neXCOBOT

NexCOBOT Co., Ltd.

IoT Automation Solutions
Embedded Computing (3.5" CPU Board)
EBC 370
User Manual

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PREFACE

Copyright

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Acknowledgements

EBC 370 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.

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Package Contents

Before continuing, verify that the EBC 370 package that you received is complete. Your package should have all the items listed in the following tables.

Item	Description	Qty
1	EBC370	1
2	7P+15P SATA CABLE	1
3	COM PORT CABLE	1

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	COMPORT CABLE CP:NEX-110819-01 UL2651#28x9C-DB9+TU1001-10 L:200mm
3	603POW0391X00	Input DC Power Cable	POWER CABLE ST:1906022 ATX 2x2P PIT:4.2mm TO TERMINAL BLOCKS 3P PIT:5.08mm L=230mm
4	685050203701F	Cooler Kit	EBC370 COOLER KIT 146x101.7x36.4mm
5	6879MXM00008F	MXM Module	EBK-MXM-A1000-A0 MXM3.1 Type A, NVIDIA RTX A1000, 4GB GDDR6, MSH, 35W, 0°C to +55°C
6	685050200003F	MXM Cooler	MXM Cooler for EBK-MXM-A1000 Series
7	68603FAN0000F	MXM FAN Cable	FAN CABLE CP:NEX-241213-T1 ECI 2510CH-04-03 TO JCTC 12001H00-2P-HF L=50mm
8	7400120026X00	DC 24V Adapter, 120W	POWER ADAPTER FSP:FSP120-AAAN3 120W/24V
9	60233POW17X00	Power cable	POWER CORD QUEEN PUO:005-028065-007 (US STD) QP-02+QP-007 SVT 18AWG 3C 60°C L=1830mm W/PE PACK FOR EBS1563-563I/R
10	60233POW18X00	Power cable	POWER CORD QUEEN PUO:QP004+QP007 (歐規) FOR EBS1563-563I/R
11	60233POW19X00	Power cable	POWER CORD QUEEN PUO:QP001(13A)+SR+QP007 (英規) FOR EBS1563-563I/R

Ordering Information

The following below provides ordering information for EBC 370.

Barebone

EBC370 (P/N: 10E00037004X0)
EBC370X (P/N: 10E00037003X)

Packing List

1 x main board
1 x COM port cable (P/N: 60233SIO62X00)
1 x SATA cable (P/N: 60233AT128X00)

Optional Accessories

- Power Adapter (P/N: 7400120026X00)
  Adapter FSP:FSP120-AAAN3(120W 24V/5A, W/3PIN Phoenix contact

- DC POWER CABLE (P/N: 603POW0391X00)
  POWER cable ST:ST-1906022 ATX 2x2P PIT:4.2mm TO TERMINAL
  BLOCKS 3P PIT:5.08mm L=230mm

- Cooler (P/N: 685050203701F)
   EBC370 Cooler Kit 146x101.7x36.4 mm

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CHAPTER 1: PRODUCT INTRODUCTION

Overview
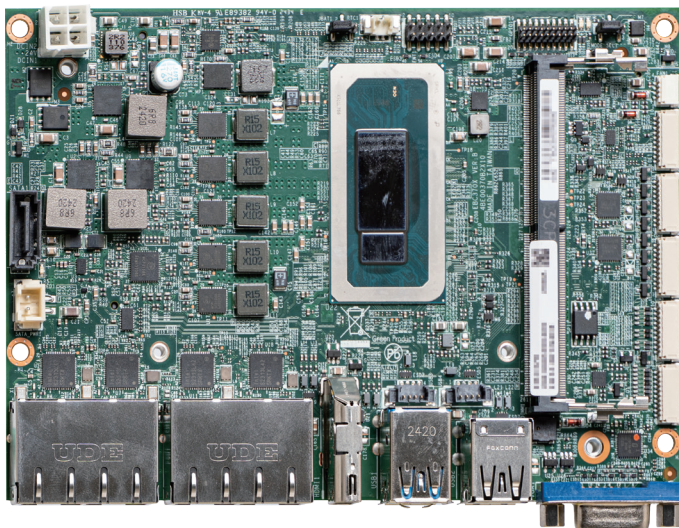
Key Features

- 13th Gen Intel® Core™ i7 processor, 15W/28W

- 1 x DDR5 5200MHz SO-DIMM, non-ECC, up to 32GB

- 1 x VGA, 1 x HDMI® , supports multiple displays

- TPM 2.0

- 24V DC IN

- 4 x 2.5 GbE LAN

- 3 x USB 3.2 (Gen2), 3 x USB 2.0, 2 x RS-232, 2 x RS-232/485/422, 1 x SATA 3.0 , 16-bit GPIO (8 IN, 8 OUT)

- 1 x MXM slot (PCIex4 LANS for MXM GPU card support)

- 1 x M.2 Key B , 1 x M.2 Key M

Hardware Specifications

CPU/Chipset

13th Gen Intel® Core™ processor (raptor lake)
- EBC 370: Intel® Core™ i7-1370PRE, 28W
- EBC 370X: Intel® Core™ i7-1365URE, 15W

Main Memory

- 1 x DDR5 5200MHz SO-DIMM, non-ECC, up to 32GB

BIOS

- AMI (UEFI)

Display

- 1 x VGA, up to 1920x1080@60Hz
- 1 x HDMI® 2.0b, up to 3840x2160@30Hz
- Support multiple displays

Storage

- 1 x SATA 3.0 / 1 x SATA power connector x 1(+5V)
- 1 x M.2 Key M 2280 (SATA, PCIe x4 NVME)

Expansion Slot

- 1 x M.2 Key B 3052 (for LTE/ 5G), (PCIe x2/USB 3.0) with nano-SIM
- MXM connector (PCIe x4 LANS for MXM/IO)

