



**NEXCOM International Co., Ltd.**

**IoT Automation Solutions**

**Embedded Computing (3.5" CPU Board)**

**EBC 358**

User Manual

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# PREFACE

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## Acknowledgements

EBC 358 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 A 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 A 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 the equipment from any AC outlet before cleaning or installing a component inside the chassis. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. To prevent electrostatic build-up, leave the board in its anti-static bag until you are ready to install it.
5. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
6. Keep the board away from humidity.
7. Put the board on a stable surface. Dropping it or letting it fall may cause damage.
8. Wear anti-static wrist strap.
9. Do all preparation work on a static-free surface.
10. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
11. Hold the board only by its edges. Be careful not to touch any of the components, contacts or connections.
12. All cautions and warnings on the board should be noted.
13. Use the correct mounting screws and do not over tighten the screws.
14. Keep the original packaging and the anti-static bag; in case the board has to be returned for repair or replacement.

## 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

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www.nexcomusa.com

## Package Contents

Before continuing, verify that the EBC 358 package that you received is complete. Your package should have all the items listed in the following table.

Item	Description	Qty
1	EBC 358	1
2	COM Port Cable	2

### Optional Accessories

Item	Part Number	Name	Description
1	60233AT128x00	7P+15P SATA Cable + 2P Power Cable	7P+15P SATA Cable ST: MD-6102064 SATA 22P/F To SATA 7P/F/L + HS L=250mm
2	60233SIO62X00	COM Port Cable	COM Port Cable CP: NEX-110819-01 UL2651#28x9C-DB9 + TU1001-10 L:200mm
3	603USB0085X00	USB2.0 Cable	USB Cable For NEX621A ST: MD-5606152 USB CONx2 + Bracket to Dupont 10P Pit=2.0mm L=200mm
4	603POW0410X00	Input DC Power Cable	Power Cable ST: ST-2006022 ATX 2x2P Pit: 4.2mm To Terminal Blocks 3P Pit: 5.08mm L=230mm
5	7400060067X00	DC 24V Adapter	Power Adapter Liteon: HA-1600-24A2 60W/24V
6	4NCPM00302X00	Phoenix Contact	1777992 5.08mm Male DIP Green



**Note:**

Heat spreader: The heatspreader acts as a thermal coupling device to the module and is thermally coupled to the CPU via a thermal gap filler. On some modules, it may also be thermally coupled to other heat generating components with the use of additional thermal gap fillers. Although the heatspreader is the thermal interface where most of the heat generated by the module is dissipated, it is not to be considered as a heatsink. It has been designed as a thermal interface between the module and the application specific thermal solution.

## Ordering Information

The following below provides ordering information for EBC 358.

### Barebone

#### **EBC 358 (P/N: 10E00035800X0)**

Intel® Atom® x6425E Processors, 1 x DDR4, VGA, HDMI, LVDS, 2 x USB 3.2 (Gen1), 2 x USB 2.0, 2 x GbE LAN, 1 x SATA 3.0, 3 x RS232, 1 x RS232/422/485, M.2 Key B, and Mini PCIe.

#### **EBC 358-6413E (P/N: 10E00035802X0)**

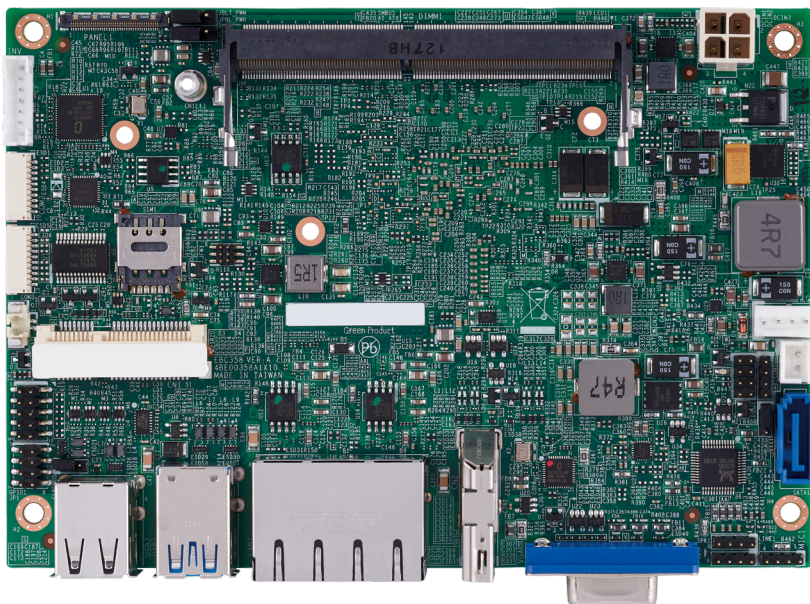
Intel® Atom® x6413E Processors, 1 x DDR4, VGA, HDMI, LVDS, 2 x USB 3.2 (Gen1), 2 x USB2.0, 2 x GbE LAN, 1 x SAT3.0, 3 x RS232, 1 x RS232/422/485, M.2 Key, and Mini PCIe.

#### **EBC 358-6211E (P/N: 10E00035801X0)**

Intel® Atom® x6211E Processors, 1 x DDR4, VGA, HDMI, LVDS, 2 x USB 3.2 (Gen1), 2 x USB2.0, 2 x GbE LAN, 1 x SATA 3.0, 3 x RS232, 1 x RS232/422/485, M.2 Key B, and Mini PCIe.

# CHAPTER 1: PRODUCT INTRODUCTION

## Overview



## Key Features

- Intel® Atom® x6000 Processor
- 1 x SO-DIMM DDR4 with non-ECC SO-DIMM 3200 MHz up to 32GB
- Support triple display VGA, HDMI, and LVDS
- 2 x Intel® GbE LAN, 2 x USB3.2 (Gen1), 3 x USB2.0, 3 x RS232, 1x RS232/485/422, 1 x SATA3.0, 8bit GPIO, and HD Audio
- 1 x M.2 Key B
- TPM 2.0
- 12V or 24 V Auto Detect

## Hardware Specifications

### CPU/Chipset

Intel Atom® x6000 Series Processors, BGA 1493

- Intel® Atom® x6425E Processor, Quad Core, 1.5M Cache, 2.0GHz (3.0GHz), 12W
- Intel® Atom® x6413E Processor, Quad Core, 1.5M Cache, 1.5GHz (3.0GHz), 9W
- Intel® Atom® x6211E Processor, Dual Core, 1.5M Cache, 1.3GHz (3.0GHz), 6W

### Main Memory

- DDR4-3200 SO-DIMM sockets supported

### Platform Control Hub

- Atom™ processor E3800 product family (formerly codenamed “Bay Trail-I”)

### BIOS

- AMI (UEFI)

### Display

- 1 x VGA (resolution up to 1920x1080 @ 60Hz)
- 1 x HDMI 1.4b (resolution up to 3840x2160 @ 30Hz)
- 1 x Dual Channel 18/24bit LVDS (resolution up to 1920x1080@60Hz)

### Storage

- 1 x SATA 3.0 / 1 x SATA power connector x 1(+5V)

### Expansion Slot

- 1 x Full size mPCIe with Nano-SIM (support SATA/PCIe/USB 2.0 Interface)
- 1 x M.2 3042 key B (Support SATA/PCIe/USB 3.2 Gen1) with Nano-SIM

### Rear I/O

- 2 x USB 3.2 Gen 1
- 2 x GbE LAN (Intel i210-IT)
- 2 x USB2.0
- 1 x VGA, 1 x HDMI connector

### I/O Interface

- 2 x USB 2.0 (Pin Header)
- 4 x serial ports:
  - 3 x RS232
  - 1 x RS232/485/422
- 1 x Front panel header, 8 bit digital I/O (4In/4Out)
- WDT, supports on board TPM 2.0
- HD AUDIO (Line-Out, SPK-Out, and MIC-In)
- 1 x Fan connector
- 1 x 4-pin (2x2) ATX Power connector

### Power Requirement

- 1 x 4-pin (2x2) ATX Power connector
  - Input power DC 12V or 24V only auto detect
- Support both AT and ATX power supply mode





## Environment

- Board level operation temperature: 0°C to 60°C
- Storage temperature: -40°C to 85°C
- Relative humidity:
  - 10% to 95% (operating, non-condensing)
  - 5% to 95% (non-operating, non-condensing)

