EmCORE-i230G

3.5" Compact Board

User's Manual
Version 1.1

2017.05

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Revision History

Version	Release Time	Description
1.0	April, 2015	Initial release
1.1	May, 2017	Added supported SDXC information in <u>1.3. Specifications</u> and <u>2.3.3. Connectors</u> SD1 section

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Declaration of Conformity
CE

The CE symbol on your product indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from ARBOR. Please contact your local supplier for ordering information.

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

Warning
This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC Class A

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and

(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

RoHS

ARBOR Technology Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.

The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.

ARBOR Technology Corp. hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, Arbor hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH --Registration, Evaluation, Authorization, and Restriction of Chemicals) regulated by the European Union.

All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Warning

Single Board Computers and their components contain very delicate Integrated Circuits (IC). To protect the Single Board Computer and its components against damage from static electricity, you should always follow the following precautions when handling it :

1. Disconnect your Single Board Computer from the power source when you want to work on the inside.
2. Hold the board by the edges and try not to touch the IC chips, leads or circuitry.
3. Use a grounded wrist strap when handling computer components.
4. Place components on a grounded antistatic pad or on the bag that comes with the Single Board Computer, whenever components are separated from the system.

Replacing Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.

Do not throw lithium batteries into the trash-can. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please do not hesitate to call or e-mail our customer service.

> http://www.arbor-technology.com
>
> E-mail:info@arbor.com.tw

Warranty

This product is warranted to be in good working order for a period of two years from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.
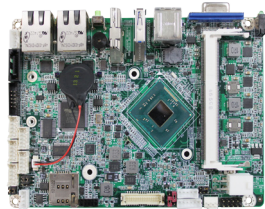
Chapter 1

Introduction

1.1. The Product

- Support Intel® Atom™ Processor E3800 family
- Integrated Gigabit Ethernet
- LVDS, Analog RGB Port, HDMI port
- Support Dual Independent Displays
- Soldered Onboard eMMC (OEM request)
- **Wide Range Operating Temp.: -40 ~ 85°C**

1.2. About this Manual

This manual is intended for experienced users and integrators with hardware knowledge of computers. If you are not sure about the description in this manual, consult your vendor before further handling.

We recommend that you keep one copy of this manual for the quick reference for any necessary maintenance in the future. Thank you for choosing ARBOR products.

1.3. Specifications

Form Factor	3.5" Compact Board
CPU	Soldered onboard Intel® Atom™ Processor E3825 1.33GHz or E3845 1.91GHz
System Memory	1 x DDR3L SO-DIMM socket, supporting up to 8GB 1333/1600 MT/s SDRAM
Graphics Chipset	Integrated Intel® HD Graphics
Graphics Interface	Analog RGB with resolution up to 2048x1536, HDMI
	LVDS: Dual Channels 24-bit LVDS, with resolution up to 1920x1200
Ethernet	2 x Realtek® RTL8111 PCIe GbE controllers
BIOS	Insyde BIOS
Audio	Realtek ALC662 HD Audio CODEC, MIC-in/ Line-out/Line-in
Storage	1 x Serial ATA port with 300MB/s HDD transfer rate
	1 x CFast socket
	4GB/ 8GB/ 16GB eMMC 4.5 (OEM request)
Serial Port	2 x RS-232/485 selectable
USB 2.0	6 x USB 2.0 ports
USB 3.0/2.0	1 x USB 3.0/2.0 port
Digital I/O	8-bit Programmable
Expansion Bus	1 x Mini-card socket (Full size)
	1 x Micro-SDXC socket (supports SDXC card SD 3.0 only)
	1 x micro SIM socket
Power Requirement	DC 12V
Power Consumption	0.83A@+12V with E3845 (Typical)
Operating Temp.	-40°C ~ 85°C (-40°F ~ 185°F)
Operating Humidity	10% ~ 95% @ 85°C (non-condensing)
Watchdog Timer	1~255 levels reset
Dimension (L x W)	146 x 102 mm (5.7" x 4.0")

1.4. Inside the Package

Before starting to install the single board, make sure the following items are shipped:

	1 x EmCORE-i230G 3.5" Compact Board with heatsink
DRIVER	1 x Driver CD
GUIDE	1 x Quick Installation Guide

If any of the aforelisted items is damaged or missing, contact your vendor immediately.

1.5. Ordering Information

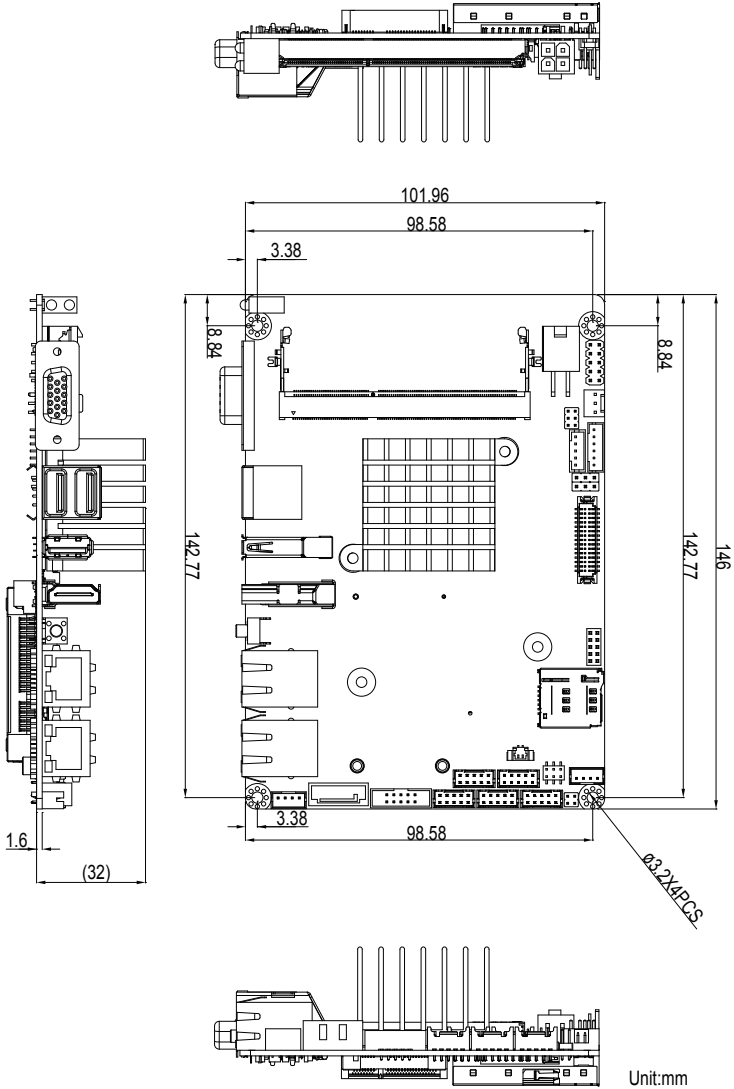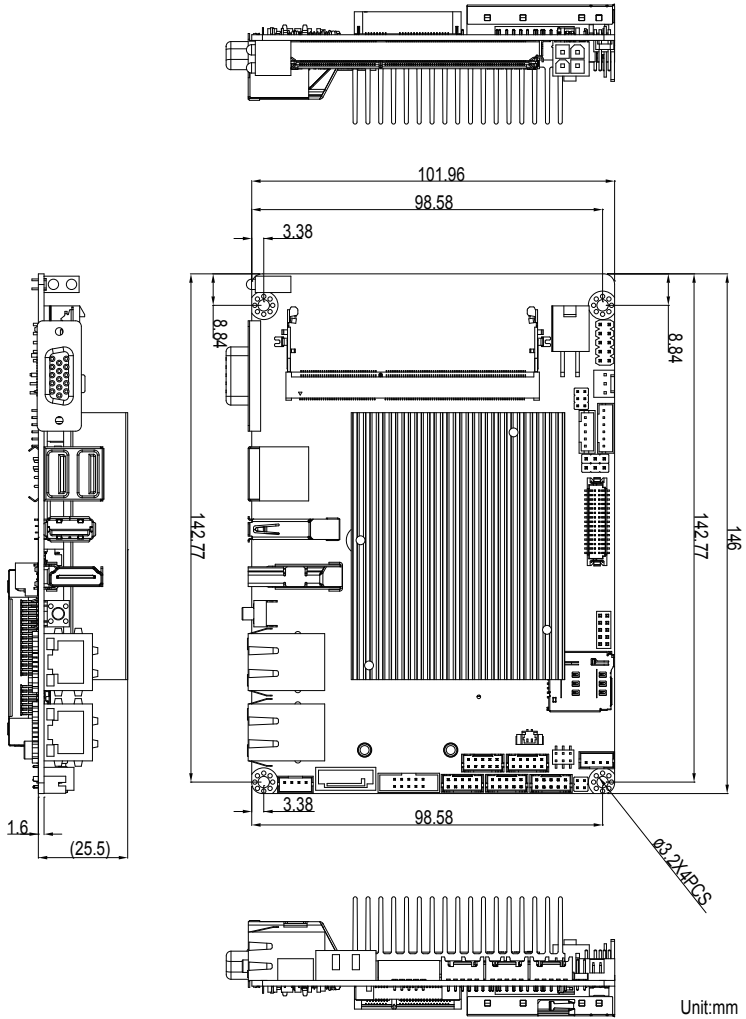|	
EmCORE-i230G-E3825	Intel® Atom™ Processor E3825 3.5" Compact Board
EmCORE-i230G-WT-E3825 (BTO)	Wide range temperature Intel® Atom™ Processor E3825 3.5" Compact Board
EmCORE-i230G-E3845	Intel® Atom™ Processor E3845 3.5" Compact Board
EmCORE-i230G-WT-E3845 (BTO)	Wide range temperature Intel® Atom™ Processor E3845 3.5" Compact Board

CBK-08-230G-00	Cable kit
	    1 x AUDIO cable
	    2 x COM port latching cables
	    1 x Keyboard & mouse latching y-cable
	    1 x SATA cable
	    1 x SATA power cable
	    2 x USB cables

Chapter 2

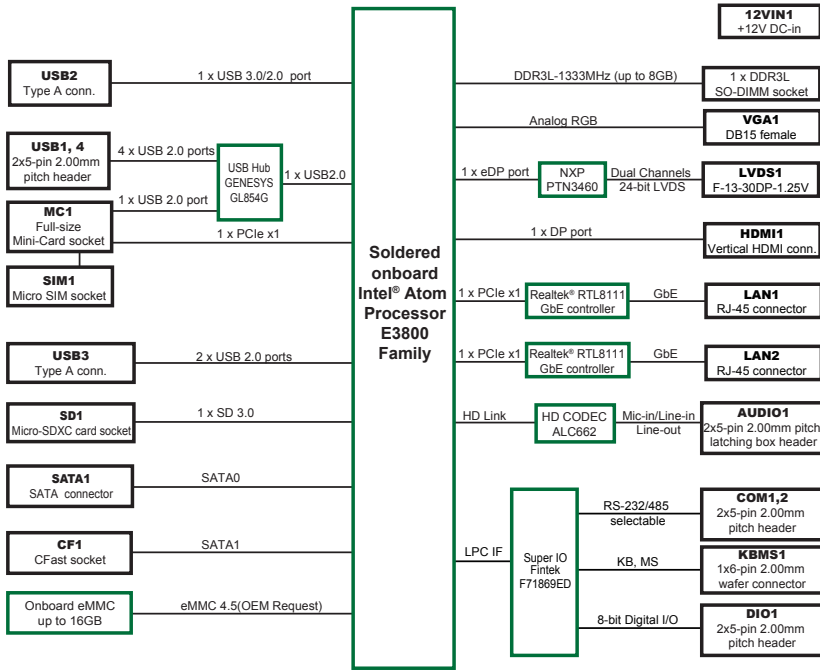# Getting Started

2.1. Board Dimensions

2.1.1. SKU-E3825

Unit:mm

2.1.2. SKU-E3845

Unit:mm

2.2. Block Diagram

USB2 Type A conn.	1 x USB 3.0/2.0 port
USB1, 4 2x5-pin 2.00mm pitch header	4 x USB 2.0 ports
	1 x USB 2.0 port
MC1 Full-size Mini-Card socket	1 x PCIe x1

USB Hub GENESYS GL854G — 1 x USB2.0

SIM1
Micro SIM socket

USB3
Type A conn. — 2 x USB 2.0 ports

SD1
Micro-SDXC card socket — 1 x SD 3.0

SATA1
SATA connector — SATA0

CF1
CFast socket — SATA1

Onboard eMMC up to 16GB — eMMC 4.5(OEM Request)

Soldered onboard Intel® Atom Processor E3800 Family

12VIN1
+12V DC-in

DDR3L-1333MHz (up to 8GB) — **1 x DDR3L SO-DIMM socket**

Analog RGB — **VGA1**
DB15 female

1 x eDP port — NXP PTN3460 — Dual Channels 24-bit LVDS — **LVDS1**
F-13-30DP-1.25V

1 x DP port — **HDMI1**
Vertical HDMI conn.