Rear I/O

- 3 x USB 3.2 Gen 2
- 4 x 2.5GbE LAN
- 1 x USB 2.0
- 1 x VGA, 1 x HDMI®

Internal I/O

- 2 x USB 2.0 (Pin Header)
- 4 x COM port:
   - 2 x RS-232, 2 x RS-232/485/422
- 1 x Front panel header
- 1 x 16-bit GPIO (8 IN, 8 OUT)
- 1 x Fan connector
- WDT, supports on board TPM 2.0

Power Requirement

- 1 x 4-pin (2x2) ATX power connector
   - Input power DC 24V Only
- Support both AT and ATX power supply mode

Dimensions

- 3.5" SBC Form Factor (146mm x 105mm)

Dimensions

- 148m x 102mm (5.8" x 4")

Environment

- Board level operation temperature:
   - EBC370: 0°C~60°C
   - EBC370X: -20°C~70°C
- Storage temperature: -40°C~85°C
- Relative humidity:
- 10%~95% (operating, non-condensing)
- 5%~95% (non-operating, non-condensing)

Certifications

- Meet CE/FCC Class A

Knowing Your EBC 370

Top View

RTC

GPIO

Front Panel
Pin Header

Clean CMOS

Mode Select Pin Header

DC In

Fan1 Connector

Debug Port

COM4 Port

SATA

COM3 Port

COM2 Port

SATA_Power

COM1 Port

DIMM Slot

USB3   USB4

![nexCOBOT logo]

Bottom View

M.2 Key M

Fan2 Connector

MXM Connector

SIM Card Slot
*The SIM card slot operates with the M.2 Key B slot.

