



NEXCOM International Co., Ltd.

IoT Automation Solutions

Embedded Computing (PICO-ITX)

EBC 260

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	xiii
Barebone	xiii

Chapter 1: Product Introduction

Overview	1
Key Features	1
Hardware Specifications	2
Knowing Your EBC 260	4
Top View	4
Mechanical Dimensions	5

Chapter 2: Jumpers and Connectors

Before You Begin	6
Precautions	6
Jumper Settings	7
Locations of the Jumpers and Connectors	8
Top View	8
Bottom View	9
Connector Pin Definitions	10
External I/O Interfaces	10
HDMI	10
LAN Ports	10
Dual USB 3.2 Gen 2 Ports	11
12V External Power Input	11
Internal Jumpers	12
Clear CMOS Jumper, Auto Power Button Selection	12
Internal Connectors	13
eDP Port	13
Mini-Card Slot (Full Size)	14
SATA Port	15
USB3.2 Gen 1 Dual Port Header	15
DIO 4bit/COM Dual Port/USB 2.0 x 4 Header	16
M.2 2280 M-Key Slot	17
SPI Flash Programming Port	19
Fan Connector	19



eSPI Debug Port	20
Front Panel	20
Audio I/O Port	21
5V SATA Power Connector	21
RTC Battery Connector	22
DIO 4bit Port	22
Block Diagram	23

Chapter 3: BIOS Setup

About BIOS Setup	23
When to Configure the BIOS	23
Default Configuration	24
Entering Setup	24
Legends	24
BIOS Setup Utility	26
Main	26
Advanced	26
System I/O	34
Security	38
Boot	40
Save & Exit	41



PREFACE

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Disclaimer

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Acknowledgements

EBC 260 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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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.
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, Zhongzheng Rd.,
Zhonghe District, New Taipei City, 23586,
Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7782
www.nexcom.com

Asia

Taiwan

NexAIoT Headquarters

Industry 4.0 and Cloud Services

12F, No.922, Zhongzheng Rd.,
Zhonghe District, New Taipei City,
23586, Taiwan, R.O.C.
Tel: +886-2-8226-7796
Fax: +886-2-8226-7926
Email: sales@nexaiot.com
www.nexaiot.com

NexAIoT Co., Ltd.

Taichung Office

16F, No.250, Sec.2, Chongde Rd.,
Beitun District,
Taichung City, 406, Taiwan, R.O.C.
Tel: +886-4-2249-1179
Fax: +886-4-2249-1172
Email: jacobhuang@nexaiot.com
www.nexaiot.com

NexCOBOT Taiwan Co., Ltd.

13F, No.916, Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7926
Email: jennyshern@nexcobot.com
www.nexcobot.com

GreenBase Technology Corp.

13F, No.922, Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7900
Email: vivianlin@nexcom.com.tw
www.nexcom.com.tw

DivioTec Inc.

19F-1A, No.97, Sec.4, ChongXin Rd.,
Sanhong District,
New Taipei City, 24161, Taiwan, R.O.C.
Tel: +886-2-8976-3077
Email: sales@diviotec.com
www.diviotec.com

AIoT Cloud Corp.

13F, No.922, Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7782
Email: alantsai@aiotcloud.net
www.aiotcloud.dev

EMBUX TECHNOLOGY CO., LTD.

13F, No.916, Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7782
Email: info@embux.com
www.embux.com

TMR TECHNOLOGIES CO., LTD.

13F, No.916, Zhongzheng Rd.,
Zhonghe District,
New Taipei City, 23586, Taiwan, R.O.C.
Tel: +886-2-8226-7786
Fax: +886-2-8226-7782
Email: services@tmrtek.com
www.tmrtek.com

China NEXSEC Incorporated

201, Floor 2, Unit 2, Building 15, Yard 3,
Gaolizhang Road, Haidian District,
Beijing, 100094, China
Tel: +86-10-5704-2680
Fax: +86-10-5704-2681
Email: marketing@nexsec.cn
www.nexsec.cn

NEXCOM Shanghai

Room 406-407, Building C, No 154, Lane 953,
Jianchuan Road, Minhang District,
Shanghai, 201108, China
Tel: +86-21-5278-5868
Fax: +86-21-3251-6358
Email: sales@nexcom.cn
www.nexcom.cn

NEXCOM Surveillance Technology Corp.

Floor 8, Building B3, Xiufeng Industrial Zone,
GanKeng Community, Buji Street,
LongGang District,
ShenZhen, 518112, China
Tel: +86-755-8364-7768
Fax: +86-755-8364-7738
Email: steveyang@nexcom.com.tw
www.nexcom.cn

NEXGOL Chongqing

1st Building No.999,
Star Boulevard, Yongchuan Dist,
Chongqing City, 402160, China
Tel: +86-23-4960-9080
Fax: +86-23-4966-5855
Email: sales@nexgol.com.cn
www.nexcom.cn

Beijing NexGemo Technology Co.,Ltd.

Room 205, No.1, Fazhan Rd.,
Beijing International Information Industry Base,
Changping District,
Beijing, 102206, China
Tel: +86-10-8072-2025
Fax: +86-10-8072-2022
Email: sales@nexgemo.cn
www.nexgemo.com

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
www.nexcom-jp.com

America

USA NEXCOM USA

46665 Fremont Blvd.,
Fremont CA 94538, USA
Tel: +1-510-656-2248
Fax: +1-510-656-2158
Email: sales@nexcom.com
www.nexcomusa.com

Package Contents

Before continuing, verify that the EBC 260 package that you received is complete. Your package should have all the items listed in the following table.

Item	Description	Qty
1	EBC 260 mainboard	1

Ordering Information

The following below provides ordering information for EBC 260.

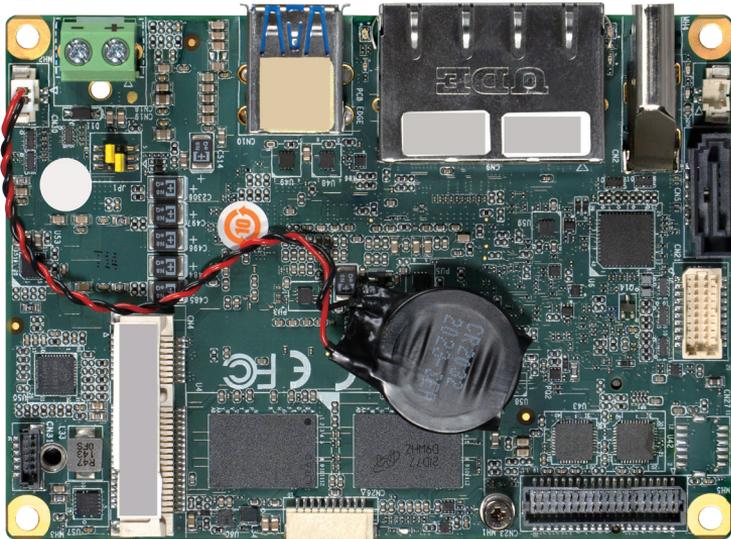
Barebone

EBC260 (P/N: 6879G0002600F)