1 x PCIe x1 — Realtek® RTL8111 GbE controller — GbE — **LAN1**
RJ-45 connector

1 x PCIe x1 — Realtek® RTL8111 GbE controller — GbE — **LAN2**
RJ-45 connector

HD Link — HD CODEC ALC662 — Mic-in/Line-in Line-out — **AUDIO1**
2x5-pin 2.00mm pitch latching box header

LPC IF — Super IO Fintek F71869ED

RS-232/485 selectable — **COM1,2**
2x5-pin 2.00mm pitch header

KB, MS — **KBMS1**
1x6-pin 2.00mm wafer connector

8-bit Digital I/O — **DIO1**
2x5-pin 2.00mm pitch header

2.3. Jumpers & Connectors

The board comes with some connectors to join some devices and also some jumpers to alter the hardware configuration. The following in this chapter will explicate each of these components one-by-one.
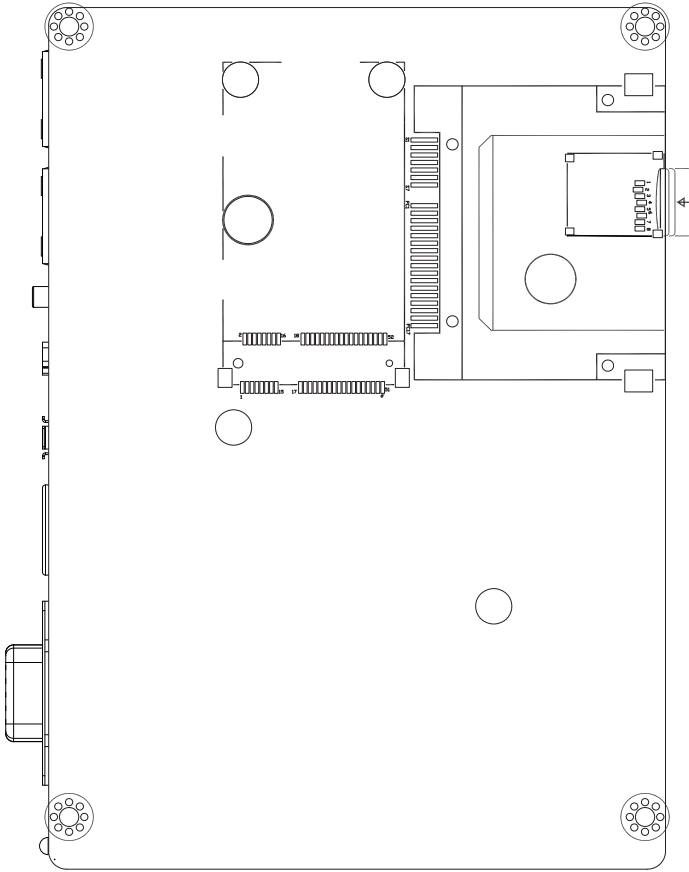
2.3.1. Layout

This section will provide an overview of this board, both the top and bottom sides.

Board Top
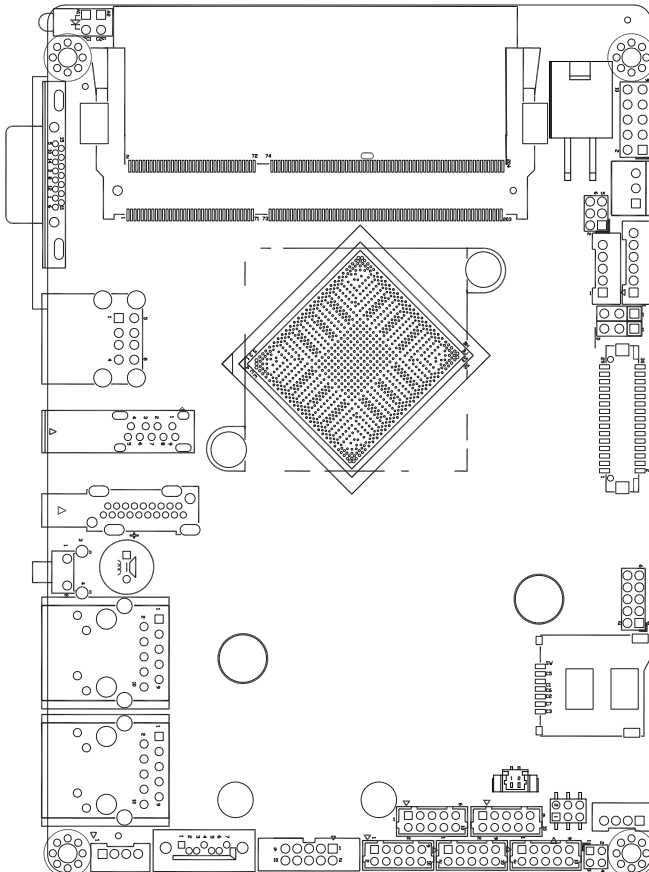
Board Bottom

2.3.2. Jumpers

JPIC1

Function:	AT/ATX Power Mode Selection
Jumper Type:	2.00mm pitch 2x3-pin header

Setting:

Pin	Description	
2-4	AT	
4-6	ATX mode (default)	

Board Top

JPIC1
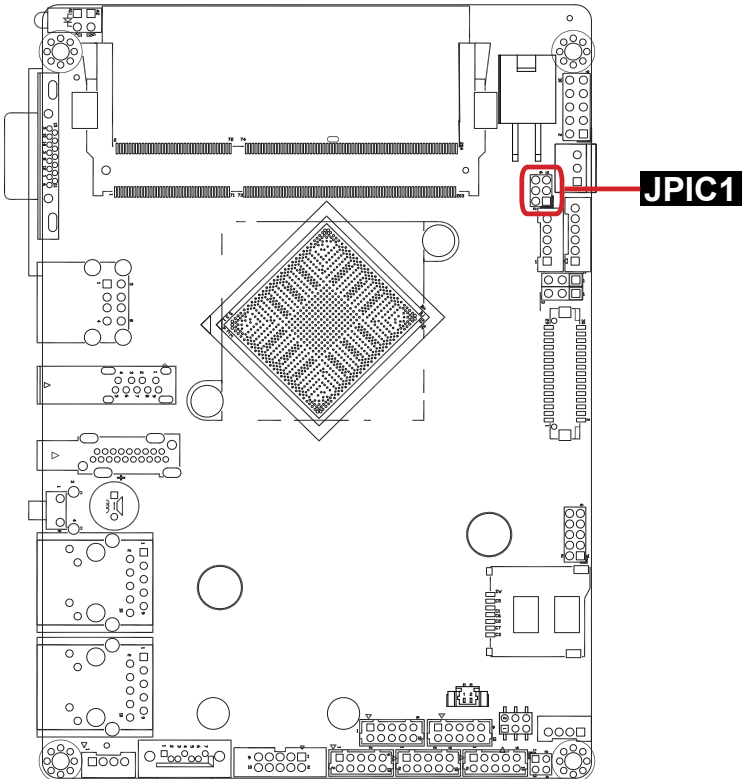
JVLCD1

Function:	LCD Panel Voltage Selection
Jumper Type:	2.54mm pitch 1x3-pin header

Setting:

Pin	Description	
1-2	+5V	3 2 1
2-3	+3.3V (default)	3 2 1

Board Top

JVLCD1
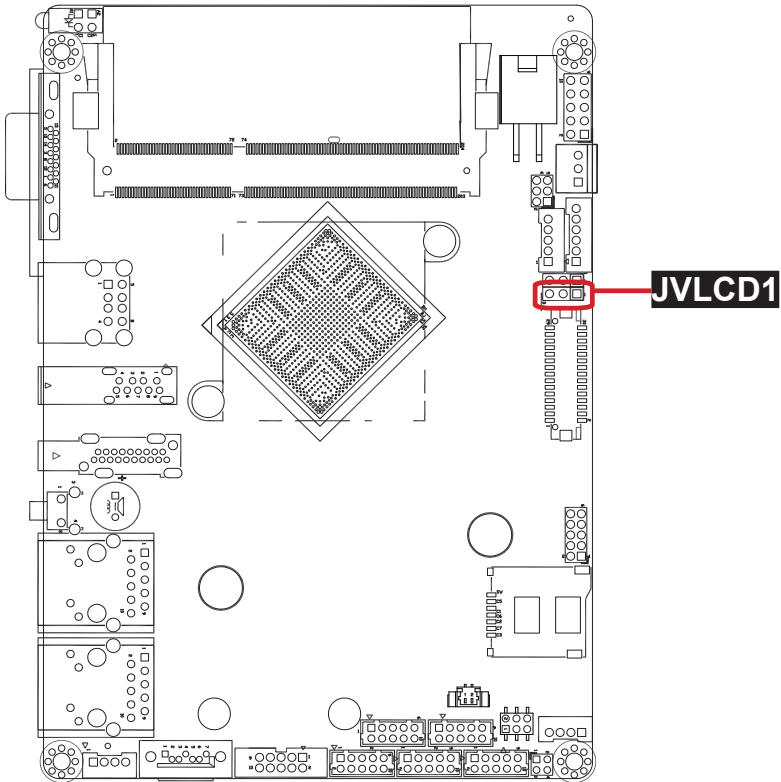
JINV1

Function:	LCD Inverter Voltage Selection
Jumper Type:	2.54mm pitch 1x3-pin header

Setting:
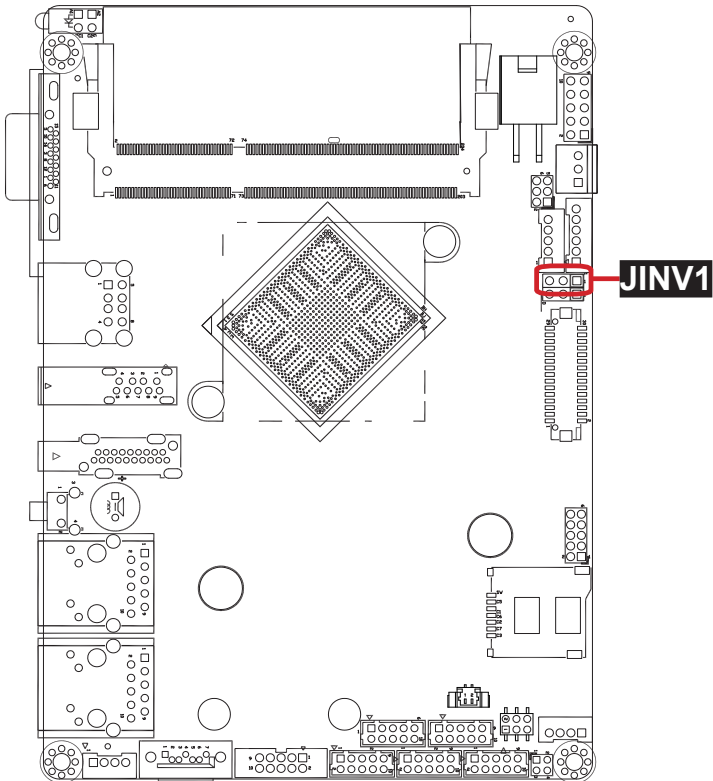
| Pin	Description	
1-2	+12V	3 2 1
2-3	+5V (default)	3 2 1

Board Top

JRS1

Function: COM1&2 RS-232/485 Selection

Jumper Type: 2.00 mm pitch 2x3-pin header

Setting:

Pin	Description	
1-3	COM1=RS-232 (default)	
3-5	COM1=RS-485	
2-4	COM2=RS-232 (default)	
4-6	COM2=RS-485	

Note: To enable RS-485 CON1, beside jumper setting, please go to BIOS Setting Menu to Enable RS-485 mode of COM1&2. Option is under **Advanced/ SIO FINTEK71869E/ RS-232/485 Setting/ RS-485**.

Board Top
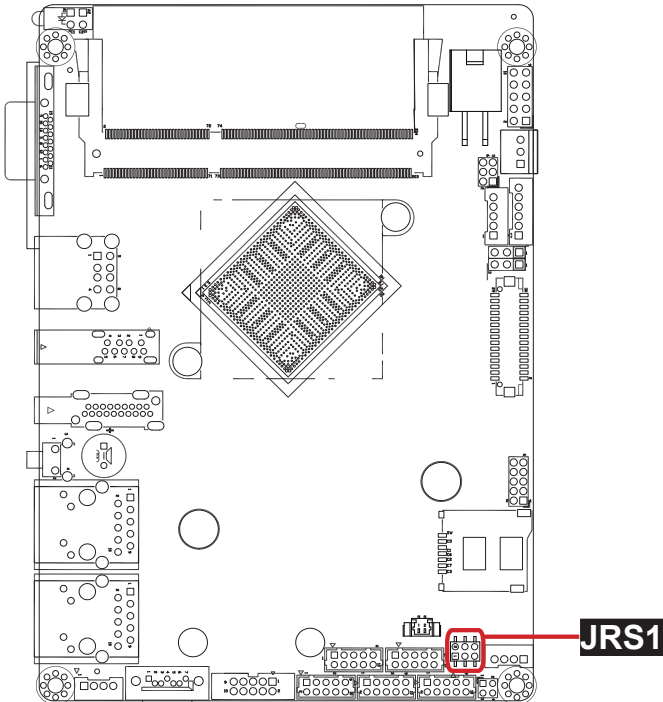
JRS2

Function:	COM1&2 RS-485 Terminator Mode Selection	
Jumper Type:	2.00 mm pitch 2x2-pin header	

Setting:

Pin	Status	Description	
1-2	Open	Set COM1 to RS-485 Terminator Mode (default)	
	Short	Set COM1 to RS-485 Normal Mode	
3-4	Open	Set COM2 to RS-485 Terminator Mode (default)	
	Short	Set COM2 to RS-485 Normal Mode	