M.2 Key B

Rear IO Layout

LAN1: 2.5GbE RJ45

LAN2: 2.5GbE RJ45

HDMI® 1.4b

USB 3.2 Gen 2

USB 2.0

VGA
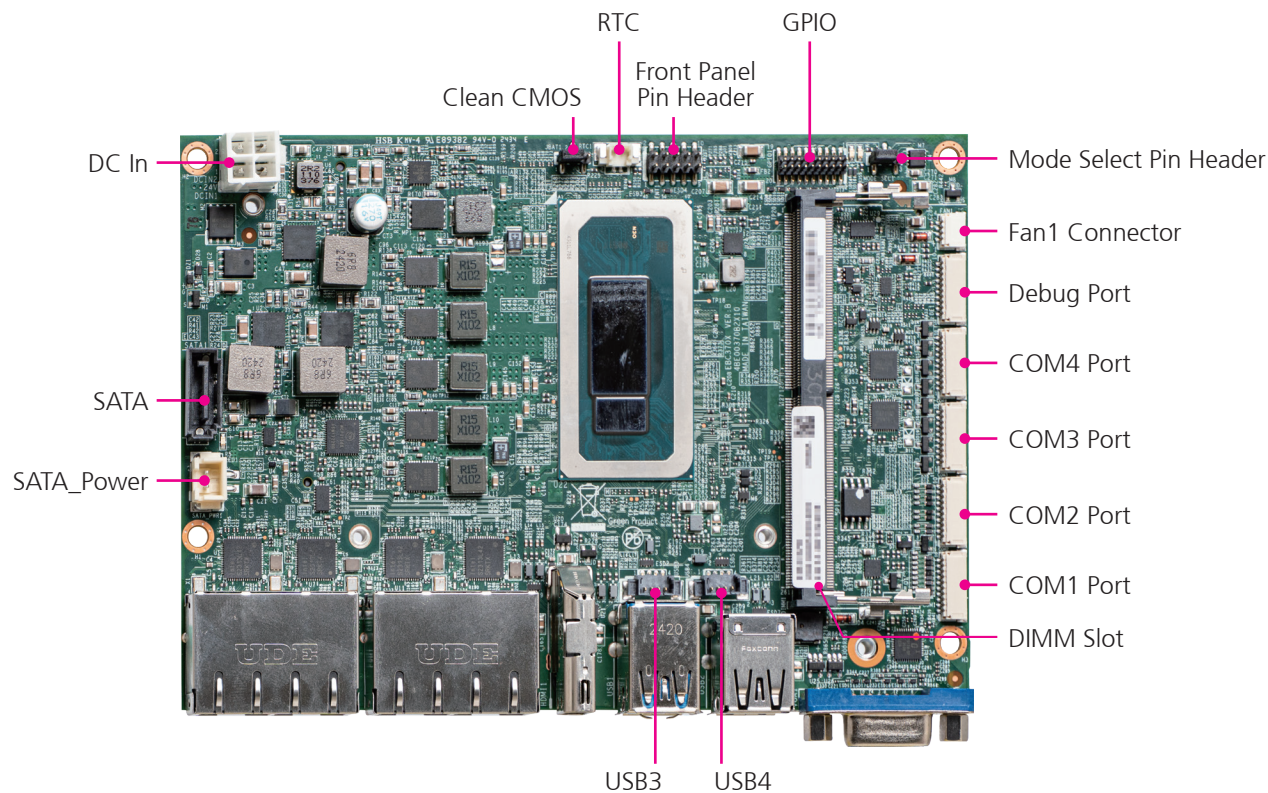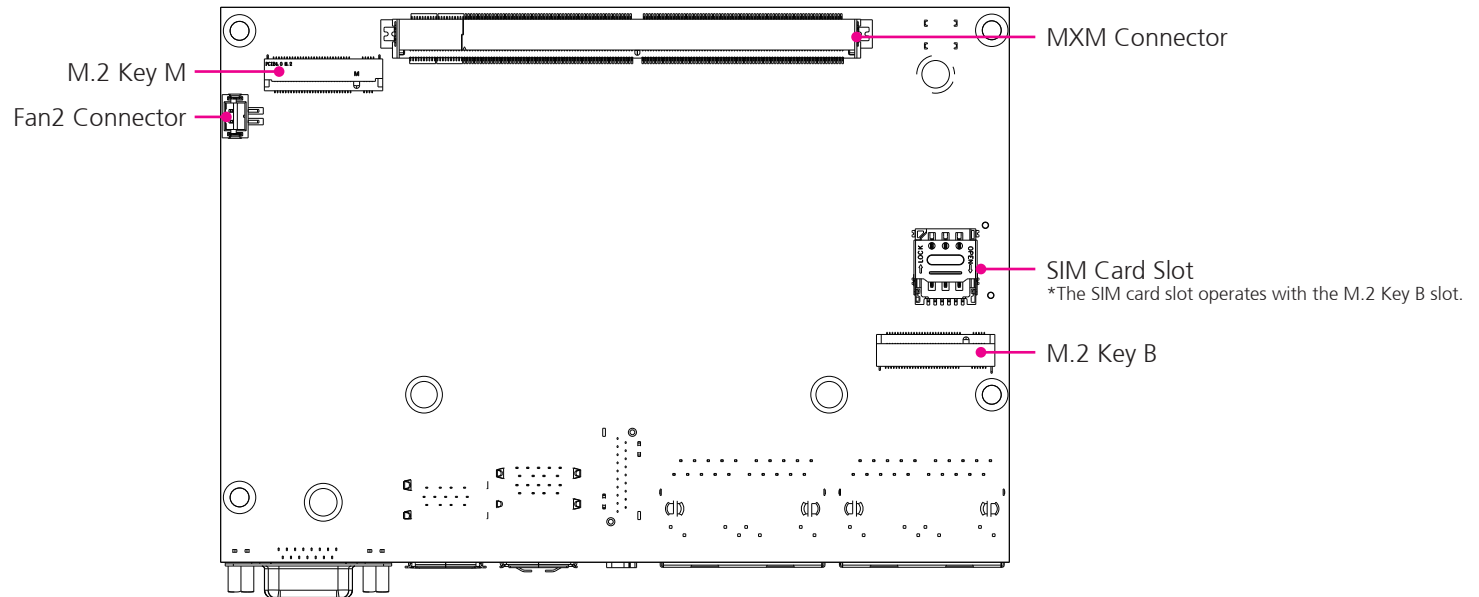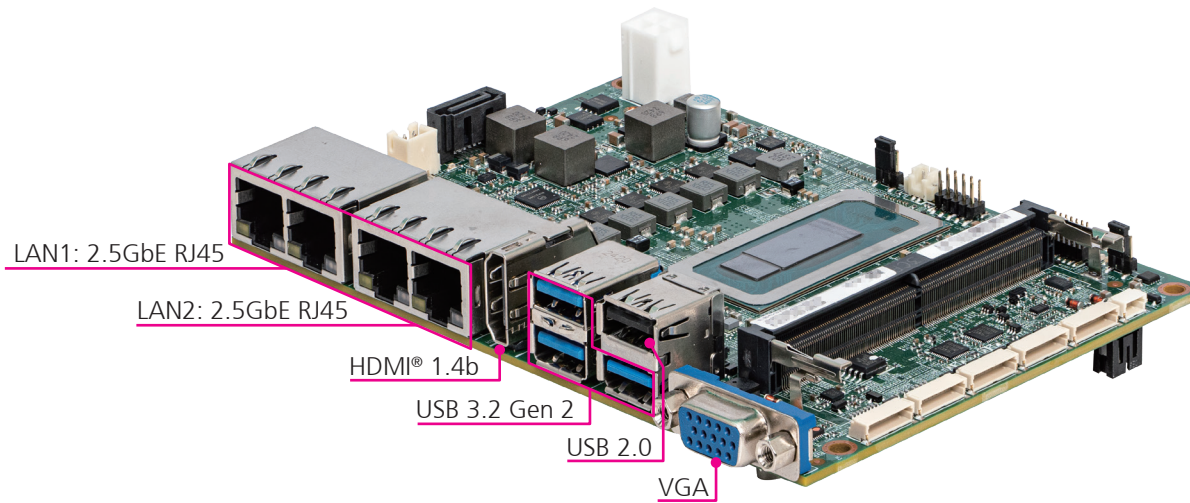
Power Management States

S3, S4, and S5 are power management states defined by ACPI (Advanced Configuration and Power Interface), representing different sleep or shutdown modes. They are designed to balance performance and energy consumption for various usage scenarios. Refer to the following tables for detailed power status information.

If the function is supported, it will be marked with a check in the tables; if not, it will be marked with an X.

Sleeping States

S3 – Suspend to RAM	V
S4 – Suspend to disk	V
S5 – Soft off	V

Wake Up Event

System state	S3	S4	S5
LAN1/2/3/4	V	V	V
USB 2.0 1/2/3	V	V	X
USB 3.2 1/2/3	V	V	X
COM Port 1/2/3/4	V	V	X

- The LAN 1 and LAN 2 ports support Wake-on-LAN functionality across power states S3, S4, and S5. Additionally, LAN1 ports are equipped with TSN (Time-Sensitive Networking) and TCC (Time-Coordinated Computing) capabilities.
- Support for the system's S3, S4, and S5 power states is disabled when an MXM module is installed.

