a task.



### Caution:

Information to avoid damaging components or losing data.



### Note:

Provides additional information to complete a task easily.

## Global Service Contact Information

### Headquarters

#### **NEXCOM International Co., Ltd.**

9F, No. 920, Chung-Cheng Rd.,  
ZhongHe District, New Taipei City, 23586,  
Taiwan, R.O.C.

Tel: +886-2-8226-7786

Fax: +886-2-8226-7782

[www.nexcom.com](http://www.nexcom.com)

### America

#### **USA**

#### **NEXCOM USA**

2883 Bayview Drive,  
Fremont CA 94538, USA

Tel: +1-510-656-2248

Fax: +1-510-656-2158

Email: [sales@nexcom.com](mailto:sales@nexcom.com)

[www.nexcom.com](http://www.nexcom.com)

### Asia

#### **Taiwan**

#### **NEXCOM Intelligent Systems**

#### **Taipei Office**

13F, No.920, Chung-Cheng Rd.,  
ZhongHe District,  
New Taipei City, 23586, Taiwan, R.O.C.

Tel: +886-2-8226-7796

Fax: +886-2-8226-7792

Email: [sales@nexcom.com.tw](mailto:sales@nexcom.com.tw)

[www.nexcom.com.tw](http://www.nexcom.com.tw)

### **NEXCOM Intelligent Systems**

#### **Taichung Office**

16F, No.250, Sec. 2, Chongde Rd.,  
Beitun Dist.,

Taichung City 406, R.O.C.

Tel: +886-4-2249-1179

Fax: +886-4-2249-1172

Email: [sales@nexcom.com.tw](mailto:sales@nexcom.com.tw)

[www.nexcom.com.tw](http://www.nexcom.com.tw)

### **Japan**

#### **NEXCOM Japan**

9F, Tamachi Hara Bldg.,  
4-11-5, Shiba Minato-ku,  
Tokyo, 108-0014, Japan

Tel: +81-3-5419-7830

Fax: +81-3-5419-7832

Email: [sales@nexcom-jp.com](mailto:sales@nexcom-jp.com)

[www.nexcom-jp.com](http://www.nexcom-jp.com)

### **China**

#### **NEXCOM China**

Floor 5, No.4, No.7 fengxian middle Rd.,  
(Beike Industrial Park), Haidian District,  
Beijing, 100094, China

Tel: +86-10-5704-2680

Fax: +86-10-5704-2681

Email: [sales@nexcom.cn](mailto:sales@nexcom.cn)

[www.nexcom.cn](http://www.nexcom.cn)

## **NEXCOM Shanghai**

Room 603/604, Huiyinmingzun Plaza Bldg., 1,  
No.609, Yunlin East Rd.,  
Shanghai, 200333, China  
Tel: +86-21-5278-5868  
Fax: +86-21-3251-6358  
Email: sales@nexcom.cn  
www.nexcom.cn

## **NEXCOM Surveillance Technology Corp.**

Room202, Building B,  
the GuangMing Industrial Zone Zhonghua Rd.,  
Minzhi Street, Longhua District,  
Shenzhen 518131, China  
Tel: +86-755-8364-7768  
Fax: +86-755-8364-7738  
Email: steveyang@nexcom.com.tw  
www.nexcom.cn

## **NEXCOM United System Service**

Hui Yin Ming Zun Building Room 1108,  
Building No. 11, 599 Yunling Road, Putuo District,  
Shanghai, 200062, China  
Tel: +86-21-6125-8282  
Fax: +86-21-6125-8281  
Email: frankyang@nexcom.cn  
www.nexcom.cn

## **Europe**

### **United Kingdom NEXCOM EUROPE**

10 Vincent Avenue,  
Crownhill Business Centre,  
Milton Keynes, Buckinghamshire  
MK8 0AB, United Kingdom  
Tel: +44-1908-267121  
Fax: +44-1908-262042  
Email: sales.uk@nexcom.eu  
www.nexcom.eu

## **Italy**

### **NEXCOM ITALIA S.r.l**

Via Lanino 42,  
21047 Saronno (VA), Italia  
Tel: +39 02 9628 0333  
Fax: +39 02 9625 570  
Email: nexcomitalia@nexcom.eu  
www.nexcomitalia.it

## Package Contents

Before continuing, verify that the NEX 650 package that you received is complete. Your package should have all the items listed in the following table.

Item	Name	Qty
1	NEXCOM NEX 650 Motherboard	1
2	NEXCOM NEX 650 Driver CD	1
3	NEXCOM NEX 650 Quick Guide	1
4	I/O Panel Shield	1

## Ordering Information

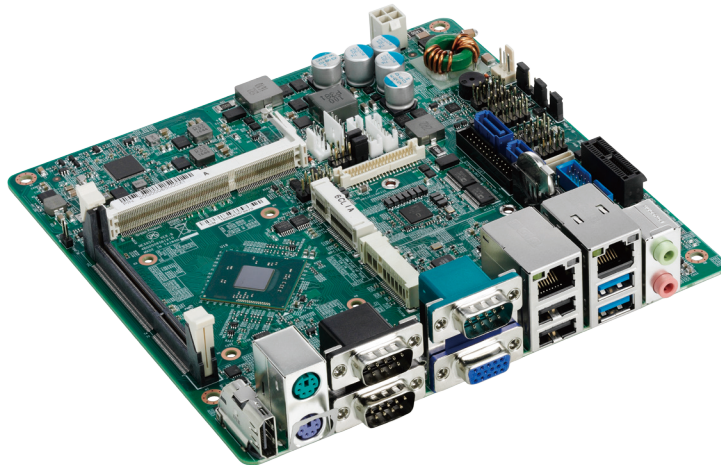
The following information below provides ordering information for NEX 650.

### **NEX 650 (P/N: 10G00065001X1)**

Mini-ITX form factor powered by onboard 4-core Intel® Celeron® J1900 processor that integrates with 24/48-bit LVDS & up to 8GB DDR3/L memory & rich I/Os

# CHAPTER 1: PRODUCT INTRODUCTION

## Overview



## Key Features

- Intel® Celeron® processor J1900
- Integrated Intel® Gen7 Intel® Graphics DX 11\*, OGL3.2
- Supports dual channel DDR3L 1333MHz, 2 x SO-DIMM, up to 8GB system memory
- 3 x COM (RS-232/422/485), 2 x COM (RS-232); 1 x HDMI, 1 x D-Sub,
- 1 x Dual channel 24-bit LVDS; 4 x USB 3.0, 6 x USB 2.0, 2 x SATA2; Gigabit LAN: 2 x Realtek LAN
- 12~24 V DC-in power support

## Hardware Specifications

### Form Factor

- Dimensions: Mini-ITX (6.7-in x 6.7-in)

### Processor System

- CPU: Intel® Celeron® processor J1900
- Core number: 4
- L3 cache: 2MB
- Chipset: N/A
- BIOS: UEFI

### Expansion Slot

- Mini-PCIe: 1 (full size)
- mSATA: 1
- PCIe: 1

### Memory

- Technology: dual channel DDR3L 1333 MHz SDRAM
- Max.: 8GB
- Socket: 2 x SO-DIMM

### Graphics

- Controller: Intel® Gen7 Intel® graphics DX 11\*, OGL3.2
- VRAM: shared memory
- VGA: supports max. resolution 1920 x 1200
- LVDS: dual channel 24-bit, max resolution 1920 x 1200 @ 60Hz
- HDMI: supports HDMI 1.3a, max resolution 1920 x 1200

### Ethernet

- Ethernet: 10/100/1000 Mbps
- Controller: GbE LAN: 2 x Realtek RTL8111G-CG
- Connector: 2 x RJ-45

### Rear I/O

- VGA: 1
- HDMI: 1
- Ethernet: 2
- USB: 4 (2 x USB 3.0, 2 x USB 2.0)
- Audio: 2 (Mic-in, Line-out)
- Serial: 3 (RS-232/422/485)
- PS2: 2 (1 x keyboard, 1 x mouse)