PICO-ITX, 11th Gen Intel® Core™ i3 Processor SoC TDP15W, Onboard LPDDR4x 3200, 1 x HDMI, 1 x eDP, 2 x USB 3.2 (Gen2), 2 x USB 3.2 (Gen1), 4 x USB 2.0, 1 x 2.5GbE, 1 x GbE, 1 x SATA III, 2 x RS232/422/485, 1 x M.2, 1 x mSATA

CHAPTER 1: PRODUCT INTRODUCTION

Overview



Key Features

- 11th Gen Intel® Core i3 Processor with Intel® SoC
- Onboard LPDDR4 memory, 32 GB
- 1 x 2.5GbE Intel i225 + 1 x GbE Intel i219
- 1 x HDMI 2.0 , 4Kx2K + eDP, up to HBR3 8K
- 1 x M.2 Key M 2280 slot
- 1 x Full size mPCIe/mSATA
- 2 x USB 3.2 Gen 2, 1 x USB 3.2 Gen1, 4 x USB 2.0
- 1 x SATA 3.0 (6 Gb/s)
- 2 x COM (RS232/422/485)
- PICO-ITX form factor (100mm x 72mm)
- Support 12V

Hardware Specifications

CPU/Chipset

- Intel® 11th Generation Intel® Core™ i3 Processor 15W TDPs with Intel SoC

Main Memory

- Onboard LPDDR4 3200, 32GB, Dual Channel

BIOS

- UEFI BIOS

Display

- 1 x HDMI 2.0b, up to 3840 x 2160@60Hz
- 1 x eDP 1.3, up to 3840 x 2160@60Hz

Ethernet

- 1 x 2.5GbE Intel i225/226
- 1 x 1GbE Intel i219

Storage

- 2 x SATA 3.0 (6Gb/s)

Expansion Slot

- 1 x M.2 Key M 2280, PCIe 4.0 x4
- 1 x Full-Size mSATA/mPCIe (Default: mPCIe, select by BIOS)

Serial Port

- 2 x RS232/422/485

External I/O

- 1 x 2.5GbE
- 1 x GbE
- 2 x USB 3.2 Gen2
- 1 x HDMI 2.0

Internal I/O

- 1 x eDP 1.3
- 2 x USB 3.2 Gen1
- 4 x USB 2.0
- 1 x 12V DC, Terminal block
- 1 x 8bit GPIO
- 1 x 4pins Smart Fan

Dimensions

- PICO-ITX Form Factor, 3.94" x 2.84" (100mm x 72mm)

Power Requirement

- 12V DC in
- Power supply type : AT / ATX
- Phoenix 2-pin Connector, Lockable DC Jack Connector (colay)

Environment

- Board level operation temperature: 0°C to 60°C
- Storage temperature: -20°C to 85°C
- Relative humidity:
 - 10% to 95% (operating, non-condensing)
 - 5% to 95% (non-operating, non-condensing)

