MTC-4015 USER Manual

15” Fanless Multi-Touch Computer, 6 GbE LAN with 4 PoE+, 2 SIM, 5 USB, Intel® Core™ i7/i5/i3 Processor (Broadwell-U)

Vecow

1.1.0 Edition 20161201

Record of Revision

Version	Date	Page	Description	Remark
0.1	03/17/2016	All	Preliminary Release	
1.0	03/22/2016	All	Official Release	
1.1	12/01/2016	50-51	Update	

Declaimer

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Declaration of Conformity

FCC

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.

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.

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Order Information

Part Number	Description
MTC-4015-PoER650U	15" Fanless Multi-Touch Computer, 6 GbE LAN with 4 PoE+, 2 SSD Tray, 2 SIM, 4 COM, 5 USB, Isolated DIO, Onboard Intel® Core™ i7-5650U
MTC-4015-PoER350U	15" Fanless Multi-Touch Computer, 6 GbE LAN with 4 PoE+, 2 SSD Tray, 2 SIM, 4 COM, 5 USB, Isolated DIO, Onboard Intel® Core™ i5-5350U
MTC-4015-PoER010U	15" Fanless Multi-Touch Computer, 6 GbE LAN with 4 PoE+, 2 SSD Tray, 2 SIM, 4 COM, 5 USB, Isolated DIO, Onboard Intel® Core™ i3-5010U
MTC-4015-2R650U	15" Fanless Multi-Touch Computer, 2 GbE LAN, 2 SSD Tray, 2 SIM, 4 COM, 5 USB, DIO, Onboard Intel® Core™ i7-5650U
MTC-4015-2R350U	15" Fanless Multi-Touch Computer, 2 GbE LAN, 2 SSD Tray, 2 SIM, 4 COM, 5 USB, DIO, Onboard Intel® Core™ i5-5350U
MTC-4015-2R010U	15" Fanless Multi-Touch Computer, 2 GbE LAN, 2 SSD Tray, 2 SIM, 4 COM, 5 USB, DIO, Onboard Intel® Core™ i3-5010U
MTC-4015P	15" Fanless Multi-Touch Computer with 5th Gen Intel® Core™ i7/ i5/ i3 Processor (Broadwell-U), built with IP65 Front Bezel

Optional Accessories

Part Number	Description
DDR3L8G	Certified DDR3L-1600 8G RAM
DDR3L4G	Certified DDR3L-1600 4G RAM
PWA-120W	120W, 24V, 90VAC to 264VAC Power Adapter with 3-pin Terminal Block
PWA-120WM4P	120W, 24V, 90VAC to 264VAC Power Adapter with 4-pin Mini-DIN Connector
PWA-160W-WT	160W, 24V, 85VAC to 264VAC Power Adapter with 3-pin Terminal Block, Wide Temperature -30°C to +70°C
Panel-Mount	Panel Mount Kit
VESA Stand	VESA Table Stand
TMBK-20P-100	Terminal Block 20-pin to SCSI Cable, 100cm
TMBK-20P-500	Terminal Block 20-pin to SCSI Cable, 500cm
TMB-SCSI-20P	Terminal Board with One 20-pin SCSI Connector and DIN-Rail Mounting
3G Module	Mini PCIe 3G/GPS Module with Antenna
4G Module	Mini PCIe 4G/GPS Module with Antenna
WiFi Module	Mini PCIe WiFi Module with Antenna
WiFi & Bluetooth Module	Mini PCIe WiFi & Bluetooth Module with Antenna

Table of Contents

1

GENERAL INTRODUCTION

1.1 Overview

Vecow MTC-4015 Series Fanless Multi-Touch Computer is a 15 inch all-in-one fanless Multi-Touch Computer for Internet of Thing (IoT) and/ or Industry 4.0 applications with excellent performance and trusted reliability. Powered by 5th generation Intel® Core™ i7/ i5/ i3 U-Series SoC (Broadwell-U) engine, dual DDR3L 1333/ 1600 MHz SO-DIMMs, up to 16GB memory. Advanced Intel® HD Graphics 6000 supports 1080p Full HD displays, onboard DVI-D and DisplayPort display interface delivers up to 20% enhanced graphics performance than former generation.

Full HD LCD panel with LED backlight, Projected Capacitive 20-point Multi-Touch Screen with 7H Anti-Scratch Surface, Touchscreen works with gloves, 6 Gigabit LAN ports with 4 IEEE 802.3at PoE+ports, 2 Mini PCIe sockets for PCIe/ USB/ External SIM Card/ mSATA, 2 External SIM Card sockets support 3G/ 4G/ LTE/ WiFi/ GPRS/ UMTS, dual External 2.5” SSD/HDD Tray, 1 External CFast socket, 16 Isolated DIO, 2 USB 3.0, 3 USB 2.0, 4 COM RS-232/ 422/ 485, Ignition Control, 6V to 36V wide range power input with up to 80V smart surge protection, all-in-one fanless design, -20°C to 70°C operating temperature, optional supports sunlight readable features and IP65 front panel protection, Vecow MTC-4015 is ready to customize for your requirements.

Vecow MTC-4015 Series Fanless Multi-Touch Computer integrates outstanding system performance, considerate manageability, smart protection functions and trusted reliability for Smart Manufacturing, Medical, Industrial Automation, HMI, Infotainment, Intelligent Control, Self-service, Smart Transportation and any IoT (Internet of Thing)/ Industry 4.0 applications.

1.2 Features

- 15” 1024 x 768 (4 : 3) LCD Panel with LED Backlight
- Projected Capacitive Multi-Touch Screen with 7H Anti-Scratch Surface, up to 20-point Multi-touch
- Fanless, 5th generation Inte® Core™ i7/ i5/ i3 U-Series Processor (Broadwell-U)
- 6V to 36V DC-in, 80V Surge Protection
- 6 Gigabit LAN with 4 IEEE 802.3at PoE+
- 2 External SIM Socket support 3G/ 4G/ LTE/ WiFi/ GPRS/ UMTS
- External CFast Socket, 2 SSD Tray, 4 COM, 2 USB 3.0, 3 USB 2.0
- 16 Isolated DIO, Ignition Control
- Touchscreen works with gloves
- IP65 Front Panel Protection (Optional)

1.3 Product Specification

1.3.1 Specifications of MTC-4015-PoER

Panel	
Panel Type	TFT LCD
Active Area	15” (4 : 3)
Max Resolution	1024 x 768
Display Color	16.7M
Backlight	LED Backlight
Brightness (cd/m2)	250
Viewing Angle	160°/160° (H/V)
Contrast Ratio	600 : 1
Touch Screen	
Touch Screen Type	20-point Projected Capacitive
Transparency	≧91%
Surface Hardness	7H Surface Hardness
Control Interface	USB Interface
System	
Processor	Intel® Core™ i7-5650U/ i5-5350U/ i3-5010U Processor (Broadwell-U)
Chipset	Intel® SoC
Memory	2 DDR3L 1333/ 1600 MHz SO-DIMM, up to 16GB
Graphics	Intel® HD Graphics 6000

Audio	Realtek ALC892, 5.1 Channel HD Audio
OS Support	Windows 8, Windows 7, Linux
I/O Interface	
Serial	4 COM RS-232/ 422/ 485
USB	• 2 External USB 3.0 • 3 External USB 2.0
DIO	16 Isolated DIO : 8DI, 8DO
LAN	• LAN 1 : Intel® I218 Gigabit LAN supports iAMT • LAN 2 : Intel® I210 Gigabit LAN • LAN 3 : Intel® I210 Gigabit LAN supports support IEEE 802.3at PoE+ • LAN 4 : Intel® I210 Gigabit LAN supports support IEEE 802.3at PoE+ • LAN 5 : Intel® I210 Gigabit LAN supports support IEEE 802.3at PoE+ • LAN 6 : Intel® I210 Gigabit LAN supports support IEEE 802.3at PoE+
Audio	1 Mic-in, 1 Line-out
Display	• DVI-D : Up to 1920 x 1080 @ 60Hz • DisplayPort : Up to 3840 x 2160 @ 60Hz
LED	Power, HDD
CFast	1 External CFast Socket, Push-in/ Push-out Ejector
SIM Card	2 External SIM Card Socket
Expansion	
Mini PCIe	2 Mini PCIe Socket : • 1 Mini PCIe for PCIe/ USB/ External SIM Card • 1 Mini PCIe for PCIe/ USB/ External SIM Card/ mSATA
Storage	
SATA	2 SATA III (External, 6Gbps)
mSATA	1 SATA III (Mini PCIe Type, 6Gbps)
Storage Device	• 1 CFast Socket, Push-in/ Push-out Ejector • 2 2.5” SSD/ HDD Tray
Power	
Power Input	6V to 36V, DC-in
Power Interface	• 3-pin Terminal Block : V+, V-, Frame Ground • Mini-DIN 4-pin
Power Adapter	AC to DC 120W Power Adapter (Optional)
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power

Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC Interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
Mechanical	
Dimension (W x L x H)	350.0mm x 274.0mm x 97.6mm (13.8” x 10.8” x 3.8”)
Weight	5.3 kg (11.7 lb)
Front Panel Protection	IP65 Compliant (Optional)
Mounting	• VESA Mount (75 x 75mm, 100 x 100mm) • Panel Mount
Environment	
Operating Temperature	-20°C to 70°C (-4°F to 158°F)
Storage Temperature	-30°C to 80°C (-22°F to 176°F)
Humidity	10% to 90% Humidity, non-condensing
Shock	• IEC 60068-2-27 • 20G, Half-sine, 11ms
Vibration	• IEC 60068-2-64 • Non-operation : 10Hz to 200Hz, 1.5Grms, X, Y, Z, 30 mins each Axis
EMC	CE, FCC