### Internal Connector

- USB: 6 (2 x USB 3.0, 4 x USB 2.0)
- LVDS/inverter: 1/1
- VGA: 1 (shared with rear I/O VGA COM)
- Serial: 2 (RS-232)
- SATA: 2 x SATA2 (3.0Gb/s)
- mPCIe: 1
- Parallel: 1
- mSATA: 1 (shared)
- GPIO 8-bit: 4 x GPI + 4 x GPO
- SATA PWR output con: 1
- Speaker header: 1



### Watchdog Timer

- Output: from super I/O to drag RESETCON#
- Interval: 256 segments, 0, 1, 2...255sec/min

### Power Requirements

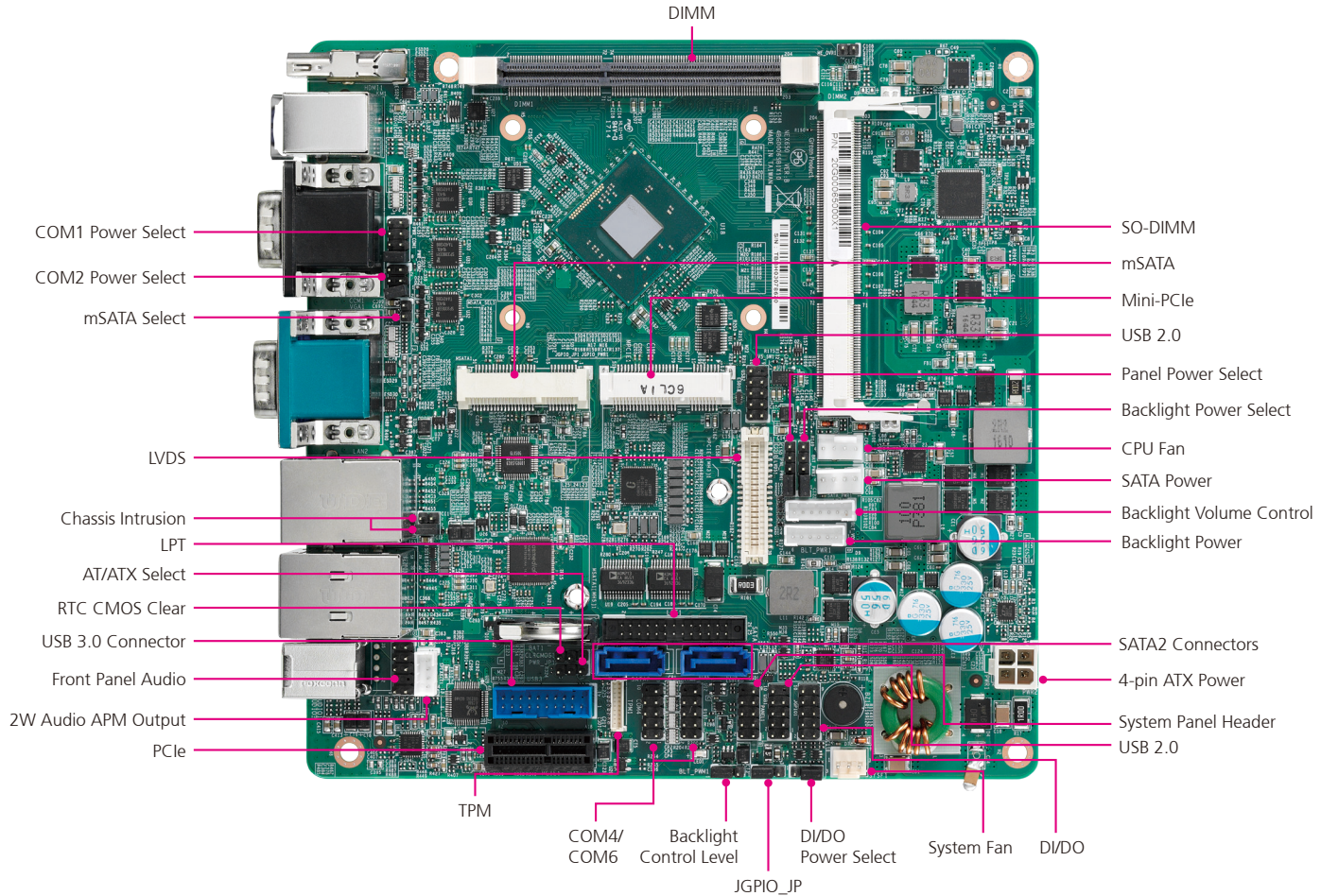
- Input PWR: 12~24V DC-in (4-pin ATX PWR Con)
- Power on: AT/ATX supported
- AT: directly PWR on as power input ready
- ATX: press button to PWR on after power input ready

### Environment

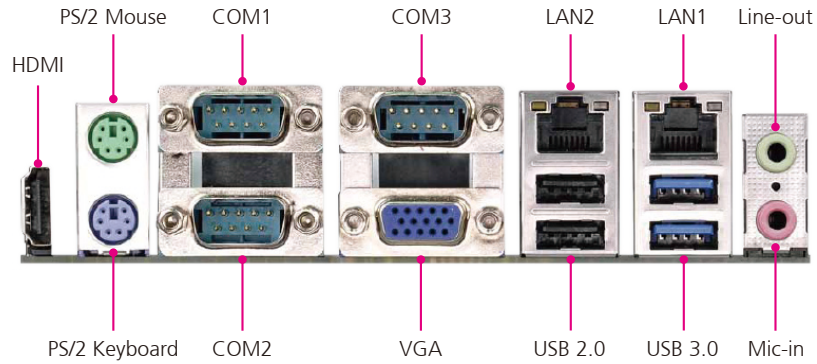
- Temperature: 0°C~60°C

# Knowing Your NEX 650

## Top View



## Rear I/O View



## CHAPTER 2: JUMPERS AND CONNECTORS

This chapter describes how to set the jumpers and connectors on the NEX 650 motherboard.

### Before You Begin

- Ensure you have a stable, clean working environment. Dust and dirt can get into components and cause a malfunction. Use containers to keep small components separated.
- Adequate lighting and proper tools can prevent you from accidentally damaging the internal components. Most of the procedures that follow require only a few simple tools, including the following:
  - A Philips screwdriver
  - A flat-tipped screwdriver
  - A set of jewelers screwdrivers
  - A grounding strap
  - An anti-static pad
- Using your fingers can disconnect most of the connections. It is recommended that you do not use needle-nosed pliers to disconnect connections as these can damage the soft metal or plastic parts of the connectors.
- Before working on internal components, make sure that the power is off. Ground yourself before touching any internal components, by touching a metal object. Static electricity can damage many of the electronic components. Humid environments tend to have less static electricity than

dry environments. A grounding strap is warranted whenever danger of static electricity exists.

### Precautions

Computer components and electronic circuit boards can be damaged by discharges of static electricity. Working on computers that are still connected to a power supply can be extremely dangerous.

Follow the guidelines below to avoid damage to your computer or yourself:

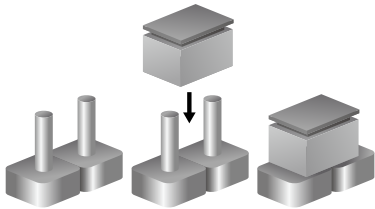
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal body of any other grounded appliance.
- Hold electronic circuit boards by the edges only. Do not touch the components on the board unless it is necessary to do so. Don't flex or stress the circuit board.
- Leave all components inside the static-proof packaging that they shipped with until they are ready for installation.
- Use correct screws and do not over tighten screws.

## Jumper Settings

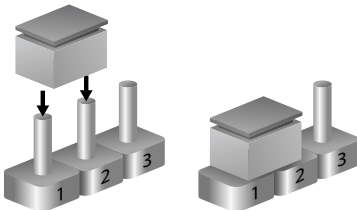
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just one pin, the jumper is open.

Refer to the illustrations below for examples of what the 2-pin and 3-pin jumpers look like when they are short (on) and open (off).