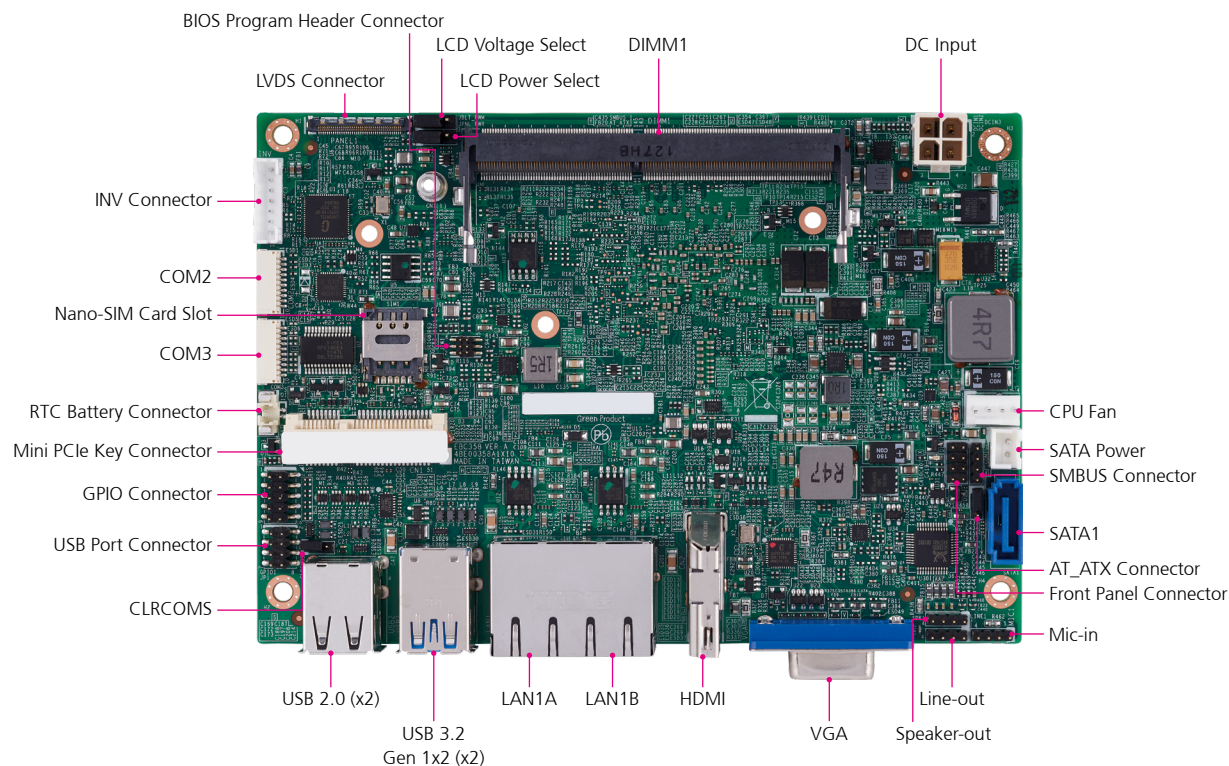
## Certifications

- Meet CE
- FCC Class A

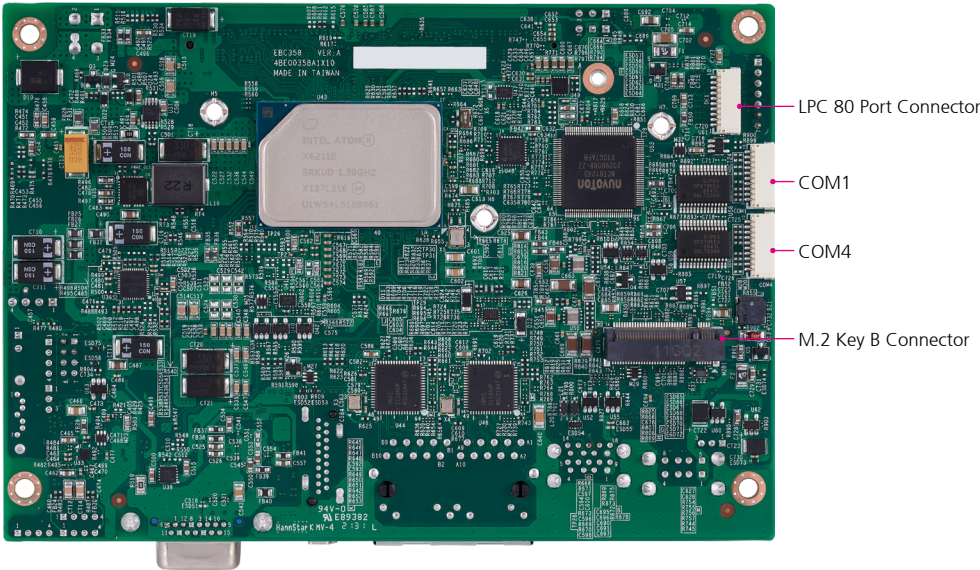


# Knowing Your EBC 358

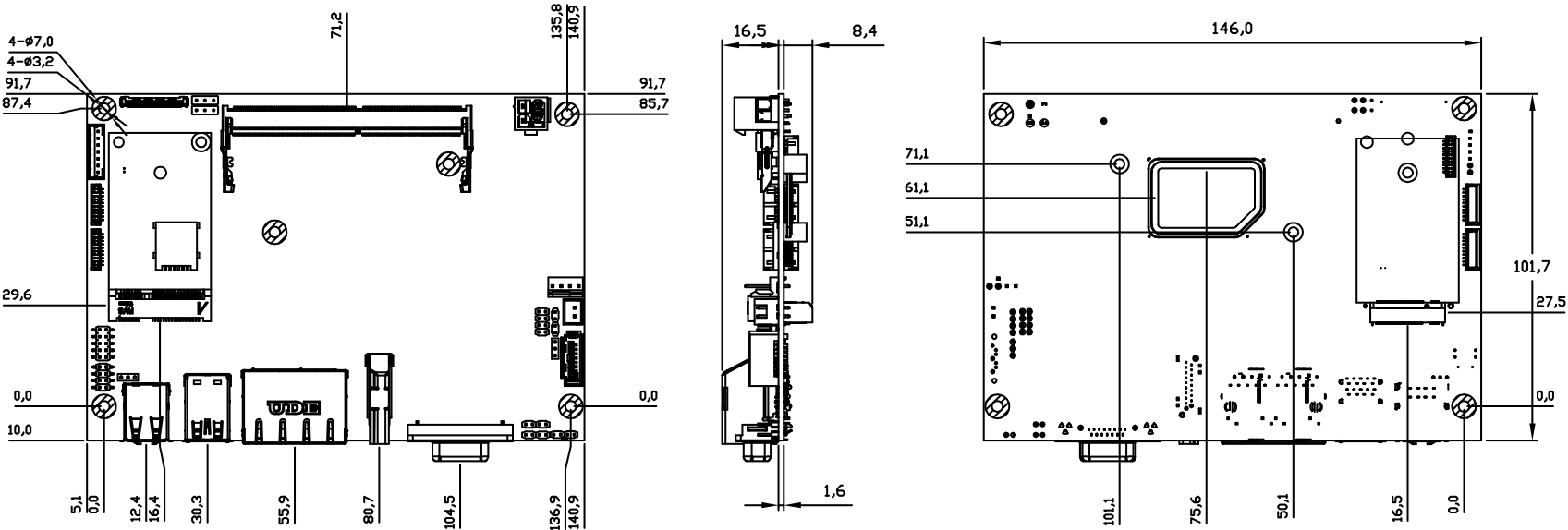
## Top View



Bottom View



Mechanical Dimensions



## CHAPTER 2: JUMPERS AND CONNECTORS

This chapter describes how to set the jumpers and connectors on the EBC 358 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:

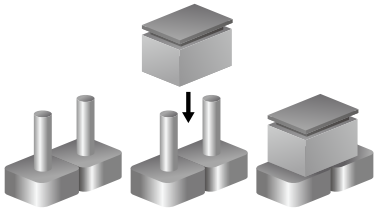
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal 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

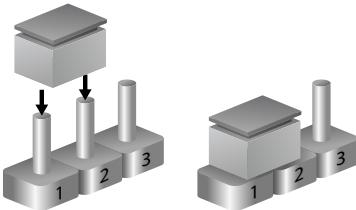
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just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



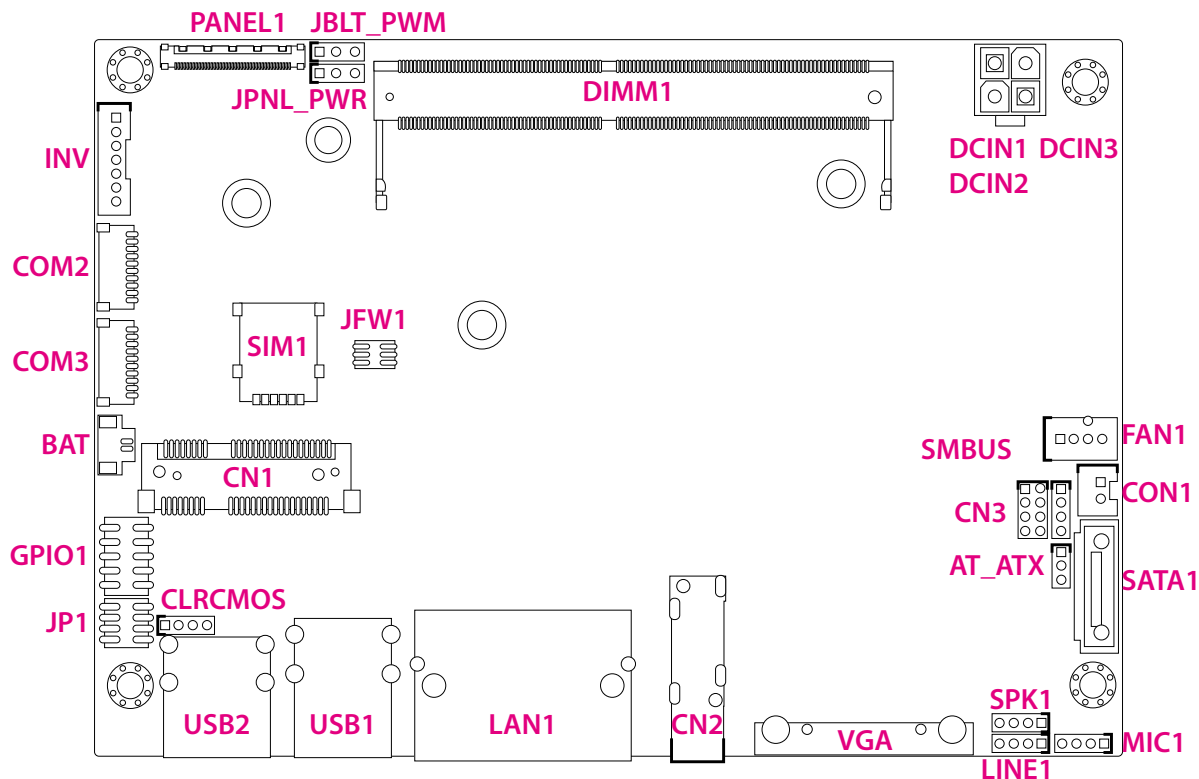
Three-Pin Jumpers: Pins 1 and 2 are Short