1.3.2 Specifications of MTC-4015-2R

Panel	
Panel Type	TFT LCD
Active Area	15” (4 : 3)
Max Resolution	1024 x 768
Display Color	16.7M
Backlight	LED Backlight
Brightness (cd/m2)	250
Viewing Angle	160°/160° (H/V)
Contrast Ratio	600 : 1

Touch Screen	
Touch Screen Type	20-point Projected Capacitive
Transparency	≧ 91%
Surface Hardness	7H Surface Hardness
Control Interface	USB Interface
System	
Processor	Intel® Core™ i7-5650U/ i5-5350U/ i3-5010U Processor (Broadwell-U)
Chipset	Intel® SoC
Memory	2 DDR3L 1333/ 1600 MHz SO-DIMM, up to 16GB
Graphics	Intel® HD Graphics 6000
Audio	Realtek ALC892, 5.1 Channel HD Audio
OS Support	Windows 8, Windows 7, Linux
I/O Interface	
Serial	4 COM RS-232/ 422/ 485
USB	• 2 External USB 3.0 • 3 External USB 2.0
DIO	16 DIO : 8DI, 8DO
LAN	• LAN 1 : Intel® I218 Gigabit LAN supports iAMT • LAN 2 : Intel® I210 Gigabit LAN
Audio	1 Mic-in, 1 Line-out
Display	• DVI-D : Up to 1920 x 1080 @ 60Hz • DisplayPort : Up to 3840 x 2160 @ 60Hz
LED	Power, HDD
CFast	1 External CFast Socket, Push-in/ Push-out Ejector
SIM Card	2 External SIM Card Socket
Expansion	
Mini PCIe	2 Mini PCIe Socket : • 1 Mini PCIe for PCIe/ USB/ External SIM Card • 1 Mini PCIe for PCIe/ USB/ External SIM Card/ mSATA
Storage	
SATA	2 SATA III (External, 6Gbps)
mSATA	1 SATA III (Mini PCIe Type, 6Gbps)
Storage Device	• 1 CFast Socket, Push-in/ Push-out Ejector • 2 2.5” SSD/ HDD Tray

Power	
Power Input	6V to 36V, DC-in
Power Interface	• 3-pin Terminal Block : V+, V-, Frame Ground • Mini-DIN 4-pin
Power Adapter	AC to DC 120W Power Adapter (Optional)
Ignition Control	16 Mode (Internal)
Remote Switch	3-pin Terminal Block : On, Off, IGN
Surge Protection	Up to 80V/1ms Transient Power
Others	
TPM	Optional Infineon SLB9665 supports TPM 2.0, LPC Interface
Watchdog Timer	Reset : 1 to 255 sec./min. per step
Smart Management	Wake on LAN, PXE supported
HW Monitor	Monitoring temperature, voltages. Auto throttling control when CPU overheats.
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Dimension (W x L x H)	350.0mm x 274.0mm x 97.6mm (13.8” x 10.8” x 3.8”)
Weight	5.3 kg (11.7 lb)
Front Panel Protection	IP65 Compliant (Optional)
Mounting	• VESA Mount (75 x 75mm, 100 x 100mm) • Panel Mount
Environment	
Operating Temperature	-20°C to 70°C (-4°F to 158°F)
Storage Temperature	-30°C to 80°C (-22°F to 176°F)
Humidity	10% to 90% Humidity, non-condensing
Shock	• IEC 60068-2-27 • 20G, Half-sine, 11ms
Vibration	• IEC 60068-2-64 • Non-operation : 10Hz to 200Hz, 1.5Grms, X, Y, Z, 30 mins each Axis
EMC	CE, FCC

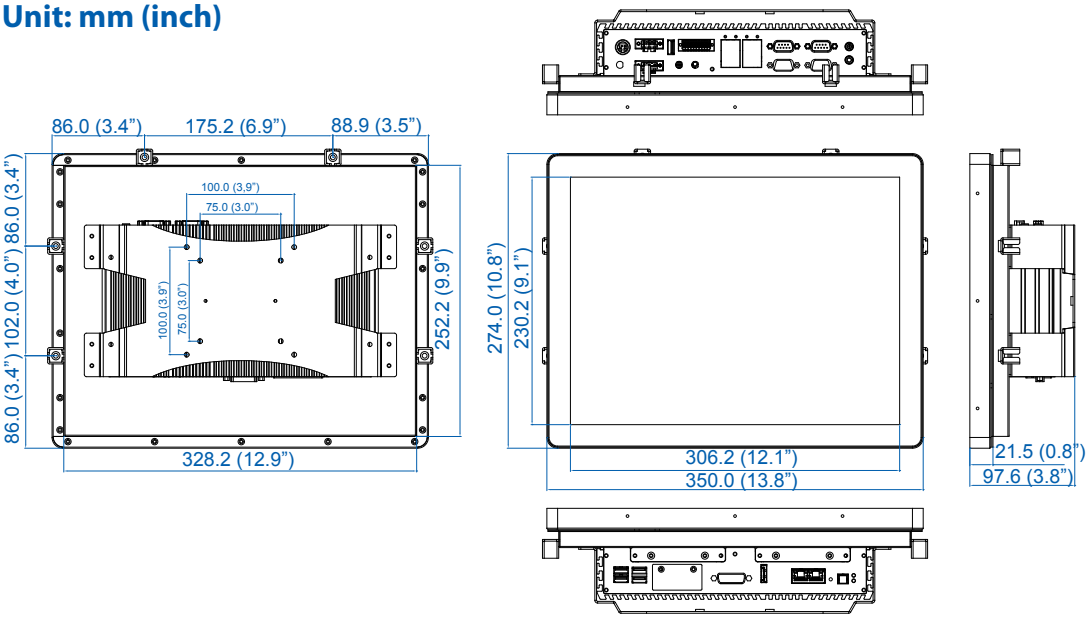
1.4 Supported CPU List

CPU Name	TDP	Cache	Max. Frequency	Embedded
i7-5557U	28W	4M	Up to 3.40 GHz	
i7-5650U	**15W**	**4M**	**Up to 3.20 GHz**	Yes
i7-5600U	15W	4M	Up to 3.20 GHz	
i7-5550U	15W	4M	Up to 3.00 GHz	
i7-5500U	15W	4M	Up to 3.00 GHz	
i5-5287U	28W	3M	Up to 3.30 GHz	
i5-5257U	28W	3M	Up to 3.10 GHz	
i5-5350U	**15W**	**3M**	**Up to 2.90 GHz**	Yes
i5-5300U	15W	3M	Up to 2.90 GHz	
i5-5250U	15W	3M	Up to 2.70 GHz	
i5-5200U	15W	3M	Up to 2.70 GHz	
i3-5157U	28W	3M	Up to 2.5 0 GHz	
i3-5020U	15W	3M	Up to 2.20 GHz	
i3-5015U	**15W**	**3M**	**Up to 2.10 GHz**	Yes
i3-5010U	15W	3M	Up to 2.10 GHz	
i3-5005U	15W	3M	Up to 2.00 GHz	
Pentium 3805U	15W	2M	Up to 1.90 GHz	
Pentium 3825U	15W	2M	Up to 1.90 GHz	
Celeron 3765U	15W	2M	Up to 1.90 GHz	
Celeron 3755U	**15W**	**2M**	**Up to 1.70 GHz**	Yes
Celeron 3215U	15W	2M	Up to 1.70 GHz	
Celeron 3205U	15W	2M	Up to 1.50 GHz	

1.5 Mechanical Dimensions

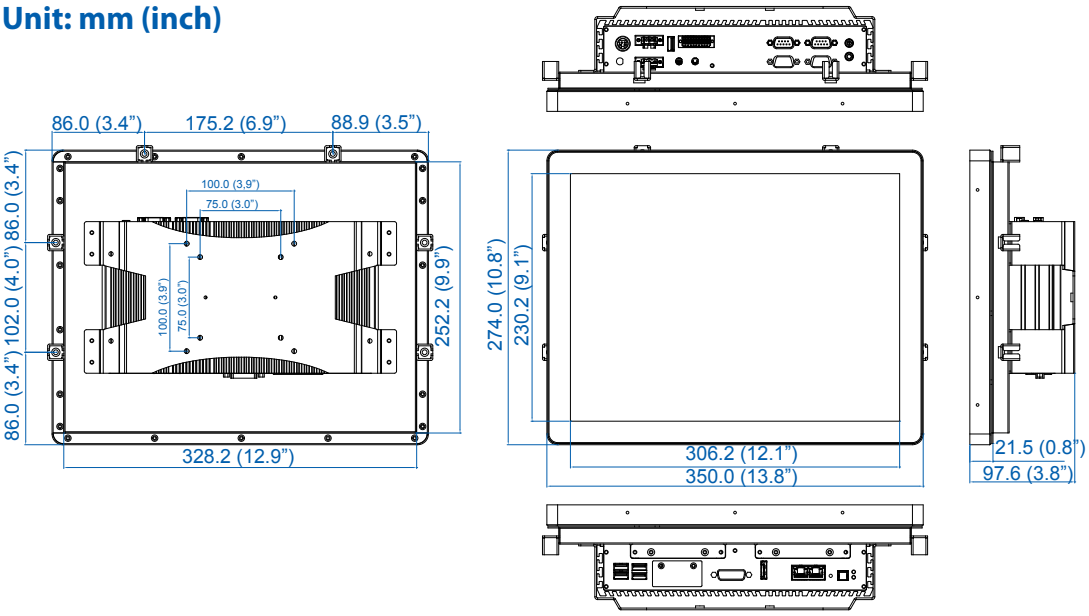
1.5.1 Dimensions of MTC-4015-PoER

Unit: mm (inch)