Two-Pin Jumpers: Open (Left) and Short (Right)

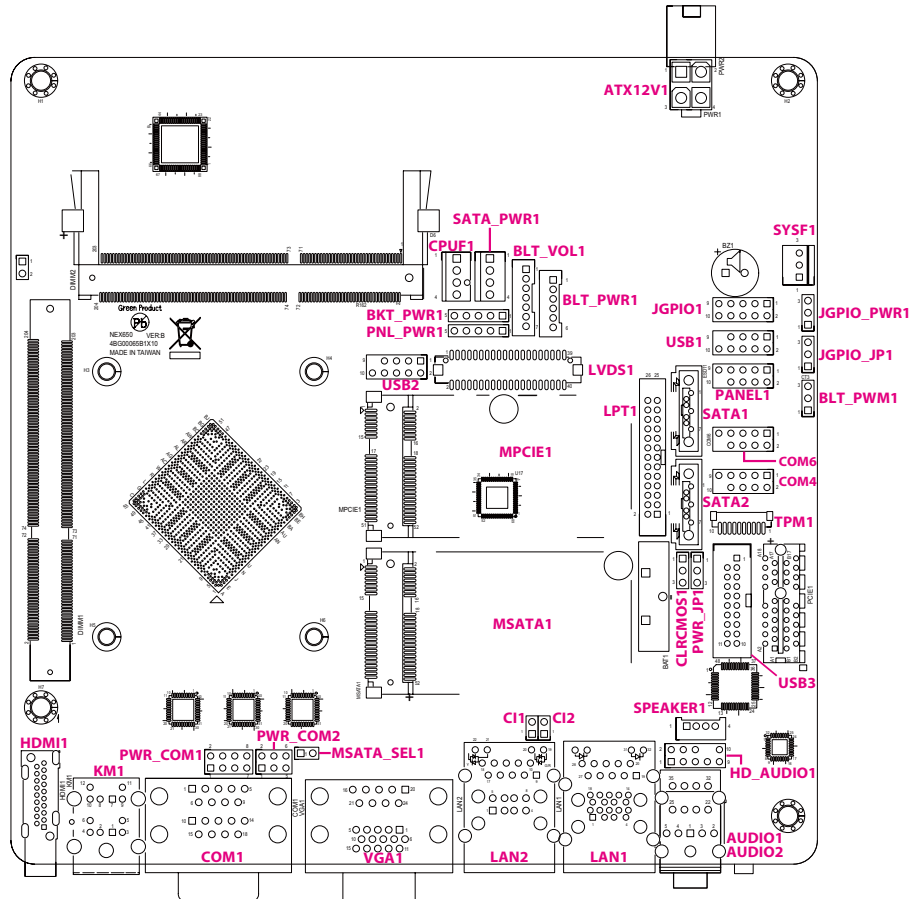


Three-Pin Jumpers: Pins 1 and 2 are Short



# Locations of the Jumpers and Connectors

The figure below shows the location of the jumpers and connectors.



## Jumpers

### ATX/AT Mode Jumper

Connector type: 1x3 3-pin header  
Connector location: PWR\_JP1



Pin	Status	Settings
1-2 On	Short	AT Mode
2-3 On	Short	ATX Mode

1-2 On: default

### Backlight Control Level

Connector type: 1x3 3-pin header  
Connector location: BLT\_PWM1



Pin	Status	Settings
1-2 On	Short	+3V Level
2-3 On	Short	+5V Level

1-2 On: default

## Panel Power Selection (LCD\_VCC)

Connector type: 1x5 5-pin header

Connector location: PNL\_PWR1



Pin	Status	Settings
1-2 On	Short	LVDD: +3V
2-3 On	Short	LVDD: +5V
4-5 On	Short	LVDD: +12V

1-2 On: default

## Backlight Power Selection (LCD\_BLT\_VCC)

Connector type: 1x5 5-pin header

Connector location: BKT\_PWR1



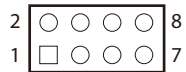
Pin	Status	Settings
1-2 On	Short	LCD_BLT_VCC: +5V
2-3 On	Short	LCD_BLT_VCC: +12V
4-5 On	Short	LCD_BLT_VCC: DC_IN

1-2 On: default



## COM1 Power Select

Connector type: 2x4 8-pin header, 2.54mm pitch  
Connector location: PWR\_COM1

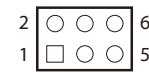


Pin	Status	Settings
1-2 On	Short	+5V
3-4 On	Short	+12V
5-6 On	Short	+5VSB
7-8 On	Short	RI#

7-8 On: default

## COM2 Power Select

Connector type: 2x3 6-pin header, 2.54mm pitch  
Connector location: PWR\_COM2



Pin	Status	Settings
1-2 On	Short	+5V
3-4 On	Short	+12V
5-6 On	Short	RI#

5-6 On: default

## mSATA Select

Connector type: 1x2 2-pin header

Connector location: mSATA\_SEL1



Pin	Status	Settings
1-2 On	Short	For mSATA1
1-2 Off	Open	For SATA2

1-2 Off: default

## CMOS Clear Select

Connector type: 1x2 2-pin header

Connector location: CLRCMOS1



Pin	Status	Settings
1-2	Short	Normal
2-3	Short	Clear CMOS

1-2 On: default

## Digital Input/Output Power Select

Connector type: 1x3 3-pin header

Connector location: JGPIO\_PWR1



Pin	Status	Settings
1-2 On	Short	+12V
2-3 On	Short	+5V

## JGPIO\_JP Jumper

Connector type: 1x3 3-pin header

Connector location: JGPIO\_JP1



Pin	Status	Settings
1-2 On	Short	High
2-3 On	Short	Low

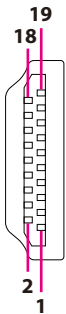
## Connector Pin Definitions

### External Connectors

#### HDMI Port

Connector type: HDMI port

Connector location: HDMI1

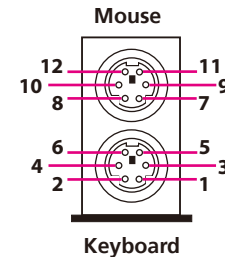


Pin	Definition	Pin	Definition
1	HDMI_DATA2_P_C	2	GND
3	HDMI_DATA2_N_C	4	HDMI_DATA1_P_C
5	GND	6	HDMI_DATA1_N_C
7	HDMI_DATA0_P_C	8	GND
9	HDMI_DATA0_N_C	10	HDMI_CLK_P_C
11	GND	12	HDMI_CLK_N_C
13	NC	14	NC
15	HDMI_CTRL_CLK_C	16	HDMI_CTRL_DATA_C
17	GND	18	+5V_HDMI
19	HDMI_HPD_C		

#### PS/2 Keyboard and Mouse

Connector type: PS/2, Mini-DIN-6

Connector location: KM1

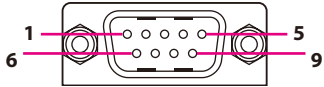


Pin	Definition	Pin	Definition
1	KDAT_C	2	NC
3	GND	4	+5V_PS2
5	KCLK_C	6	NC
7	MDAT_C	8	NC
9	GND	10	+5V_PS2
11	MCLK_C	12	NC

## COM1 Port

Connector type: DB-9 port, 9-pin D-Sub

Connector location: COM1

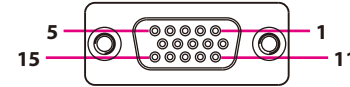


RS232		RS422		RS485	
Pin	Definition	Pin	Definition	Pin	Definition
1	DCD#	1	TX-	1	RTX-
2	RXD	2	TX+	2	RTX+
3	TXD	3	RX+	3	NC
4	DTR#	4	RX-	4	NC
5	GND	5	GND	5	GND
6	DSR#	6	NC	6	NC
7	RTS#	7	NC	7	NC
8	CTS#	8	NC	8	NC
9	RI#	9	NC	9	NC