Mechanical Dimensions
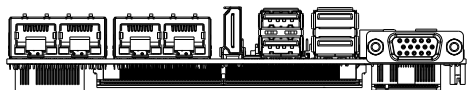
CHAPTER 2: JUMPERS AND CONNECTORS

This chapter describes how to set the jumpers and connectors on the EBC 370 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)
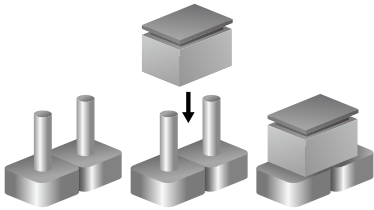
Three-Pin Jumpers: Pins 1 and 2 are Short
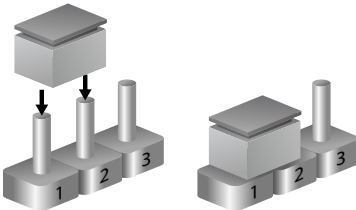
Locations of the Jumpers and Connectors

The figures below show the location of the jumpers and connectors. Refer to this chapter for detailed pin settings and definitions of the connectors marked in pink on the figures.

Top View
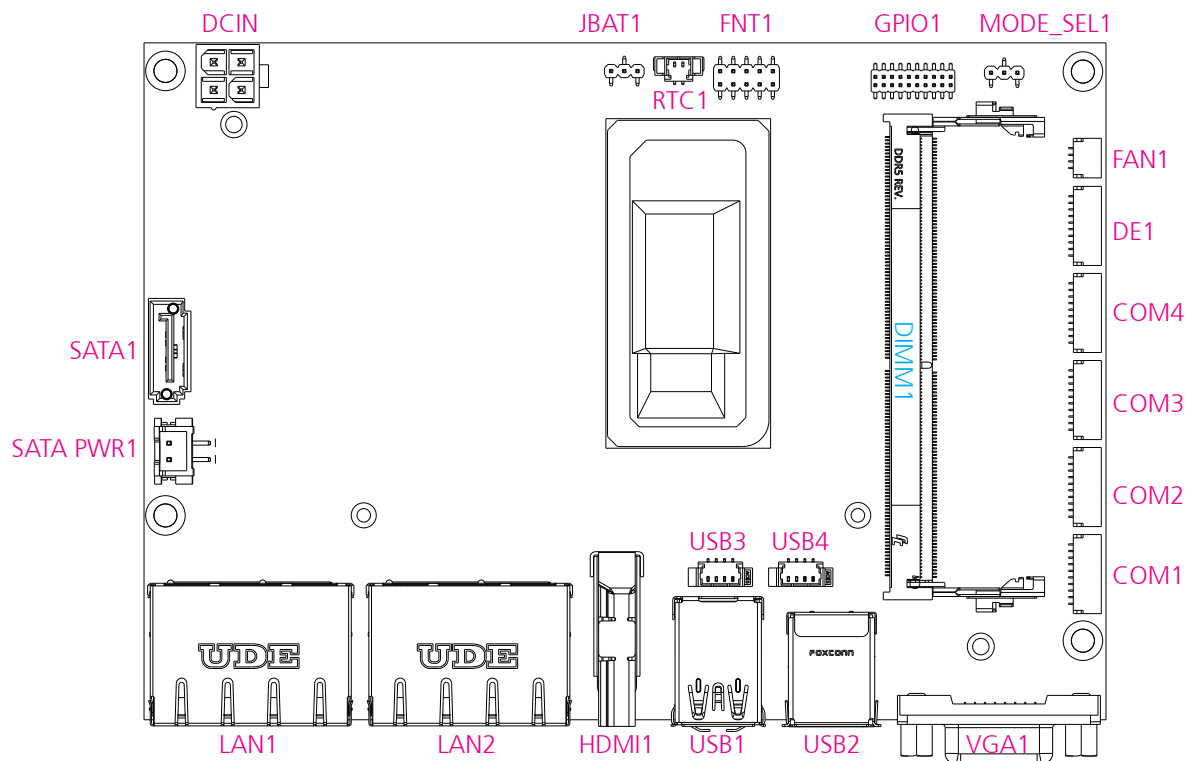
Bottom View
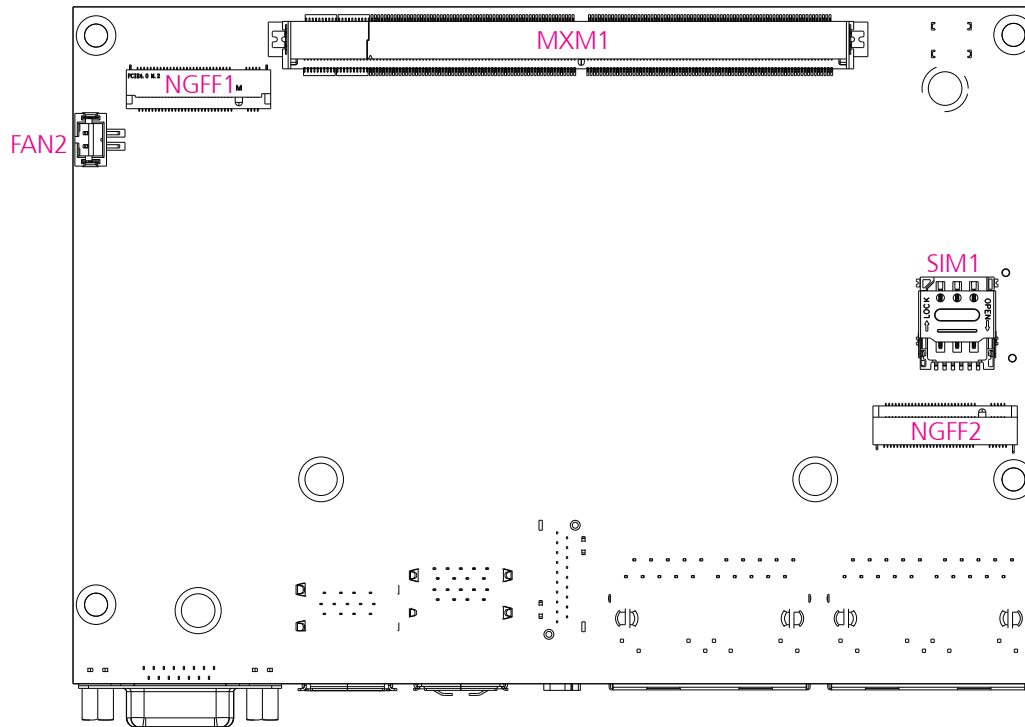
Rear I/O Interface