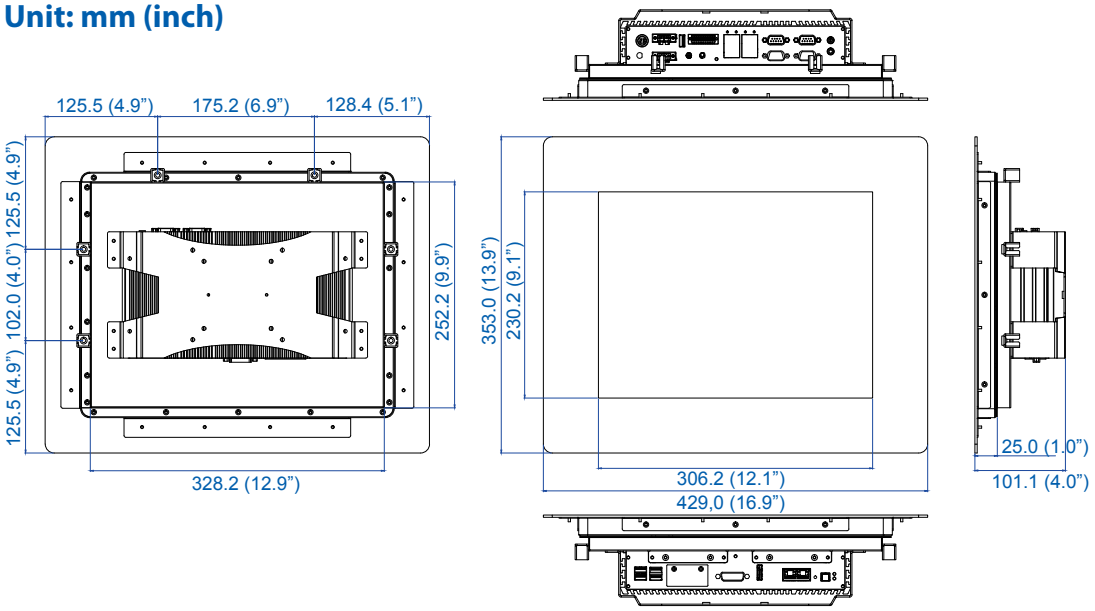
1.5.2 Dimensions of MTC-4015-2R

Unit: mm (inch)



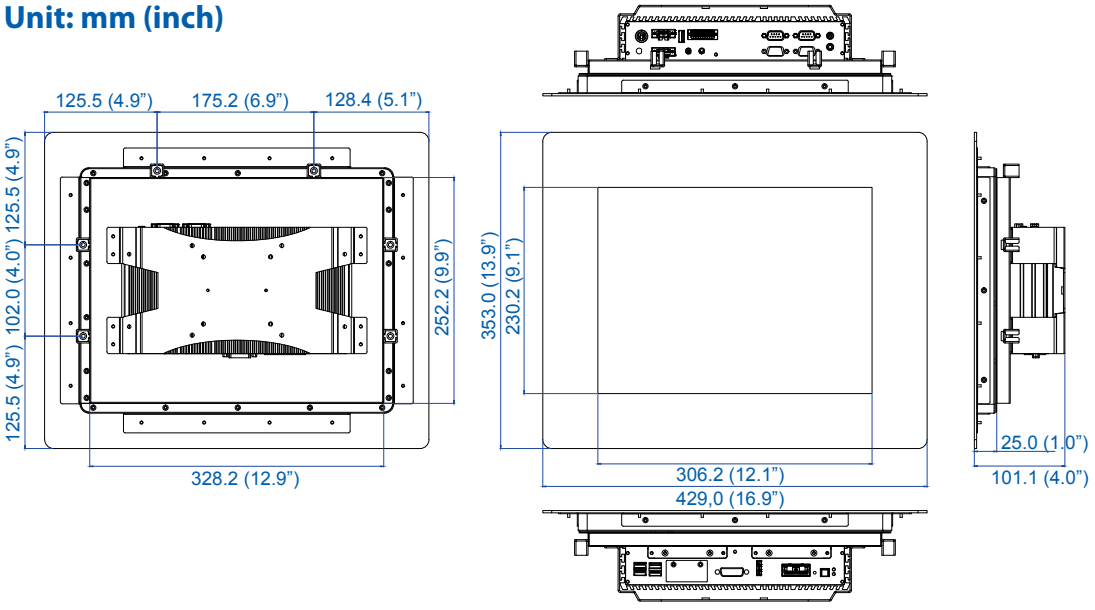
1.5.3 Dimensions of MTC-4015P-PoER

Unit: mm (inch)



1.5.4 Dimensions of MTC-4015P-2R

Unit: mm (inch)



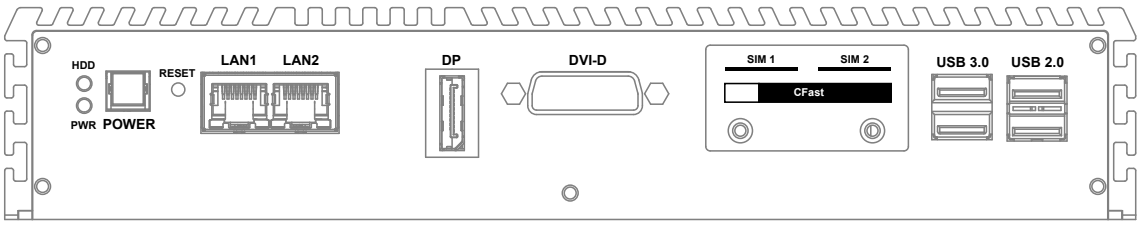
2

GETTING TO KNOW YOUR MTC-4015

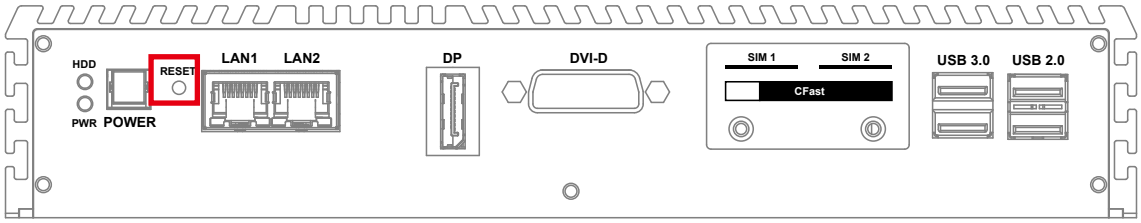
2.1 Packing List

Item	Description	Qty
1	MTC-4015, 15” Fanless Multi-Touch Computer (According to the configuration you order, the MTC-4015 series may contain SSD/HDD and DDR3L SO-DIMM. Please do verify these items if possible.)	1
2	Accessory box, it contains ● Vecow Drivers & Utilities DVD ● M2.5x6 screw for Mini PCIe Socket ● 3-pin pluggable terminal block ● 20-pin pluggable terminal block ● M3x6 screw for HDD ● HDD Tray Key	 1 4 2 1 4 2

2.2 I/O Functions

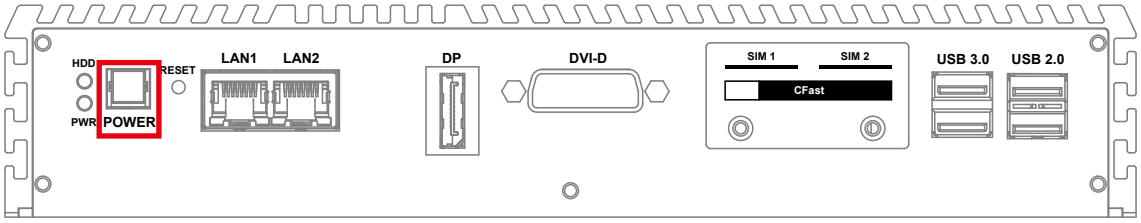


2.2.1 Reset Tact Switch



It is a hardware reset switch. Use this switch to reset the system without power off the MTC-4015. Press the Reset Switch for a few seconds, then reset will be enabled.

2.2.2 Power Button



The Power Button is a non-latched switch with dual color LED indication. It indicates power status: S0, S3 and S5. More detail LED indications are listed as follows:

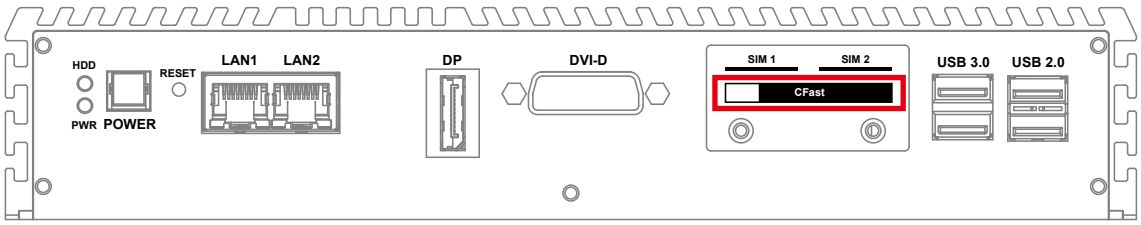
LED Color	Power Status	System Status
Solid Blue	S0	System working
Solid Orange	S3, S5	Suspend to RAM, System off with standby power

To power on MTC-4015, press the power button and then the blue LED is lightened. To power off MTC-4015, you can either command shutdown by OS operation, or just simply press the power button.

If system error, you can just press the power button for 4 seconds to shut down the machine directly.

Please do note that a 4-second interval between each 2 power-on/ power-off operation is necessary in normal working status. (For example, once turning off the system, you have to wait for 4 seconds to initiate another power-on operation).

2.2.3 CFast Card



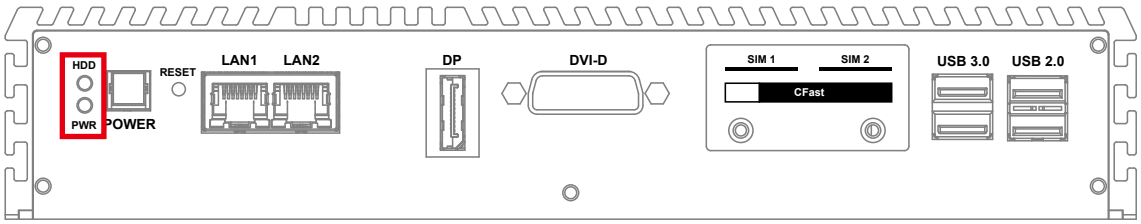
There is a CFast socket on the front panel supporting Type-I/ Type-II Compact Flash card.