## VGA Port

Connector type: DB-15 port, 15-pin D-Sub

Connector location: VGA1



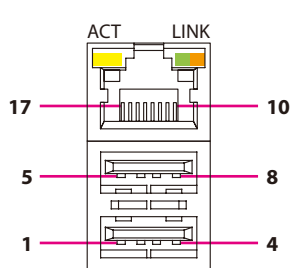
Pin	Definition	Pin	Definition
1	VGA_R	2	VGA_G
3	VGA_B	4	GND
5	GND	6	GND
7	GND	8	GND
9	VCC	10	GND
11	ID2	12	VGA_DDC_DATA
13	G_HSYNC	14	G_VSYNC
15	VGA_DDC_CLK		

## LAN2 and USB 2.0 Ports

Connector type: RJ45 port with LEDs

Dual USB 2.0 ports, Type A

Connector location: LAN2



Act	Status
Flashing Yellow	Data activity
Off	No activity

Link	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	10Mbps or no link

## USB

Pin	Definition	Pin	Definition
1	+5V_H_USB2_P12	2	S_USB_C_DN1
3	S_USB_C_DP1	4	GND
5	+5V_H_USB2_P12	6	S_USB_C_DN2
7	S_USB_C_DP2	8	GND

## LAN

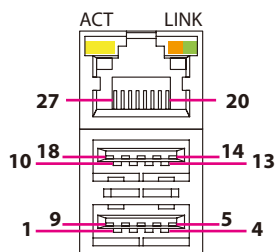
Pin	Definition	Pin	Definition
9	LAN1_VCT	10	MDI0P_LAN1
11	MDI0N_LAN1	12	MDI1P_LAN1
13	MDI1N_LAN1	14	MDI2P_LAN1
15	MDI2N_LAN1	16	MDI3P_LAN1
17	MDI3N_LAN1	18	GND
19	LAN1_ACT_P	20	LAN1_LED_ACT#
21	LAN1_LINK100#	22	LAN1_1000_P

## LAN1 and USB 3.0 Ports

Connector type: RJ45 port with LEDs

Dual USB 3.0 ports, Type A

Connector location: LAN1



Act	Status
Flashing Yellow	Data activity
Off	No activity

Link	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	10Mbps or no link

### USB

Pin	Definition	Pin	Definition
1	+5V_USB3_P12	2	USB2_C_N1
3	USB2_C_P1	4	GND
5	USB3_RX_C_N1	6	USB3_RX_C_P1
7	GND	8	USB3_TX_C_N1
9	USB3_TX_C_P1	10	+5V_USB3_P12
11	USB2_C_N2	12	USB2_C_P2
13	GND	14	USB3_RX_C_N2
15	USB3_RX_C_P2	16	GND
17	USB3_TX_C_N2	18	USB3_TX_C_P2

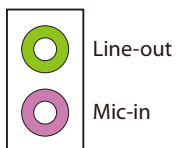
### LAN

Pin	Definition	Pin	Definition
19	LAN0_VCT	20	MDIOP_LAN0
21	MDI0N_LAN0	22	MDI1P_LAN0
23	MDI1N_LAN0	24	MDI2P_LAN0
25	MDI2N_LAN0	26	MDI3P_LAN0
27	MDI3N_LAN0	28	GND
29	LAN0_ACT_P	30	LAN0_LED_ACT#
31	LAN0_LINK100#	32	LAN0_1000_P

## Audio Connectors

Connector type: 2x 3.5mm jack

Connector location: AUDIO1 and AUDIO2



Pin	Definition	Pin	Definition
1	GND	2	MIC_OUT_L_C
3	MIC1_JD	4	AGND_P
5	MIC_OUT_R_C	N/A	N/A
22	LINE_OUT_L_C	23	LINEOUT1_JD
24	AGND_G	25	LINE_OUT_R_C

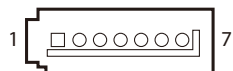


## Internal Connectors

### SATA Connectors

Connector type: Standard Serial ATA 7P (1.27mm, SATA-M-180)

Connector location: SATA1 and SATA2

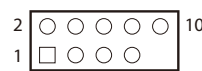


Pin	Definition	Pin	Definition
1	GND	2	TXP0
3	TXN0	4	GND
5	RXN0	6	RXP0
7	GND		

### USB 2.0 Headers

Connector type: 2x5 10-pin header

Connector location: USB1 and USB2

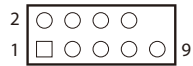


Pin	Definition	Pin	Definition
1	USB_PWR	2	USB_PWR
3	-A	4	-B
5	+A	6	+B
7	GND	8	GND
		10	DUMMY

## System Panel Header

Connector type: 2x5 10-pin header

Connector location: PANEL1

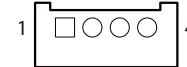


Pin	Definition	Pin	Definition
1	HDLED+	2	PLED+
3	HDLED-	4	PLED-
5	GND	6	PWRBTN#
7	RESET#	8	GND
9	GND		

## 2W Audio AMP Output Wafer

Connector type: 1x4 4-pin header

Connector location: SPEAKER1

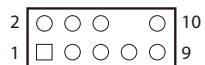


Pin	Definition
1	OUTLN
2	OUTLP
3	OUTRP
4	OUTRN

## Front Panel Audio Header

Connector type: 2x5 10-pin header

Connector location: HD\_AUDIO1

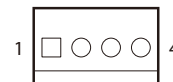


Pin	Definition	Pin	Definition
1	MIC2_L	2	GND
3	MIC2_R	4	PRESENCE#
5	OUT2_R	6	MIC_RET
7	J_SENSE		
9	OUT2_L	10	OUT_RET

## CPU FAN Connector

Connector type: 1x4 4-pin Wafer

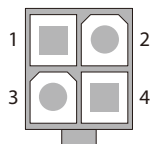
Connector location: CPUF1



Pin	Definition
1	GND
2	+12V
3	CPU_FAN_SPEED
4	FAN_SPEED_CONTROL

### DC-In Power Connector

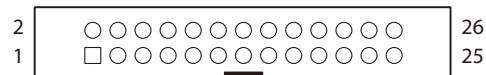
Connector type: 2x2 4-pin power connector  
 Connector location: ATX12V1



Pin	Definition
1	GND
2	GND
3	DC Input
4	DC Input

### Printer Port Box Header

Connector type: 2x13 26-pin header  
 Connector location: LPT1

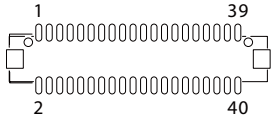


Pin	Definition	Pin	Definition
1	STB#	2	AFD#
3	SPD0	4	ERROR#
5	SPD1	6	PINIT#
7	SPD2	8	SLIN#
9	SPD3	10	GND
11	SPD4	12	GND
13	SPD5	14	GND
15	SPD6	16	GND
17	SPD7	18	GND
19	ACK#	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SLCT		

## LVDS Connector

Connector type: 2x20 40-pin header

Connector location: LVDS1

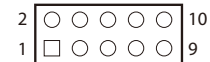


Pin	Definition	Pin	Definition
1	LCD_VCC	2	LCD_VCC
3	+3.3V	4	LDDC_CLK
5	LDDC_DATA	6	LVDS_A_DATA0#
7	LVDS_A_DATA0	8	GND
9	LVDS_A_DATA1#	10	LVDS_A_DATA1
11	GND	12	LVDS_A_DATA2#
13	LVDS_A_DATA2	14	GND
15	LVDS_A_DATA3#	16	LVDS_A_DATA3
17	GND	18	LVDS_A_CLK#
19	LVDS_A_CLK	20	GND
21	LVDS_B_DATA0#	22	LVDS_B_DATA0
23	GND	24	LVDS_B_DATA1#
25	LVDS_B_DATA1	26	GND
27	LVDS_B_DATA2#	28	LVDS_B_DATA2
29	DPLVDD_EN	30	LVDS_B_DATA3#
31	LVDS_B_DATA3	32	GND
33	LVDS_B_CLK#	34	LVDS_B_CLK
35	GND	36	CON_LBKLT_EN
37	CON_LBKLT_CTL	38	LCD_BLT_VCC
39	LCD_BLT_VCC	40	LCD_BLT_VCC