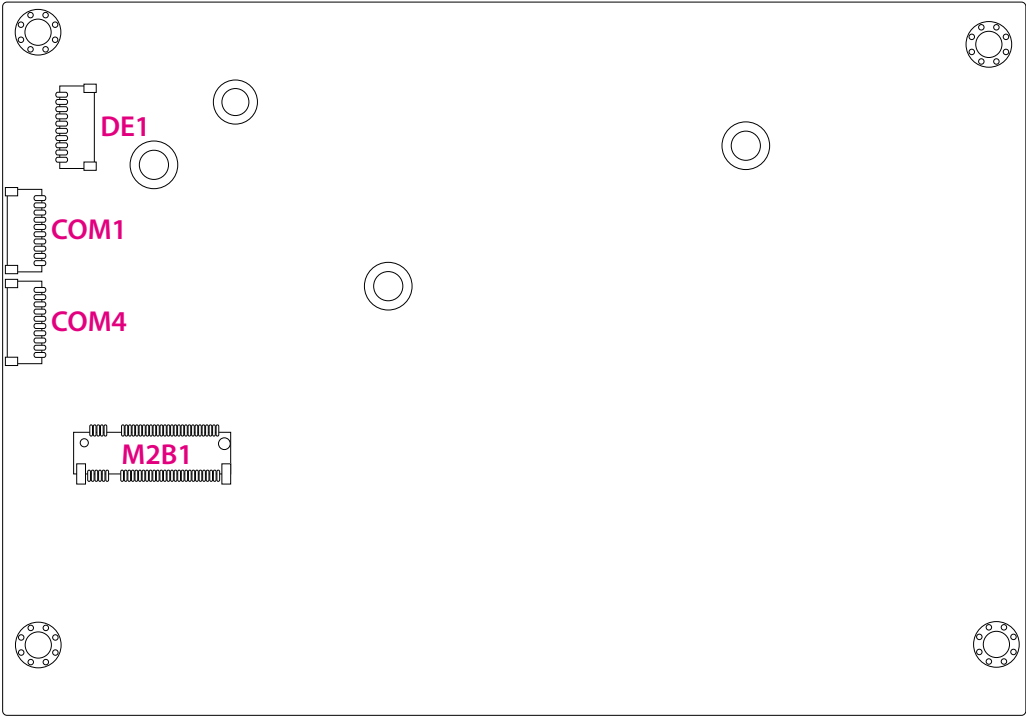
## Locations of the Jumpers and Connectors

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

### Top View



Bottom View



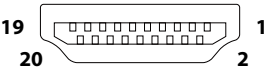


# Connector Pin Definitions

## External I/O Interfaces

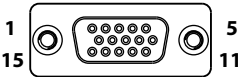
### HDMI

Connector type: HDMI port  
Connector location: CN2



Pin	Definition	Pin	Definition
1	HDMITX2P1	2	GND
3	HDMITX2N1	4	HDMIX1P1
5	GND	6	HDMITX1N1
7	HDMITX0P1	8	GND
9	HDMITX0N1	10	HDMICLK P1
11	GND	12	HDMICLK N1
13	NC	14	NC
15	HDMISCL	16	HDMISDA
17	GND	18	VCC5HDMI
19	HDMIHPD	20	

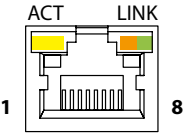
Connector type: DB-15 port, 15-pin D-Sub  
Connector location: VGA1



Pin	Definition	Pin	Definition
1	VGA_RED	2	VGA_GREEN
3	VGA_BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VGA_+5V	10	GND
11	NC	12	VGA_DATA
13	VGA_HS	14	VGA_VS
15	VGA_CLK	16	

LAN Port

Connector type: RJ45 port with LEDs  
Connector location: LAN1A, LAN1B



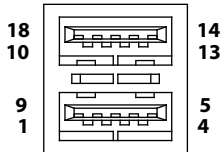
Pin	Definition	Pin	Definition
A1	MDI_0_P_1	A2	MDI_0_N_1
A3	MDI_1_P_1	A4	MDI_1_N_1
A5	MDI_2_P_1	A6	MDI_2_N_1
A7	MDI_3_P_1	A8	MDI_3_N_1
A9	NC	A10	GND
A11	LINK1G_LAN1	A12	LINK100_LAN1
A13	LED1_1	A14	ACTPW_LAN1
B1	MDI_0_P_2	B2	MDI_0_N_2
B3	MDI_1_P_2	B4	MDI_1_N_2
B5	MDI_2_P_2	B6	MDI_2_N_2
B7	MDI_3_P_2	B8	MDI_3_N_2
B9	NC	B10	GND
B11	LINK1G_LAN2	B12	LINK100_LAN2
B13	LED1_2	B14	ACTPW_LAN2

Act (Left)	Status
Flashing Yellow	Data activity
Off	No activity

Link (Right)	Status
Steady Green	1G network link
Steady Orange	100Mbps network link
Off	10Mbps

USB 3.0 Connector

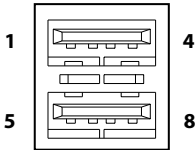
Connector type: Dual USB port, Type A  
Connector location: USB1



Pin	Definition	Pin	Definition
1	5VSB_USB12	2	USB2N0
3	USB2P0	4	GND
5	USB31_RX_N0	6	USB31_RX_P0
7	GND	8	USB31_TX_N0
9	USB31_TX_P0	10	5VSB_USB12
11	USB2N1	12	USB2P1
13	GND	14	USB31_RX_N1
15	USB31_RX_P1	16	GND
19 (17)	USB31_TX_N1	18	USB31_TX_P1

USB 2.0 Connector

Connector type: Dual USB port, Type A  
Connector location: USB2



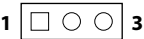
Pin	Definition	Pin	Definition
1	P5V_USB_P34	2	USB2N4
3	USB2P4	4	GND
5	P5V_USB_P34	6	USB2N5
7	USB2P5	8	GND



Internal Connectors

AT\_ATX Connector

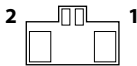
Connector type: 1x3 3-pin header, 2.0mm male 180D DIP  
Connector location: AT\_ATX



Pin	Definition	Pin	Definition
1	AT_BTN	2	PWRBTN#
3	ATX_BTN		

RTC Battery Connector

Connector type: 1x2 2-pin 2.5mm male 180D DIP  
Connector location: BAT



Pin	Definition	Pin	Definition
1	GND	2	3V_BAT1



Audio Connector

Connector type: 1x4 4-pin header, 2.0mm male 180D DIP  
Connector location: SPK1, LINE1, and MIC1



SPK1

Pin	Definition	Pin	Definition
1	OUT-LR+_C	2	OUT-LR-_C
3	OUT-RR+_C	4	OUT-RR-_C

LINE1

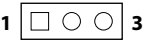
Pin	Definition	Pin	Definition
1	LINE_OUT_LC	2	NC
3	LINEOUT_JD	4	LINE_OUT_RC

MIC1

Pin	Definition	Pin	Definition
1	MIC_OUT-L	2	NC
3	MIC_JD	4	MIC_OUT-R

CLRCMOS Circuit Connector

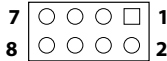
Connector type: 1x3 3-pin 2.0mm male 180D DIP  
Connector location: CLRCMOS



Pin	Definition	Pin	Definition
1	VCCRTC	2	I_RTCRSTL
3	GND		

Front Panel Connector

Connector type: 2x4 8-pin header, 2.0mm male 180D  
Connector location: CN3

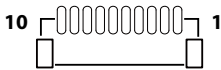


Pin	Definition	Pin	Definition
1	ATX_PWRBT#	2	GND
3	PWRLED#	4	PWR_LED
5	SYSRESETN	6	GND
7	HD_LED#	8	HDD_LED_DP



COM Port 1

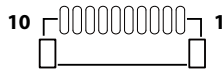
Connector type: 1x10 10-pin, 1.0mm male 90D 0.5A SMD  
Connector location: COM1



Pin	Definition	Pin	Definition
1	COM1DCDL	2	COM1RXD
3	COM1TXD	4	COM1DTRL
5	GND	6	COM1DSRL
7	COM1RTSL	8	COM1CTSL
9	COM1RIL	10	GND