It is implemented by a SATA II Port from Broadwell-U PCH. Be sure to disconnect the power source and unscrew the CFast socket cover before installing a CFast card. The MTC-4015 does not support the CFast hot swap and PnP (Plug and Play) functions. It is necessary to remove power source first before inserting or removing the CFast card.

The pinouts of CFast port are listed as follows:

Pin No.	Description	Pin No.	Description
S1	GND	PC6	NC
S2	SATA_TXP	PC7	GND
S3	SATA_TXN	PC8	CFAST_LED
S4	GND	PC9	NC
S5	SATA_RXN	PC10	NC
S6	SATA_RXP	PC11	NC
S7	GND	PC12	NC
PC1	GND	PC13	+3.3V
PC2	GND	PC14	+3.3V
PC3	GND	PC15	GND
PC4	NC	PC16	GND
PC5	NC	PC17	NC

2.2.4 PWR and HDD LED Indicator

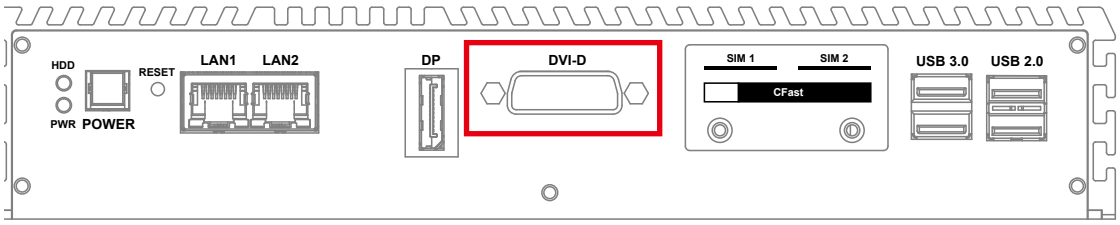


Yellow-HDD LED: A hard disk/ CFast LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities.

Green-Power LED: If the LED is solid green, it indicates that the system is powered on.

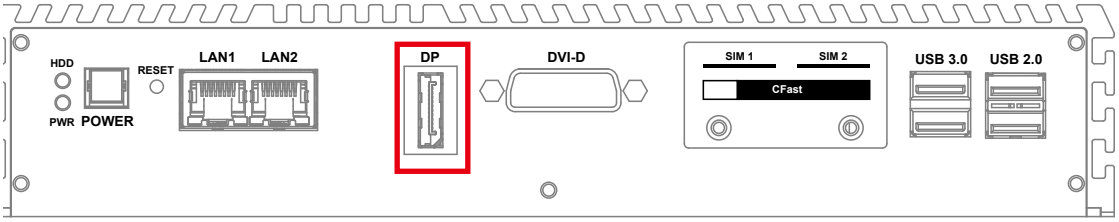
LED Color	Power Status	System Status
Yellow	HDD/ CFast	• On/ Off : Storage status, function or not. • Twinkling : Data transferring.
Green	Power	System power status (on/ off)

2.2.5 DVI-D Connector



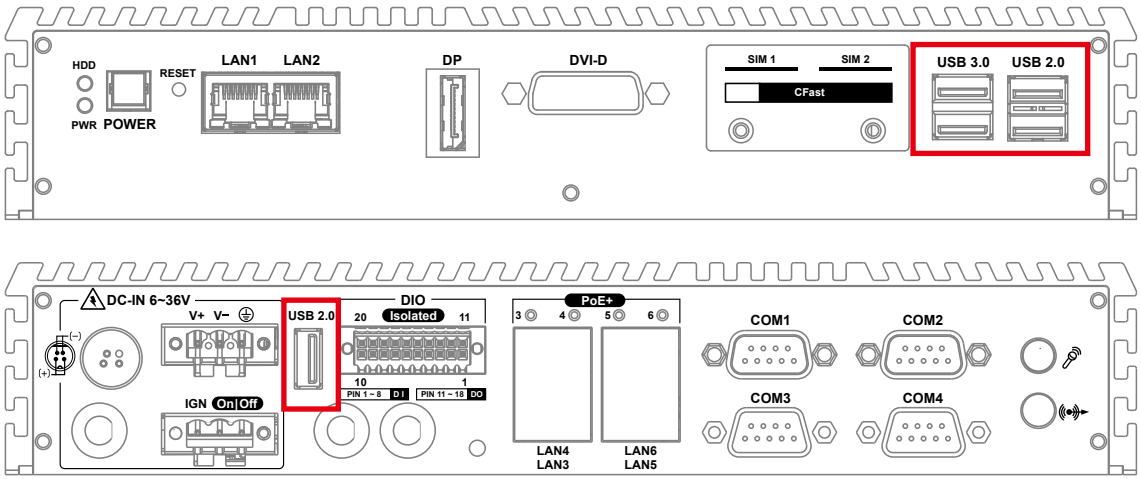
The DVI-D connector on the front panel supports DVI display modes. The DVI output mode supports up to 1920 x 1080 resolutions.

2.2.6 DisplayPort



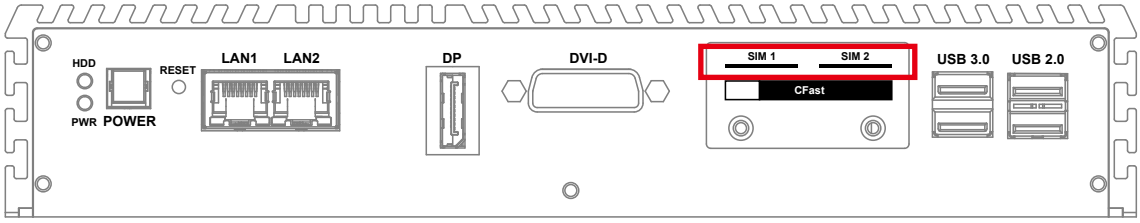
Onboard DisplayPort connection supports up to 3840 x 2160 resolutions at 60 Hz.

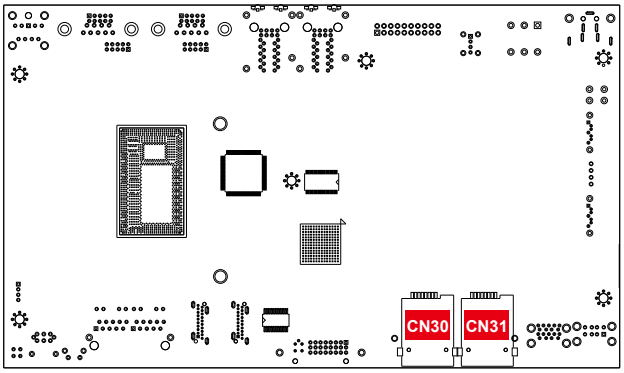
2.2.7 External USB



There are 2 USB 3.0 connections available supporting up to 5GB per second data rate in the front side of MTC-4015. They also comply with the requirements of SuperSpeed (SS), High Speed (HS), Full Speed (FS) and Low Speed (LS).

2.2.8 Mini PCIe & SIM Card Comparison Table

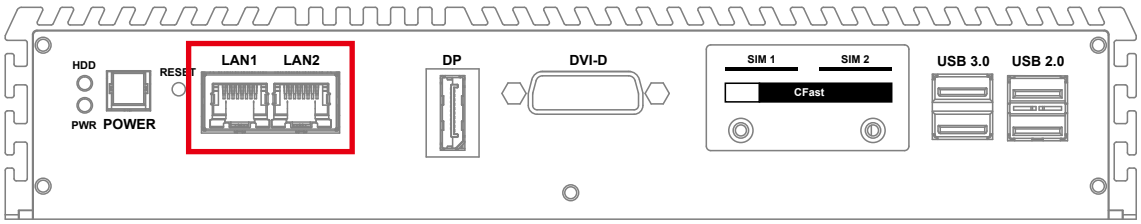




Mini PCIe	SIM
CN18	CN30 (SIM 1)
CN16	CN31 (SIM 2)

Note:
The SIM card sockets do not support hot-plug. Please make sure to unplug the system power before inserting the SIM card(s).

2.2.9 10/ 100/ 1000 Mbps Ethernet Port

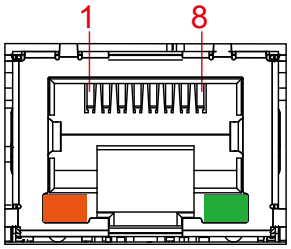


There are 2 8-pin RJ-45 jacks supporting 10/ 100/1000 Mbps Ethernet connections in the front side of MTC-4015. LAN 1 is powered by Intel® 218LM Ethernet engine; LAN 2 is powered by Intel I210 Ethernet engine. When both LAN 1 and LAN 2 work in normal status, basic iAMT function is enabled.
Using suitable RJ-45 cable, you can connect MTC-4015 system to a computer, or to any other devices with Ethernet connection, for example, a hub or a switch. Moreover, both of LAN 1 and LAN 2 supports Wake on LAN and Pre-boot functions. The pinouts of LAN 1 and LAN 2 are listed as follows:

Pin No.	10/ 100Mbps	1000Mbps
1	E_TX+	MDI0_P
2	E_TX-	MDI0_N
3	E_RX+	MDI1_P
4	----	MDI2_P
5	-----	MDI2_N
6	E_RX-	MDI1_N
7	-----	MDI3_P
8	------	MDI3_N

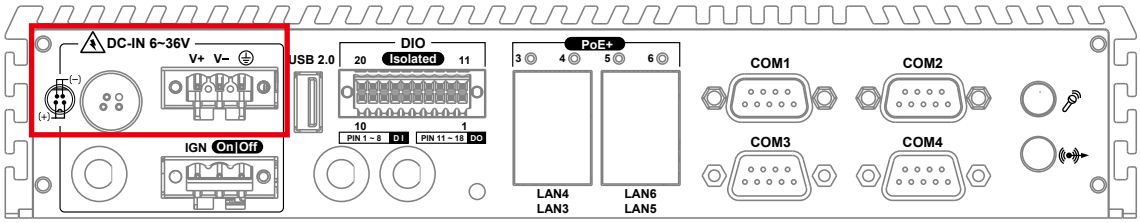
Each LAN port is supported by standard RJ-45 connector with LED indicators to present Active/ Link/ Speed status of the connection.
The LED indicator on the right bottom corner lightens in solid green when the cable is properly connected to a 100Mbps Ethernet network; The LED indicator on the right bottom corner lightens in solid orange when the cable is properly connected to a 1000Mbps Ethernet network; The left LED will keep twinkling/ off when Ethernet data packets are being transmitted/ received.