## Digital Input/Output Pin Header

Connector type: 2x5 10-pin header

Connector location: JGPIO1

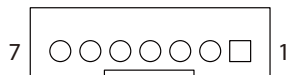


Pin	Definition	Pin	Definition
1	SIO_GP24	2	SIO_GP20
3	SIO_GP25	4	SIO_GP21
5	SIO_GP26	6	SIO_GP22
7	SIO_GP27	8	SIO_GP23
9	JGPIO_PWR	10	GND

## Backlight Volume Control

Connector type: 1x7 7-pin header

Connector location: BLT\_VOL1

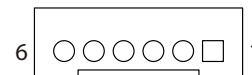


Pin	Definition	Pin	Definition
1	GPIO_VOL_UP	2	GPIO_VOL_DW
3	PWRDN	4	LVDS1 BLUP
5	LVDS1 BLDW	6	GND
7	GND		

## Backlight Power Connector

Connector type: 1x6 6-pin header

Connector location: BLT\_PWR1

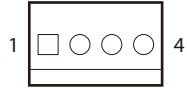


Pin	Definition	Pin	Definition
1	GND	2	GND
3	BL CTL	4	BL EN
5	LCD_BLT_VCC	6	LCD_BLT_VCC

## SATA Power Output Connector

Connector type: 1x4 4-pin Wafer

Connector location: SATA\_PWR1



Pin	Definition
1	+12V
2	GND
3	GND
4	+5V

## Chassis Intrusion Pin Headers

Connector type: 1x2 2-pin header

Connector location: CI1 and CI2

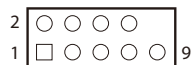


Pin	Definition
1	Signal
2	GND

## COM4 and COM6 Pin Headers

Connector type: 2x5 10-pin header

Connector location: COM4 and COM6

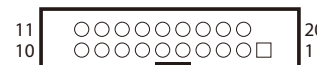


Pin	Definition	Pin	Definition
1	DDCD#	2	RRXD
3	TTXD	4	DDTR#
5	GND	6	DDSR#
7	RRTS#	8	CCTS#
9	CM_P9		

## USB 3.0 + USB 2.0 Connector

Connector type: 2x10 20-pin header

Connector location: USB3



Pin	Definition	Pin	Definition
1	Dummy	2	PORT B USB
3	PORT B USB	4	GND
5	PORT B USB	6	PORT B USB
7	GND	8	PORT B USB
9	PORT B USB	10	Vbus
11	PORT A USB	12	PORT A USB
13	GND	14	PORT A USB
15	PORT A USB	16	GND
17	PORT A USB	18	PORT A USB
19	Vbus	20	



## TPM Connector

Connector type: 1x10 10-pin header

Connector location: TPM1



Pin	Definition	Pin	Definition
1	GND	2	PLTRST_3P3#
3	S_ILB_LPC_CLK_1	4	S_ILB_LPC_FRAME#
5	S_ILB_LPC_AD_3	6	S_ILB_LPC_AD_2
7	S_ILB_LPC_AD_1	8	S_ILB_LPC_AD_0
9	ILB_LPC_SERIRQ	10	+3.3V

## System Fan Connector

Connector type: 1x3 3-pin Wafer

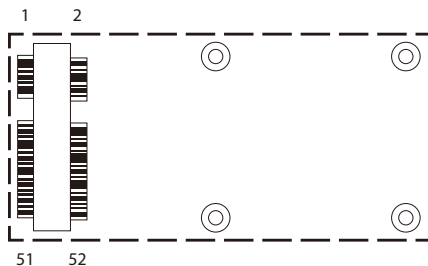
Connector location: SYSF1



Pin	Definition
1	GND
2	+12V
3	FAN_SPEED

## Mini-PCIe/mSATA Connector

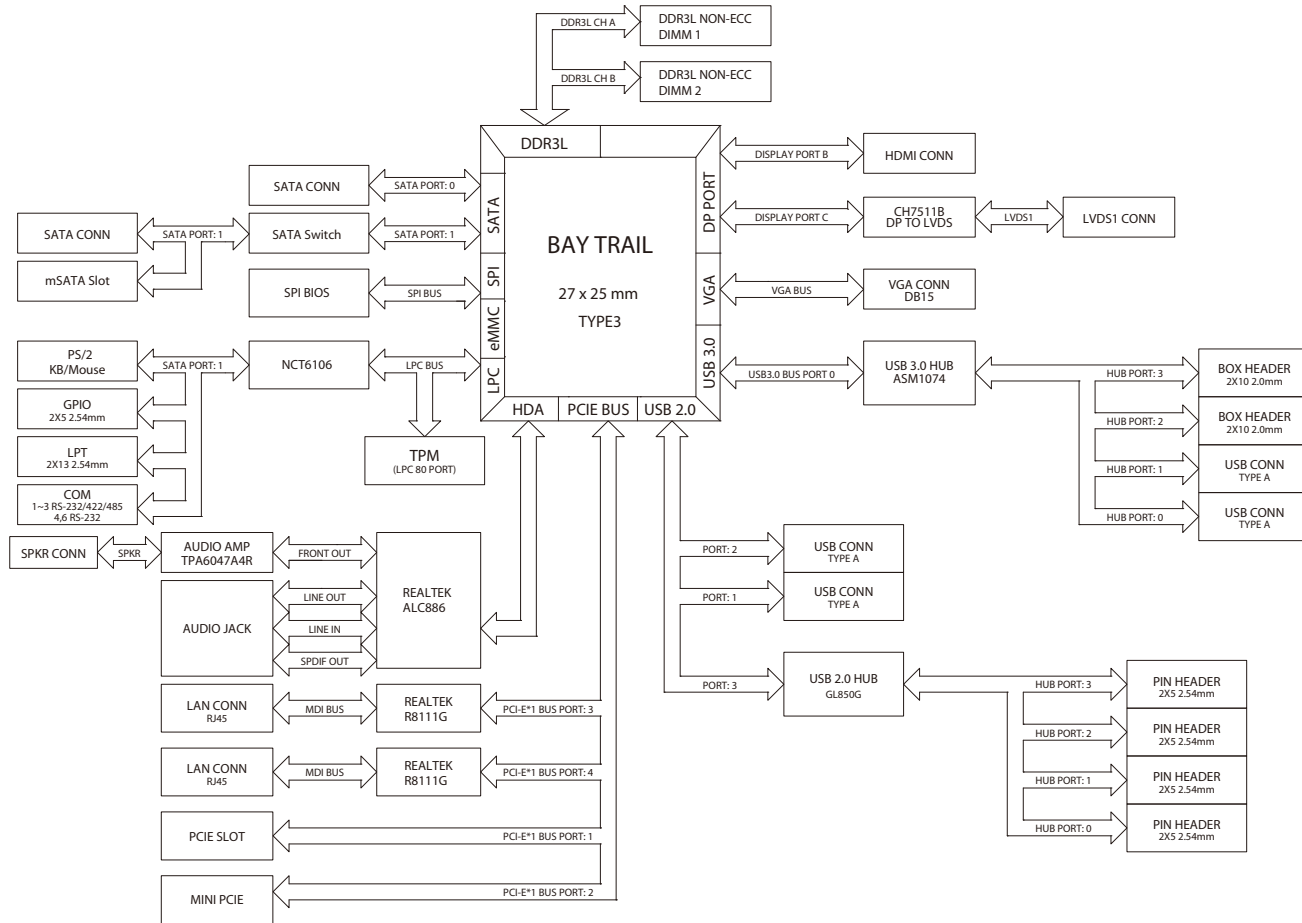
Connector location: MPCIE1 and MSATA1



Pin	Definition	Pin	Definition
1	WAKE#	2	3.3VSB_3
3	COEX1	4	GND12
5	COEX2	6	1.5V_3
7	CLKREQ#	8	UIM_PWR
9	GND6	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND5	16	UIM_VPP
17	REV10/UIM_C8	18	GND11
19	REV9/UIM_C4	20	W_DISABLE#
21	GND4	22	PERST#
23	PERn0	24	+3.3VSB_1
25	PERp0	26	GND10

Pin	Definition	Pin	Definition
27	GND3	28	1.5V_2
29	GND2	30	SMBCLK
31	PETn0	32	SMBDAT
33	PETp0	34	GND9
35	GND0	36	USB_D-
37	GND13	38	USB_D+
39	+3.3VSB_4	40	GND8
41	+3.3VSB_5	42	LED_WWAN#
43	GND14	44	LED_WLAN#
45	REV4	46	LED_WPAN#
47	REV3	48	1.5V_1
49	REV2	50	GND7
51	REV1	52	3.3VSB_2

# Block Diagram



## CHAPTER 3: BIOS SETUP

This chapter describes how to use the BIOS setup program for NEX 650. The BIOS screens provided in this chapter are for reference only and may change if the BIOS is updated in the future.