Certifications

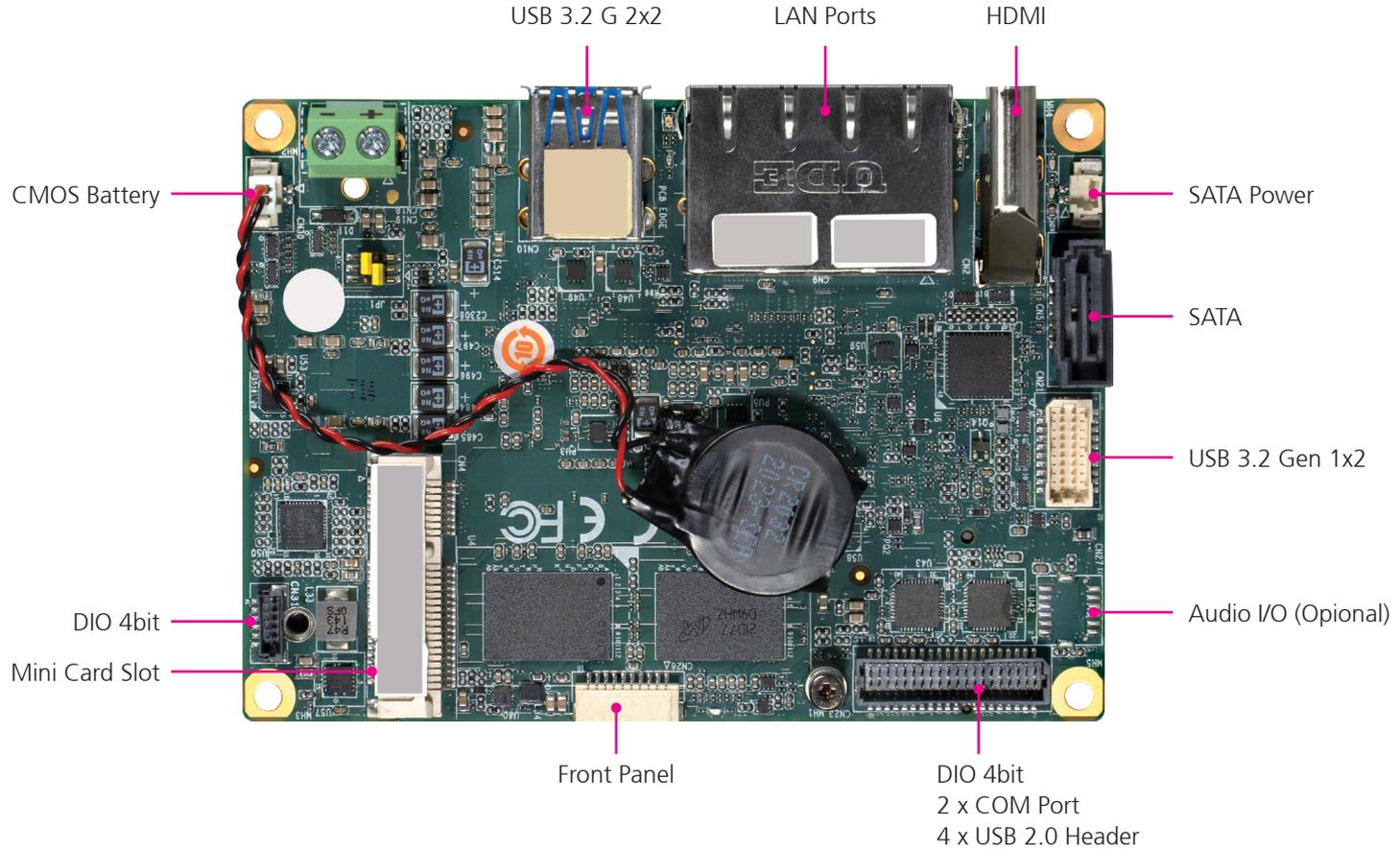
- Meet CE / FCC Class A

OS Support

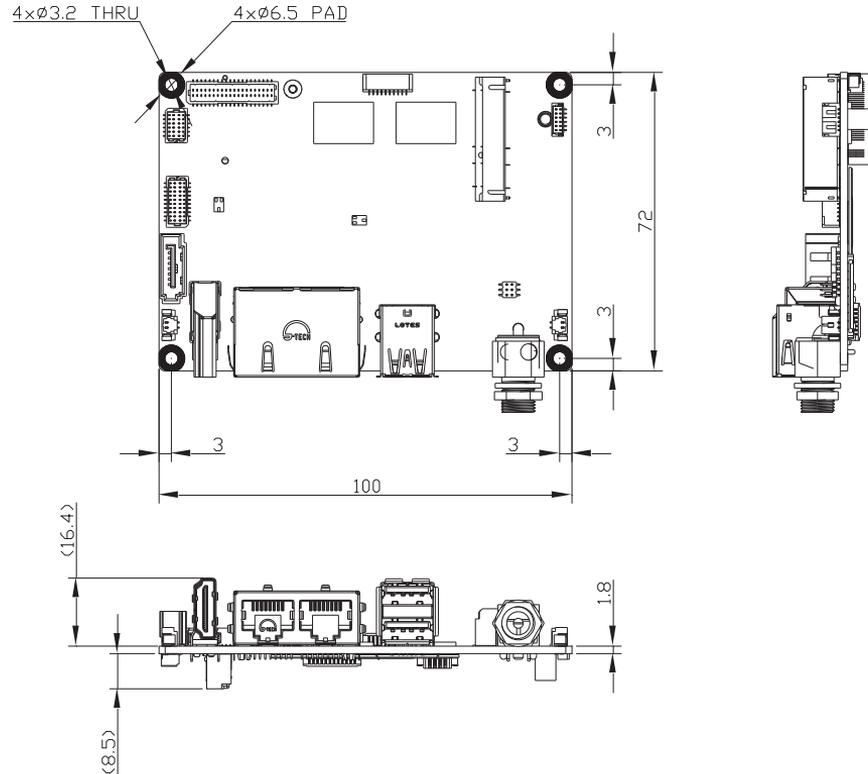
- Windows 10, 64bit

Knowing Your EBC 260

Top View



Mechanical Dimensions



This product is part of a series. The dimension shown in this section is an example of one variant in the series for reference. The actual product may vary based on the shipment.

CHAPTER 2: JUMPERS AND CONNECTORS

This chapter describes how to set the jumpers and connectors on the EBC 260 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:

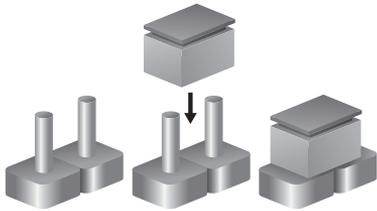
- Always disconnect the unit from the power outlet whenever you are working inside the case.
- If possible, wear a grounded wrist strap when you are working inside the computer case. Alternatively, discharge any static electricity by touching the bare metal chassis of the unit case, or the bare metal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

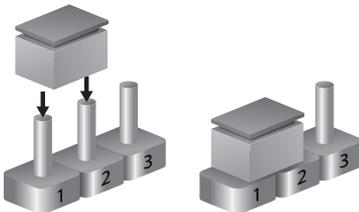
A jumper is the simplest kind of electric switch. It consists of two metal pins and a cap. When setting the jumpers, ensure that the jumper caps are placed on the correct pins. When the jumper cap is placed on both pins, the jumper is short. If you remove the jumper cap, or place the jumper cap on just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



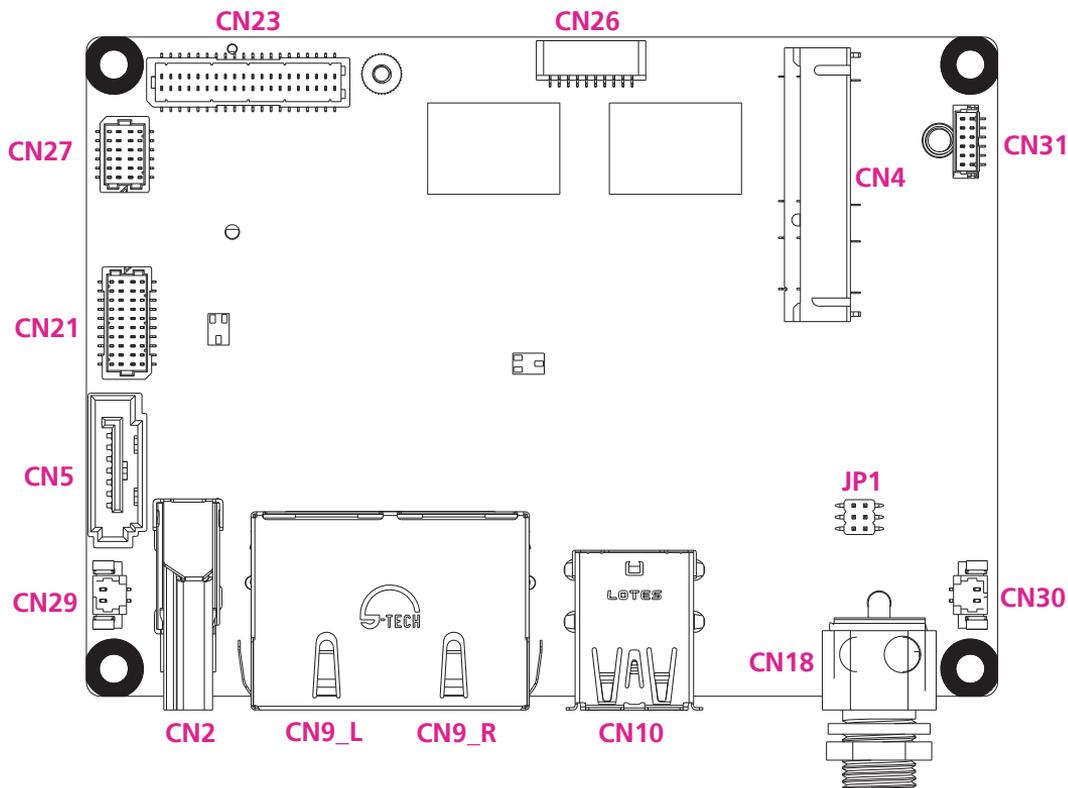
Three-Pin Jumpers: Pins 1 and 2 are Short