COM Port 2

Connector type: 1x10 10-pin, 1.0mm male 90D 0.5A SMD  
Connector location: COM2



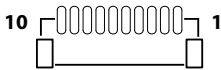
Pin	Definition	Pin	Definition
1	COM2DCDL	2	COM2RXD
3	COM2TXD	4	COM2DTRL
5	GND	6	COM2DSRL
7	COM2RTSL	8	COM2CTSL
9	COM2RIL	10	GND





COM Port 3

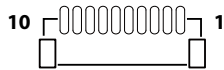
Connector type: 1x10 10-pin, 1.0mm male 90D 0.5A SMD  
Connector location: COM3



Pin	Definition	Pin	Definition
1	COM3DCDL	2	COM3RXD
3	COM3TXD	4	COM3DTRL
5	GND	6	COM3DSRL
7	COM3RTSL	8	COM3CTSL
9	COM3RIL	10	GND

COM Port 4

Connector type: 1x10 10-pin, 1.0mm male 90D 0.5A SMD  
Connector location: COM4



Pin	Definition	Pin	Definition
1	COM4DCDL	2	COM4RXD
3	COM4TXD	4	COM4DTRL
5	GND	6	COM4DSRL
7	COM4RTSL	8	COM4CTSL
9	COM4RIL	10	GND





SATA Power Connector

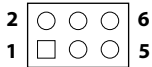
Connector type: 1x2 2-pin, 2.54mm male 180D DIP  
Connector location: CON1



Pin	Definition	Pin	Definition
1	VCC5	2	GND

BIOS Program Header Connector

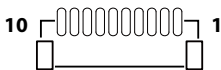
Connector type: 2x3 6-pin 1.27mm H :5.5mm male 180D SMD  
Connector location: JFW1



Pin	Definition	Pin	Definition
1	VSPI	2	GND
3	BIOS_SPICSL0	4	BIOS_SPIO_CLK
5	BIOS_SPIO_MISO	6	BIOS_SPIO_MOSI

LPC 80 Port Connector

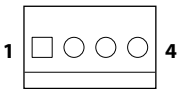
Connector type: 1x10 10-pin header, 1.0mm male 90D 0.5A SMD  
Connector location: DE1



Pin	Definition	Pin	Definition
1	GND	2	I_PLTRSTL
3	I_PLTRSTL	4	I_ESPICSOL
5	I_ESPIIO3	6	I_ESPIIO2
7	I_ESPIIO1	8	I_ESPIIO0
9	I_ESERIRQ	10	VCC3

CPU Fan Connector

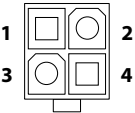
Connector type: 1x4 4-pin 2.54mm male 180D DIP wide: 5.08mm  
Connector location: Fan1



Pin	Definition	Pin	Definition
1	GND	2	VCC12
3	FAN1TACH	4	FAN1PWM

PWR Connector

A1 . Connector size: ATX Power Con 2x2 male 180D DIP  
A2. Connector size: ATX Power Con 2x2 male 90D DIP  
Connector location: DCIN1, DCIN2



DCIN1

Pin	Definition	Pin	Definition
1	GND	2	GND
3	VIN_12_24	4	VIN_12_24

DCIN2

Pin	Definition	Pin	Definition
1	GND	2	GND
3	VIN_12_24	4	VIN_12_24

A3. Connector size: Terminal Blocks 2P  
Connector location: DCIN3

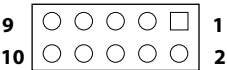


DCIN3

Pin	Definition	Pin	Definition
1	GND	2	VIN_12_24

GPIO Connector

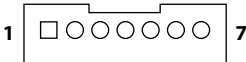
Connector type: 2x5 10-pin header, SMD 1.0mm H: 5mm male 180D  
Connector location: GPIO1



Pin	Definition	Pin	Definition
1	GPIO_PWR	2	GND
3	GPIO_GP30	4	GPIO_GP34
5	GPIO_GP31	6	GPIO_GP35
7	GPIO_GP32	8	GPIO_GP36
9	GPIO_GP33	10	GPIO_GP37

INV Connector

Connector type: 1x7 7-pin 2.0mm male 180D DIP  
Connector location: INV

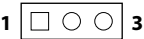


Pin	Definition	Pin	Definition
1		2	12V_PANEL
3	12V_PANEL	4	PL_BKLTCTRL
5	GND	6	GND
7	M_BKLTEN_R		



LCD Voltage Select Connector

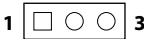
Connector type: 1x3 3-pin 2.54mm male 180D DIP wide: 5.08mm  
Connector location: JBLT\_PWM



Pin	Definition	Pin	Definition
1	VCC3	2	PL_BKLTCTRL
3	VCC5		

LCD Power Connector

Connector type: 1x3 3-pin 2.54mm male 180D DIP wide: 5.08mm  
Connector location: JPNL\_PWR



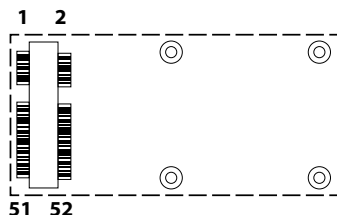
Pin	Definition	Pin	Definition
1	VCC3	2	+VCCLCDIN
3	VCC5		



## Mini PCIe Key Connector

Connector type: Mini PCIe card slot 52pin

Connector location: CN1



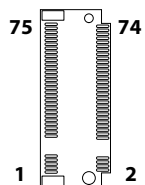
Pin	Definition	Pin	Definition
1	I_WAKEL	2	VCC3_MPCIE1
3	NC	4	GND
5	NC	6	1V5_MPCIE1
7	I_PCIECLKREQ_L3	8	UIM_PWR
9	GND	10	UIM_DATA
11	I_PCIECLKOUT_N3	12	UIM_CLK
13	I_PCIECLKOUT_P3	14	UIM_RESET
15	GND	16	UIM_VPP
17	NC	18	GND
19	NC	20	VCC3_MPCIE1
21	GND	22	PERST#
23	I_PCIE_RXN2	24	VCC3_MPCIE1
25	I_PCIE_RXP2	26	GND

Pin	Definition	Pin	Definition
27	GND	28	1V5_MPCIE1
29	GND	30	I_SMB3P3CLK
31	PCIETXP2	32	I_SMB3P3DATA
33	PCIETXP2	34	GND
35	GND	36	USB2N2
37	GND	38	USB2P2
39	VCC3_MPCIE1	40	GND
41	VCC3_MPCIE1	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	1V5_MPCIE1
49	NC	50	GND
51	NC	52	VCC3_MPCIE1

## M.2 Key B Connector (3042)

Connector type: H:8.5mm 90D gold flash SMD pit: 0.5mm

Connector location: M2B1



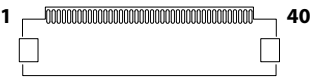
Pin	Definition	Pin	Definition
1	GND	2	3V3_NGFF_M2
3	GND	4	3V3_NGFF_M2
5	GND	6	POWER_OFF#
7	USB2P3	8	M2LTEDISL
9	USB2N3	10	DSS#_1
11	NC	12	
13		14	
15		16	
17		18	
19		20	NC
21	M2LTECONFIG0	22	NC
23	NC	24	NC
25	NC	26	LTEDISL
27	GND	28	UIM_VPP
29	USB3RXN2	30	UIM_RESET
31	USB3RXP2	32	UIM_CLK
33	GND	34	UIM_DATA
35	USB3TXN2	36	UIM_PWR
37	USB3TXP2	38	SATA0DEVSLP0

Pin	Definition	Pin	Definition
39	GND	40	NC
41	SATA_PCIE_RXN0	42	NC
43	SATA_PCIE_RXP0	44	NC
45	GND	46	NC
47	SATA_PCIE_TXN0	48	NC
49	SATA_PCIE_TXP0	50	NGFF_PERSET#
51	GND	52	NGFF_CLKREQ#
53	I_PCIECLKOUTN2	54	NGFF_WAKE#
55	I_PCIECLKOUTP2	56	NGFF_SMB_CLK
57	GND	58	NGFF_SMB_DAT
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	3V3_N_PLTRST#	68	M2B_SUSCLK
69	SATA_PCIE_SEL	70	3V3_NGFF_M2
71	GND	72	3V3_NGFF_M2
73	GND	74	3V3_NGFF_M2
75	3V3_NGFF_M2		



LVDS Connector

Connector type: 1x40 40-pin 0.4mm female 180D SMD  
Connector location: PANEL1



Pin	Definition	Pin	Definition
1	LVDS0_D0-	2	LVDS0_D0+
3	LVDS0_D1-	4	LVDS0_D1+
5	LVDS0_D2-	6	LVDS0_D2+
7	LVDS0_D3-	8	LVDS0_D3+
9	LVDS1_D0-	10	LVDS1_D0+
11	LVDS1_D1-	12	LVDS1_D1+
13	LVDS1_D2-	14	LVDS1_D2+
15	LVDS1_D3-	16	LVDS1_D3+
17	GND	18	VCC_LCD
19	VCC_LCD	20	VCC_LCD

Pin	Definition	Pin	Definition
21	VCC_LCD	22	NA
23	GND	24	GND
25	GND	26	LVDS0_CLK-
27	LVDS0_CLK+	28	GND
29	GND	30	GND
31	GND	32	CH_ENABKL
33	PL_BKLTCTRL	34	LVDS1_CLK-
35	LVDS1_CLK-	36	12V_PANEL
37	12V_PANEL	38	12V_PANEL
39	12V_PANEL	40	NC