To check for the latest updates and revisions, visit the NEXCOM website at [www.nexcom.com.tw](http://www.nexcom.com.tw).

### About BIOS Setup

The BIOS (Basic Input and Output System) Setup program is a menu driven utility that enables you to make changes to the system configuration and tailor your system to suit your individual work needs. It is a ROM-based configuration utility that displays the system's configuration status and provides you with a tool to set system parameters.

These parameters are stored in non-volatile battery-backed-up CMOS RAM that saves this information even when the power is turned off. When the system is turned back on, the system is configured with the values found in CMOS.

With easy-to-use pull down menus, you can configure items such as:

- Hard drives, diskette drives, and peripherals
- Video display type and display options
- Password protection from unauthorized use
- Power management features

The settings made in the setup program affect how the computer performs. It is important, therefore, first to try to understand all the setup options, and second, to make settings appropriate for the way you use the computer.

### When to Configure the BIOS

- This program should be executed under the following conditions:
  - When changing the system configuration
  - When a configuration error is detected by the system and you are prompted to make changes to the setup program
  - When resetting the system clock
  - When redefining the communication ports to prevent any conflicts
  - When making changes to the Power Management configuration
  - When changing the password or making other changes to the security setup

Normally, CMOS setup is needed when the system hardware is not consistent with the information contained in the CMOS RAM, whenever the CMOS RAM has lost power, or the system features need to be changed.

## Default Configuration


Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

## Entering Setup












When the system is powered on, the BIOS will enter the Power-On Self Test (POST) routines. These routines perform various diagnostic checks; if an error is encountered, the error will be reported in one of two different ways:

- If the error occurs before the display device is initialized, a series of beeps will be transmitted.
- If the error occurs after the display device is initialized, the screen will display the error message.

Powering on the computer and immediately pressing <Del> allows you to enter Setup.

Press the  key to enter Setup:


## Legends

Key	Function
	Moves the highlight left or right to select a menu.
	Moves the highlight up or down between sub-menus or fields.
	Exits the BIOS Setup Utility.
	Scrolls forward through the values or options of the highlighted field.
	Scrolls backward through the values or options of the highlighted field.
	Selects a field.
	Displays General Help.
	Load previous values.
	Load optimized default values.
	Saves and exits the Setup program.
	Press <Enter> to enter the highlighted sub-menu


### Scroll Bar

When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

### Submenu

When “▶” appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press  .

## BIOS Setup Utility

Once you enter the AMI BIOS Setup Utility, the Main Menu will appear on the screen. The main menu allows you to select from several setup functions and one exit. Use arrow keys to select among the items and press  to accept or enter the submenu.

### Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.

### System Date

The date format is <day>, <month>, <date>, <year>. Day displays a day, from Monday to Sunday. Month displays the month, from January to December. Date displays the date, from 1 to 31. Year displays the year, from 1999 to 2099.

### System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.



The screenshot shows the Aptio Setup Utility Main menu. The title bar reads "Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc." The menu is divided into several sections: BIOS Information, CPU Configuration, Memory Information, and System Date/Time. The BIOS Information section includes fields for Vendor, Core Version, Compliancy, Project Name, Project Version, and Build Date and Time. The CPU Configuration section includes Microcode Patch. The Memory Information section includes Total Memory. The System Date and System Time fields are highlighted in blue, indicating they are the current selection. A help box on the right side of the screen provides instructions for navigating the menu, such as using arrow keys to select items and the Enter key to confirm selections. The bottom of the screen displays the version number "Version 2.17.1249. Copyright (C) 2017 American Megatrends, Inc."

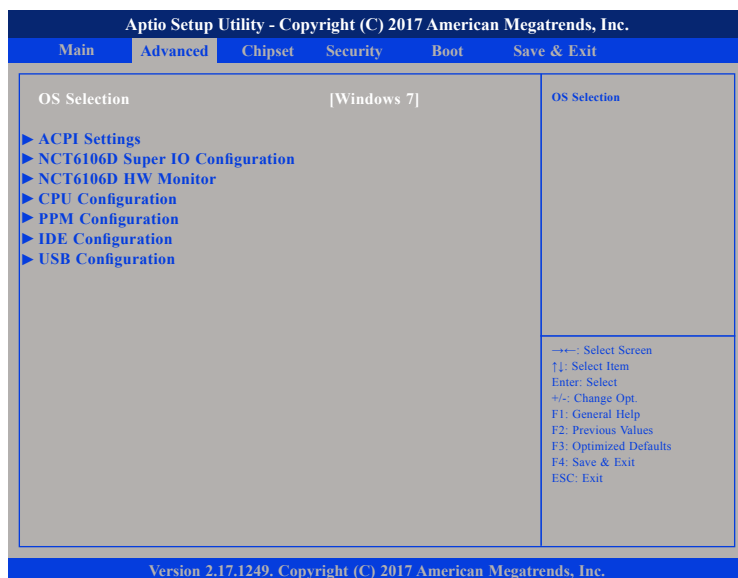
Aptio Setup Utility - Copyright (C) 2017 American Megatrends, Inc.					
Main	Advanced	Chipset	Security	Boot	Save & Exit
<b>BIOS Information</b>		Set the Date. Use Tab to switch between Date elements.			
BIOS Vendor	American Megatrends				
Core Version	5.010				
Compliancy	UEFI 2.4; PI 1.3				
Project Name	NEX-650				
Project Version	N650A011 x64				
Build Date and Time	05/18/2017 10:15:21				
<b>CPU Configuration</b>					
Microcode Patch	833				
<b>Memory Information</b>					
Total Memory	2048 MB (DDR3L)				
System Date	[Sat 06/03/2017]				←→: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
System Time	[10:06:47]				
Version 2.17.1249. Copyright (C) 2017 American Megatrends, Inc.					

## Advanced

The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.



Setting incorrect field values may cause the system to malfunction.

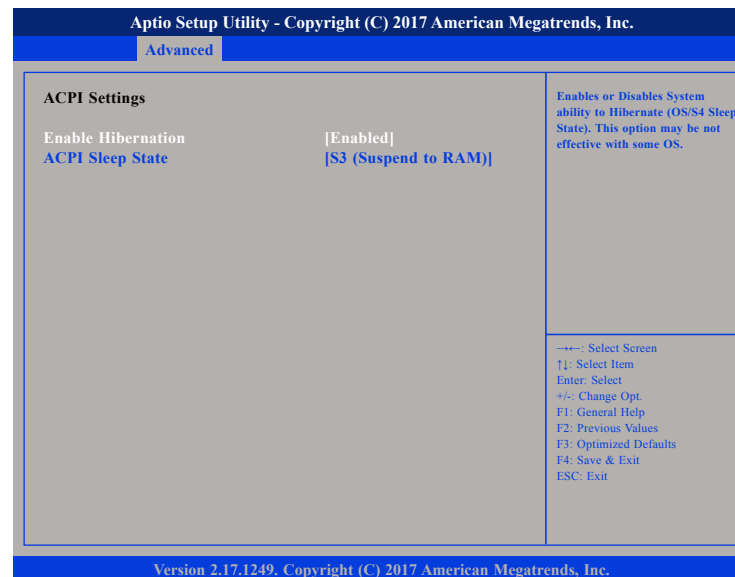


### OS Selection

Configures the target OS. The options are Windows 7 and Windows 8.X.