Board Top

JRS2
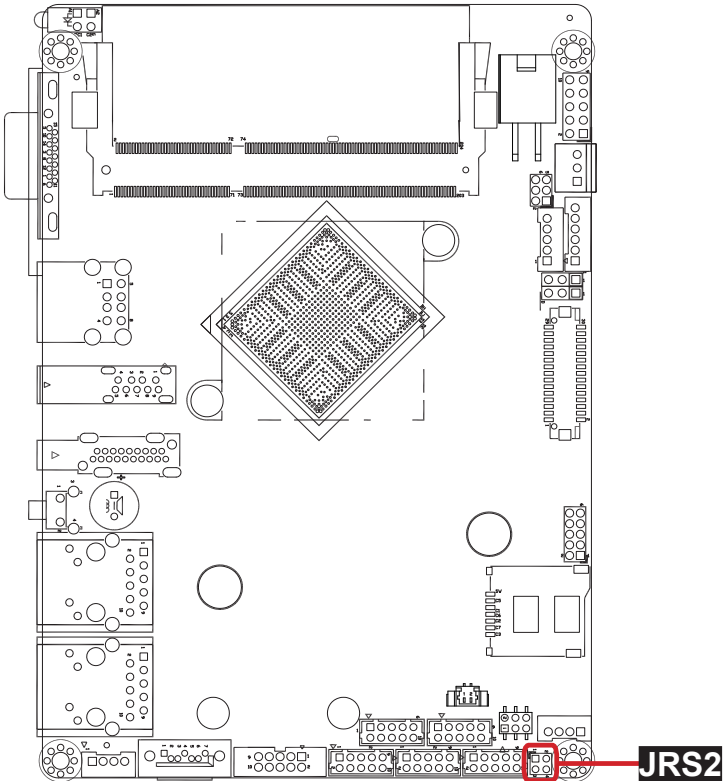
2.3.3. Connectors

12VIN1

Function:	ATX +12V Connector
Connector Type:	4-pin power connector

Pin Assignment:

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

Board Top
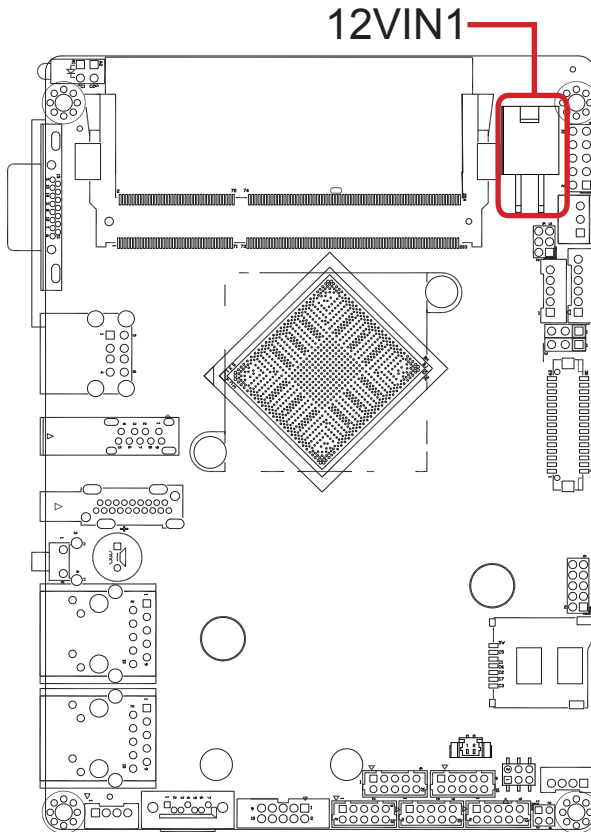
JFRT1

Function: Provides connectors to front-panel status LED and toggles

Connector Type: 2.54mm pitch 2x5-pin header

Pin Assignment:

Pin	Description	Pin	Description
1	RESET+	2	RESET-
3	PLED+	4	PLED-
5	HLED+	6	HLED-
7	SPEAK+	8	SPEAK-
9	PSON+	10	PSON-

Board Top

JFRT1
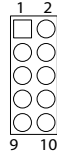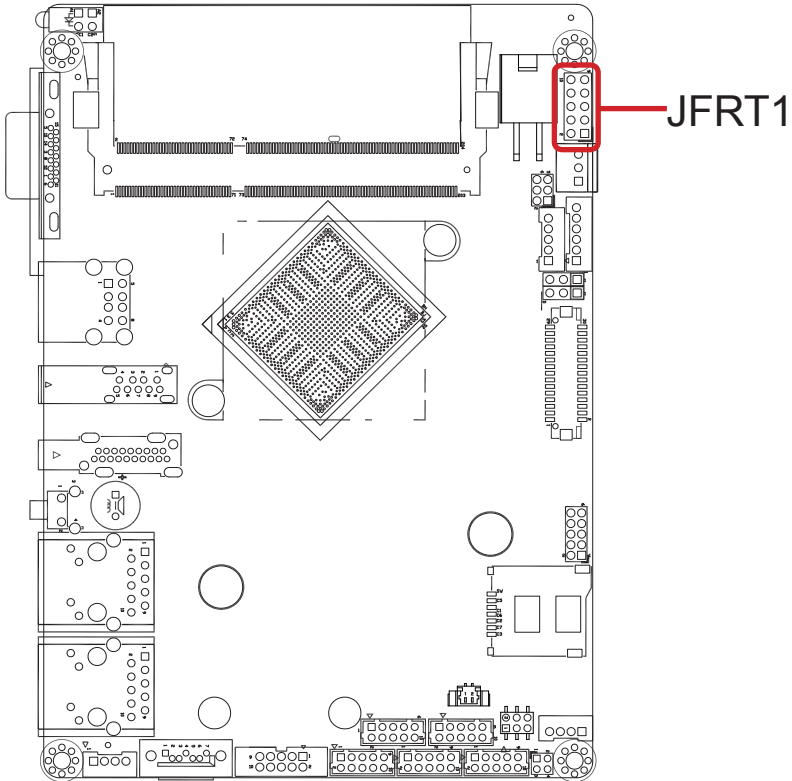
FAN1

Function: Fan connector

Connector Type: 2.54mm pitch 1x3-pin wafer connector.

Pin Assignment:

Pin	Description
1	GND
2	+12V
3	Speed

Board Top
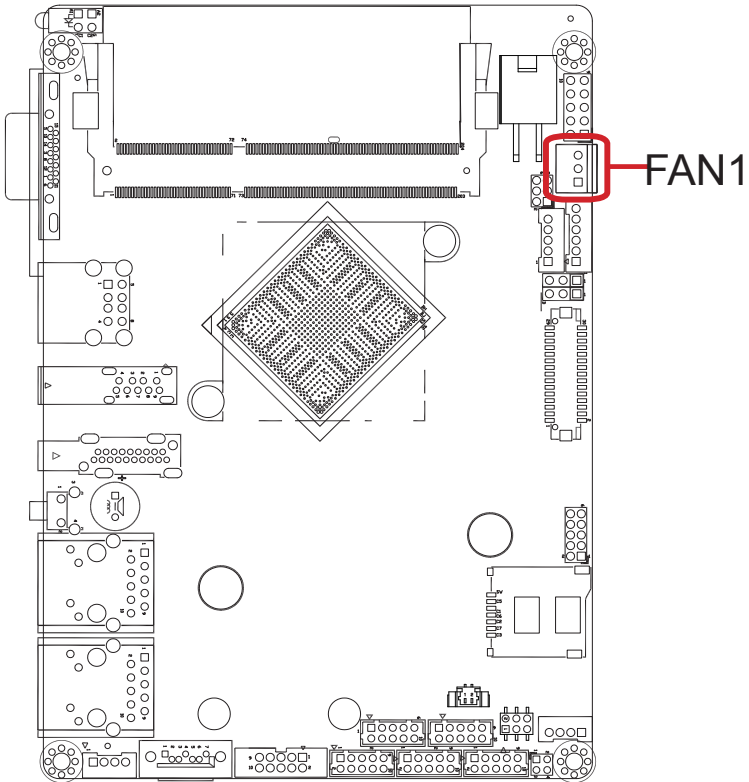
KBMS1

Function: Keyboard & Mouse connector

Connector Type: 2.0mm pitch 1x6-pin header

Pin Assignment:

Pin	Description
1	KB_DATA
2	GND
3	MS_DATA
4	KB_CLK
5	PS2_VCC
6	MS_CLK

Board Top

KBMS1
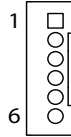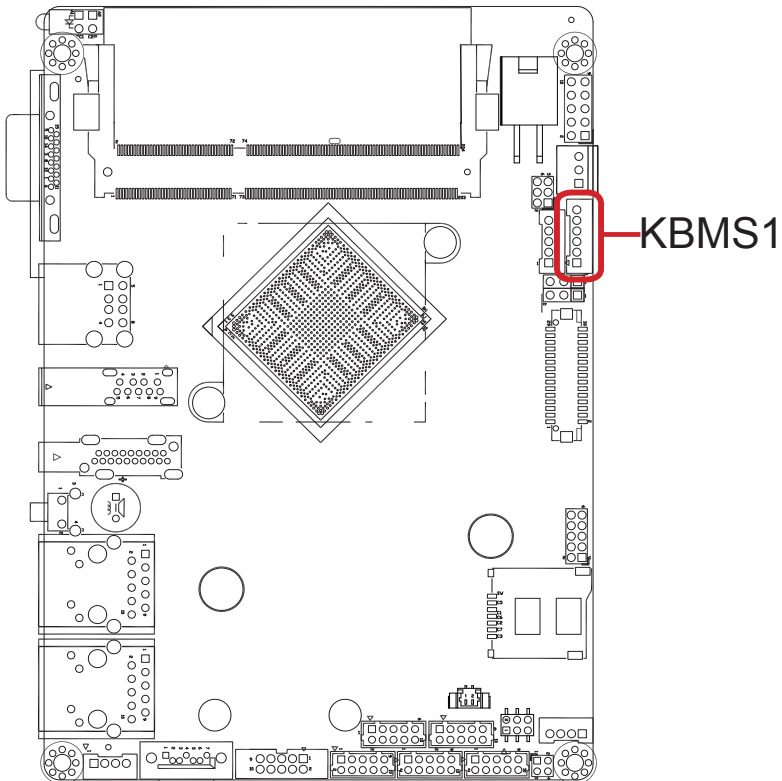
INV1

Function: LCD inverter connector

Connector Type: 2.00mm pitch 1x5-pin box wafer

Pin Assignment:

Pin	Description
1	Vin
2	GND
3	on/off
4	Brightness control
5	GND

Board Top
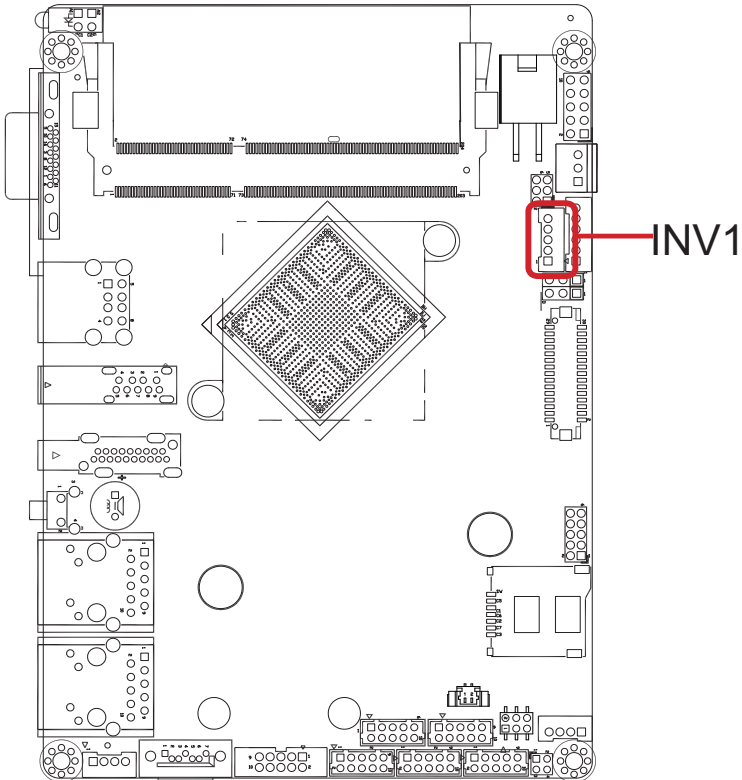
LVDS1

Function: LVDS LCD panel connector

Connector Type: ACES 1.25mm 87209-3040-06 connector that supports 24-bit dual channels.