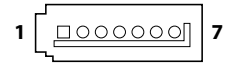






SATA Power Connector

Connector type: 1.27mm H: 8.45mm male 180D DIP  
Connector location: SATA1



Pin	Definition	Pin	Definition
1	GND	2	SATA_TXP1_C
3	SATA_TXN1_C	4	GND
5	SATA_RXN1_C	6	SATA_RXP1_C
7	GND		

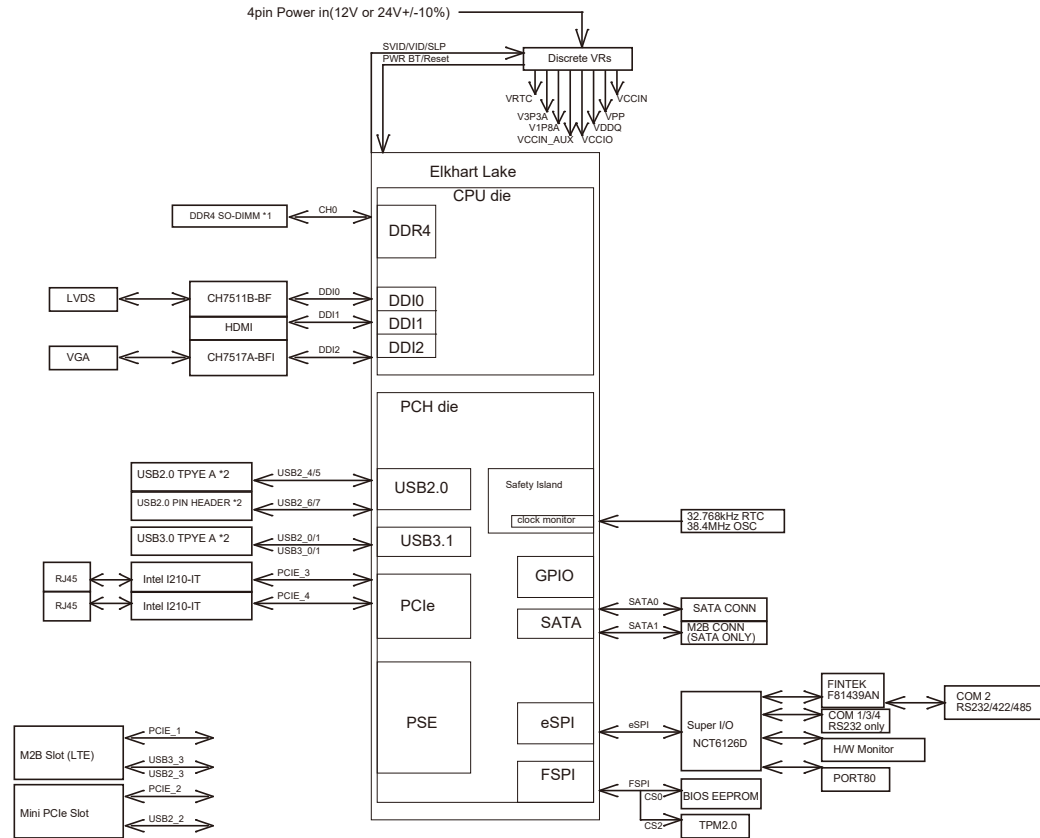
SMBUS Connector

Connector type: 1x4 4-pin header, 2.0mm male 180D DIP  
Connector location: SMBUS



Pin	Definition	Pin	Definition
1	VCC5	2	I_SMB3P3DATA
3	I_SMB3P3CLK	4	GND

## Block Diagram



# CHAPTER 3: BIOS SETUP

This chapter describes how to use the BIOS setup program for the EBC 358. 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 Web site 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 such items 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. Another way to enter Setup is to power on the computer and wait for the following message during the POST:

TO ENTER SETUP BEFORE BOOT PRESS + +

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-menu 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.



Setting incorrect field values may cause the system to malfunction.

## Main

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

Aptio Setup - AMI

Main

Advanced

Chipset

Security

Boot

Save & Exit

BIOS Information

Compliance

Build Date and Time

Access Level

Project Version

UEFI 2.7; PI 1.6

11/25/2021 15:18:43

Administrator

E358T010 x64

Processor Information

Name

Speed

ID

Stepping

Number of Processors

Microcode Revision

E1khardtLake ULX

2000MHz

0x90661

B0

4Core(s) / 4Thread(s)

14

IGFX GOP Version

Total Memory

Memory Data Rate

18.0.1034

8192 MB

2400 MTPS

ME FW Version

0.0.0.0

System Date

System Time

[Wed 02/16/2022]

[18:45:21]

Set the Date. Use Tab to switch between Date elements.  
Default Ranges:  
Year: 1998-9999  
Months: 1-12  
Days: Dependent on month  
Range of Years may vary.

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

Version 2.22.1282. Copyright (C) 2021 AMI

## 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 2005 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.

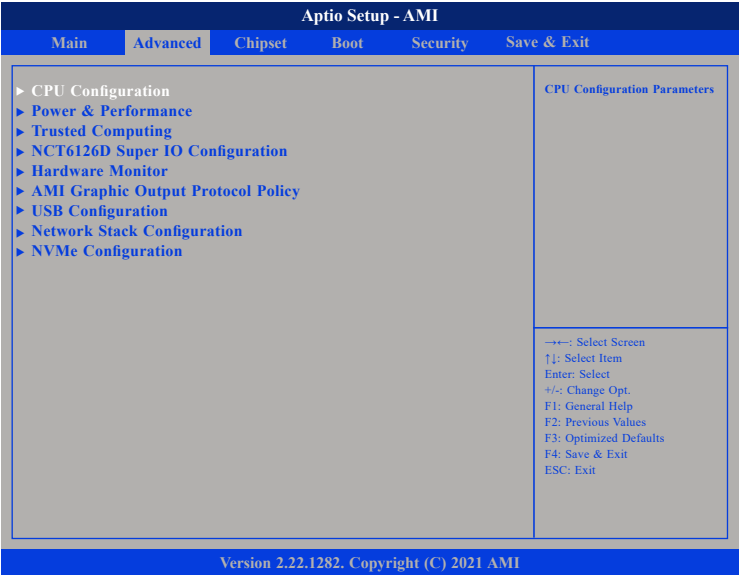
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EBC 358 User Manual

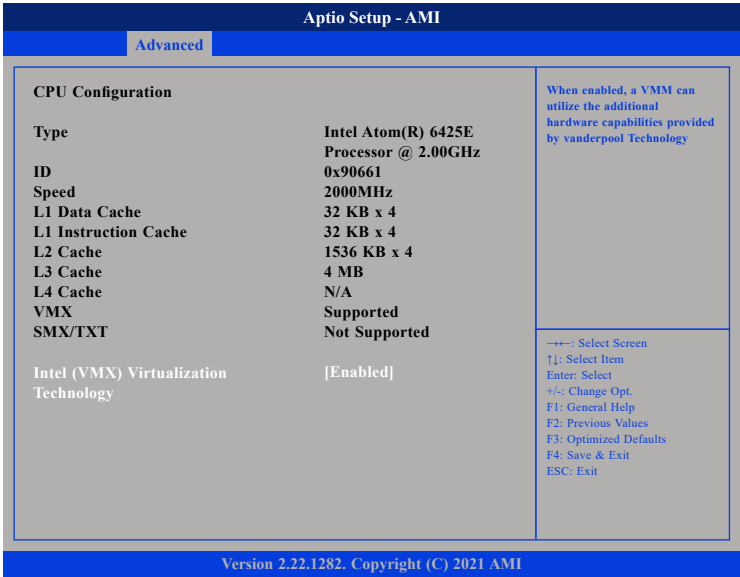
## Advanced

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.



## CPU Configuration

This section is used to configure the CPU settings.



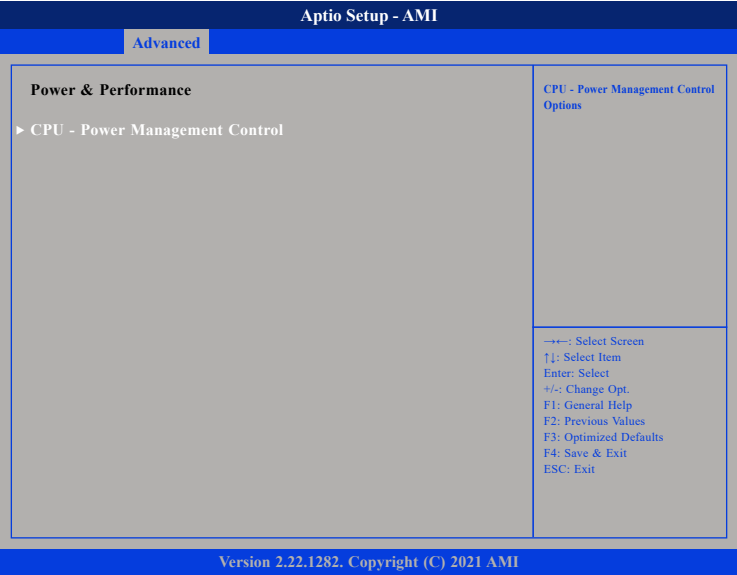
### Intel® (VMX) Virtualization Technology

When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.



Power & Performance

This section is used to configure the CPU power management features



Power Management Control

Enters the submenu for more configurations.



Intel(R) SpeedStep(tm)

Enables or disables Intel Speedstep technology.