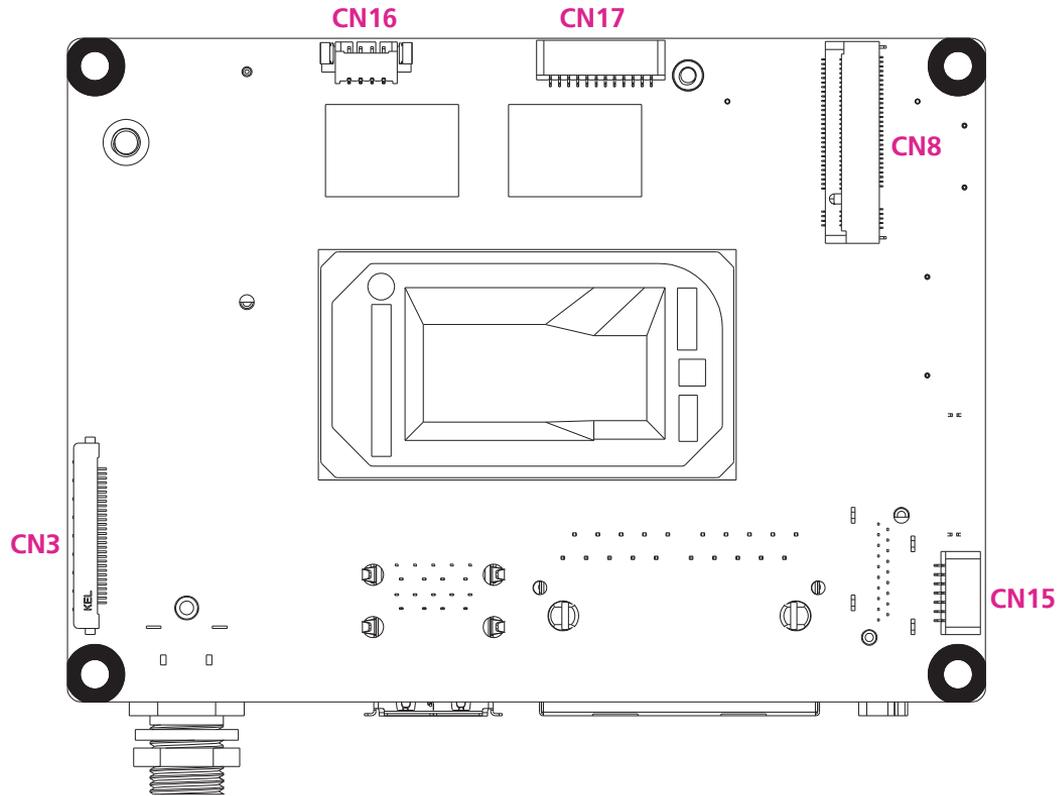
Locations of the Jumpers and Connectors

The figure below shows the location of the jumpers and connectors. This product is part of a series. The illustration shown below is an example of one variant in the series for reference. The actual product may vary based on the shipment.

Top View



Bottom View



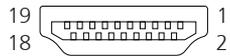
Connector Pin Definitions

External I/O Interfaces

HDMI

Connector type: HDMI port

Connector location: CN2

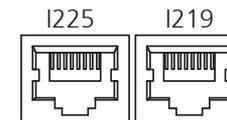


Pin	Definition	Pin	Definition
1	HDMITX2P1	2	GND
3	HDMITX2N1	4	HDMIX1P1
5	GND	6	HDMITX1N1
7	HDMITX0P1	8	GND
9	HDMITX0N1	10	HDMICLK1P1
11	GND	12	HDMICLK1N1
13	NC	14	NC
15	HDMISCL	16	HDMISDA
17	GND	18	VCC5HDMI
19	HDMIHPD	20	

LAN Ports

Connector type: RJ45

Connector location: CN9



I225

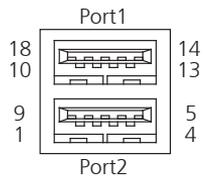
Pin	Definition	Pin	Definition
1P1	LAN2_MDIO_P	2P1	LAN1_MDIO_P
1P2	LAN2_MDIO_N	2P2	LAN1_MDIO_N
1P3	LAN2_MDI1_P	2P3	LAN1_MDI1_P
1P4	LAN2_MDI1_N	2P4	LAN1_MDI1_N
1P5	1CT5	2P5	2CT5
1P6	1CT6	2P6	2CT6
1P7	LAN2_MDI2_P	2P7	LAN1_MDI2_P
1P8	LAN2_DDI2_N	2P8	LAN1_DDI2_N
1P9	LAN2_MDI3_P	2P9	LAN1_MDI3_P
1P10	LAN2_MDI3_N	2P10	LAN1_MDI3_N

I229

Dual USB 3.2 Gen 2 Ports

Connector type: USB Type A

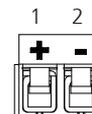
Connector location: CN10



Pin	Definition	Pin	Definition
1	+5VSB	10	+5VSB
2	USB0_D-	11	USB1_D-
3	USB0_D+	12	USB1_D+
4	GND	13	GND
5	USB0_SSRX-	14	USB1_SSRX-
6	USB0_SSRX+	15	USB1_SSRX+
7	GND	16	GND
8	USB0_SSTX-	17	USB1_SSTX-
9	USB0_SSTX+	18	USB1_SSTX+

12V External Power Input

Connector location: CN18

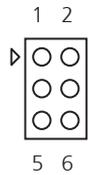


Pin	Definition
1	+VIN
2	GND

Internal Jumpers

Clear CMOS Jumper, Auto Power Button Selection

Connector location: JP1

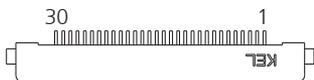


Pin	Status	Description
1-3	On	Normal (Default)
3-5	On	Clear CMOS
2-4	On	Disable Auto Button/ATX Mode (Default)
4-6	On	Enable Auto Power Button/AT Mode

Internal Connectors

eDP Port

Connector location: CN3

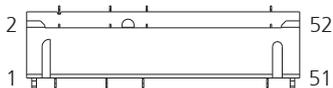


Pin	Definition	Pin	Definition
1	+VDD	9	EDP_LINE1_DP
2	+VDD	10	GND
3	+VDD	11	EDP_LINE0_DN
4	GND	12	EDP_LINE0_DP
5	EDP_LANE2_DN	13	GND
6	EDP_LANE2_DP	14	EDP_LINE3_DN
7	GND	15	EDP_LINE3_DP
8	EDP_LANE1-DN	16	GND

Pin	Definition	Pin	Definition
17	EDP_AUX_DN	24	GND
18	EDP_AUX_DP	25	GND
19	GND	26	GND
20	DDIO_BKLTCTL_R	27	+VCC_EDP_BKLT
21	LVDS_DDC_DATA	28	+VCC_EDP_BKLT
22	DDIO_BKLTEN_R	29	+VCC_EDP_BKLT
23	DDIO_HPI	30	+VCC_EDP_BKLT

Mini-Card Slot (Full Size)

Connector location: CN4

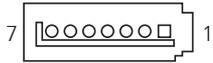


Pin	Definition	Pin	Definition
1	PCIE_WAKE#	14	UIM_RST
2	+3.3VSB	15	GND
3	NC	16	UIM_VPP
4	GND	17	NC
5	NC	18	GND
6	+1.5V	19	NC
7	PCIE_CLK_REQ#	20	W-DISABLE#
8	UIM_PWR	21	GND
9	GND	22	PCIE_RST#
10	UIM_DATA	23	PCIE_RX-
11	PCIE_REF_CLK-	24	+3.3VSB
12	UIM_CLK	25	PCIE_RX+
13	PCIE_REF_CLK+	26	GND