## ACPI Settings

This section is used to configure ACPI Settings.



### Enable Hibernation

Enables or disables system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.

### ACPI Sleep State

Select the highest ACPI sleep state the system will enter when the suspend button is pressed. The options are Suspend Disabled and S3 (Suspend to RAM).



## NCT6106D Super IO Configuration

This section is used to configure the serial ports.



### Super IO Chip

Displays the Super I/O chip used on the board.

## Serial Port 1 Configuration

This section is used to configure serial port 1.



### Serial Port

Enables or disables the serial port.

### Serial Port Mode

Select this to change the serial port mode to RS232, RS422 or RS485.

## Serial Port 2 Configuration

This section is used to configure serial port 2.



### Serial Port

Enables or disables the serial port.

### Serial Port Mode

Select this to change the serial port mode to RS232, RS422 or RS485.

## Serial Port 3 Configuration

This section is used to configure serial port 3.



### Serial Port

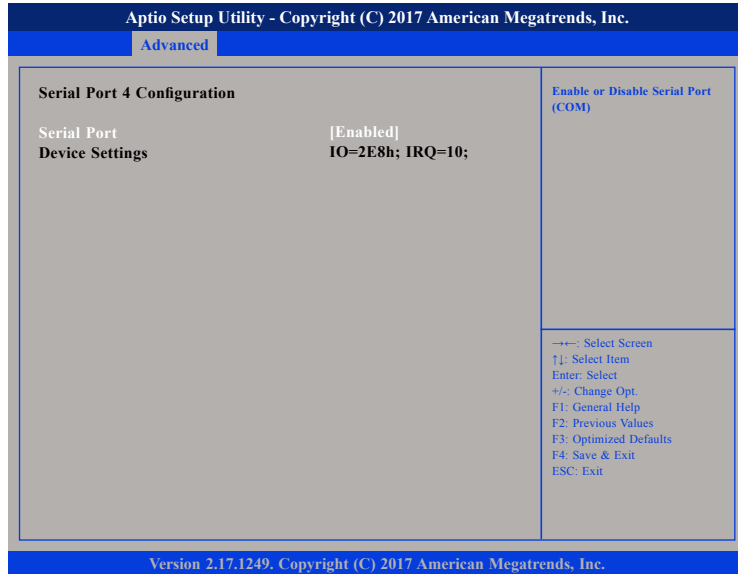
Enables or disables the serial port.

### Serial Port Mode

Select this to change the serial port mode to RS232, RS422 or RS485.

### Serial Port 4 Configuration

This section is used to configure serial port 4.



#### Serial Port

Enables or disables the serial port.

### Serial Port 6 Configuration

This section is used to configure serial port 6.



#### Serial Port

Enables or disables the serial port.

## Parallel Port Configuration

This section is used to configure the parallel port.



### Parallel Port

Enables or disables the parallel port.

### Change Settings

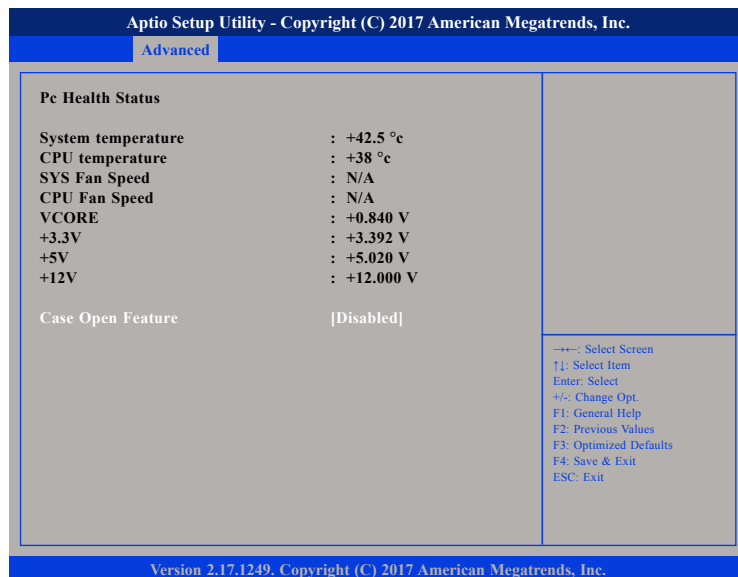
Selects the optimal setting for the Super IO device.

### Device Mode

Selects the parallel port mode.

## NCT6106D HW Monitor

This section is used to monitor hardware status such as temperature, fan speed and voltages.



### System Temperature

Detects and displays the current system temperature.

### CPU Temperature

Detects and displays the current CPU temperature.

### SYS Fan Speed

Detects and displays the current system fan speed.

### CPU Fan Speed

Detects and displays the current CPU fan speed.

### VCORE

Detects and displays the Vcore CPU voltage.

### +3.3V

Detects and displays the 3.3V voltage.

### +5V

Detects and displays the 5V voltage.

### +12V

Detects and displays the 12V voltage.

### Case Open Feature

Enables or disables the case open detection feature.

## CPU Configuration

This section is used to configure the CPU.



### Limit CPUID Maximum

The CPUID instruction of some newer CPUs will return a value greater than 3. The default is Disabled because this problem does not exist in the Windows series operating systems. If you are using an operating system other than Windows, this problem may occur. To avoid this problem, enable this field to limit the return value to 3 or lesser than 3.

### Execute Disable Bit

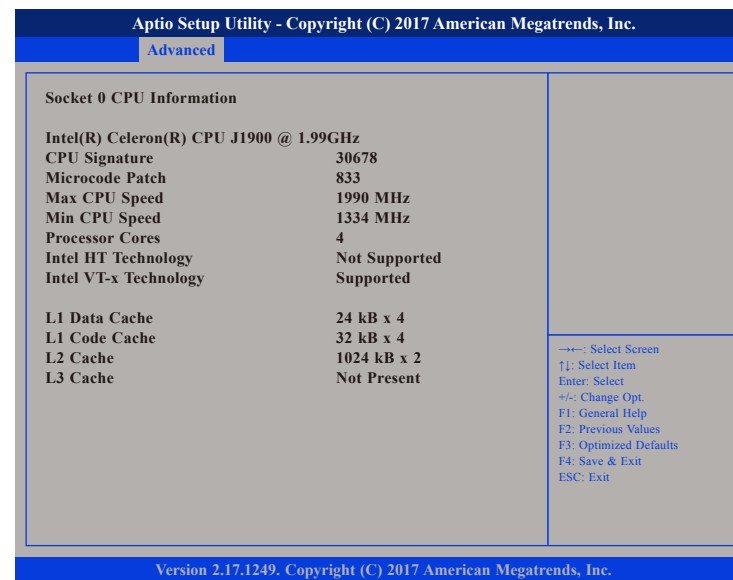
When this field is set to Disabled, it will force the XD feature flag to always return to 0. XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS (Windows Server 2003 SP1, Windows XP SP2, SuSE Linux 9.2, RedHat Enterprise 3 Update 3).

### Intel® Virtualization Technology

Enables or disables Intel® Virtualization technology.

### Socket 0 CPU Information

Display information on the CPU installed on socket 0.



## PPM Configuration

This section is used to configure the Processor Power Management (PPM) configuration.



### CPU C State Report

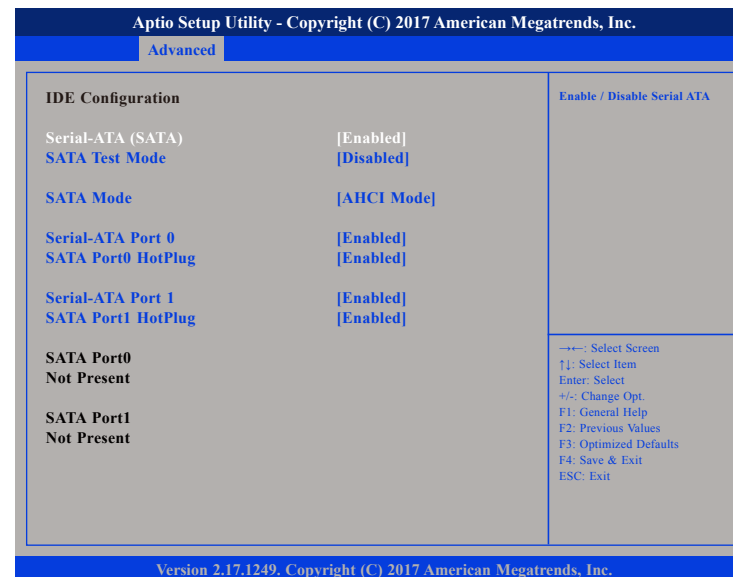
Enables or disables CPU C-State report to OS.