Pin Assignment:

Pin	Description	Pin	Description
2	VDD	1	VDD
4	TX2_CLK+	3	TX1_CLK+
6	TX2_CLK-	5	TX1_CLK-
8	GND	7	GND
10	TX2_D0+	9	TX1_D0+
12	TX2_D0-	11	TX1_D0-
14	GND	13	GND
16	TX2_D1+	15	TX1_D1+
18	TX2_D1-	17	TX1_D1-
20	GND	19	GND
22	TX2_D2+	21	TX1_D2+
24	TX2_D2-	23	TX1_D2-
26	GND	25	GND
28	TX2_D3+	27	TX1_D3+
30	TX2_D3-	29	TX1_D3-

Board Top

LVDS1
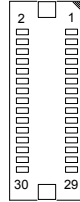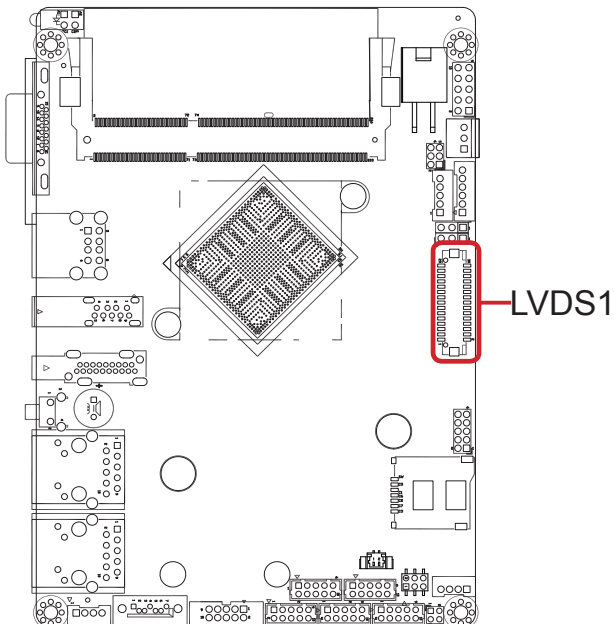
SIM1

Function: micro-SIM card socket

Connector Type: REGO 80440GIH-061T-120L socket

Pin Assignment:

Pin	Description	Pin	Description
C1	VCC	C2	RST
C3	CLK	C5	GND
C6	VPP	C7	I/O
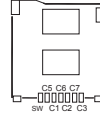
Board Top
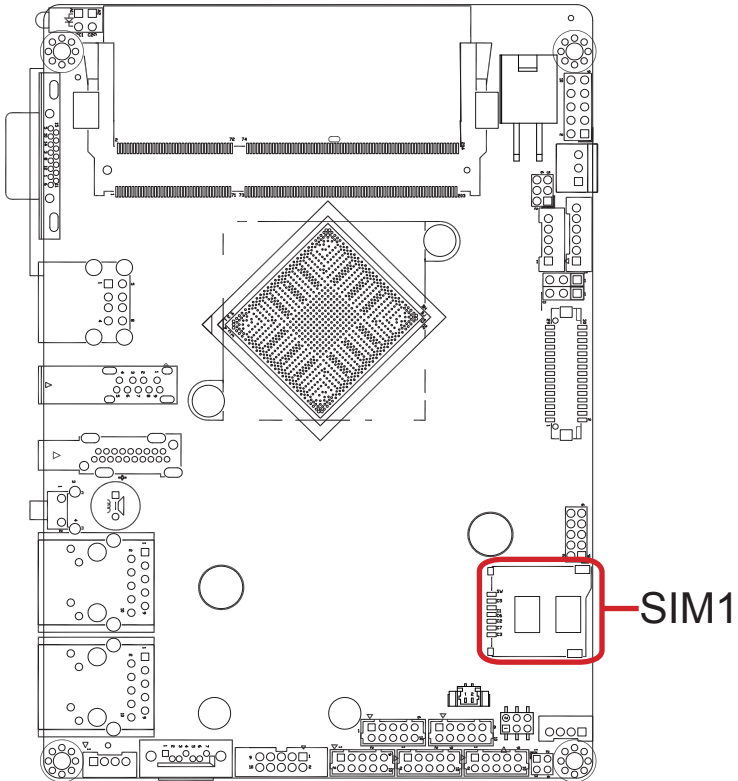
BAT1

Function: Battery connector

Connector Type: 1.25mm pitch 1x2 pin wafer connector

Pin Assignment:

Pin	Description
1	GND
2	Battery Power

1
2

Board Top

BAT1
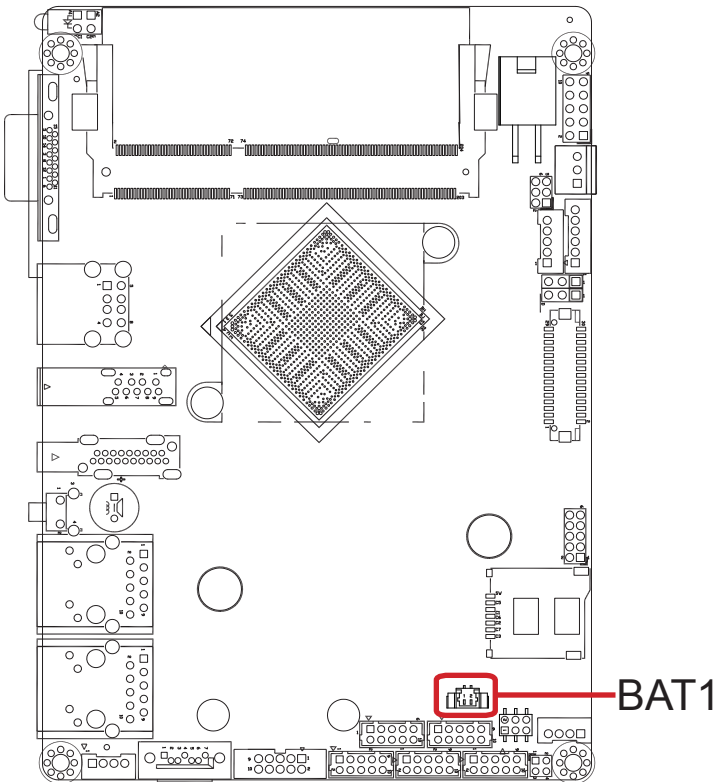
CON1

Function:	RS-485 connector
Connector Type:	2.00mm pitch 1x4-pin wafer connector

Pin Assignment:

Pin	Description
1	COM1 DATA1 +
2	COM1 DATA1 -
3	COM2 DATA2 +
4	COM2 DATA2 -

Note: To enable this port, please refer to .

Board Top

CON1
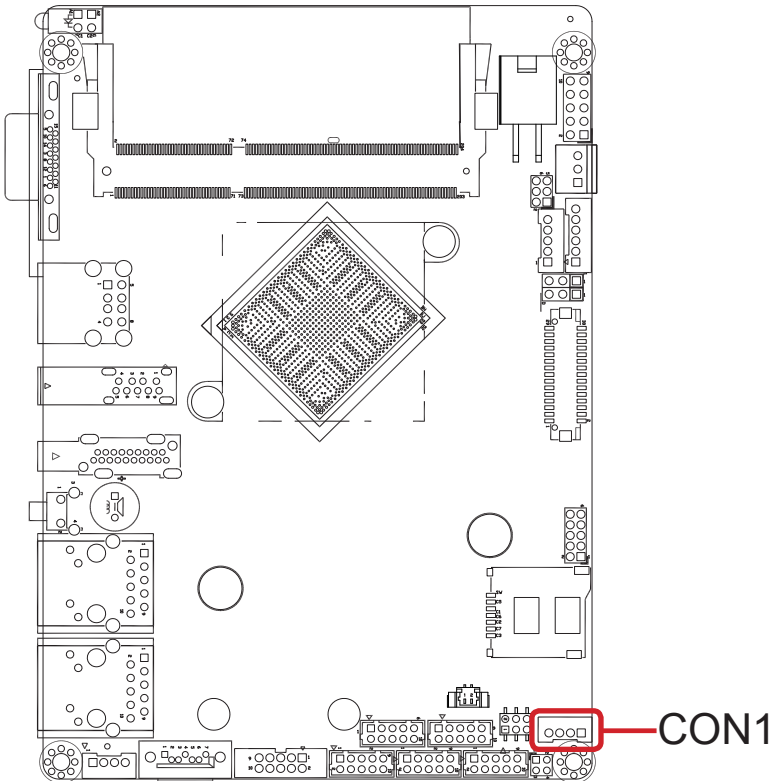
USB1,4

Function: USB 2.0 connector

Connector Type: 2.00mm pitch 2x5-pin lockable box headers

Pin Assignment:

Pin	Description	Pin	Description
2	+5V	1	+5V
4	USBP1-	3	USBP0-
6	USBP1+	5	USBP0+
8	GND	7	GND
10	GND	9	GND

Board Top

USB4

USB1
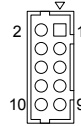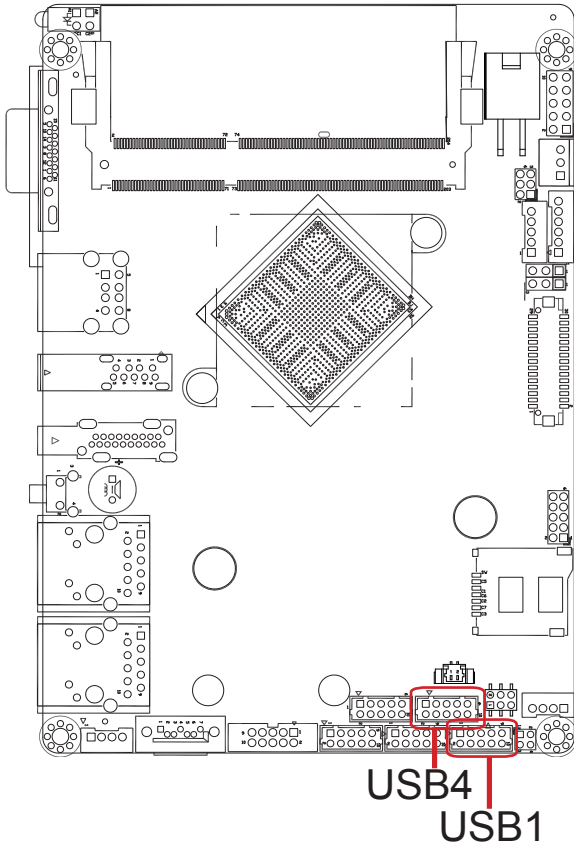
COM1&2

Function: Serial port connector

Connector Type: 2.00mm pitch 2x5-pin wafer connector

Pin Assignment:

Pin	Description	Pin	Description
2	RX	1	DCD#
4	DTR#	3	TXD
6	DSR#	5	GND
8	CTS#	7	RTS#
10	N/C	9	RI#

Board Top

COM2
COM1
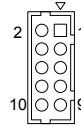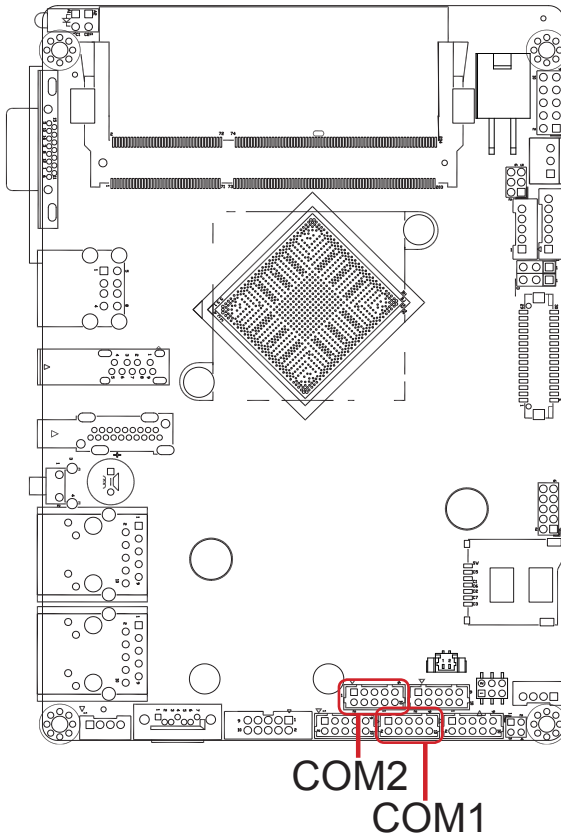
DIO1

Function: Digital I/O connector

Connector Type: 2.00mm pitch 2x5-pin lockable box headers

Pin Assignment:

Pin	Description	Pin	Description
2	GPIO1	1	GPIO0
4	GPIO3	3	GPIO2
6	GPIO5	5	GPIO4
8	GPIO7	7	GPIO6
10	GND	9	+5V
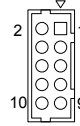
Board Top
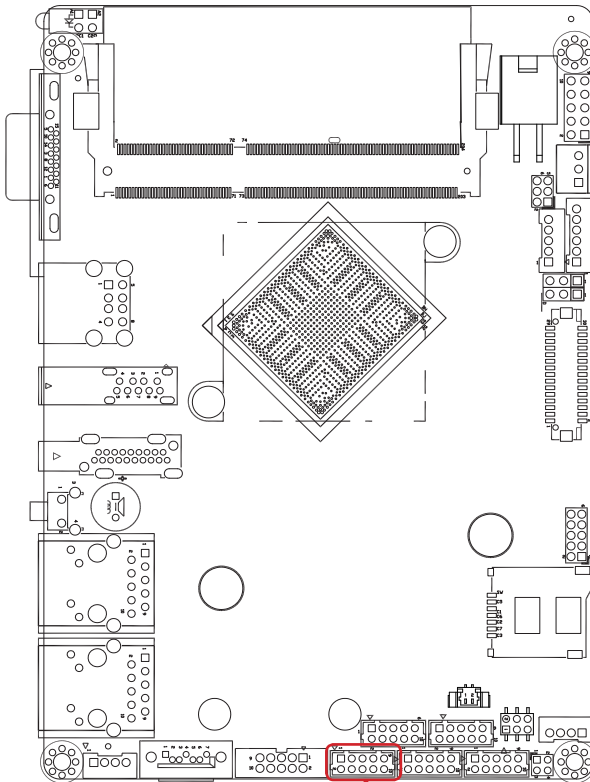
DIO1

AUDIO1

Function: Audio connector

Connector Type: 2.00mm pitch 2x5-pin header

Pin Assignment:

Pin	Description	Pin	Description
1	Line Left In	2	Line Right In
3	GND	4	GND
5	MIC1	6	MIC2
7	GND	8	GND
9	Line-out Left	10	Line-out Right
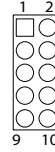
Board Top
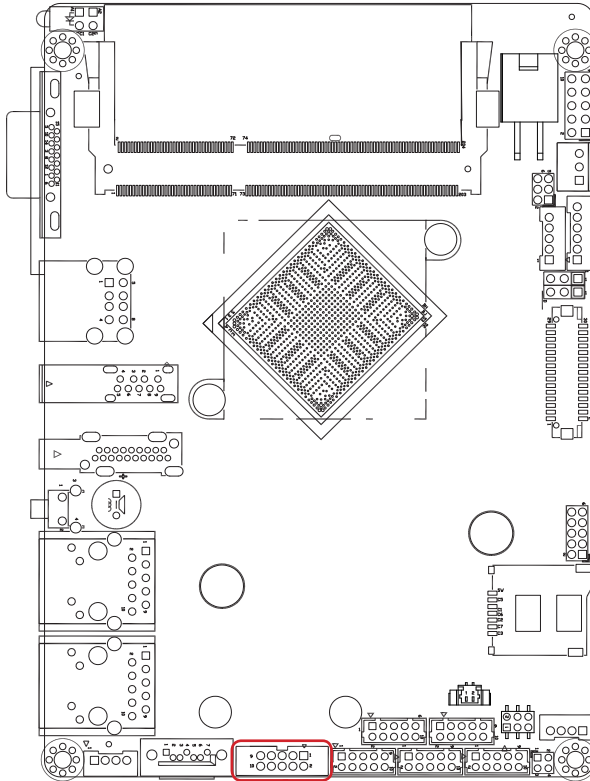
AUDIO1

SATA1

Function: Serial ATA connector

Pin Assignment: The pin assignments conform to the industry standard.
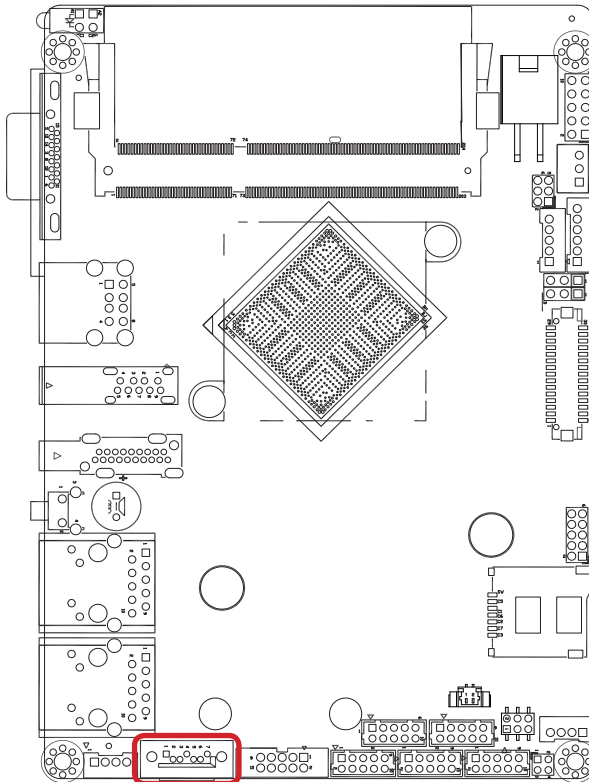
Board Top

SATA1

PWROUT1

Function: SATA power connector

Connector Type: 2.00mm pitch 1x4-pin wafer connector

Pin Assignment:

Pin	Description
1	VCC 5V
2	GND
3	GND
4	VCC 12V

Board Top
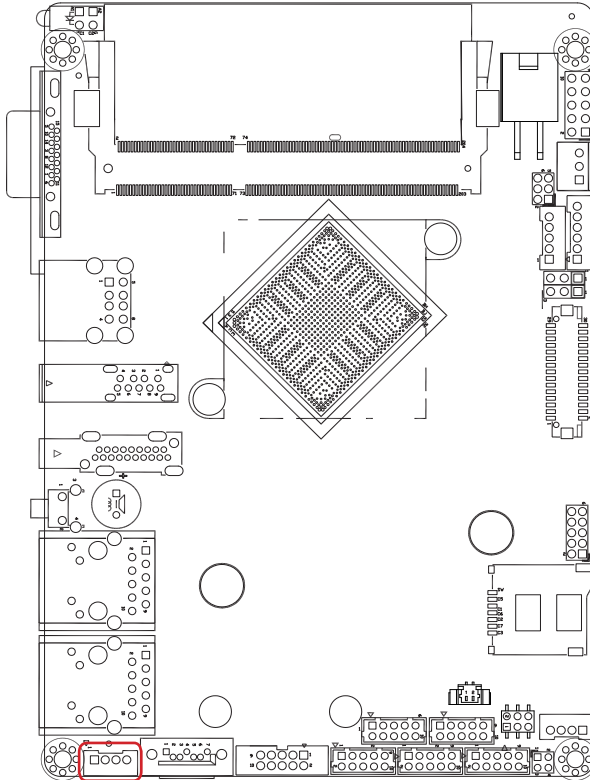
PWROUT1

LAN1, 2

Function:	Ethernet connectors
Connector Type:	RJ-45 connector that supports 10/100/1000Mbps Ethernet
Pin Assignment:	

Pin	Description	Pin	Description
1	MDI0+	2	MDI0-
3	MDI1+	4	MDI1-
5	MDI2+	6	MDI2-
7	MDI3+	8	MDI3-
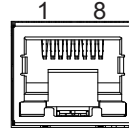
Board Top
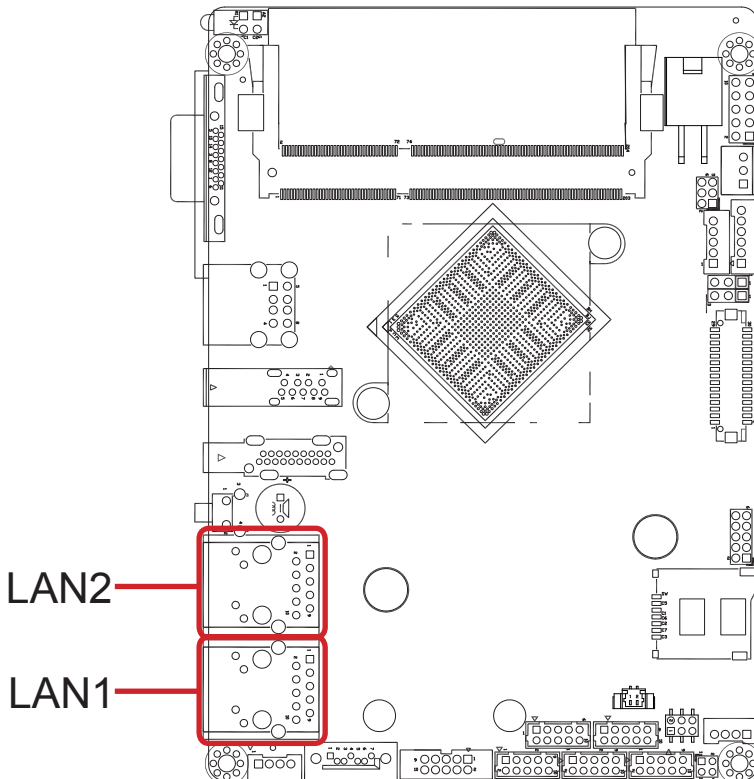
RES1

Function: Reset button

Board Top

RES1—
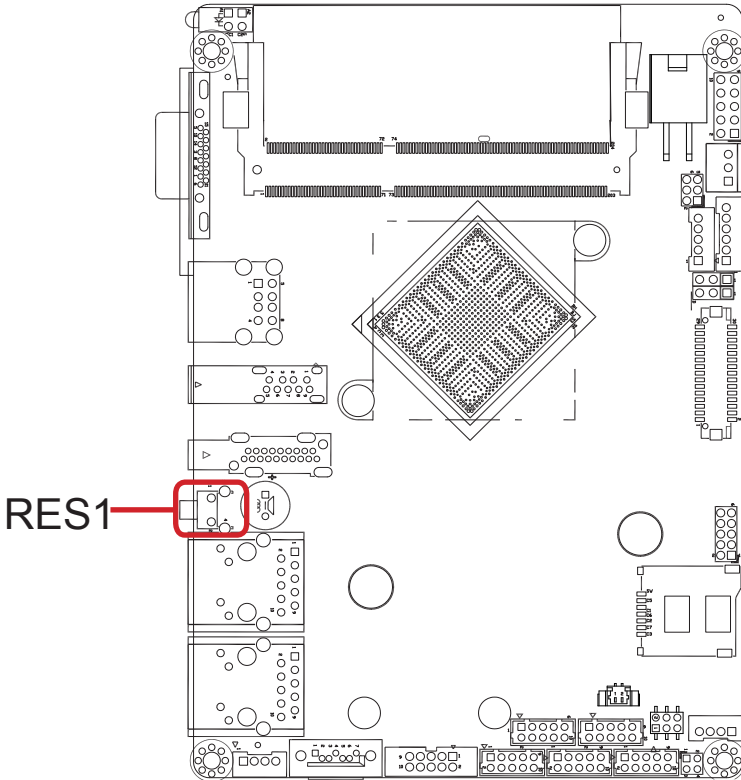
HDMI1

Function: HDMI connector

Connector Type: 19-pin HDMI connector with flange

Pin Assignment: The pin assignments conform to the industry standard.

Board Top

HDMI1
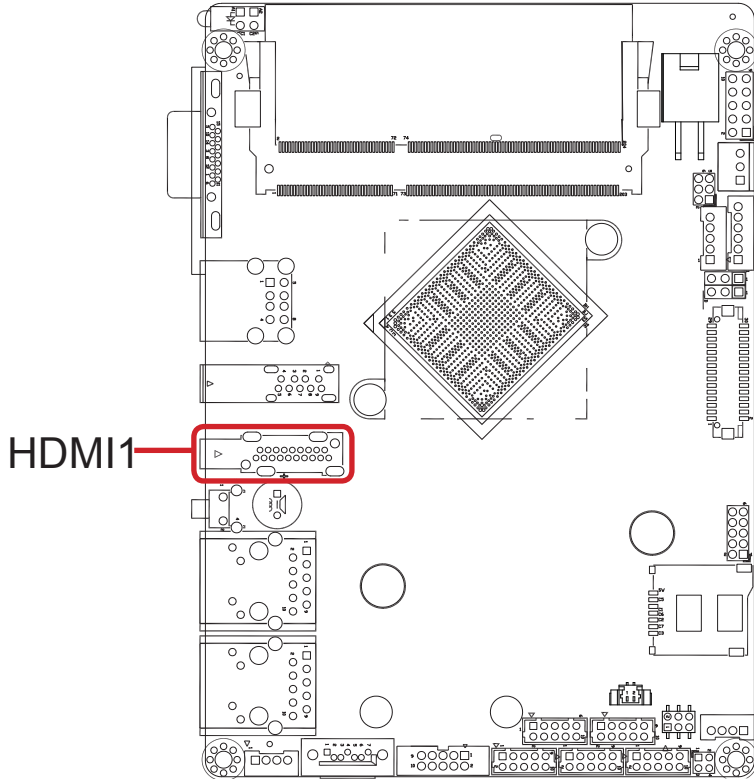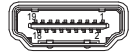
USB2

Function:	USB 3.0 connector
Connector Type:	USB 3.0/2.0 type-A connectors
Pin Assignment:	The pin assignments conform to the industry standard.
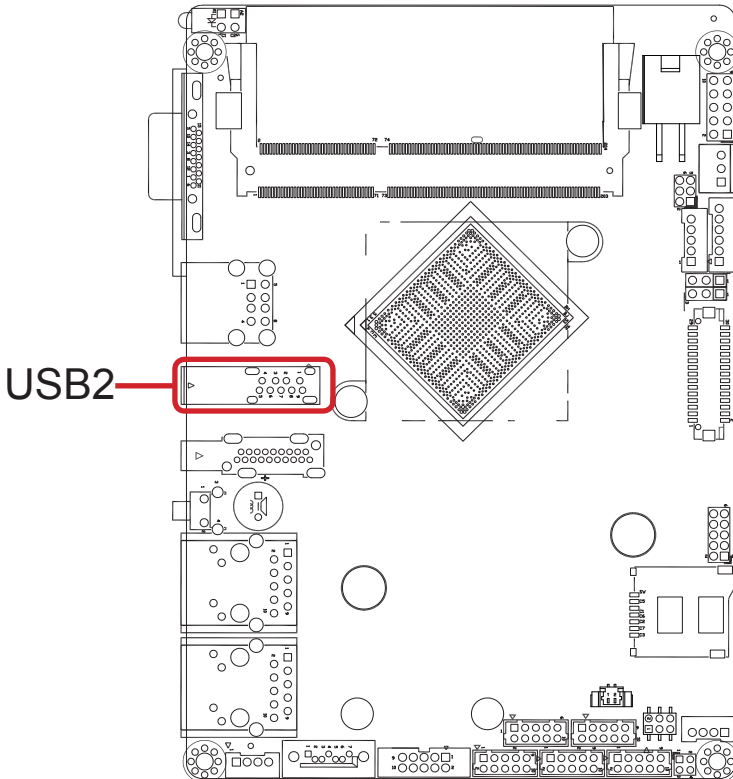
Board Top