Pin	Definition	Pin	Definition
27	GND	40	GND
28	+1.5V	41	+3.3VSB
29	GND	42	NC
30	SMB_CLK	43	GND
31	PCIE_TX-	44	NC
32	SMB_DATA	45	NC
33	PCIE_TX+	46	NC
34	GND	47	NC
35	GND	48	+1.5V
36	USB_D-	49	NC
37	GND	50	GND
38	USB_D+	51	NC
39	+3.3VSB	52	+3.3VSB

SATA Port

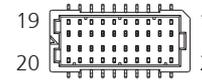
Connector location: CN5



Pin	Definition
1	GND
2	SATA_TX+
3	SATA_TX-
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

USB3.2 Gen 1 Dual Port Header

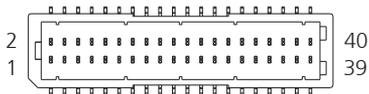
Connector location: CN21



Pin	Definition	Pin	Definition
1	5V_USB	11	USB3_1_RXP
2	5V_USB	12	USB3_4_RXP
3	USB2_9_DN	13	GND
4	USB2_10_DN	14	GND
5	USB2_9_DP	15	USB3_1_TXN
6	USB2_10_DP	16	USB3_4_TXN
7	GND	17	USB3_1_TXP
8	GND	18	USB3_4_TXP
9	USB3_1_RXN	19	GND
10	USB3_4_RXN	20	GND

DIO 4bit/COM Dual Port/USB 2.0 x 4 Header

Connector location: CN23



Pin	Definition	Pin	Definition
1	DIO_0	11	TX_1_CON
2	DIO_1	12	TX_2_CON
3	DIO_2	13	DTR_1_CON
4	DIO_3	14	DTR_2_CON
5	GND	15	DSR_1_CON
6	5V	16	DSR_2_CON
7	DCD_1_CON	17	RTS_1_CON
8	DCD_2_CON	18	RTS_2_CON
9	RX_1_CON	19	CTS_1_CON
10	RS_2_CON	20	CTS_2_CON

Pin	Definition	Pin	Definition
21	RI_1_CON	31	GND
22	RI_2_COM	32	GND
23	GND	33	5V_USB
24	GND	34	5V_USB
25	5V_USB	35	USB2_7_DN
26	5V_USB	36	USB2_8_DN
27	USB2_5_DN	37	USB2_7-DP
28	USB2_6_DN	38	USB2_8-DP
29	USB2_5_DP	39	GND
30	USB2_6_DP	40	GND

M.2 2280 M-Key Slot

Connector location: CN8



Pin	Definition	Pin	Definition
1	GND	11	PCIE3_TX-
2	+3.3V	12	+3.3V
3	GND	13	PCIE3_TX+
4	+3.3V	14	+3.3V
5	PCIE3_RX-	15	GND
6	NC	16	+3.3V
7	PCIE3_RX+	17	PCIE2_RX-
8	NC	18	+3.3V
9	GND	19	PCIE2_RX+
10	SATA_LED	20	NC

Pin	Definition	Pin	Definition
21	GND	31	PCIE1_RX+
22	NC	32	NC
23	PCIE2_TX-	33	GND
24	NC	34	NC
25	PCIE2_TX+	35	PCIE1_TX-
26	NC	36	NC
27	GND	37	PCIE1_TX+
28	NC	38	DECSLP
29	PCIE1_RX-	39	GND
30	NC	40	NC

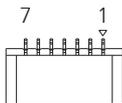
Continued on next page

Pin	Definition	Pin	Definition
41	PCIE0_RX-	50	PERST#
42	NC	51	GND
43	PCIE0_RX+	52	PCIE_CLK_REQ#
44	NC	53	PCIE_CLK-
45	GND	54	PCIE_WAKE
46	NC	55	PCIE_CLK+
47	PCIE0_TX-	56	NC
48	NC	57	GND
49	PCIE0_TX+	58	NC

Pin	Definition	Pin	Definition
59		68	NC
60		69	NC
61		70	+3.3V
62		71	GND
63		72	+3.3V
64		73	GND
65		74	+3.3V
66		75	GND
67	NC		

SPI Flash Programming Port

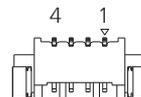
Connector location: CN15



Pin	Definition
1	SPI_MISO
2	GND
3	SPI_CLK
4	+3.3VSB
5	SPI_MOSI
6	SPI_CS
7	NC

Fan Connector

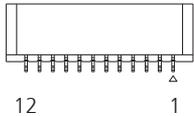
Connector location: CN16



Pin	Definition
1	GND
2	+V12S
3	TACH
4	PWM

eSPI Debug Port

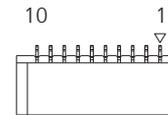
Connector location: CN17



Pin	Definition	Pin	Definition
1	LAD0	7	LRESET#
2	LAD1	8	GND
3	LAD2	9	LCLK
4	LAD3	10	SMB_DATA/12C_SDA
5	+3.3V	11	SMB_CLK/12C_CLK
6	LFRAME#	12	SMB_ALERT/SERIRQ

Front Panel

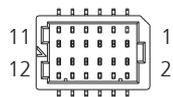
Connector location: CN26



Pin	Definition	Pin	Definition
1	PWR_BTN-	6	BUZZER+
2	PWR_BTN+	7	PWR_LED-
3	HDD_LED-	8	PWR_LED+
4	HDD_LED+	9	H/W RESET-
5	BUZZER-	10	H/W RESET+

Audio I/O Port

Connector location: CN27



Pin	Definition	Pin	Definition
1	LOUT_R	7	AUD_GND
2	MIC_L	8	AUD_GND
3	LOUT_L	9	LINE_R_IN
4	MIC_R	10	LIN_R
5	JD_LOUT	11	+VDD_AUD
6	JD_MIC	12	LIN_L