LED	10Mbps	100Mbps	1000Mbps
Right Bottom Led	Off	Solid Green	Solid Orange
Left Bottom Led	Twinkling Yellow	Twinkling Yellow	Twinkling Yellow



2.3 Rear Panel I/O and Functions

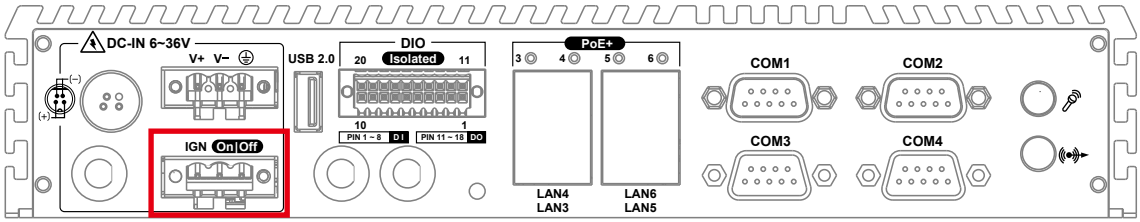
2.3.1 Power Terminal Block



MTC-4015 supports 6V to 36V DC power input by terminal block in the rear side. In normal power operation, power LED lightens in solid green. MTC-4015 supports up to 80V surge protection.

Pin No.	Definition
1	V+
2	V-
3	Earth GND

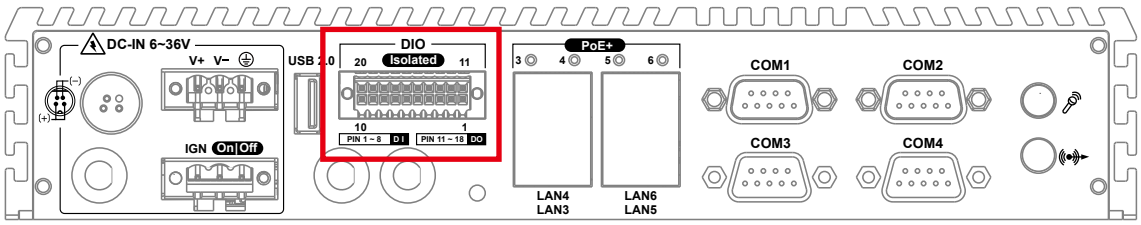
2.3.2 Remote Power On/ Off Switch

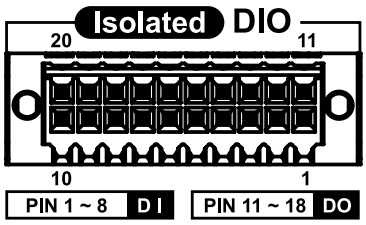


It is a 2-pin power-on or power-off switch through Phoenix Contact terminal block. You could turn on or off the system power by using this contact. This terminal block supports dual function of soft power-on/ power-off (instant off or delay 4 second), and suspend mode.

Pin No.	Definition
1	IGNITION
2	SW+
3	SW-

2.3.3 Isolated DIO



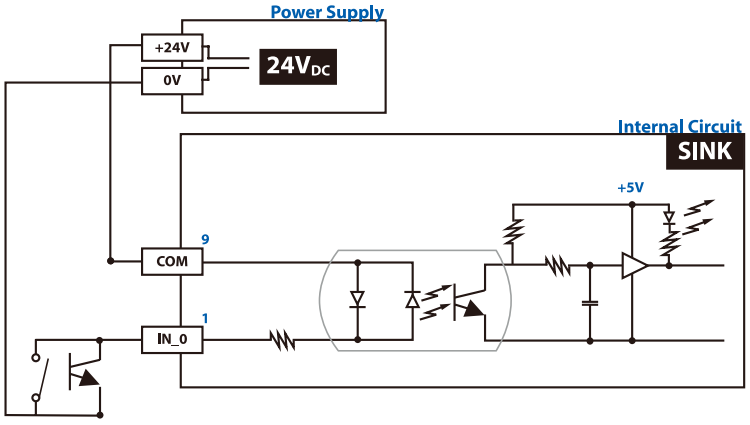


There is a 16-bit DIO (8-bit DI, 8-bit DO) connector in the rear side. Each DIO channel is equipped with a photocoupler for isolated protection. A power buffer device TPD2007F integrated in 8-DO circuit for motors, solenoids, and lamp driver applications. Please refer to **Appendix A** for more details.

Pin No.	Definition	Pin No.	Definition
1	INPUT 0	11	OUTPUT 0
2	INPUT 1	12	OUTPUT 1
3	INPUT 2	13	OUTPUT 2
4	INPUT 3	14	OUTPUT 3
5	INPUT 4	15	OUTPUT 4
6	INPUT 5	16	OUTPUT 5
7	INPUT 6	17	OUTPUT 6
8	INPUT 7	18	OUTPUT 7
9	DI_COM	19	DIO_GND
10	DIO_GND	20	External 24~78VDC Input

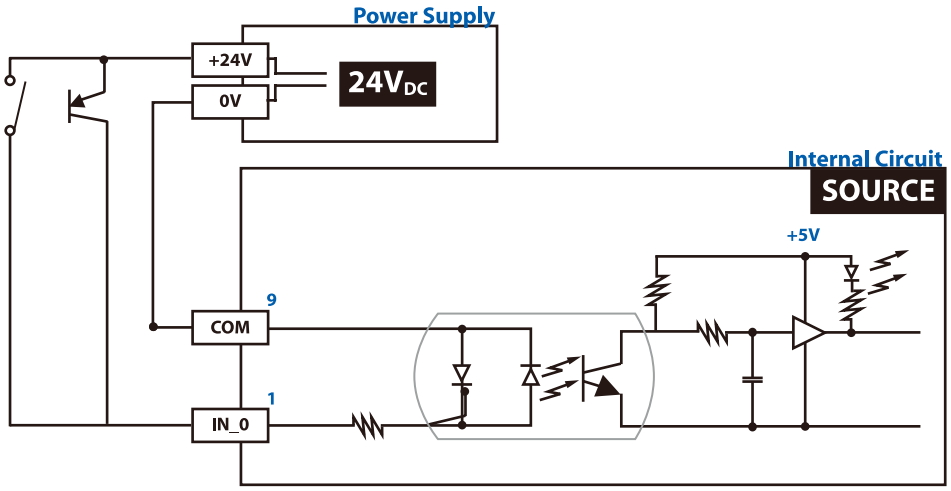
GPI SINK Mode

Isolated GPI input circuit in SINK mode (NPN) is illustrated as follow :



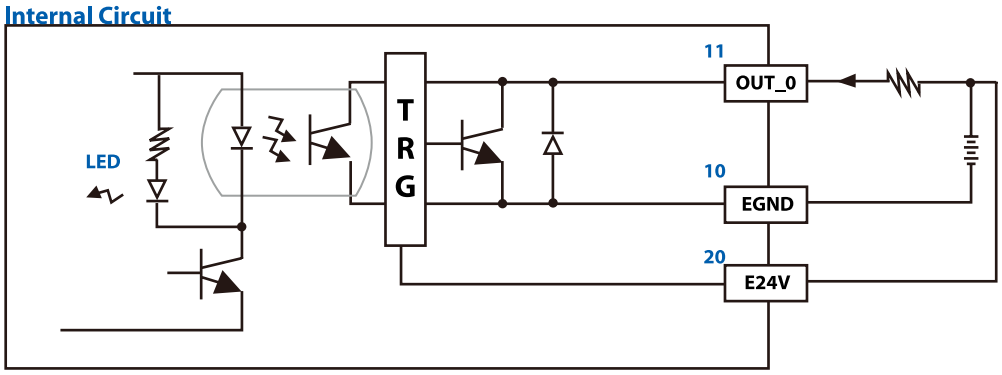
GPI SOURCE Mode

Digital GPI input signal circuit in SOURCE mode (PNP) is illustrated as follow :

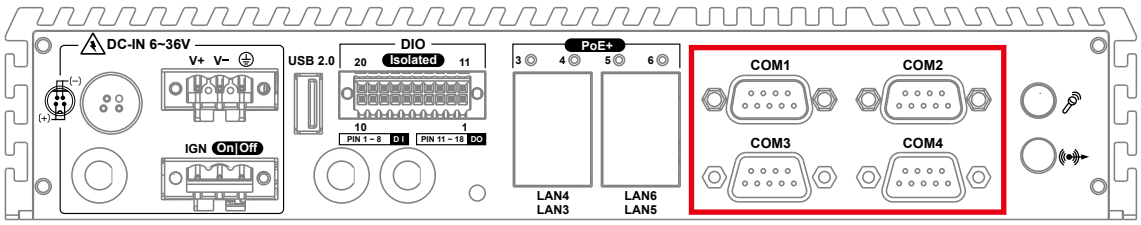


GPO SINK Mode

Digital GPO output circuit in SINK mode (NPN) is illustrated as follow :



2.3.4 Serial Port COM



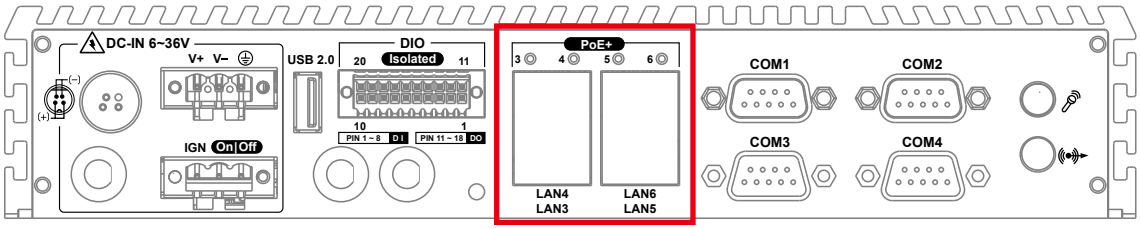
Serial port can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. The default definition is RS-232, if you want to change to RS-422 or RS-485, you can find the setting in BIOS.