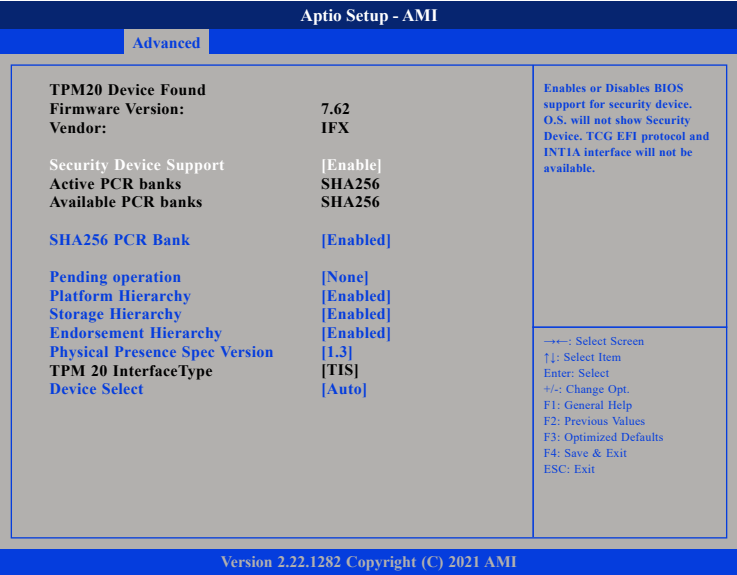






Trusted Computing

This section is used to configure Trusted Platform Module (TPM) settings.



Security Device Support

Enables or disables BIOS support for security device. O.S will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

SHA256 PCR Bank

Enables or disables SHA256 PCR Bank. Pending operation Schedules an operation for the security device.

Platform Hierarchy

Enables or disables Platform Hierarchy.

Storage Hierarchy

Enables or disables Storage Hierarchy.

Endorsement Hierarchy

Enables or disables Endorsement Hierarchy.

Physical Presence Spec Version

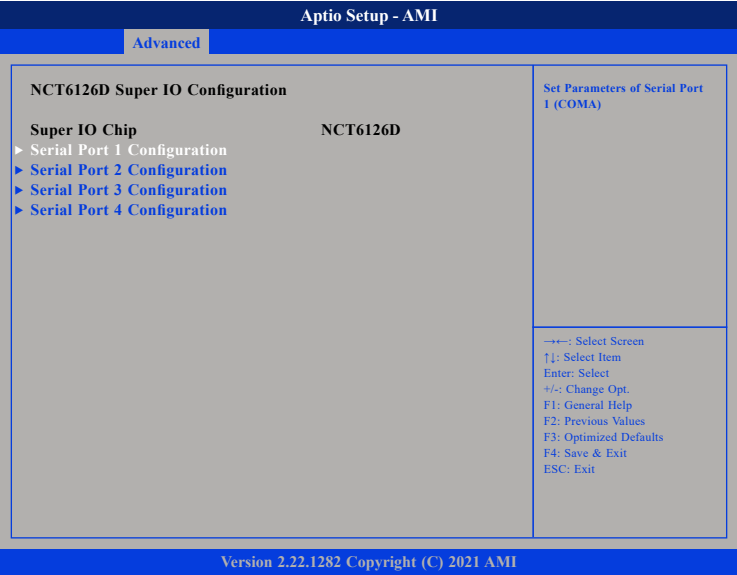
Configures which physical presence spec version the OS will support. Please note that some HCK tests might not support 1.3.

Device Select

TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both TPM 1.2 and 2.0 devices with the default set to TPM 2.0 devices if not found, and TPM 1.2 devices will be enumerated.

### NCT6126D Super IO Configuration

This section is used to configure the serial ports.



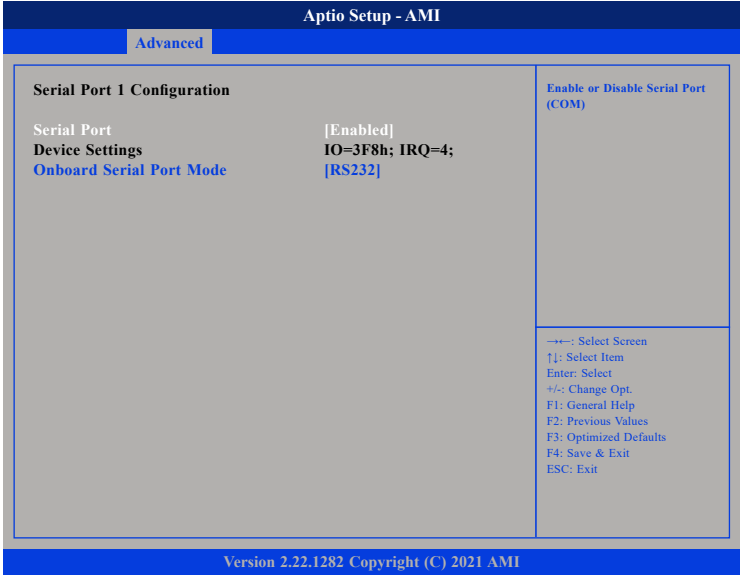
#### Super IO Chip

Displays the Super I/O chip used on the board. Click on the desired serial port for additional configurations.

#### Serial Port 1/2/3/4

Click on the desired serial port for additional configurations.

### Serial Port 1 Configuration



#### Serial Port

Enables or disables the serial port.

#### Onboard Serial Port Mode

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



Serial Port 2 Configuration

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Advanced

Serial Port 2 Configuration

Serial Port

Device Settings

Onboard Serial Port Mode

[Enabled]

IO=3F8h; IRQ=4;

[RS232]

Enable or Disable Serial Port (COM)

→←: Select Screen

↑↓: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F2: Previous Values

F3: Optimized Defaults

F4: Save & Exit

ESC: Exit

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Serial Port

Enables or disables the serial port.

Onboard Serial Port Mode

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

Serial Port 3 Configuration

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Advanced

Serial Port 3 Configuration

Serial Port

Device Settings

Change Settings

[Enabled]

IO=3F8h; IRQ=4;

[Auto]

Enable or Disable Serial Port (COM)

→←: Select Screen

↑↓: Select Item

Enter: Select

+/-: Change Opt.

F1: General Help

F2: Previous Values

F3: Optimized Defaults

F4: Save & Exit

ESC: Exit

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Serial Port

Enables or disables the serial port.

Change Settings

Selects an optimal setting for the Super IO device.



Serial Port 4 Configuration



Serial Port

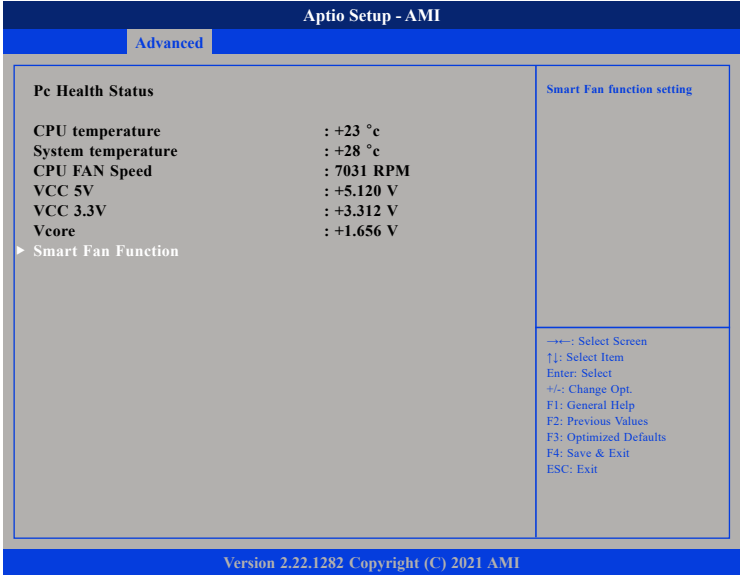
Enables or disables the serial port.

Change Settings

Selects an optimal setting for the Super IO device.

Hardware Monitor

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



CPU temperature

Detects and displays the current CPU temperature.

System temperature

Detects and displays the current system temperature.

CPU Fan Speed

Detects and displays the connected fan speed.



**VCC5**

Detects and displays 5V voltage.

**VCC3**

Detects and displays 3.3V Vcore.

**VCore**

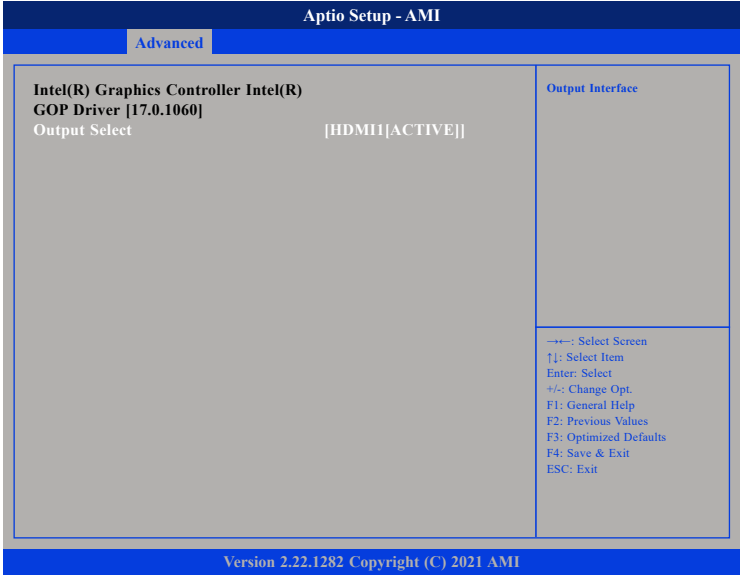
Detects and displays the Vcore CPU voltage.