### S0ix

Enables or disables CPU S0ix state.

## IDE Configuration

This section is used to configure the SATA drives.



### Serial-ATA (SATA)

Enables or disables the SATA device.

### SATA Test Mode

Enables or disables SATA test mode.

### Serial-ATA Port 0 and Serial-ATA Port 1

Enables or disables SATA port 0 and SATA port 1.

### SATA Port0 Hotplug and SATA Port1 Hotplug

Enables or disables hotplug support on SATA port 0 and SATA port 1.

### SATA Mode

Configures the SATA as IDE or AHCI mode.

- IDE This option configures the Serial ATA drives as Parallel ATA physical storage device.
- AHCI This option configures the Serial ATA drives to use AHCI (Advanced Host Controller Interface). AHCI allows the storage driver to enable the advanced Serial ATA features which will increase storage performance.



## USB Configuration

This section is used to configure the USB.



### Legacy USB Support

Enable Enables Legacy USB.

Auto Disables support for Legacy when no USB devices are connected.

Disable Keeps USB devices available only for EFI applications.

### XHCI Hand-off and EHCI Hand-off

This is a workaround for OSs that does not support XHCI hand-off and EHCI hand-off. The XHCI and EHCI ownership change should be claimed by the XHCI and EHCI driver respectively.

## Chipset

This section gives you functions to configure the system based on the specific features of the chipset. The chipset manages bus speeds and access to system memory resources.



### LVDS Panel Support

Enables or disables LVDS function.

### LVDS Panel Type

Configures the LVDS display resolution.

## South Bridge



### High Precision Timer

Enables or disables the high precision event timer.

## Azalia HD Audio



### Audio Controller

Control detection of the Azalia device.

Disabled            Azalia will be unconditionally disabled.  
 Enabled            Azalia will be unconditionally enabled.

### Azalia HDMI Codec

Enables or disables internal HDMI codec for Azalia.

## USB Configuration



### USB 2.0(EHCI) Support

Enables or disables the Enhanced Host Controller Interface (USB 2.0), one EHCI controller must always be enabled.

### USB EHCI Debug

Enables or disables PCH EHCI debug capability.

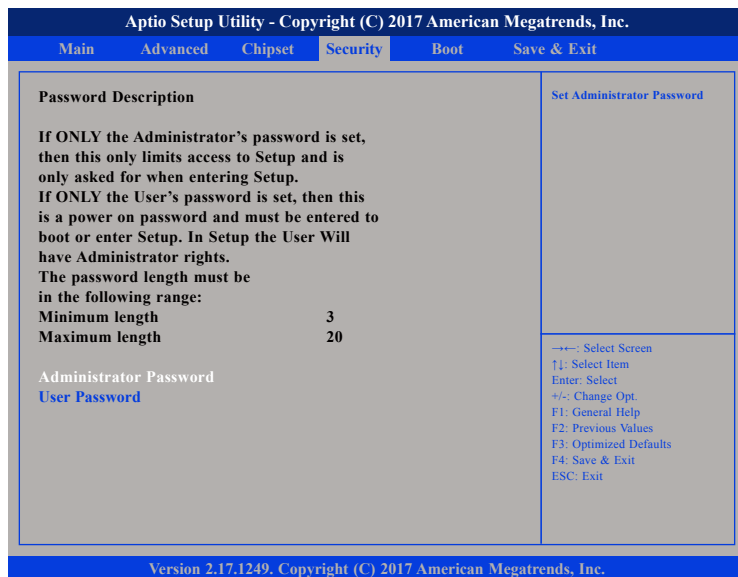
## PCI Express Configuration



### PCI Express Port 0 to PCI Express Port 3

Enables or disables the PCI Express ports 0 to 3 on the chipset.

## Security



### Administrator Password

Select this to reconfigure the administrator's password.

### User Password

Select this to reconfigure the user's password.

## Boot



### Bootup NumLock State

This allows you to determine the default state of the numeric keypad. By default, the system boots up with NumLock on wherein the function of the numeric keypad is the number keys. When set to Off, the function of the numeric keypad is the arrow keys.

### Fast Boot

When enabled, the BIOS will shorten or skip some check items during POST.

### Onboard LAN PXE

Enables or disables onboard LAN PXE ROM for LAN1 or LAN2.

### Boot Option Priorities

Adjust the boot sequence of the system. Boot Option #1 is the first boot device that the system will boot from, next will be #2 and so forth.

## Save & Exit



### Save Changes and Reset

To save the changes and reset, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

### Discard Changes and Reset

To exit the Setup utility without saving the changes, select this field then press <Enter>. You may be prompted to confirm again before exiting.

### Restore Defaults

To restore the BIOS to default settings, select this field then press <Enter>. A dialog box will appear. Confirm by selecting Yes.

# APPENDIX A: POWER CONSUMPTION

Voltage Chipset	Net Name									
	Voltage	12V	12V	5V	3.3V	1V	1.8V	5V	3.3V	1.05V
Net Name	+12VSB	+12V	+5VSB	+3VSB	+1VSB	+1V8VSB	+5V	+3V3	+1V05	
Bay Trail					0.055	0.41	0.065		0.043	1.3
DDR3L x2										
ALC886								0.5	0.5	
Audio AMP								0.2		
RTL8111G x2									0.7	
SATA x2		1.2						1.5		
USB(3.0) x4								3.6		
FAN		1.34								
Mini-PCIe					1.1					
mSATA									0.7	
USB(2.0) x6								3		
HDMI								0.5		
PCIe Slot		0.5			0.375				3	
VGA								0.5		
CH7511B									0.1	
CCFL (LVDS)		1.2						1.5	1.5	
COM Port (RS-232/422/485*2 RS-232*3)		2.5	0.5					2.5		
SIO(NCT6106D)					0.1				0.2	
GPIO		1						1		
TPM									0.5	
USB 3.0 Hub (ASM1074)									0.3	0.4
USB 2.0 Hub (GL850G)								0.18	0.18	
PS/2 KB & MS								0.55		
<b>Total Current</b>		0	7.74	0.5	1.63	0.41	0.065	15.53	7.723	1.7
<b>Total Watt</b>		0	92.88	2.5	5.379	0.41	0.117	77.65	25.4859	1.785

Voltage Chipset	Net Name									
	Voltage	1.35V	1V	1.35V	1.5V	1.8V	0.675	1V	1V	Subtotal Power
	Net Name	VDDQ	+1V	+1V35	+1V5	+1V8	VTT_DDR	VCORE	VGFX	
Bay Trail		1.3	3.6	0.4	0.1	0.01		11	14	
DDR3L x2		4.1					1.2			
ALC886					0.036					
Audio AMP										
RTL8111G x2										
SATA x2										
USB(3.0) x4										
FAN										
Mini-PCIe					0.5					
mSATA					0.5					
USB(2.0) x6										
HDMI										
PCIe Slot										
VGA										
CH7511B						0.26				
CCFL (LVDS)										
COM Port (RS-232/422/485*2 RS-232*3)										
SIO(NCT6106D)										
GPIO										
TPM										
USB 3.0 Hub (ASM1074)										
USB 2.0 Hub (GL850G)										
PS/2 KB & MS										
<b>Total Current</b>		5.4	3.6	0.4	1.136	0.27	1.2	11	14	
<b>Total Watt</b>		7.29	3.6	0.54	1.704	0.486	0.81	11	14	245.6369