BIOS Setting	Function
COM 1 (CN7) / COM 2 (CN8) / COM 3 (CN11) / COM 4 (CN12)	RS-232
	RS-422 (5-wire)
	RS-422 (9-wire)
	RS-485
	RS-485 w/z auto-flow control

The pin assignments are listed in the table as follow :

Serial Port	Pin No.	RS-232	RS-422 (5-wire)	RS-422 (9-wire)	RS-485 (3-wire)
1, 2 3, 4	1	DCD	TXD-	TXD-	DATA-
	2	RXD	TXD+	TXD+	DATA+
	3	TXD	RXD+	RXD+	----------
	4	DTR	RXD-	RXD-	----------
	5	GND	GND	GND	GND
	6	DSR	----------	RTS-	----------
	7	RTS	----------	RTS+	----------
	8	CTS	----------	CTS+	----------
	9	RI	----------	CTS-	----------

2.3.5 PoE (Power over Ethernet) Ports

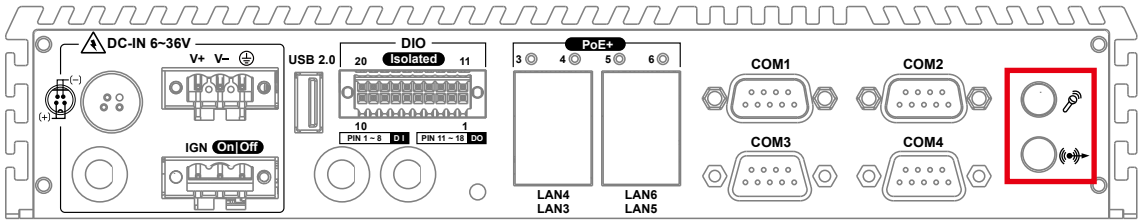


There are 4 RJ45 connectors in the rear side of MTC-4015. It supports IEEE 802.3at (PoE+) Power over Ethernet (PoE) connection delivering up to 25.5W/ 48V per port and 1000BASE-T gigabit data signals over standard Ethernet Cat 5/ Cat 6 cable.

Each PoE connection is powered by Intel® I210 Gigabit Ethernet controller and independent PCI express interface to connect with multi-core processor for network and data transmit optimization. Only when PoE port starts to supply power to power devices, the dedicated LED will be lightened.

PS. Suggest to use PoE when power input is over 11V

2.3.6 Audio Connector

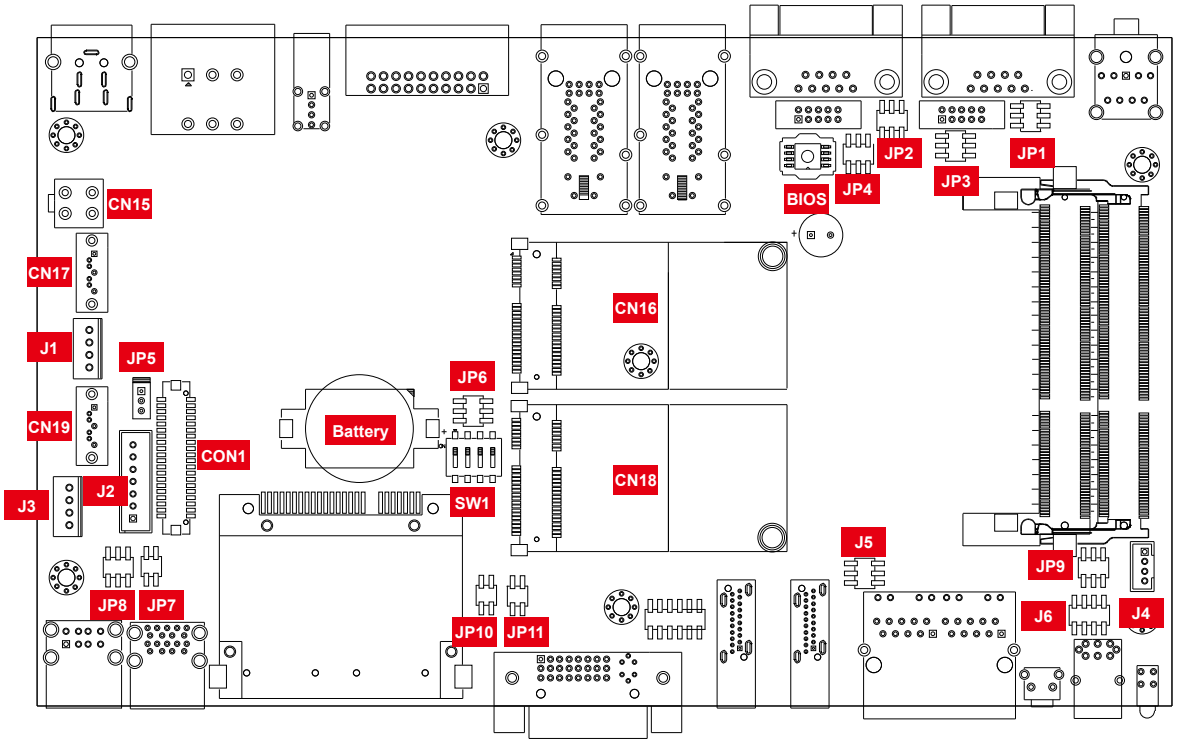


There are 2 audio connectors, Mic-in and Line-out, in the front side of MTC-4015. Onboard Realtek ALC892 audio codec supports 5.1 channel HD audio and fully complies with Intel® High Definition Audio (Azalia) specifications.

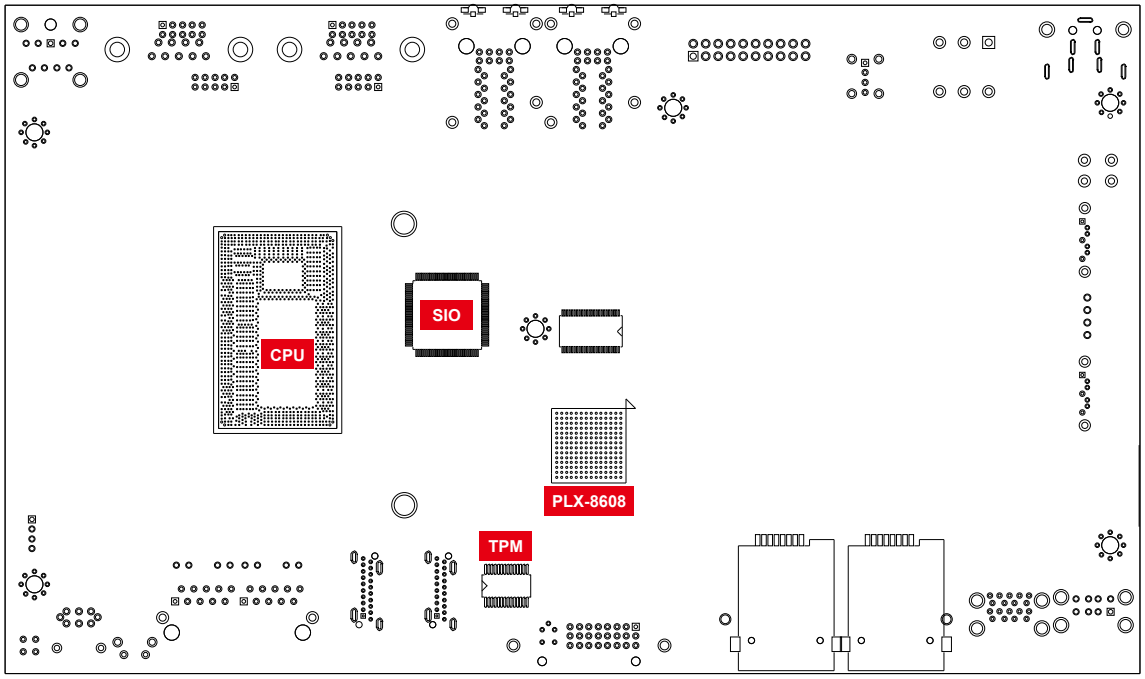
To utilize the audio function in Windows platform, you need to install corresponding drivers for both Intel® Broadwell-U chipset and Realtek ALC892 codec. Please refer to Chapter 4 for more details of driver installation.