USB2

USB3

Function:	Double-stacked USB connectors
Connector Type:	Two USB 2.0/1.0 type-A connectors
Pin Assignment:	The pin assignments conform to the industry standard.
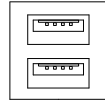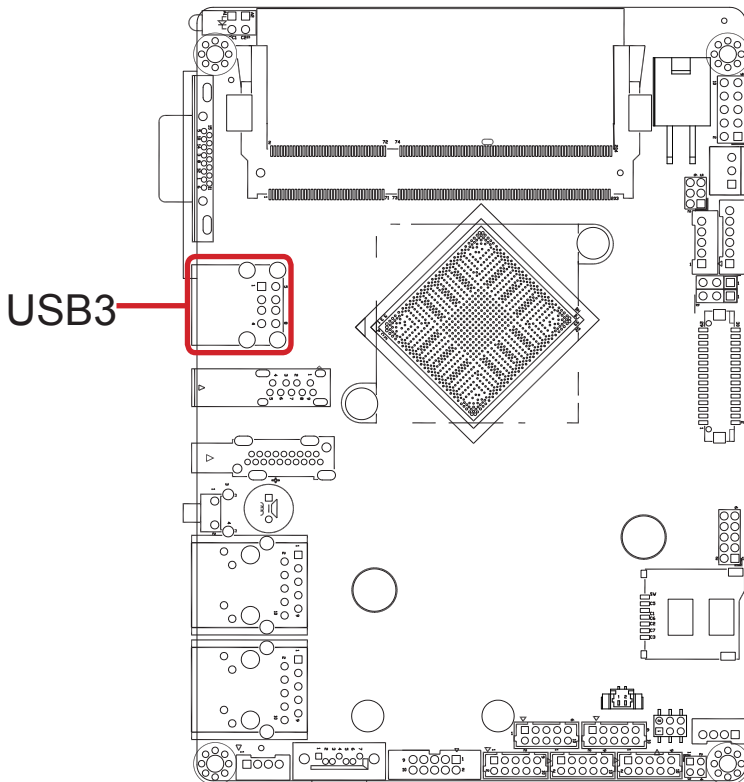
Board Top

VGA1

Function: Analog RGB connector

Connector Type: D-Sub 15-pin female connector

Pin Assignment:

Pin	Description.	Pin	Description
1	RED	9	5V
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	D-DATA
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	D-DCLK
8	GND		
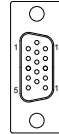
Board Top
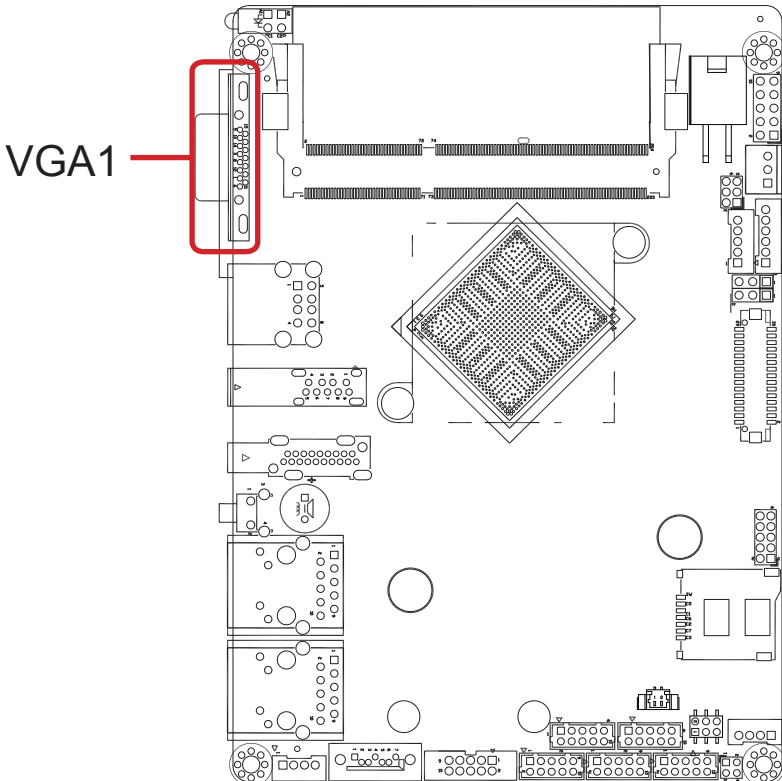
SYSLED1:

Function: Power ON & HDD LED Indicator

Board Top

SYSLED1
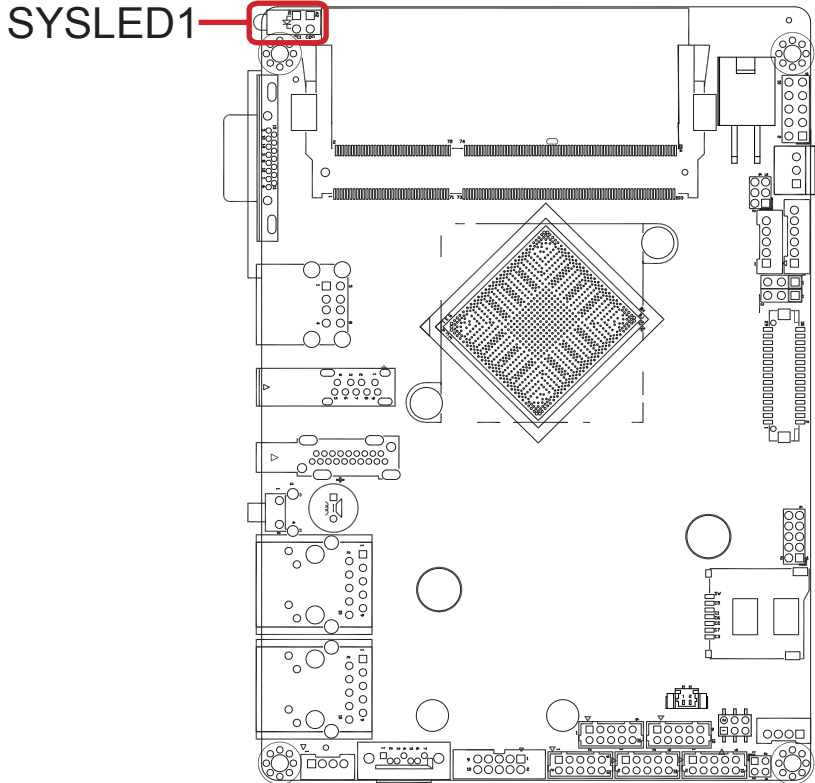
MC1

Function:	Mini-card socket
Connector Type:	Onboard 0.8mm-pitch 52-pin edge card connector interconnected with SIM card socket.

The pin assignments conform to the industry standard.
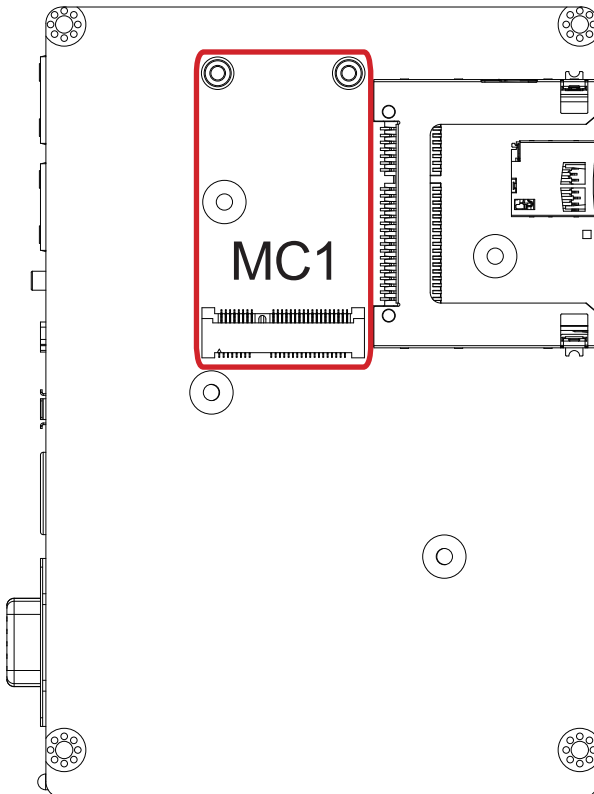
Board Bottom

CF1

Function: CFast card socket

The pin assignments conform to the industry standard.
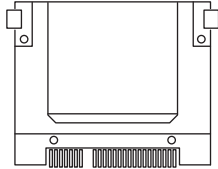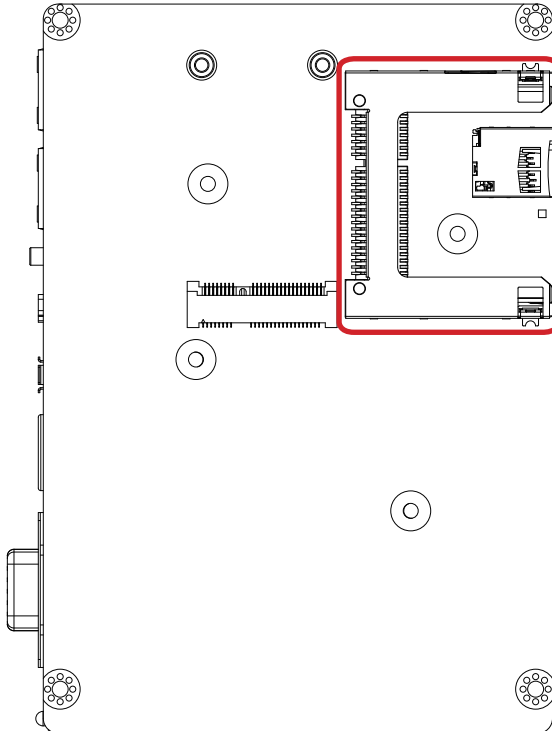
Board Bottom

SD1

Function: Micro SDXC card socket
(supports SDXC card SD 3.0 only)

The pin assignments conform to the industry standard.
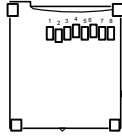
Board Bottom
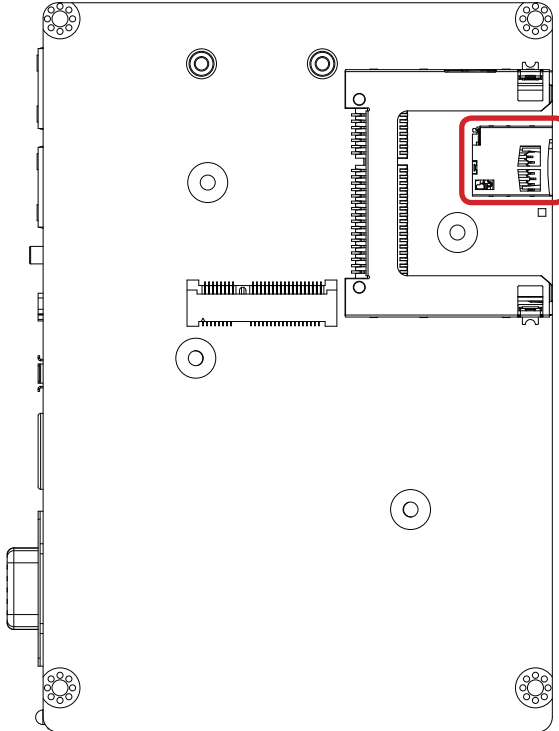
2.4. Driver Installation Notes

The board supports Windows 7 and Windows 8.1. Find the necessary drivers on the CD that comes with your purchase. For different OS, the driver/utility installation may vary slightly, but generally they are similar.

Find the drivers on CD by the following paths:

Windows 7

Device	Driver Path
Audio	\Audio\32bit_Win7_Win8_Win81_R275
	\Audio\64bit_Win7_Win8_Win81_R275
Chipset	\Chipset\SetupChipset_10.0.13_PC
Ethernet	\Ethernet\Realtek\Win7\Install_Win7_7085_05222014
GPIO	\GPIO\windows 7 32_64\Intel Atom E3800 Win7 IO Drivers_Gold_v1.0 package 501232_ 20140211
Graphic	\Graphics\WIN7_32\Intel_EMGD.WIN7_PC_Version_36_15_0_1073
	\Graphics\WIN7_64\Intel_EMGD.WIN7_PC_Version_37_15_0_1073
TXE	\TXE\Installers (Only for 64-bit)
USB3.0	\USB3.0\Intel(R) USB 3.0 eXtensible Host Controller_Win7_32bit_64bit_R3.0.0.33
Serial IO	\Serial IO\Intel Processor IO Drivers_Win7_32bit_64bit_Gold_v2.0

Windows 8.1

Device	Driver Path
Audio	\Audio\32bit_Win7_Win8_Win81_R275
	\Audio\64bit_Win7_Win8_Win81_R275
Chipset	\Chipset\SetupChipset_10.0.13_PC
Ethernet	\Ethernet\Realtek\Win8_8.1\Install_Win8_8.1_8031_05222014
GPIO	\GPIO\Kit 100882 20140211 windows 8.1 64\GPIO(Only for 64-bit)
Graphic	\Graphics\WIN8_32\15.33.22.3621
	\Graphics\WIN8_64\15.33.22.64.3621
TXE	\TXE\Installers
Serial IO	\Serial IO\SerialIO_Installer_Win8.1_64bit_WW23

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Chapter 3

BIOS

The BIOS Setup utility is featured by BIOS to configure the system settings stored in the system's BIOS ROM. BIOS is activated once the computer powers on.

After entering the utility, use the left/right arrow keys to navigate between the top menus and use the down arrow key to access one.

Menu	Description
Main	See 3.1. Main on page 45.
Advanced	See 3.2. Advanced on page 46.
Security	See 3.3. Security on page 51.
Power	See 3.4. Power on page 53.
Boot	See 3.5. Boot on page 53.
Exit	See 3.6. Exit on page 54.

NOTE: For system stability and performance, this BIOS utility is constantly improved. The screenshots demonstrated and descriptions hereinafter are for reference only and may not exactly meet what is presented onscreen.