**Smart Fan Mode**

Enables or disables smart fan mode.

**AMI Graphic Output Protocol Policy**

This section is used to configure the graphics controller settings.



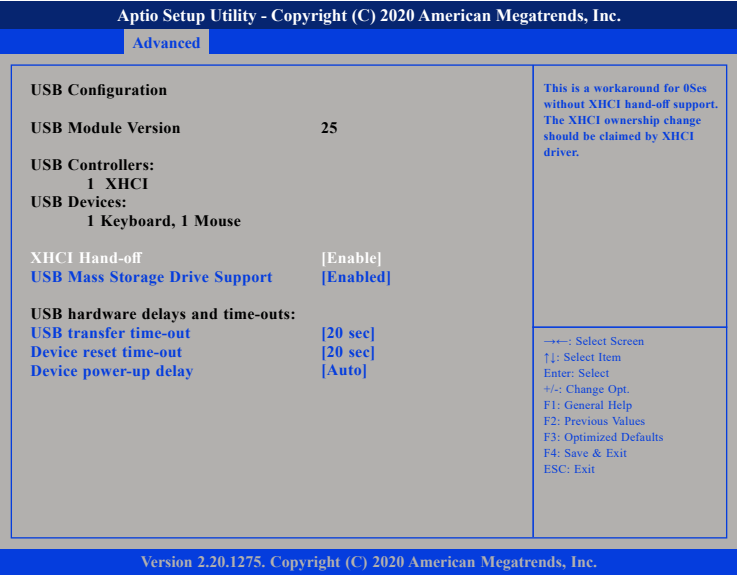
**Output Select**

Configures which display output to use upon boot.



USB Configuration

This section is used to configure the USB.



XHCI Hand-off

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

USB Mass Storage Driver Support

Enables or disables USB mass storage device driver support.

USB transfer time-out

The time-out value for control, bulk, and Interrupt transfers.

Device reset time-out

Selects the USB mass storage device’s start unit command timeout.

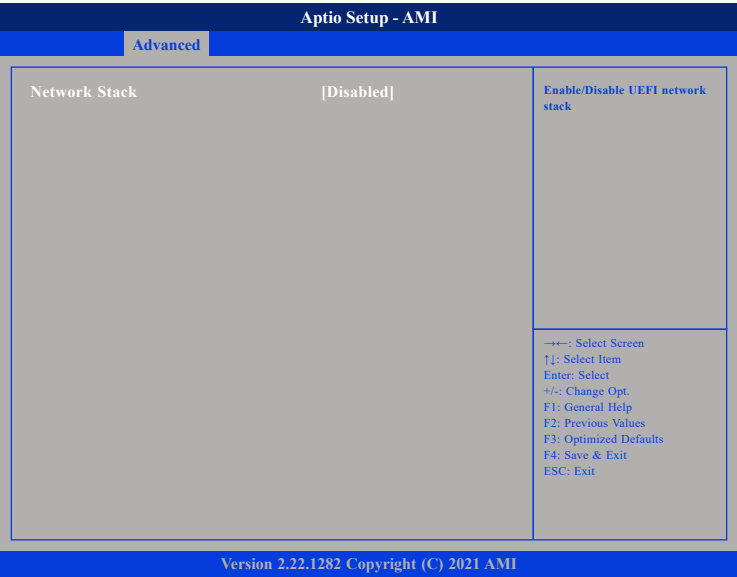
Device power-up delay

Maximum time the value will take before it properly reports itself to the Host Controller. “Auto” uses default value: for a Root port it is 100 ms, for a Hub port the delay is taken from Hub descriptor.



Network Stack Configuration

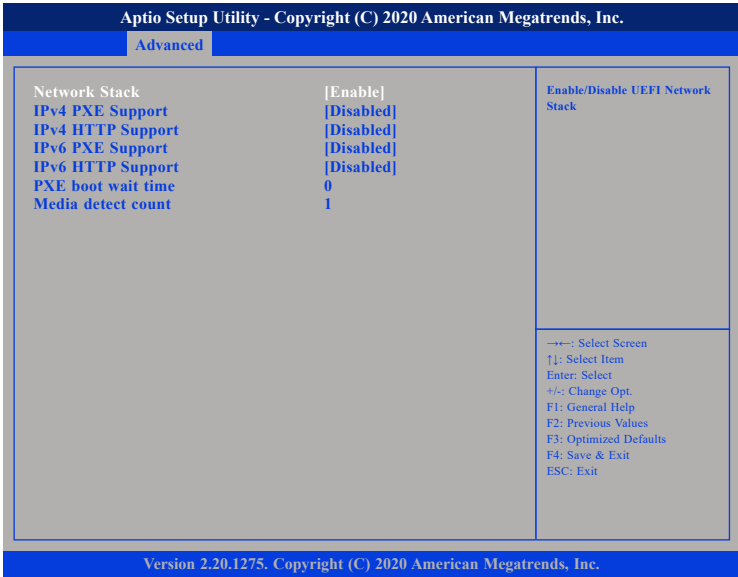
This section is used to configure the network stack.



Network Stack

Enables or disables the network stack. When Enabled is selected, more configuration options become available.

Network Stack



Network Stack

Enables or disables UEFI network stack.

Ipv4 PXE Support

Enables or disables IPv4 PXE boot support. If disabled, IPv4 PXE boot option will not be created.

Ipv4 HTTP Support

Enables or disables IPv4 HTTP support.



**Ipv6 PXE Support**

Enables or disables IPv6 PXE boot support. If disabled, IPv6 PXE boot option will not be created.

**Ipv6 HTTP Support**

Enables or disables IPv6 HTTP support.

**PXE boot wait time**

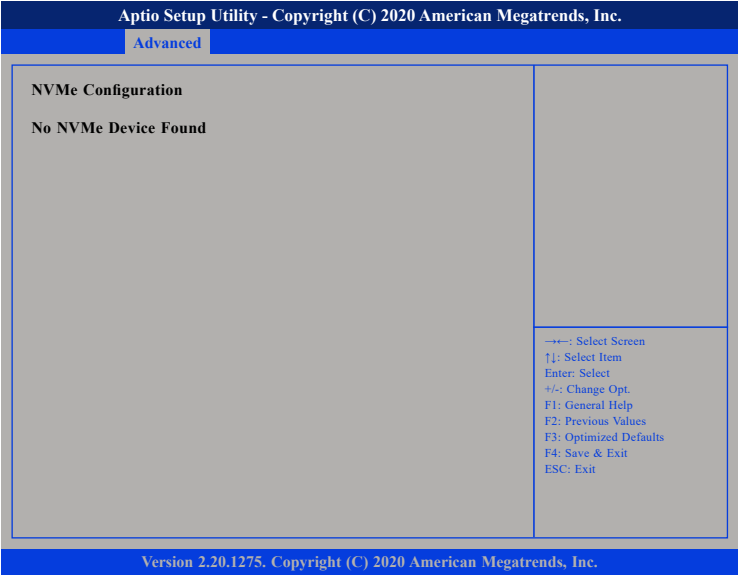
Configures the wait time to press the ESC key to abort the PXE boot.

**Media detect count**

Configures the number of times the media will be checked.

**NVMe Configuration**

This section is used to display information on the NVMe devices installed.





Chipset

This section is used to configure the system based on the specific features of the chipset.



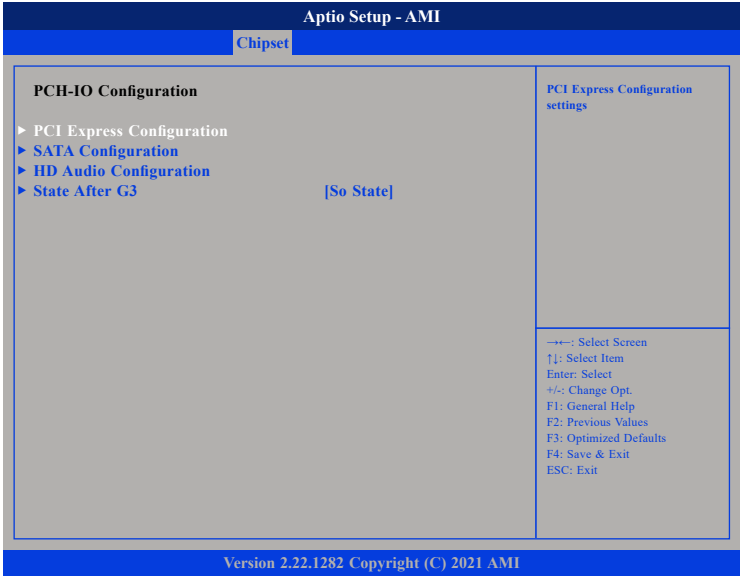
LVDS Resolution Select

Configures the resolution of the LVDS.

PCH-IO Configuration

Enters the PCH-IO Configuration submenu.

PCH-IO Configuration



PCI Express Port Configuration

Enters the PCI Express Port Configuration submenu.

SATA Configuration

Enters the SATA Configuration submenu.

HD Audio Configuration

Enters the HD Audio Configuration submenu.