2.4 Main Board Expansion Connectors

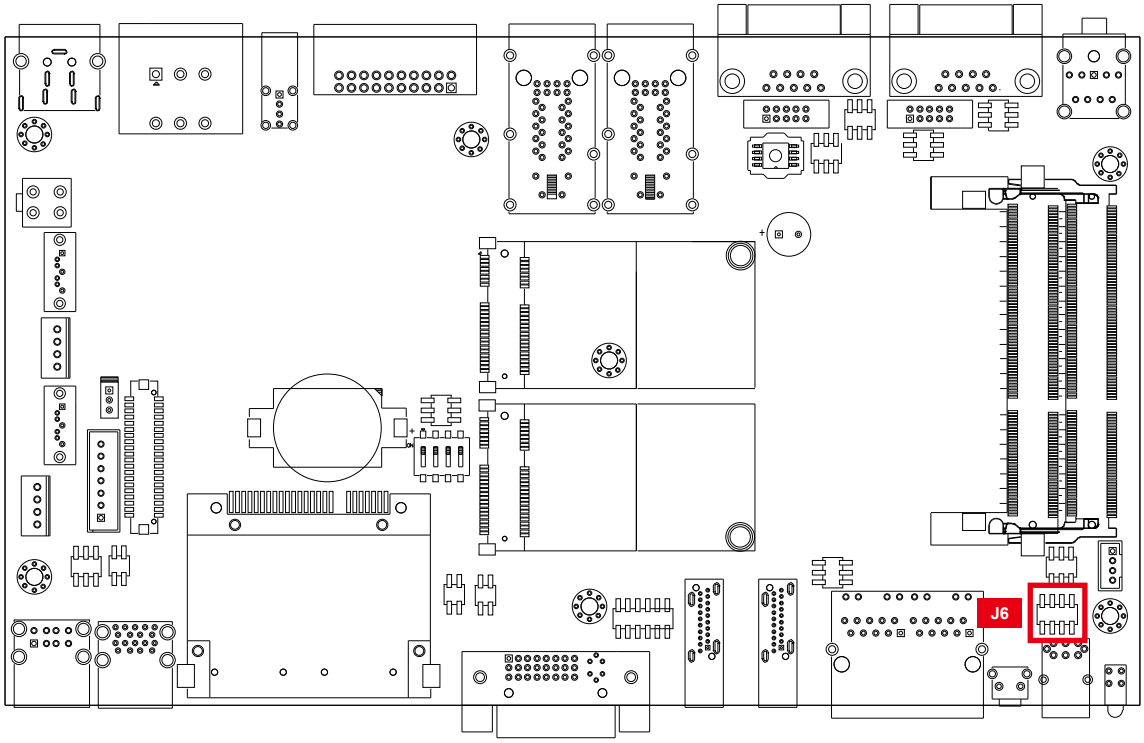
2.4.1 Front View of MTC-4015 Main Board With Connector Location



2.4.2 Rear View of MTC-4015 Main Board With Connector Location



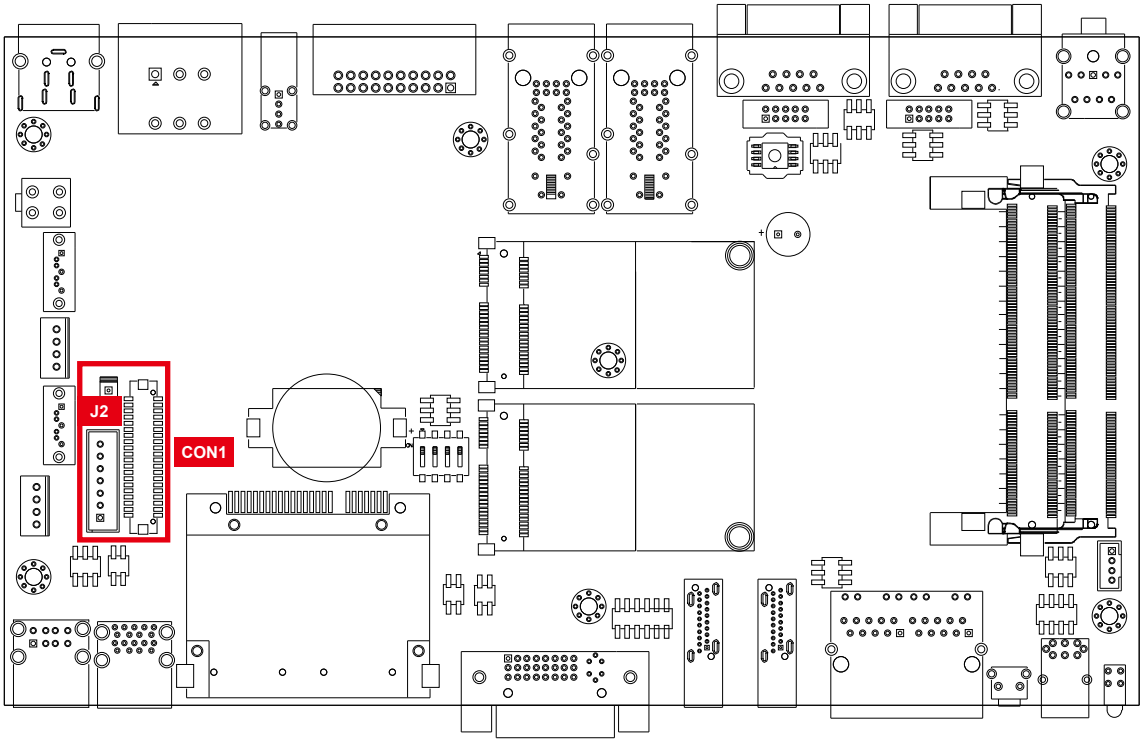
2.4.3 J6 Miscellaneous Pin Header



This pin header can be used as a backup for following functions, hard drive LED indicator, reset button, power LED indicator, and power-on/ off button, which already can be accessed by front panel and top panel. The pinouts of Miscellaneous port are listed in following table:

Group	Pin No.	Description
HDD LED	1	HDD_LED_P
	3	HDD_LED_N
RESET BUTTON	5	FP_RST_BTN_N
	7	GND
POWER LED	2	PWR_LED_P
	4	PWR_LED_N
POWER BUTTON	6	FP_PWR_BTN_IN
	8	GND

2.4.4 CON1, J2 LVDS



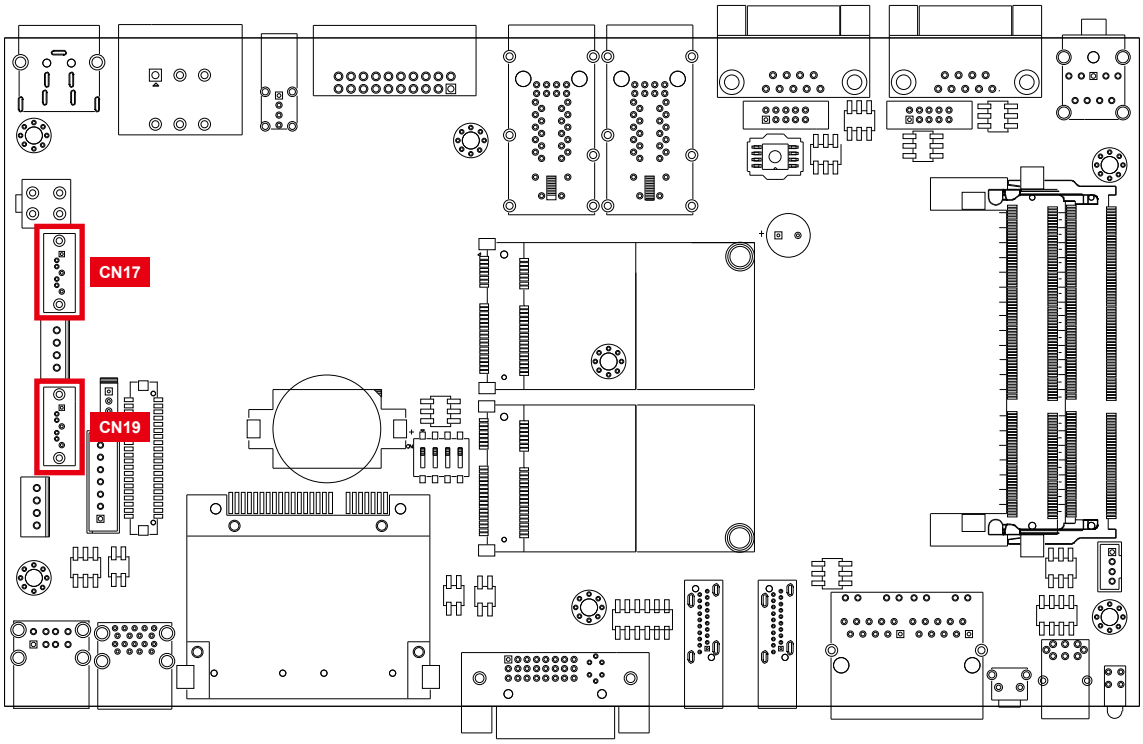
MTC-4015 supports dual-channel 24-bit LVDS display, up to 1920 x 1200 pixels resolution. The pin assignments of CON1 are listed in the following table:

Pin No.	Definition	Pin No.	Definition	Pin No.	Definition
1	PANEL_VDD	15	GND	29	GND
2	TXO0-	16	TXOC+	30	TXE2-
3	PANEL_VDD	17	GND	31	GND
4	TXO0+	18	TXO3-	32	TXE2+
5	PANEL_VDD	19	GND	33	GND
6	TXO1-	20	TXO3+	34	TXEC-
7	GND	21	GND	35	GND
8	TXO1+	22	TXE0-	36	TXEC+
9	GND	23	GND	37	GND
10	TXO2-	24	TXE0+	38	TXE3-
11	GND	25	GND	39	LVDS_DET#
12	TXO2+	26	TXE1-	40	TXE3+
13	GND	27	GND		
14	TXOC-	28	TXE1+		

The LCD inverter is connected to J2 via a JST 7-pin, 2.5mm connector providing +5V/ +12V power to LCD display. The pin assignments are listed in the following table:

Pin No.	Definition	Pin No.	Definition
1	+5V	5	GND
2	+12V	6	GND
3	+12V	7	LBKLT_EN
4	LBKLT_CTL		