3.1. Main

The **Main** menu displays some BIOS info and features the settings of **System Date** and **System Time**.

```
                              InsydeH20 Setup Utility                    Rev. 5.0
 Main  Advanced  Security  Power  Boot  Exit

 BIOS Version                      R1.03
 Project Name                      EmCORE-i230G
 Build Date                        12/19/2014
 Build Time                        15:53:56

 Platform firmware Information
 VLV SOC                           11 (D0 Stepping)
 MRC Version                       0.95
 PUNIT FW                          0x12
 PMC FW Patch                      0x5_10
 TXE FW Version                    1.0.2.1060
 IGD VBIOS Version                 3757
 Microcode Revision                901
 CPU Flavor                        VLV IVI (0)
 Board ID                          BALEY BAY (20)
 Fab ID                            FAB3 (03)

 Processor Type                    Intel(R) Atom(TM) CPU  E3845 @ 1.91GHz
 System Bus Speed                  83 MHz
 System Memory Speed               1333 MHz
 Cache RAM                         1024 KB
 Total Memory                      2048 MB
 Channel A - SODIMM 0              2048 MB
 Channel B - SODIMM 0              [Not Installed]
 Language                          <English>
 System Time                       [15:19:04]
 System Date                       [12/29/2014]




 F1  Help          ↑↓ Select Item        F5/F6 Change Values        F9  Setup Defaults
 Esc Exit          ↔  Select Menu        Enter Select ▶ SubMenu     F10 Save and Exit
```

The BIOS info displayed is:

Info Item	Description
BIOS Version	Delivers the computer's BIOS version.
Project name	Delivers the name of the project
Build Date and Time	Delivers the date and time when the BIOS Setup utility was created/updated.
Platform firmware Information	Delivers the Platform firmware Information

The featured settings are:

Setting	Description
Language	Select the current default language used by the InsydeH20
System Time	Sets system time.
System Date	Sets system date.

3.2. Advanced

The **Advanced** menu controls the system's CPU, IDE, Super IO, AHCI and USB. It also helps users monitor hardware health.
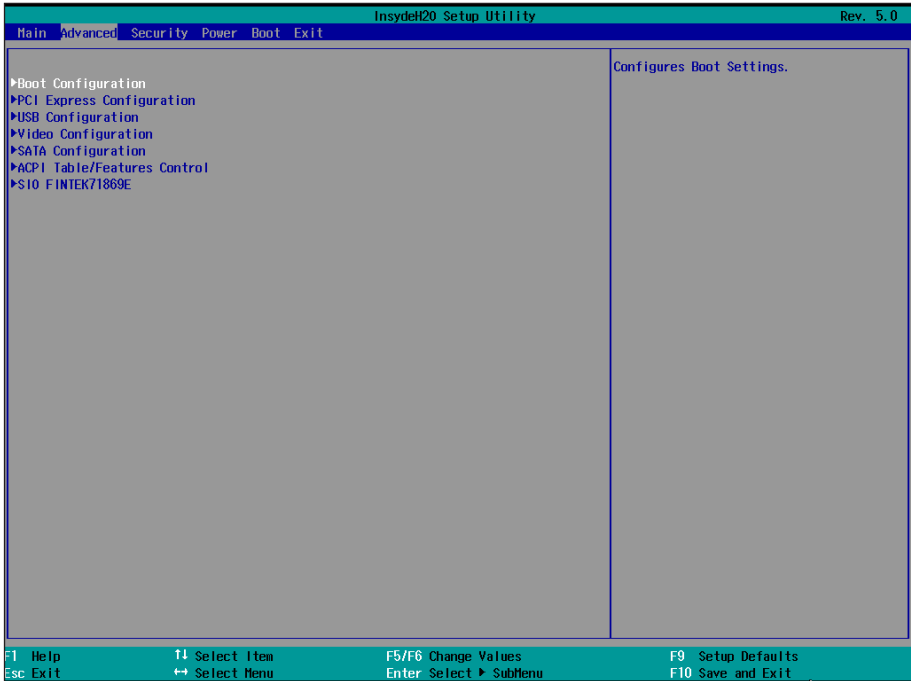
The featured submenus are:

Submenu	Description
Boot Configuration	See 3.2.1. Boot Configuration on page 47.
PCI Express Configuration	See 3.2.2. PCI Express Configuration on page 47.
USB Configuration	See 3.2.3. USB Configuration on page 47.
Video Configuration	See 3.2.4. Video Configuration on page 48.
SATA Configuration	See 3.2.5 SATA Configuration on page 48.
ACPI Table/Feature Control	See 3.2.6 ACPI Table/Feature Control on page 49.
SIO FINTEK71869E	See 3.2.7. SIO FINTEK71869E on page 50.

3.2.1. Boot Configuration

Setting	Description
Numlock	Select Power-on state for Num lock

3.2.2. PCI Express Configuration

Configures PCI Express by the following settings:

Setting	Description
PCI Express Root Port 1/2/3/4	▶ PCI Express Root Port Enables/disables this PCIe port. ▶ PCIe Speed Options are: Auto, Gen 1, Gen 2 Auto is the default. ▶ ASPM Support Options are: Disable : disables ASPM L0s : force all links to L0s state L1 : force all links to L1 state L0sL1 : force all links to L0s+L1 state Auto : BIOS auto configure

3.2.3. USB Configuration

Select this submenu to view the status of the USB ports and configure USB features.

The featured settings are:

Setting	Description
XHCI Pre-Boot Mode Support	Enables/Disables XHCI Pre-Boot mode support
xHCI Mode	Set the mode of operation of xHCI controller Options are Disabled/Enabled/Auto/Smart Auto(default)
XCHI Controller	Enables/Disables XHCI controller
USB2 Link Power Management	Enables/Disables USB2 Link Power Management.
XCHI Streams	Enables/disables XHCI Stream
USB OTG Support	Enables/disables USB OTG Support
USB VBUS	Turn ON/OFF USB VBUS. Turn ON in HOST mode, and turn OFF in OTG device mode.
USB RMH Mode	Enables/disables USB RMH Mode
USB ECHI debug	Enables/disables USB ECHI debug
USB Per-Port Control	Enables/Disables USB Per-port control

3.2.4. Video Configuration

Configure video settings

The featured setting is:

Setting	Description
Configure DDI1 as	Set the hardware configuration of DDI1 Options are LVDS (default) / No device

3.2.4.1 PTN3460 (eDP to LVDS) Configuration

Setting	Description
PTN3460 Output Format	Set the Output Format of PTN3460. Options are (00) VESA (24bpp) / (01) VESA or JEIDA (18bpp) / (10) JEIDA (24bpp) / (11) JEIDA (24bpp)
PTN3460 Channel Control	Set the Channel of PTN3460. Options are Single(default), Dual.
PTN3460 EDID Table	Set the EDID Table of PTN3460.

3.2.4.2 IGD- LCD Control

Setting	Description
GMCH BLC Control	Set the mode of GMCH BLC Control Options are Auto(default) / PWM-Inverted

3.2.5 SATA Configuration

Select this submenu to configure the SATA controller and HD.

Setting	Description
SATA Controller(s)	Enables/disables the present SATA controller. ‣ **Enabled** is the default.
Configures SATA Mode	Configures how to sun the SATA drives. ‣ Options available are **AHCI** (default) and **IDE**.
SATA Port 0 Hot Plug Capability	Enables/disables hot-pluggable feature for the SATA port.
SATA Port 1 Hot Plug Capability	‣ **Enabled** is the default.
SATA Port 0 Connect to an ODD	Enables/disables the SATA port connect to an ODD If enabled, when you connect an ODD to a SATA port.
SATA Port 1 Connect to an ODD	The software auto detection for media insert and tray will be enabled. ‣ **Disabled** is the default.
Serial ATA Port 0	Delivers the SATA port Media information and Security Mode.
Serial ATA Port 1	

3.2.6 ACPI Table/Feature Control

Setting	Description
FACP - RTC S4 Wakeup	This function will be avalible only when ACPI is enabled. Enables/disables S4 Wakup from RTC.
APIC - IO APIC Mode	This item is valid only for WIN2K and WINXP. Also, a frech install of the OS must occur when APIC mode is desired. Enables/disables the APIC mode
DSDT - ACPI S3	Enables/disables ACPI S3 state
DSDT - ACPI S4	Enables/disables ACPI S4 state
BGRT - ACPI BGRT	Enables/disables ACPI BGRT Table

3.2.7. SIO FINTEK71869E

Configures SIO by the following settings:

Setting	Description
Power Loss mode	Set the state of Power Loss mode Options are Keep last state/ Bypass mode/ Always On(default)/Always Off
Serial Port A	▶ Serial Port A Enables/disables the Serial port. ▶ RS-232/RS-485 Setting Set the mode of Serial port. Options are RS232 (default), RS485 ▶ Base I/O Address Setup the Base I/O Address of the Serial Port. ▶ Interrupt Setup the Interrupt of the Serial Port
Serial Port B	▶ Serial Port B Enables/disables the Serial port. ▶ RS-232/RS-485 Setting Set the mode of Serial port. Options are RS232 (default), RS485 ▶ Base I/O Address Setup the Base I/O Address of the Serial Port. ▶ Interrupt Setup the Interrupt of the Serial Port

3.3. Security

The **Security** menu sets up the password for the system's administrator account. Once the administrator password is set up, this BIOS Setup utility is limited to access and will ask for the password each time any access is attempted.

```
                              InsydeH20 Setup Utility                           Rev. 5.0
   Main  Advanced  Security  Power  Boot  Exit

                                                              Install or Change the password and the
                                                              length of password  must be greater than
   Supervisor Password                   Not Installed        one character.

   Set Supervisor Password




















 F1  Help              ↑↓ Select Item         F5/F6 Change Values            F9  Setup Defaults
 Esc Exit              ↔  Select Menu          Enter Select ▶ SubMenu        F10 Save and Exit
```

The featured setting is:

Setting	Description
Set Supervisor Password	To set up an administrator password: 1. Select **Set Supervisor Password**. An **Create New Password** dialog then pops up onscreen. 2. Enter your desired password that is no less than 3 characters and no more than 20 characters. 3. Hit [Enter] key to submit.

3.4. Power

The **Power** menu sets up the power option of system
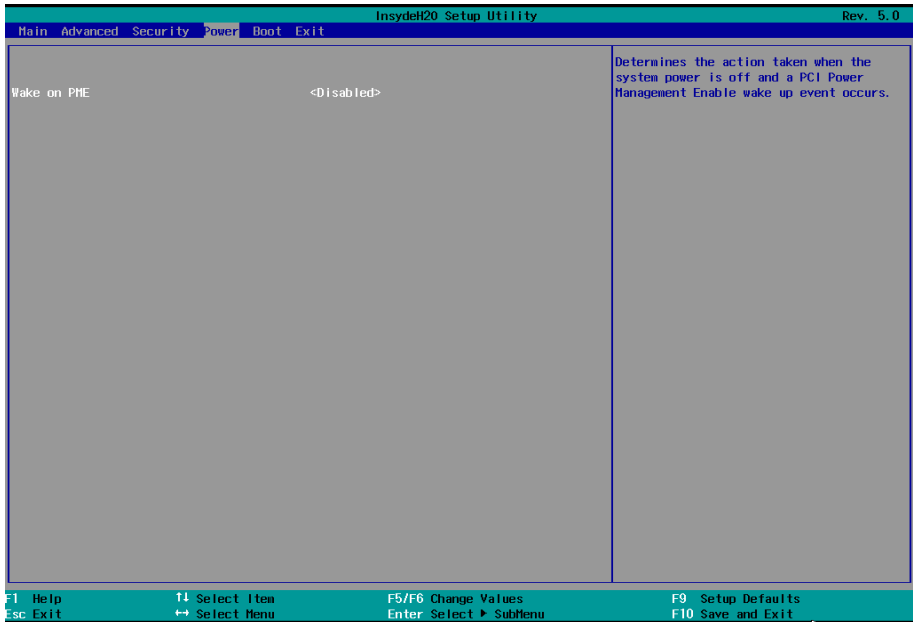
The featured setting is:

Setting	Description
Wake on PME	Enables or disables Wake on PME. Determines the action taken when the system power is off and a PCI Power Management Enable wake up event occurs.