5V SATA Power Connector

Connector location: CN29



Pin	Definition
1	+5V
2	GND

RTC Battery Connector

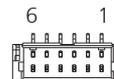
Connector location: CN30



Pin	Definition
1	GND
2	+3.3V

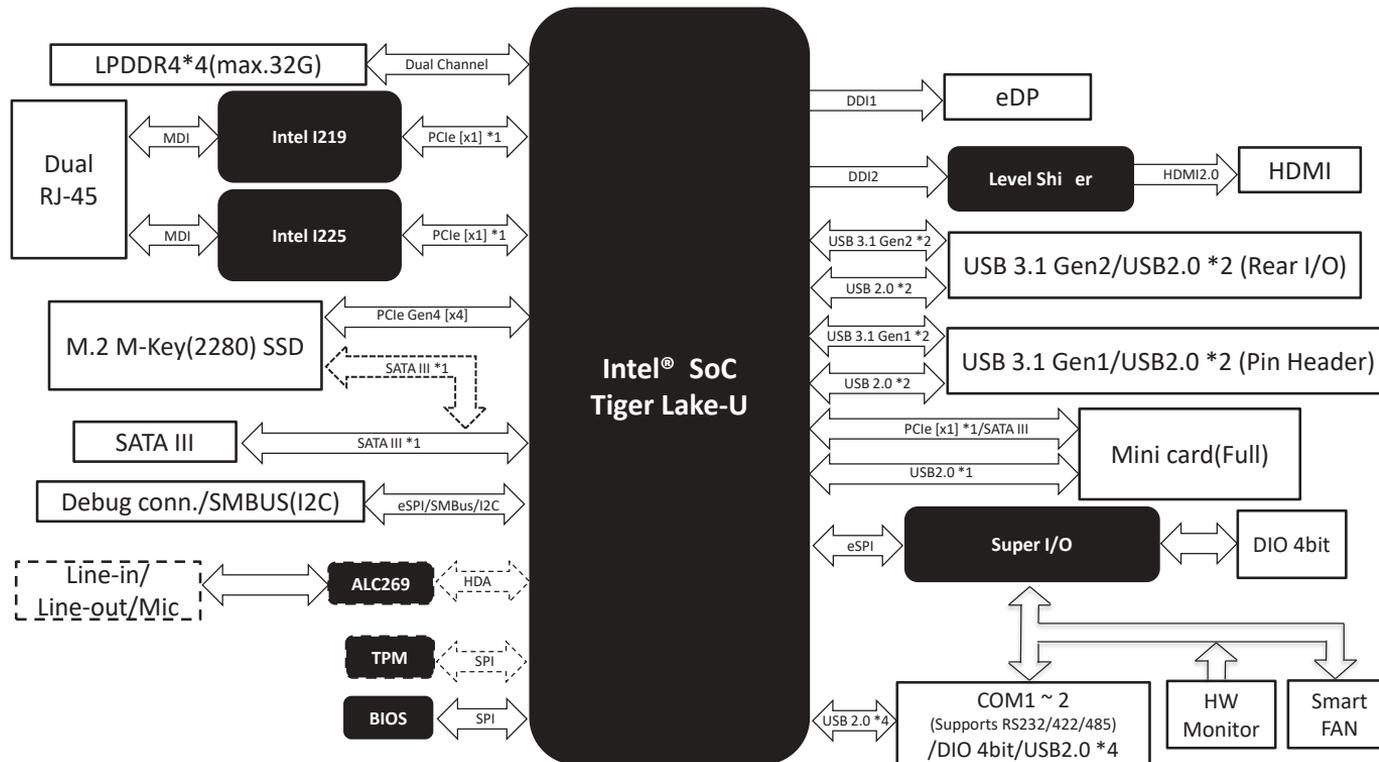
DIO 4bit Port

Connector location: CN31



Pin	Definition
1	DIO_4
2	DIO_5
3	DIO_6
4	DIO_7
5	GND
6	+5V

Block Diagram



CHAPTER 3: BIOS SETUP

This chapter describes how to use the BIOS setup program for EBC 260. 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 NexCOBOT website at www.nexcobot.com.

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 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-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.

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 <MM/DD/YYYY>. 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 <HH:MM:SS>. 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.

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.

System Information

This section is used to display the system information.

CPU Configuration

This section is used to display the current CPU information and configure the installed CPU.

> Intel(R) (VMX) Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

> Intel (R) SpeedStep(tm)

Allow more than two frequency ranges to be supported.

> Turbo Mode

Enable or disable processor Turbo Mode (requires EMTTM enabled too).

Memory Configuration

This section shows memory RC version and memory speed.

Hardware Monitor

This section shows hardware status, including system temperature, CPU temperature, system fan speed, VCORE, +12V, +5V, VMEM, +3.3V, 3VSB, 5 VSB, VBAT.

> Smart Fan

Enable or disable smart function.

> Smart Fan Mode Configuration

Press to enter the Smart Fan Mode Configuration submenu.

Smart Fan Mode Configuration > FAN1 Output Mode

Output PWM Mode (push pull) to control 4-wire fans. Linear fan application circuit to control 3-wire fan speed by fan's power terminal. Output PWM mode (open drain) to control Intel 4-wire fans.

Smart Fan Mode Configuration > Fan 1 Smart Fan Control

Select a smart fan mode. The following features may vary depending on the option the user selects.

Smart Fan Mode Configuration > Fan 1 Smart Fan Control (Auto Duty-Cycle Mode) > Temperature Source

Select the monitored temperature source for this fan.

Smart Fan Mode Configuration > Fan 1 Smart Fan Control (Auto Duty-Cycle Mode) > Duty Cycle #1 to #5

Auto fan speed control. Fan speed will follow different temperature by different duty cycle 1-100.

Smart Fan Mode Configuration > Fan 1 Smart Fan Control (Manual Duty Mode) > Manual Duty Mode

Manual mode fan control, users can write expected duty cycle (PWM fan type).

PCH-FW Configuration

This section is used to configure firmware upgrade configuraiton.

> Firmware Update Configuration

Enter the Firmware Update Configure submenu.

> Firmware Update Configuration > ME FW Image Re-Flash

Enable or disable ME FW Image Re-Flash function.

> Firmware Update Configuration > Firmware Update

Enable or disable ME FW update function.

NVMe Configuration

This section is used to configure NVMe settings. More options appear when NVMe devices are plugged in.

Power Management

This section is used to configure power management settings.

> Power Mode

Select system power mode.

> Power Saving(ERP) Control

Enable or disable power saving control function.

> Restore AC Power Loss

IO restore when AC power loss.

> RTC wake system from S5

Enable or disable the system to wake up from S5.

Fixed Time: System will wake on the hr:min:sec specified.

Dynamic Time: System will wake on the current time + increase minute(s).

NEXCOM BIOS Robot

This section is used to configure NEXCOM BIOS Robot settings.

> Sends Watch Dog Before BIOS POST

Enabled Robot set Watch Dog Timer (WDT) right after power on, before BIOS start POST process. And then Robot will clear WDT on completion of POST. WDT will reset system automatically if it is not cleared before its timer counts down to zero.

> Post Timer (second)

Set timer count set to Watch Dog Timer for POST. **WARNING:** Do not set to a value equal or shorter than normal POST time, otherwise system may never complete POST unless clearing BIOS settings. More than 2x normal POST time is suggested.

> Sends Watch Dog Before Booting OS

Enabled Robot set Watch Dog Timer (WDT) after POST completion, before BIOS transfer control to OS. **WARNING:** Before enabling this function, a program in OS must be in responsible for clearing WDT. Also, this function should be disabled if OS is going to update itself.

> OS Timer (minute)

Set timer count set to Watch Dog Timer for OS loading.

> Delayed POST (PEI phase)

Enabled Robot holds BIOS from starting POST, right after power on. This allows BIOS POST to start with stable power or start after system is physically warmed up. Note: Robot does this before 'Sends watch dog'.