State After G3

Enters the State After G3 submenu.



PCI Express Configuration

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Chipset

PCI Express Configuration		PCI Express Root Port 1 Settings.
► PCI Express Root Port 1	[Enabled]	
► PCI Express Root Port 2	[Enabled]	
► PCI Express Root Port 3	[Enabled]	

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

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PCI Express Root Port 1/2/3

Settings for PCI Express root port 1/2/3.

SATA Configuration

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Chipset

SATA Configuration		Enable/Disable SATA Device.
SATA Controller(s)	[Enabled]	
SATA Test Mode	[Disable]	
Serial ATA Port 0	Empty	
Port 0	[Enabled]	
Serial ATA Port 1	Empty	
Port 1	[Enabled]	

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

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SATA Controller(s)

Enables or disables the SATA controller.

SATA Test Mode

Enables or disables the SATA test mode.

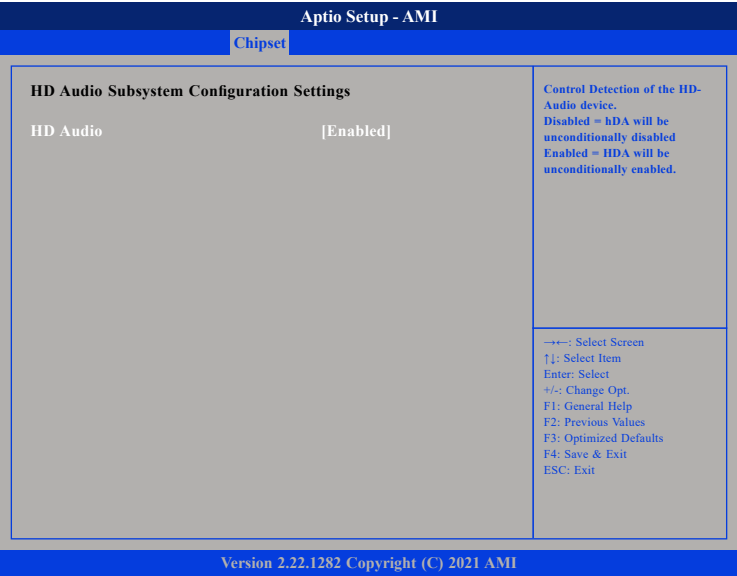
Port 0/1

Enables or disables the port 0/1.





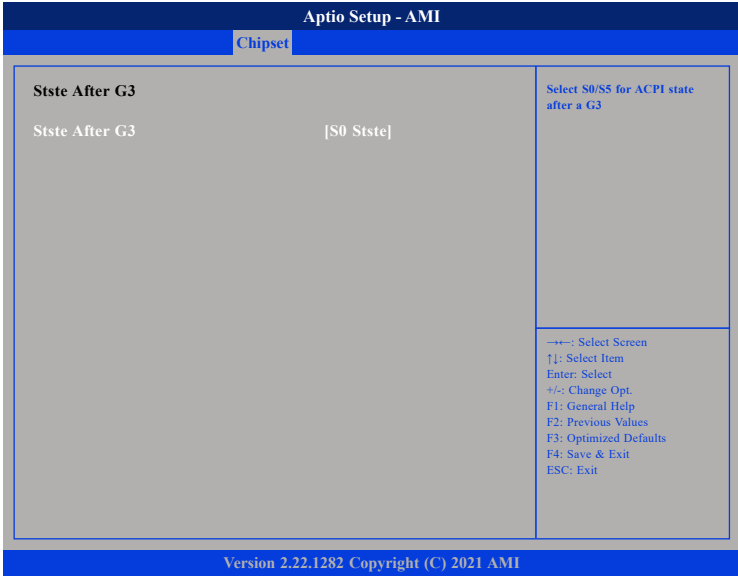
HD Audio Configuration



HD Audio

Enables or disables the HD audio.

Stste After G3



Stste After G3

Configures the power state when power is re-applied after a power failure (G3 state).





Security

Aptio Setup - AMI

Main

Advanced

Chipset

Security

Boot

Save & Exit

<p><b>Password Description</b></p> <p>If <b>ONLY</b> the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.</p> <p>If <b>ONLY</b> 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.</p> <p>The password length must be in the following range:</p> <table><tr><td>Minimum length</td><td>3</td></tr><tr><td>Maximum length</td><td>20</td></tr></table> <p>Administrator Password</p> <p>User Password</p>	Minimum length	3	Maximum length	20	<p>Set Administrator Password</p>
Minimum length	3				
Maximum length	20				

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Administrator Password

Selects this to reconfigure the administrator's password.

User Password

Selects this to reconfigure the user's password.

Secure Boot

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Main

Advanced

Chipset

Security

Boot

Save & Exit

<p><b>Boot Configuration</b></p> <p>Bootup NumLock State</p> <p>Quiet Boot</p> <p><b>Boot Option Priorities</b></p> <p>Boot Option #1</p>	<p>[On] [Disable]</p> <p>[UEFI: Built-in EFI Shell]</p>	<p>Select the keyboard NumLock state</p>
---	---	--

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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.

Quiet Boot

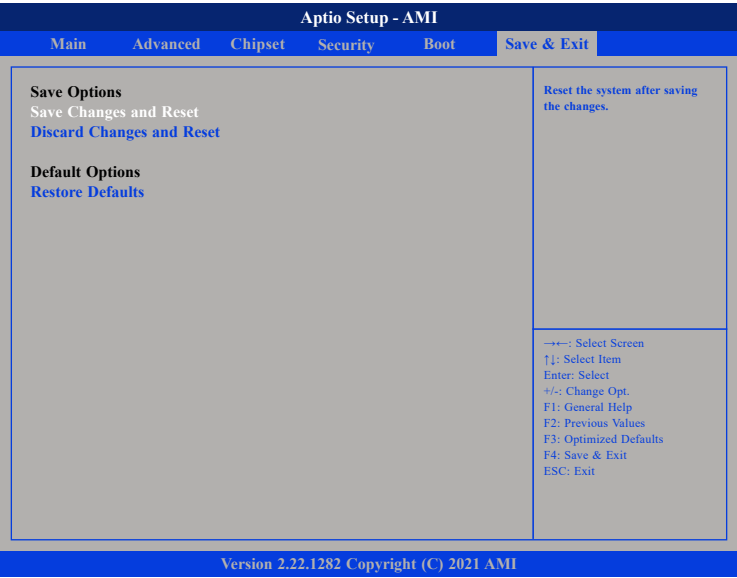
Enables or disables the quiet boot function.

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 and reset 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: WATCHDOG TIMER SETTING

## GuideNCT6126D WatchDog Programming Guide

```
#define SUPERIO_PORT    0x2E
#define WDT_SET         0xF0
#define WDT_VALUE 0xF1

void main(void)
{
    #Enter SuperIO Configuration
        outputb(SUPERIO_PORT, 0x87);
        outputb(SUPERIO_PORT, 0x87);

    # Set LDN
        outputb(SUPERIO_PORT, 0x07);
        outputb(SUPERIO_PORT+1 ,0x08);

    # Set WDT setting
        outputb(SUPERIO_PORT, WDT_SET);
        outputb(SUPERIO_PORT+1, 0x00); # Use the second
# Use the minute, change value to 0x08
    # Set WDT sec/min
        outputb(SUPERIO_PORT, WDT_VALUE);
        outputb(SUPERIO_PORT+1, 0x05); #Set 5 seconds
}
```

## APPENDIX B: GPIO PROGRAMMING GUIDE

GPIO (General Purpose Input/Output) pins are provided for custom system design. This appendix provides definitions and its default setting for the ten GPIO pins in the EBC-358 series. The pin definition is shown in the following table:

Pin No.	GPIO mode	PowerOn Default	Address	Pin No.	GPIO mode	PowerOn Default	Address
1	VCC	-	-	2	GND	-	-
3	GPO0	HIGH	A02h (Bit0)	4	GPIO	-	A02h (Bit4)
5	GPO1	HIGH	A02h (Bit1)	6	GPIO	-	A02h (Bit5)
7	GPO2	HIGH	A02h (Bit2)	8	GPIO	-	A02h (Bit6)
9	GPO3	HIGH	A02h (Bit3)	10	GPIO	-	A02h (Bit7)

Control the GPO 0/1/2/3 level from I/O port A02h bit0 / A02h bit1 / A02h bit2 / A02h bit3.  
The bit is Set/Clear indicated output High/Low

Read GPIO 0/1/2/3 Set GPO3X

## GPIO programming sample code

```
#define GPO0      (0x01 << 0)
#define GPO1      (0x01 << 1)
#define GPO2      (0x01 << 2)
#define GPO3      (0x01 << 3)
#define GPO3X      outputb(0xA00, 0x03)
#define GPO0_HI      outputb(0xA02, GPO0)
#define GPO0_LO      outputb(0xA02, 0x00)
#define GPO1_HI      outputb(0xA02, GPO1)
#define GPO1_LO      outputb(0xA02, 0x00)
#define GPO2_HI      outputb(0xA02, GPO2)
#define GPO2_LO      outputb(0xA02, 0x00)
#define GPO3_HI      outputb(0xA02, GPO3)
#define GPO3_LO      outputb(0xA02, 0x00)
```

```
void main(void)
```

```
{
    GPO3X;
    GPO0_HI;
    GPO1_LO;
    GPO2_HI;
    GPO3_LO;
}
```