HDMI®

Connector location: HDMI1

Pin	Definition	Pin	Definition
1	HDMI_D2P_C	14	NC
2	GND	15	HDMI_SCL_C
3	HDMI_D2N_C	16	HDMI_SDA_C
4	HDMI_D1P_C	17	GND
5	GND	18	5V_HDMI
6	HDMI_D1N_C	19	HDMI_HPD_C
7	HDMI_D0P_C	MH1	CHASIS_GND_L
8	GND	MH2	NC
9	HDMI_D0N_C	MH3	CHASIS_GND_L
10	HDMI_CKP_C	MH4	NC
11	GND	NH1	NC
12	HDMI_CKN_C	NH2	NC
13	NC		

LAN Ports

Connector location: LAN1A, LAN1B, LAN2A, LAN2B
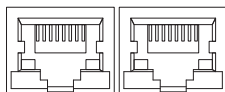
Act (Left)	Status	Link (Right)	Description
Blinking	Active	Green	2.5Gbps link
Off	Inactive	Orange	1Gbps link
		Off	No/10/100 link

LAN1A, LAN1B

Pin	Definition	Pin	Definition
A1	LAN1_MDI_A_P	B1	LAN2_MDI_A_P
A2	LAN1_MDI_A_N	B2	LAN2_MDI_A_N
A3	LAN1_MDI_B_P	B3	LAN2_MDI_B_P
A4	LAN1_MDI_B_N	B4	LAN2_MDI_B_N
A5	LAN1_MDI_C_P	B5	LAN2_MDI_C_P
A6	LAN1_MDI_C_N	B6	LAN2_MDI_C_N
A7	LAN1_MDI_D_P	B7	LAN2_MDI_D_P
A8	LAN1_MDI_D_N	B8	LAN2_MDI_D_N
A9	TVCC_LAN1	B9	TVCC_LAN2
A10	GND	B10	GND
A11	LAN1_2500	B11	LAN2_1G
A12	LAN1_1G	B12	LAN2_2500
A13	LAN1_LED_ACTN	B13	LAN2_ACTPW
A14	LAN1_ACTPW	B14	LAN2_LED_ACTN
MH1	CHASIS_GND_L	MH2	CHASIS_GND_L
NH1	NC	NH2	NC

LAN2A, LAN2B

Pin	Definition	Pin	Definition
A1	LAN3_MDI_A_P	B1	LAN4_MDI_A_P
A2	LAN3_MDI_A_N	B2	LAN4_MDI_A_N
A3	LAN3_MDI_B_P	B3	LAN4_MDI_B_P
A4	LAN3_MDI_B_N	B4	LAN4_MDI_B_N
A5	LAN3_MDI_C_P	B5	LAN4_MDI_C_P
A6	LAN3_MDI_C_N	B6	LAN4_MDI_C_N
A7	LAN3_MDI_D_P	B7	LAN4_MDI_D_P
A8	LAN3_MDI_D_N	B8	LAN4_MDI_D_N
A9	TVCC_LAN3	B9	TVCC_LAN4
A10	GND	B10	GND
A11	LAN3_2500	B11	LAN4_2500
A12	LAN3_1G	B12	LAN4_1G
A13	LAN3_LED_ACTN	B13	LAN4_LED_ACTN
A14	LAN3_ACTPW	B14	LAN4_ACTPW
MH1	CHASIS_GND_L	MH2	CHASIS_GND_L
NH1	NC	NH2	NC

USB 3.2 Gen 2 Ports

Connector location: USB1

```
18 ┌─────────┐ 14
13 │ ▢▢▢▢▢▢ │ 10
   │ ▭▭▭   │
   │ ▭▭▭   │
9  │ ▢▢▢▢▢▢ │ 5
1  └─────────┘ 4
```
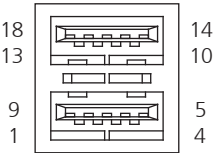
Pin	Definition	Pin	Definition
1	5VSB_USB1	10	5VSB_USB1
2	USB1N	11	USB2N
3	USB1P	12	USB2P
4	GND	13	GND
5	USB32_RX_N1	14	USB32_RX_N2
6	USB32_RX_P1	15	USB32_RX_P2
7	GND	16	GND
8	USB32_TX_N1	17	USB32_TX_N2
9	USB32_TX_P1	18	USB32_TX_P2
MH1	CHASIS_GND_L	MH2	CHASIS_GND_L
MH3	NC	MH4	NC

USB 3.2 Gen 2 and USB 2.0 Ports

Connector location: USB2

```
10 ┌─────────┐ 13
   │ ▢▢▢▢▢▢ │
5  │ ▭▭▭   │ 9
1  │ ▢▢▢▢▢▢ │ 4
   └─────────┘
```
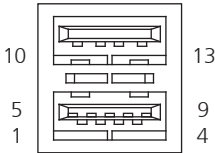
Pin	Definition	Pin	Definition
1	5VSB_USB2	10	5VSB_USB2
2	USB3N	11	USB4N
3	USB3P	12	USB4P
4	GND	13	GND
5	USB32_RX_N3		
6	USB32_RX_P3		
7	GND		
8	USB32_TX_N3		
9	USB32_TX_P3		
MH1	CHASIS_GND_L	MH2	CHASIS_GND_L
MH3	NC	MH4	NC