3.5. Boot

The **Boot** menu configures how to boot up the system such as the configuration of boot device priority.

```
                              InsydeH20 Setup Utility                              Rev. 5.0
  Main  Advanced  Security  Power  Boot  Exit

 Boot Type                          <Legacy Boot Type>         Select boot type to Dual type, Legacy
 Quick Boot                         <Enabled>                  type or UEFI type
 Quiet Boot                         <Enabled>
 PXE Boot to LAN                    <Disabled>
 ACPI Selection                     <Acpi4.0>
 USB Boot                           <Enabled>
 Automatic Failover                 <Enabled>

 ▶Legacy








 F1  Help          ↑↓ Select Item      F5/F6 Change Values         F9  Setup Defaults
 Esc Exit          ↔  Select Menu      Enter Select ▶ SubMenu      F10 Save and Exit
```
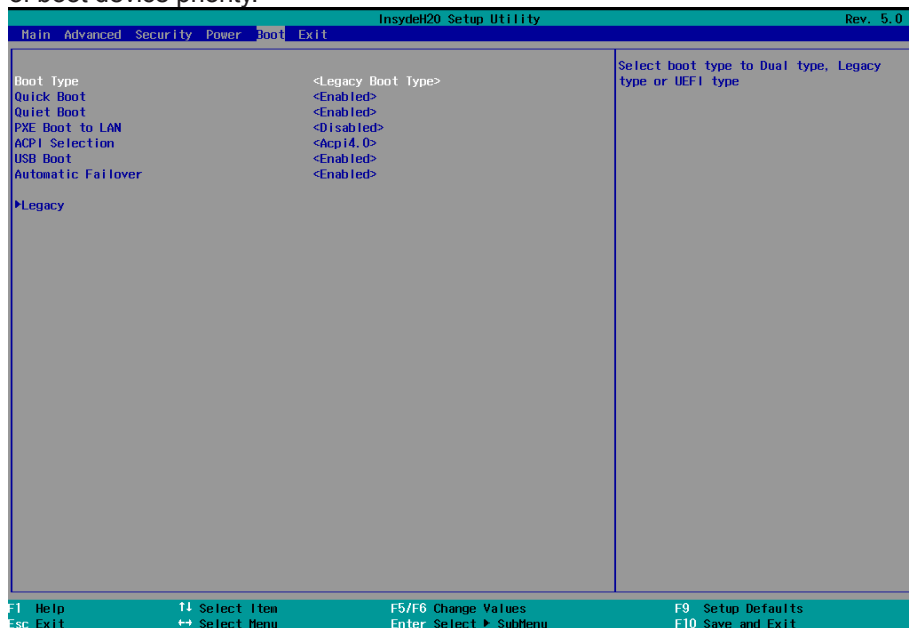
The featured settings are:

Setting	Description
Boot Type	Select the boot type. Options are Legacy Boot Type (default), and UFEI Boot Type.
Quick Boot	Allow InsydeH20 to Skip certain tests while booting . This will decrease the time need to boot the system.
Quiet Boot	Disables or enables booting in text mode.
PXE boot to LAN	Disables or enables PXE boot to LAN.
ACPI Selection	Select boot to Acpi 3.0/Acpi 1.0B Options are Acpi 1.0B/Acpi 3.0/Acpi 4.0/Acpi 5.0
USB Boot	Disables or enables booting to USB boot devices.
Automatic Failover	Enables/disables the Automatic Failover.

3.6. Exit

The **Save & Exit** menu features a handful of commands to launch actions from the BIOS Setup utility regarding saving changes, quitting the utility and recovering defaults.
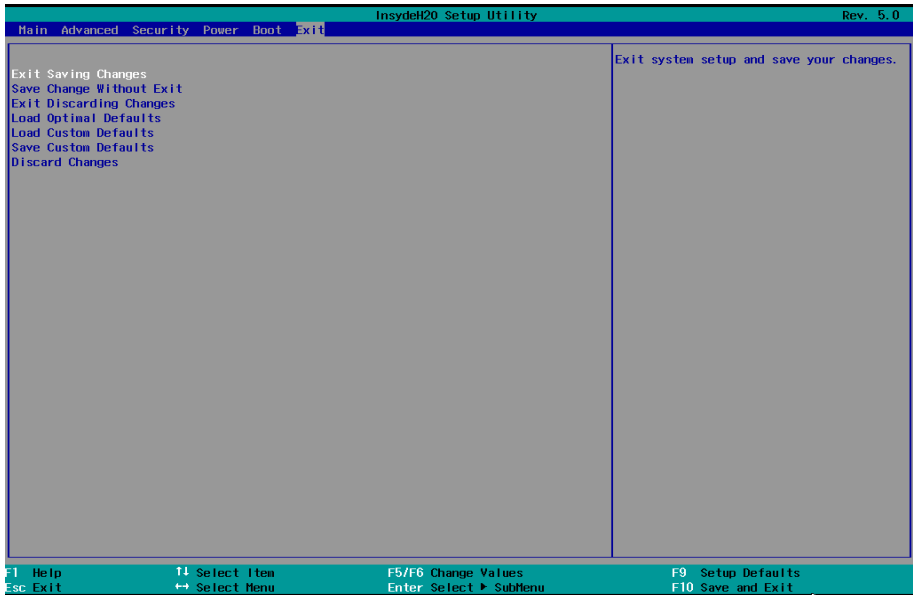
The features settings are:

Setting	Description
Exit Saving Changes	Saves the changes and quits the BIOS Setup utility.
Save Changes Without Exit	Save Changes but does not quit the BIOS.
Exit Discard Changes	Quits the BIOS Setup utility without saving the change(s).
Load Optimal Defaults	Restores all settings to defaults. ▶ This is a command to launch an action from the BIOS Setup utility rather than a setting.
Load Custom Default	Load custom default values
Save Custom Default	Save current setting as custom default
Discard Changes	Discard all changes without Exit.

Appendices

Appendix A. Watchdog Timer (WDT) Setting

The application software depends on its requirement to trigger WDT with adequate timer setting. Before WDT timeout, the functional normal system will reload the WDT. The WDT never time-out for a normal system. The WDT will not be reloaded by an abnormal system, then WDT will time-out and auto-reset the system to avoid abnormal operation.

This computer supports 255 levels watchdog timer by software programming I/O ports.

Below is an program example to disable and load WDT.

Sample Codes:

```
/*-----  Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

unsigned char sioIndex  = 0x2E;                          /* or index = 0x4E */
unsigned char sioData   = 0x2F;                          /* or data  = 0x4F */

/*-----  routing, sub-routing -----*/
void main()
{
        outportb(sioIndex, 0x87);                        /* Enable Super I/O */
        outportb(sioIndex, 0x87);

        outportb(sioIndex, 0x07);                        /* Select logic device
- WDT */
        outportb(sioData,  0x07);

        outportb(sioIndex, 0x30);                        /* Enable WDT */
        outportb(sioData,  0x01);

        outportb(sioIndex, 0xF0);                        /*  Enable   WDTRST#
Output */
        outportb(sioData,  0x80);

        outportb(sioIndex, 0xF6);                        /*  Set  WDT  Timeout
value */
        outportb(sioData,  0x05);

        outportb(sioIndex, 0xF5);                        /*  Set  Configure  and
Enable WDT timer, Start countdown */
        outportb(sioData,  0x32);

        outportb(sioIndex, 0xAA);                        /* SIO - Disable */
}
```

Appendix B. Digital I/O Setting

Below are the source codes written in C, please take them for Digital I/O application examples. The default I/O address is 6Eh.

```
/*-----      Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

#define    sioIndex                 0x2E                              /* or 0x4E */
#define    sioData                  0x2F                              /* or 0x4F */

/*-----      routing, sub-routing -----*/
void main()
{
   int iData;

   SioGPIOMode(0x0F);
   delay(2000);

    SioGPIOData(0x05);
    delay(2000);

   iData = SioGPIOStatus();
   printf(" Input : %2x \n",iData);
   delay(2000);

    SioGPIOData(0x0A);
    delay(2000);

   iData = SioGPIOStatus();
   printf(" Input : %2x \n",iData);
   delay(2000);
}

void SioGPIOMode(int iMode)
{
   outportb(sioIndex,0x87);                                  /* Enable Super I/O */
   outportb(sioIndex,0x87);

   outportb(sioIndex,0x07);                                  /* Select logic device – GPIO */
   outportb(sioData, 0x06);

   outportb(sioIndex,0x30);                                  /* Enable GPIO */
   outportb(sioData, 0x01);

   outportb(sioIndex,0xC0);                                  /* GPIO3 0~7 - Output Enable */
   outportb(sioData,iMode);

    outportb(sioIndex,0xAA);                                 /* Disable Super I/O */
```

```
}


void SioGPIOData(int iData)
{
    outportb(sioIndex,0x87);                              /* Enable Super I/O */
    outportb(sioIndex,0x87);

    outportb(sioIndex,0x07);                              /* Select logic device – GPIO */
    outportb(sioData, 0x06);

    outportb(sioIndex,0xC1);                              /* GPIO3 0~7 - Output Data */
    outportb(sioData,iData);

     outportb(sioIndex,0xAA);                             /* Disable Super I/O */
}


int SioGPIOStatus()
{
    int iStatus;

    outportb(sioIndex,0x87);                              /* Enable Super I/O */
    outportb(sioIndex,0x87);

    outportb(sioIndex,0x07);                              /* Select logic device – GPIO */
    outportb(sioData, 0x06);

     outportb(sioIndex,0xC2);                             /* GPIO3 0~7 - Status */
    iStatus = inportb(sioData);

     outportb(sioIndex,0xAA);                             /* Disable Super I/O */

     return iStatus;
}
```

Appendix C: I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device.
The following table lists the I/O port addresses used.

Address	Device Description
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x00002000-0x000020FF	Ethernet Controller
0x00001000-0x000010FF	Ethernet Controller
0x00000060-0x00000060	Microsoft PS/2 Mouse
0x00000064-0x00000064	Microsoft PS/2 Mouse
0x00000070-0x00000077	Motherboard resources
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000080-0x0000008F	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x00000400-0x0000047F	Motherboard resources
0x00000500-0x000005FE	Motherboard resources
0x00000000-0x0000006F	PCI bus
0x00000078-0x00000CF7	PCI bus
0x00000D00-0x0000FFFF	PCI bus
0x00002000-0x000020FF	PCI standard PCI-to-PCI bridge
0x00001000-0x000010FF	PCI standard PCI-to-PCI bridge
0x00000020-0x00000021	Programmable interrupt controller

0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00003000-0x0000301F	SM Bus Controller
0x00003048-0x0000304F	Standard AHCI 1.0 Serial ATA Controller
0x0000305C-0x0000305F	Standard AHCI 1.0 Serial ATA Controller
0x00003040-0x00003047	Standard AHCI 1.0 Serial ATA Controller
0x00003058-0x0000305B	Standard AHCI 1.0 Serial ATA Controller
0x00003020-0x0000303F	Standard AHCI 1.0 Serial ATA Controller
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00003050-0x00003057	Standard VGA Graphics Adapter
0x000003B0-0x000003BB	Standard VGA Graphics Adapter
0x000003C0-0x000003DF	Standard VGA Graphics Adapter
0x00000070-0x00000077	System CMOS/real time clock
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer

Appendix D: Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ0	System timer
IRQ1	Standard PS/2 Keyboard
IRQ3	Communications Port (COM2)
IRQ4	Communications Port (COM1)
IRQ7	PCI Encryption/Decryption Controller
IRQ8	High precision event timer
IRQ10	Ethernet Controller
IRQ10	SM Bus Controller
IRQ11	Ethernet Controller
IRQ11	Universal Serial Bus (USB) Controller
IRQ12	Microsoft PS/2 Mouse
IRQ16	PCI standard PCI-to-PCI bridge
IRQ17	PCI standard PCI-to-PCI bridge
IRQ18	SDA Standard Compliant SD Host Controller
IRQ18	PCI standard PCI-to-PCI bridge
IRQ19	Standard AHCI 1.0 Serial ATA Controller
IRQ19	PCI standard PCI-to-PCI bridge
IRQ22	High Definition Audio Controller
IRQ23	SDA Standard Compliant SD Host Controller
IRQ23	Standard Enhanced PCI to USB Host Controller
IRQ48	
IRQ49	
IRQ50	
IRQ81~190	Microsoft ACPI-Compliant System

Appendix E: Memory Mapping

Address	Device Description
0x90504000-0x90504FFF	Ethernet Controller
0x90500000-0x90503FFF	Ethernet Controller
0x90404000-0x90404FFF	Ethernet Controller
0x90400000-0x90403FFF	Ethernet Controller
0x90810000-0x90813FFF	High Definition Audio Controller
0xFED00000-0xFED003FF	High precision event timer
0xFF000000-0xFFFFFFFF	Intel(R) 82802 Firmware Hub Device
0xFED0C000-0xFED0CFFF	Motherboard resources
0xE0000000-0xEFFFFFFF	Motherboard resources
0xFED01000-0xFED01FFF	Motherboard resources
0xFED03000-0xFED03FFF	Motherboard resources
0xFED04000-0xFED04FFF	Motherboard resources
0xFED08000-0xFED08FFF	Motherboard resources
0xFED1C000-0xFED1CFFF	Motherboard resources
0xFEE00000-0xFEEFFFFF	Motherboard resources
0xFEF00000-0xFEFFFFFF	Motherboard resources
0xFED40000-0xFED44FFF	Motherboard resources
0x80000000-0x8FFFFFFF	PCI bus
0xA0000-0xBFFFF	PCI bus
0xC0000-0xDFFFF	PCI bus
0xE0000-0xFFFFF	PCI bus
0x90700000-0x907FFFFF	PCI Encryption/Decryption Controller
0x90600000-0x906FFFFF	PCI Encryption/Decryption Controller
0x90500000-0x90503FFF	PCI standard PCI-to-PCI bridge
0x90400000-0x90403FFF	PCI standard PCI-to-PCI bridge
0x90817000-0x90817FFF	SDA Standard Compliant SD Host Controller
0x90816000-0x90816FFF	SDA Standard Compliant SD Host Controller
0x9081A000-0x9081AFFF	SDA Standard Compliant SD Host Controller
0x90819000-0x90819FFF	SDA Standard Compliant SD Host Controller

0x90815000-0x9081501F	SM Bus Controller
0x90818000-0x908187FF	Standard AHCI 1.0 Serial ATA Controller
0x90814000-0x908143FF	Standard Enhanced PCI to USB Host Controller
0x90000000-0x903FFFFF	Standard VGA Graphics Adapter
0x80000000-0x8FFFFFFF	Standard VGA Graphics Adapter
0xA0000-0xBFFFF	Standard VGA Graphics Adapter
0x90800000-0x9080FFFF	Universal Serial Bus (USB) Controller
0xFED0C000-0xFED0CFFF	
0xFED0D000-0xFED0DFFF	
0xFED0E000-0xFED0EFFF	