> Delayed Time (second)

Set period of time for Robot to hold BIOS from POST.

> Delayed POST (DXE phase)

Enabled Robot holds BIOS before POST completion. This allows BIOS POST to start with stable power or start after system is physically warmed up.

Note: Robot does this after 'Sends watch dog before BIOS POST'.

> Delayed Time (second)

Set period of time for Robot to hold BIOS from POST.

> Reset System Once

When enabled, Robot resets system for one time on each boot. This will send a soft or hard reset to onboard devices, thus puts devices to more stable state. Select reset type robot should send on each boot.

> Soft or Hard Reset

Select reset type robot should send on each boot.

> Device detecting Configuration

Enter the Device detecting Configuration submenu.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration

Select the device and do the following configurations.

> Device detecting Configuration > Action

Select action that robot should do. The following features may vary depending on the option the user selects.

> Device detecting Configuration > Action (Reset System) > Soft or Hard Reset

Select reset type robot should send on each boot.

> Device detecting Configuration > Action (Reset System) > Retry-Count

Fill retry counter here. Robot will reset system at most counter times, and then let system continue its POST.

> Device detecting Configuration > Action (Reset System) > At Time

Select robot action time: After show logo Robot will do action after logo is displayed. System devices are almost ready. Before show logo Robot will do action earlier before logo, but some devices may not be ready.

> Device detecting Configuration > Action (Hold System) > Hold Time Out (second)

Robot will hold system no longer than the time-out value, and let the system continue its POST.

> Device detecting Configuration > Action (Hold System) > AT Time

Select robot action time: after show logo, or before show logo.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface

Select interface robot should use to communicate with device. The following features may vary depending on the option the user selects.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (PCI) > BUS

Fill in BUS number to a PCI device, in hexadecimal. Range: 0 to FF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (PCI) > Device

Fill in device number to a PCI device, in hexadecimal. Range 0 to FF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (PCI) > Function

Fill in function number to a PCI device, in hexadecimal. Range 0 to FF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (PCI) > Device

Select that robot should or should not do the action if condition meets.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (PCI) > In Condition

Select the condition that robot should check for the device.

Present: Device is detected.

According to register: Robot read register according to configuration.

Note: Device will be considered 'Present' by Robot, when data read from device is not 0xFF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (PCI) > Register Data Is

Select how robot should compare data read from register to a value configured below.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (PCI) > Register Offset

Fill register offset (or index) for robot to read, in hexadecimal, Range: 0 to FF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (PCI) > Bit Offset

Fill bit offset for register, for robot to compare with bit value.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (PCI) > Bit Value

Fill bit value for robot to compare register-bit with specified offset.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (DIO) > DIO Pin Number

Fill DIO pin number. 0 DIO0 , 1 DIO1... and so on. For COM express product: 0 3 GPIO 3 , 4 7 GPO0 3.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (DIO) > Expecting > Device

Select that robot should or should not do action if condition met.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (DIO) > Expecting in High/Low Level

Select High/Low level of the DIO action that robot should do.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (SMBUS) > SMBUS Slave Address

Fill in the slave address to a SMBUS device, in hexadecimal. Range: 0 to FF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (SMBUS) > Device

Select the action that robot should or should not do if condition meets.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (SMBUS) > In Condition

Select the condition that robot should check for the device.

Present: Device is detected.

According to register: Robot read register according to configuration.

Note: Device will be considered 'Present' by Robot, when data read from device is not 0xFF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (SMBUS) > Register Data Is

Select how robot should compare data read from register to a value configured below.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (SMBUS) > Register Offset

Fill in the register offset (or index) for robot to read, in hexadecimal, Range: 0 to FF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (SMBUS) > Bit Offset

Fill in the bit offset for robot to compare with bit value.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (SMBUS) > Bit Value

Fill in the bit value for robot to compare register-bit with specified offset.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Legacy I/O) > Bit Value

Fill in the I/O address that the device is responding to. Range: 0 to FFFF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Legacy I/O) > Device

Select the action that robot should or should not do if condition meets.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Legacy I/O) > In Condition

Select the condition that robot should check for the device.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Legacy I/O) > Register Data Is

Select how robot should compare data read from register to a value configured below.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Legacy I/O) > Bit Offset

Fill in the bit offset for robot to compare with bit value.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Legacy I/O) > Bit Value

Fill in the bit value for robot to compare register-bit with specified offset.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Super I/O) > Super I/O LDN

Fill in LDN number to a Super I/O device. Range: 0 to FF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Super I/O) > Device

Select the action that robot should or should not do if condition meets.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Super I/O) > In Condition

Select the condition that robot should check for the device.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Super I/O) > Register Data Is

Select how robot should compare data read from register to a value configured below.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Super I/O) > Register Offset

Fill in the register offset (or index) for robot to read, in hexadecimal, Range: 0 to FF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Super I/O) > Bit Offset

Fill in the bit offset for robot to compare with bit value.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (Super I/O) > Bit Value

Fill in the bit value for robot to compare register-bit with specified offset.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (MMIO) > MMIO Address

Fill in Memory Mapped I/O address that the device is responding to. Range: 0 to FFFFFFFF.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (MMIO) > Device

Select the action that robot should or should not do if condition meets.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (MMIO) > In Condition

Select the condition that robot should check for the device.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (MMIO) > Register Data Is

Select how robot should compare data read from register to a value configured below.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (MMIO) > Bit Offset

Fill in the bit offset for robot to compare with bit value.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (MMIO) > Bit Value

Fill in the bit value for robot to compare register-bit with specified offset.

> Device detecting Configuration > Device #1 to #5 Detecting Configuration > Interface (MMIO) > Byte Value

Fill in a byte value for robot to compare register data, in hexadecimal, Range: 0 to FF.

System I/O

This section allows you to configure interfaces on the system.

PCI Express Configuration

Press to enter the PCI Express Configuration submenu.

> PCI Express Configuration > PCI Express Root Port 11

Control the PCI Express Root Port.

Storage Configuration

Press to enter the Storage Configuration submenu.

> Storage Configuration > SATA Controller (s)

Enable or disable SATA Device.

> Storage Configuration > Port 1

Enable or disable this port.

> Storage Configuration > Hot Plug

Designate this port as Hot-pluggable.

HD Audio Configuration

Press to enter the HD Audio Configuration submenu.

> HD Audio Configuration > HD Audio

Control Detection of the HD Audio device.

Disabled: HDA will be unconditionally disabled.

Enabled: HDA will be unconditionally enabled.

Digital IO Port Configuration

Press to enter the Digital IO Port Configuration submenu.

> Digital IO Port Configuration > DIO Port #1 to # 8

Set DIO as input or output.

> Digital IO Port Configuration > Output Level

Set output level when DIO pin is output.

Legacy Logical Devices Configuration

Press to enter the Legacy Logical Devices submenu.