VGA Port

Connector location: VGA1
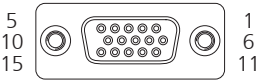
Pin	Definition	Pin	Definition
1	VGA_RED	12	VGA_DDCDATA
2	VGA_GREEN	13	VGA_HSYNC
3	VGA_BLUE	14	VGA_VSYNC
4	NC	15	VGA_DDCCLK
5	VGA_GND	MH1	CHASIS_GND_R
6	VGA_GND	MH2	CHASIS_GND_L
7	VGA_GND	NH1	NC
8	VGA_GND	NH2	NC
9	VGA_VCC5		
10	VGA_GND		
11	NC		

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Internal I/O Interface

Jumper Settings

AT/ATX Mode Select

Connector location: MODE_SEL1
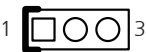
Pin	Setting
1-2	AT (Default)
2-3	ATX

Clear CMOS

Connector location: JBAT1
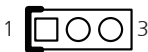
Pin	Setting
1-2	Normal (Default)
2-3	Clear CMOS

COM Ports

Connector location: COM1, COM2, COM3, COM4

COM1		COM2	
Pin	Definition	Pin	Definition
1	GND	1	GND
2	RI#_COM1	2	RI#_COM2
3	CTS#_COM1	3	CTS#_COM2
4	RTS#_COM1	4	RTS#_COM2
5	DSR#_COM1	5	DSR#_COM2
6	GND	6	GND
7	DTR#_COM1	7	DTR#_COM2
8	TXD_COM1	8	TXD_COM2
9	RXD_COM1	9	RXD_COM2
10	DCD#_COM1	10	DCD#_COM2
MH1	GND	MH1	GND
MH2	GND	MH2	GND

COM3		COM4	
Pin	Definition	Pin	Definition
1	GND	1	GND
2	RI#_COM3	2	RI#_COM4
3	COM3CTS#	3	COM4CTS#
4	COM3RTS#	4	COM4RTS#
5	COM3DSR#	5	COM4DSR#
6	GND	6	GND
7	COM3DTR#	7	COM4DTR#
8	COM3TXD	8	COM4TXD
9	COM3RXD	9	COM4RXD
10	COM3DCD#	10	COM4DCD#
MH1	GND	MH1	GND
MH2	GND	MH2	GND

DC-IN

Connector location: DCIN
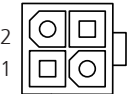
Pin	Definition
1	GND
2	GND
3	24V
4	24V

Debug Port

Connector location: DE1

Pin	Definition
1	3VSB
2	ESPI_RST#
3	ESPI_IO0_DE
4	ESPI_IO1_DE
5	ESPI_IO2_DE
6	ESPI_IO3_DE
7	ESPI_CS1#
8	ESPI_CLK_DE
9	BUF_PLTRST#
10	GND
MH1	GND
MH2	GND

Fan Connector

Connector location: FAN1

4 `[OOOO]` 1

Pin	Definition
1	FANOUT
2	FANIN
3	VCC12
4	GND
MH1	GND
MH2	GND

Connector location: FAN2

2 `[OO]` 1

Pin	Definition
1	GND
2	VCC12
MH1	GND
MH2	GND

Front Panel Connector

Connector location: FNT1

```
2 [O O O O O] 10
1 [□ O O O O] 9
```
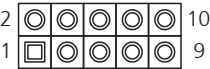
Pin	Definition	Pin	Definition
1	ATX_PWRBTN#	2	GND
3	PWRLED#	4	VCC3
5	PM_RST#	6	GND
7	SATALED#	8	VCC3
9	SMB_DATA	10	SMB_CLK

GPIO

Connector location: GPIO1

```
2 [O O O O O O O O O O] 20
1 [□ O O O O O O O O O] 19
```
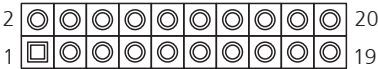
Pin	Definition	Pin	Definition
1	3V_GPIO	2	3V_GPIO
3	GPO_0	4	GPI_0
5	GPO_1	6	GPI_1
7	GPO_2	8	GPI_2
9	GPO_3	10	GPI_3
11	GPO_4	12	GPI_4
13	GPO_5	14	GPI_5
15	GPO_6	16	GPI_6
17	GPO_7	18	GPI_7
19	GND	20	GND

MXM Connector

Connector location: MXM1
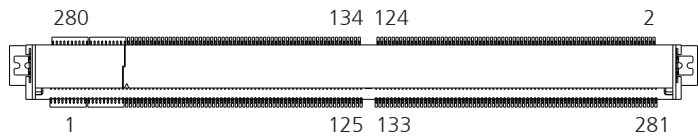
Pin	Definition	Pin	Definition
1	VCC5	2	PRSNT_R#
3	VCC5	4	MXM_WAKE#
5	VCC5	6	MXM_PWR_GOOD
7	VCC5	8	MXM_PWR_EN
9	VCC5	10	NC
11	GND	12	NC
13	GND	14	NC
15	GND	16	NC
17	GND	18	MXM_PWR_LEVEL
19	PEX_STD_SW#	20	MXM_TH_OVERT#
21	VGA_DISABLE#	22	MXM_TH_ALERT#
23	NC	24	MXM_TH_PWM
25	NC	26	NC
27	NC	28	NC
29	MXM_HDMI_CEC	30	NC

Pin	Definition	Pin	Definition
31	MXM_DVI_HPD	32	MXM_SMB_DAT
33	NC	34	MXM_SMB_CLK
35	NC	36	GND
37	GND	38	NC
39	NC	40	NC
41	NC	42	NC
43	NC	44	NC
45	NC	46	GND
47	GND	48	NC
49	NC	50	NC
51	NC	52	GND
53	GND	54	NC
55	NC	56	NC
57	NC	58	GND
59	GND	60	NC

Continued on next page

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Pin	Definition	Pin	Definition
61	NC	62	NC
63	NC	64	GND
65	GND	66	NC
67	NC	68	NC
69	NC	70	GND
71	GND	72	NC
73	NC	74	NC
75	NC	76	GND
77	GND	78	NC
79	NC	80	NC
81	NC	82	GND
83	GND	84	NC
85	NC	86	NC
87	NC	88	GND
89	GND	90	NC

Pin	Definition	Pin	Definition
91	NC	92	NC
93	NC	94	GND
95	GND	96	NC
97	NC	98	NC
99	NC	100	GND
101	GND	102	NC
103	NC	104	NC
105	NC	106	GND
107	GND	108	NC
109	NC	110	NC
111	NC	112	GND
113	GND	114	NC
115	NC	116	NC
117	NC	118	GND
119	GND	120	PEG_TXC_N3

Continued on next page

Pin	Definition	Pin	Definition
121	PEG_RXC_N3	122	PEG_TXC_P3
123	PEG_RXC_P3	124	GND
125	GND		
133	GND	134	GND
135	PEG_RXC_N2	136	PEG_TXC_N2
137	PEG_RXC_P2	138	PEG_TXC_P2
139	GND	140	GND
141	PEG_RXC_N1	142	PEG_TXC_N1
143	PEG_RXC_P1	144	PEG_TXC_P1
145	GND	146	GND
147	PEG_RXC_N0	148	PEG_TXC_N0
149	PEG_RXC_P0	150	PEG_TXC_P0
151	GND	152	GND
153	CLKOUT_PCIE_N4	154	CLKREQ_MXM#
155	CLKOUT_PCIE_P4	156	PEX_RST#

Pin	Definition	Pin	Definition
157	GND	158	NC
159	NC	160	NC
161	NC	162	NC
163	NC	164	NC
165	NC	166	GND
167	NC	168	NC
169	NC	170	NC
171	NC	172	NC
173	GND	174	GND
175	NC	176	NC
177	NC	178	NC
179	GND	180	GND
181	NC	182	NC
183	NC	184	NC
185	GND	186	GND

Continued on next page

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Pin	Definition	Pin	Definition
187	NC	188	NC
189	NC	190	NC
191	GND	192	GND
193	NC	194	NC
195	NC	196	NC
197	GND	198	GND
199	NC	200	NC
201	NC	202	NC
203	GND	204	GND
205	NC	206	NC
207	NC	208	NC
209	GND	210	GND
211	NC	212	NC
213	NC	214	NC
215	GND	216	GND

Pin	Definition	Pin	Definition
217	NC	218	NC
219	NC	220	NC
221	GND	222	GND
223	NC	224	NC
225	NC	226	NC
227	NC	228	GND
229	NC	230	NC
231	NC	232	NC
233	NC	234	NC
235	NC	236	NC
237	NC	238	NC
239	NC	240	NC
241	NC	242	NC
243	NC	244	GND
245	NC	246	NC

Continued on next page

Pin	Definition	Pin	Definition
247	NC	248	NC
249	NC	250	GND
251	GND	252	NC
253	NC	254	NC
255	NC	256	GND
257	GND	258	NC
259	NC	260	NC
261	NC	262	GND
263	GND	264	NC
265	NC	266	NC
267	NC	268	GND

Pin	Definition	Pin	Definition
269	GND	270	NC
271	NC	272	NC
273	NC	274	NC
275	GND	276	NC
277	NC	278	VCC3
279	NC	280	VCC3
281	PRSNT_L#		
E1	MXM12V	E2	MXM12V
E3	GND	E4	GND
MH1	NC	MH2	NC
NH1	NC	NH2	NC

M.2 Key M

Connector interface: PCIe 4 x4
Connector location: NGFF1
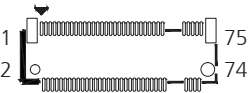
Pin	Definition	Pin	Definition
1	GND	2	3VSB_M2M
3	GND	4	3VSB_M2M
5	PCIEX4_A_RX_N3	6	NC
7	PCIEX4_A_RX_P3	8	NC
9	GND	10	LED#_M2M
11	PCIEX4_A_TX_N3	12	3VSB_M2M
13	PCIEX4_A_TX_P3	14	3VSB_M2M
15	GND	16	3VSB_M2M
17	PCIEX4_A_RX_N2	18	3VSB_M2M
19	PCIEX4_A_RX_P2	20	NC
21	GND	22	NC
23	PCIEX4_A_TX_N2	24	NC
25	PCIEX4_A_TX_P2	26	NC
27	GND	28	NC
29	PCIEX4_A_RX_N1	30	NC
31	PCIEX4_A_RX_P1	32	NC
33	GND	34	NC
35	PCIEX4_A_TX_N1	36	NC

Pin	Definition	Pin	Definition
37	PCIEX4_A_TX_P1	38	NC
39	GND	40	NC
41	SATA_PCIE_RXN	42	NC
43	SATA_PCIE_RXP	44	NC
45	GND	46	NC
47	SATA_PCIE_TXN	48	NC
49	SATA_PCIE_TXP	50	PERST#M2M
51	GND	52	CLKREQE#_M2M
53	CLKOUT_PCIE_N3	54	NC
55	CLKOUT_PCIE_P3	56	NC
57	GND	58	NC
67	NC	68	NC
69	KEYM_PEDET	70	3VSB_M2M
71	GND	72	3VSB_M2M
73	GND	74	3VSB_M2M
75	GND	MH1	GND
MH2	GND	NH1	NC
NH2	NC		