> Legacy Logical Devices Configuration > [*Active*] Serial Port 1/2

View and set basic properties of the SIO logical devices. Like IO base, IRQ range, DMA channel and device mode.

> Legacy Logical Devices Configuration > [*Active*] Serial Port 1/2 > Serial Port 1/2 Configuration > Use This Device

Enable or disable this logical device.

> Legacy Logical Devices Configuration > [*Active*] Serial Port 1/2 > Serial Port 1/2 Configuration > Possible

Allows user to change Device's Resource settings. New settings will be reflected on this Setup Page after System restarts.

> Legacy Logical Devices Configuration > [*Active*] Serial Port 1/2 > Serial Port 1/2 Configuration > Mode

Select UART RS232, 422, 485 selection.

Serial Port Console Redirection

Press to enter the Serial Port Console Redirection submenu.

> Console Redirection

Enable or disable console redirection. Once enabled, more features become available for configuration.

> Console Redirection > Console Redirection Settings > Terminal Type

ANSI: Extended ASCII char set.

VT100: ASCII char set.

VT100+: Extends VT100 to support color, function keys, etc.

VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.

> Console Redirection > Console Redirection Settings > Bits Per Second

Select the serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may cause lower speed.

> Console Redirection > Console Redirection Settings > Data Bits

Select data bit value.

> Console Redirection > Console Redirection Settings > Parity

A parity bit can be sent with the data bits to detect some transmission errors.

Even: Parity bit is 0 if the number of 1's in the data bits is even.

Odd: Parity bit is 0 if number of 1's in the data bits is odd.

Mark: Parity bit is always 1.

Space: Parity bit is always 0.

Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.

> Console Redirection > Console Redirection Settings > Stop Bits

Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.

> Console Redirection > Console Redirection Settings > Flow Control

Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to restart the flow. Hardware flow control uses two wires to send start/stop signals.

> Console Redirection > Console Redirection Settings > VT-UTF8 Combo Key Support

Enable or disable VT UTF8 Combination Key Support for ANSI/VT100 terminals.

> Console Redirection > Console Redirection Settings > Recorder Mode

With this mode enabled only text will be sent. This is to capture Terminal data.

> Console Redirection > Console Redirection Settings > Resolution 100x31

Enable or disable extended terminal resolution.

> Console Redirection > Console Redirection Settings > Putty KeyPad

Select Function Key and KeyPad on Putty.

> Console Redirection EMS

Enable or disable Console Redirection EMS.

PCH-IO Configuration

Press to enter the PCH-IO Configuration submenus.

> MiniCard Slot Function

Select function enabled for full-size MiniCard Slot.

Security

This section is used to configure the security related options for BIOS protection.

Administrator Password

Set this to configure the administrator's password.

User Password

Select this to configure the user's password.

Trusted Computing

This section is used to configure the settings for the TPM (Trusted Platform Module). Press to enter the submenu.

Trusted Computing > Security Device Support

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

Trusted Computing > SHA-1 PCR Bank

Enable or disable SHA-1 PCR Bank.

Trusted Computing > SHA-256 PCR Bank

Enable or disable SHA-256 PCR Bank.

Trusted Computing > Pending Operation

Schedule an operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.

Trusted Computing > Platform Hierarchy

Enable or disable Platform Hierarchy.

Trusted Computing > Storage Hierarchy

Enable or disable Storage Hierarchy.

Trusted Computing > Endorsement Hierarchy

Enable or disable Endorsement Hierarchy.

Trusted Computing > TPM2.0 UEFI Specifications Version

Select the supported TCG2 Spec Version.

TCG_1_2: The Compatible mode for Win8/Win10.

TCG_2: Support new TCG2 protocol and event format for Win10 or later.

Trusted Computing > Physical Presence Specifications Version

Select to tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.

Secure Boot

Press to enter the Secure Boot submenu.

> Secure Boot > Secure Boot

Secure Boot feature is Active if Secure Boot is enabled, Platform Key (PK) is enrolled and the system is in User mode. The mode change requires platform reset.

> Secure Boot > Secure Boot Mode

Secure Boot mode options: Standard or Custom.

In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

> Secure Boot > Restore Factory Keys

Force system to User Mode. Install factory default Secure Boot key databases.

> Secure Boot > Reset to Setup Mode

Delete all Secure Boot key databases from NVRAM.

> Secure Boot > Key Management

> Secure Boot > Key Management > Factory Key Provision

Install factory default Secure Boot keys after the platform reset and while the System is in Setup mode.

> Secure Boot > Key Management > Restore Factory Keys

Force System to User Mode. Install factory default Secure Boot key databases.

> Secure Boot > Key Management > Reset to Setup Mode

Delete all Secure Boot key databases from NVRAM.

> Secure Boot > Key Management > Export Secure Boot Variables

Copy NVRAM content of Secure Boot variables to files in a root folder on a file system device.

> Secure Boot > Key Management > Enroll Efi Image

Allow the image to run in Secure Boot mode. Enroll SHA256 Hash certificate of a PE image into Authorized Signature Database (db).

> Secure Boot > Key Management > Remove 'UEFI CA' from DB

Device Guard ready system must not list 'Microsoft UEFI CA' Certificate in Authorized Signature database (db).

> Secure Boot > Key Management > Restore DB Defaults

Restore DB variable to factory defaults.

> Secure Boot > Key Management > Platform Key

Configure the Platform Key settings.

> Secure Boot > Key Management > Key Exchange Keys

Configure the Key Exchange Keys settings.

> Secure Boot > Key Management > Authorized Signatures

Configure the Authorized Signatures settings.

> Secure Boot > Key Management > Forbidden Signature

Configure the Forbidden Signature settings.

> Secure Boot > Key Management > Authorized TimeStamps

Update or append the Authorized TimeStamps.

> **Secure Boot > Key Management > OsRecovery Signatures**

Enroll Factory Defaults or load certificates from a file:

1. Public Key Certificate:
 - a) EFI_SIGNATURE_LIST
 - b) EFI_CERT_X509 (DER)
 - c) EFI_CERT_RSA2048 (bin)
 - d) EFI_CERT_SHAXXX
2. Authenticated UEFI Variable
3. EFI PE/COFF Image (SHA256). Key Source: Factory, External, Mixed

Boot

This section is used to configure the boot features.

Quiet Boot

Enable or disable quiet boot option.

Network Stack

Enable or disable UEFI Network Stack.

FIXED BOOT ORDER 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 Boot Option #2 and so forth.

UEFI Hard Disk Drives BBS Priorities

Configure the boot device priority sequence from available UEFI hard disk drives.

UEFI USB Drive BBS Priorities

Configure the boot device priority sequence from available UEFI USB key drives.

Save & Exit

Save Changes and Reset

Press Enter to save the changes and reset. Confirm by selecting Yes when a dialogue box appears.

Discard Changes and Exit

Press Enter to exit the BIOS without saving the changes. You may be prompted to confirm again before exiting.

Restore Defaults

Press Enter to restore the BIOS to the default settings. Confirm by selecting Yes when a dialogue box appears.