M.2 Key B Socket

Connector location: NGFF2

Pin	Definition	Pin	Definition
1	M2B_CONFIG3	2	3VSB_M2B
3	GND	4	3VSB_M2B
5	GND	6	POWER_OFF#
7	USB2_DP10	8	M2B_DISABLE1#
9	USB2_DN10	10	M2B_LED#
11	GND	20	NC
21	M2B_CONFIG0	22	NC
23	WWAN_M2B	24	NC
25	NC	26	NC
27	GND	28	NC
29	USB_PCIERXN	30	UIM_RESET
31	USB_PCIERXP	32	UIM_CLK
33	GND	34	UIM_DATA
35	USB_PCIETXN	36	UIM_PWR
37	USB_PCIETXP	38	NC
39	GND	40	NC
41	PCIE_RX_N5	42	NC
43	PCIE_RX_P5	44	NC

Pin	Definition	Pin	Definition
45	GND	46	NC
47	PCIE_TX_N5	48	NC
49	PCIE_TX_P5	50	M2BRST#
51	GND	52	M2BCLKREQ#
53	CLKOUT_PCIE_N6	54	M2BWAKE#
55	CLKOUT_PCIE_P6	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	PLTRST#_M2B_1V8	68	M2BSUSCLK
69	M2B_CONFIG1	70	3VSB_M2B
71	GND	72	3VSB_M2B
73	GND	74	3VSB_M2B
75	M2B_CONFIG2	MH1	GND
MH2	GND	NH1	NC
NH2	NC		

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RTC Connector

Connector location: RTC1

SATA Connector

Connector location: SATA1
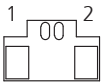
Pin	Definition	Pin	Definition
1	GND	2	VBATT
MH1	GND	MH2	GND
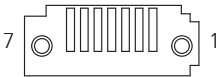
Pin	Definition
1	GND
2	SATA_TX_P0
3	SATA_TX_N0
4	GND
5	SATA_RX_N0
6	SATA_RX_P0
7	GND
MH1	GND
MH2	GND

SATA Power Connector

Connector location: SATA_PWR1

2 | [diagram] | 1

Pin	Definition
1	GND
MH1	VCC5

SIM Card Slot

Connector location: SIM1

[diagram: MH2, MH1, C3, C2, C1 / MH4, MH3, C7, C6, C5]
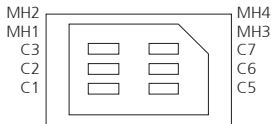
Pin	Definition	Pin	Definition
C1	UIM_PWR	C7	UIM_DATA
C2	UIM_RESET	MH1	GND
C3	UIM_CLK	MH2	GND
C5	GND	MH3	GND
C6	UIM_VPP	MH4	GND

USB 2.0 Header

Connector location: USB3, USB4

USB3   **USB4**

Pin	Definition	Pin	Definition
1	5VSB	1	5VSB
2	USB6N	2	USB5N
3	USB6P	3	USB5P
4	GND	4	GND
MH1	GND	MH1	GND
MH2	GND	MH2	GND

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Block Diagram

DDR5 5200 SO-DIMM — CH0 — Intel Raptor Lake P / U 28W/15W

VGA — CH7517 — DDI#1

HDMI 1.4 — Cost Reduced LS — TCP#0

USB3 + USB2

USB2

BIOS — SPI

TPM 2.0

RJ45 RJ45 — MDI — Intel I226IT — PCIe

MDI — Intel I226IT — PCIe

RJ45 RJ45 — MDI — Intel I226IT — PCIe

MDI — Intel I226IT — PCIe

SATA0

PCIe x4 (NVME), SATA 1 — M.2 Key M 2280

CPU PCIe x4 — B to B (MXM) Connector

PCIe x2, + USB3.0 — M.2 Key B 3052

Nano SIM

eSPI — Super I/O NCT6126D

GPIO — GPIO 8IN/8OUT

ADC — HW Monitor

PWM — Smart FAN

WDT — WDT

UART — COM1 TRANSCEIVER — RS232

UART — COM2 TRANSCEIVER — RS232

UART — COM3 TRANSCEIVER — RS232 / RS422 / RS485

UART — COM4 TRANSCEIVER — RS232 / RS422 / RS485

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APPENDIX A: GPI/O PROGRAMMING GUIDE (PCB A)

GPI/O (General Purpose Input/Output) pins are provided for custom system design. This appendix provides definitions and its default setting for the ten GPI/O pins in the EBC 370. The pin definition is shown in the following table:

Pin No.	GPI/O Mode	PowerOn Default	Address	Pin No.	GPI/O Mode	Address
1	VCC	-	-	2	GND	-
3	GPO0	HIGH	A02h (Bit0)	4	GPI0	A02h (Bit4)
5	GPO1	HIGH	A02h (Bit1)	6	GPI1	A02h (Bit5)
7	GPO2	HIGH	A02h (Bit2)	8	GPI2	A02h (Bit6)
9	GPO3	HIGH	A02h (Bit3)	10	GPI3	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 GPI 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         outportb(0xA00, 0x03)
#define GPO0_HI       outportb(0xA02, GPO0)
#define GPO0_LO       outportb(0xA02, 0x00)
#define GPO1_HI       outportb(0xA02, GPO1)
#define GPO1_LO       outportb(0xA02, 0x00)
#define GPO2_HI       outportb(0xA02, GPO2)
#define GPO2_LO       outportb(0xA02, 0x00)
#define GPO3_HI       outportb(0xA02, GPO3)
#define GPO3_LO       outportb(0xA02, 0x00)

void main(void)
{
    GPO3X;
    GPO0_HI;
    GPO1_LO;
    GPO2_HI;
    GPO3_LO;
}
```

APPENDIX B: WATCHDOG TIMER SETTING

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

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

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

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