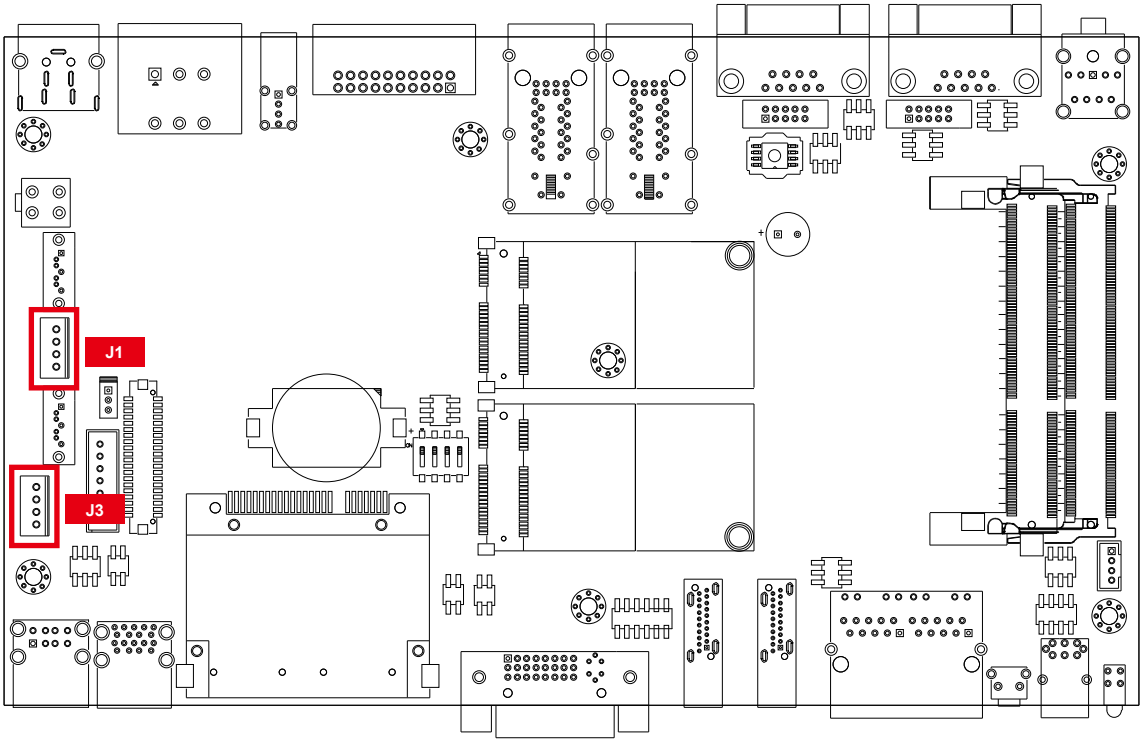
2.4.5 CN17, CN19 : SATA III Connector



There are 2 onboard high performance Serial ATA III (SATA III) on MTC-4015. It supports higher storage capacity with less cabling effort and smaller required space. The pin assignments of CN17 and CN19 are listed in the following table:

Pin No.	Definition	Pin No.	Definition
1	GND	5	RXN
2	TXP	6	RXP
3	TXN	7	GND
4	GND		

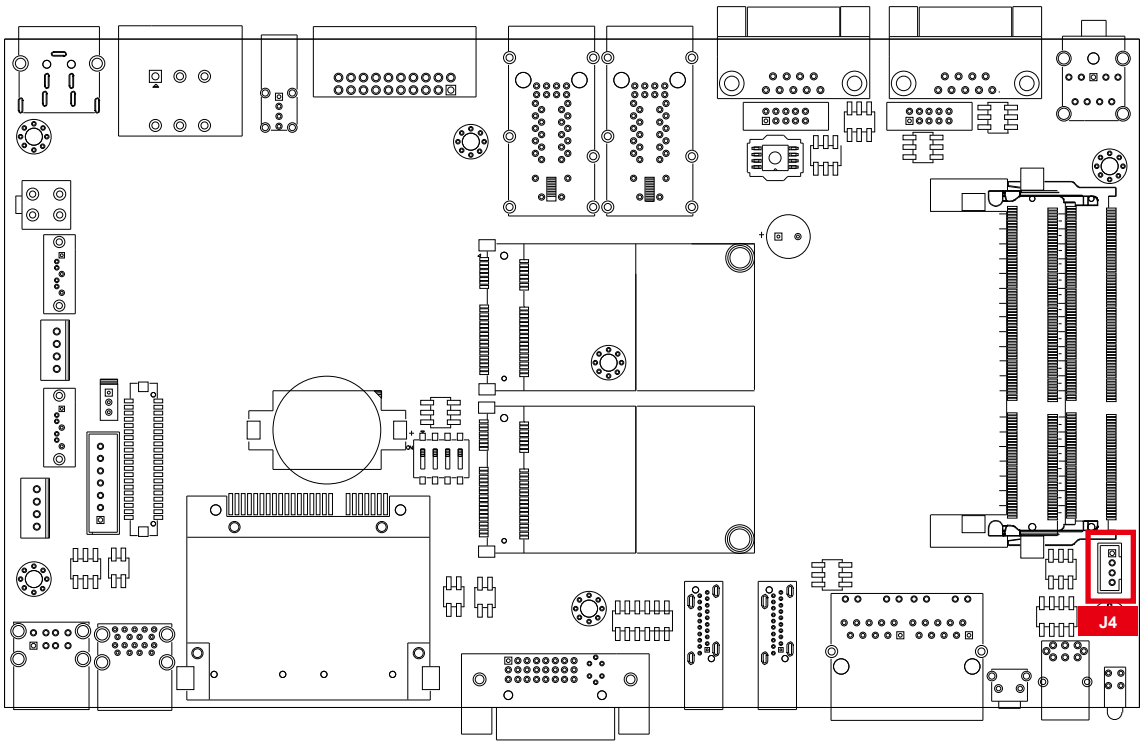
2.4.6 J1, J3 : SATA Power Connector



The MTC-4015 also equip with 2 SATA power connector. It supports 5V (Up to 2A) and 12V (Up to 1A) current to the hard drive or SSD. The pin assignments of J1 and J3 are listed in the following table:

Pin No.	Definition	Pin No.	Definition
1	+12V	3	GND
2	GND	4	+5V

2.4.7 J4 : Internal USB



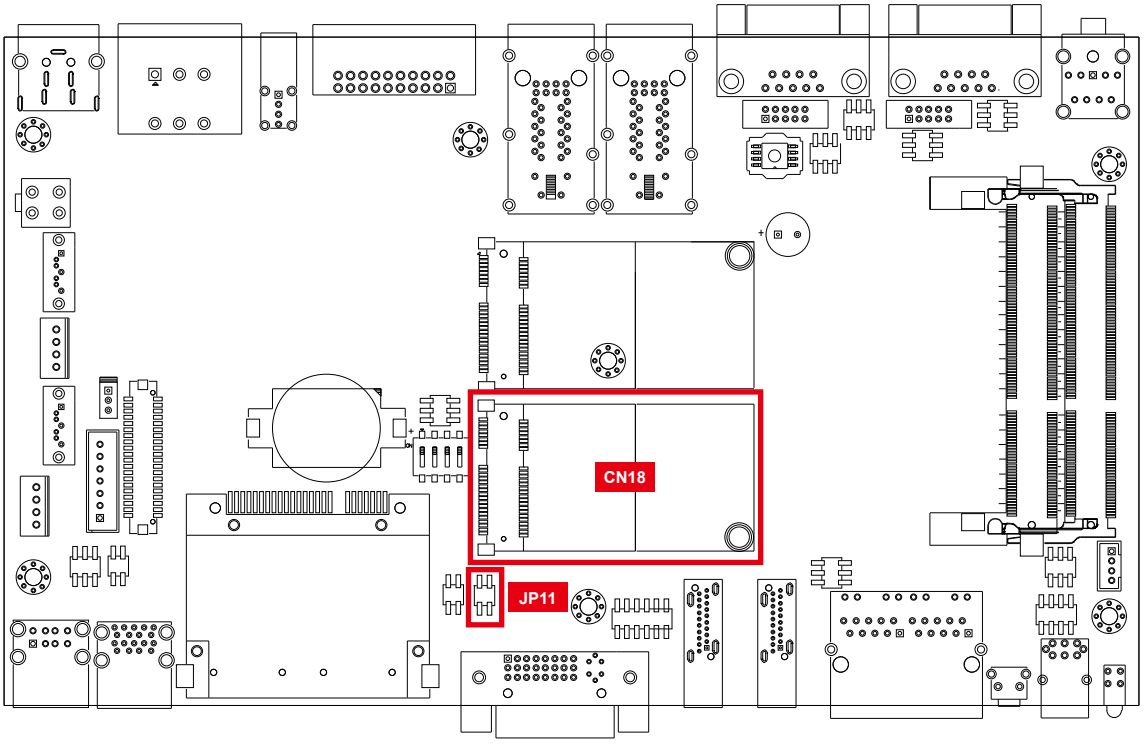
The MTC-4015 main board provide one expansion USB port using plug-and-play for Dongle Key or LCD touch Panel. The USB interface supports 480 Mbps transfer rate which comply with high speed USB specification Rev. 2.0.

The USB interface is accessed through one 4-pin JST 2.0mm connector. You will need an adapter cable if you use a standard USB connector. The adapter cable has a 4-pin connector on one end and a USB connector on the other.

The pin assignments of J4 are listed in the following table:

Connector	Pin No.	Description	Pin No.	Description
J4	1	USB_VCC	3	USBD+
	2	USBD-	4	GND

2.4.8 CN18 : Mini PCIe, mSATA



Both mSATA and Mini PCIe share the same form factor and similar electrical pinout assignments on their connectors. There was no clear mechanism to distinguish if a mSATA drive or a Mini PCIe device is plugged into the socket until recently that SATA I/O issued an ECN change (ECN #045) to redefine Pin-43 on mSATA connector as “no connect” instead of “return current path” (or GND).

When an mSATA drive is inserted, its Pin-43 is “no connect”, and the respective pin on the socket is being pulled-up to logic 1. When a Mini PCIe device is inserted, its Pin-43 forces the respective pin on the socket to ground, or logic 0.

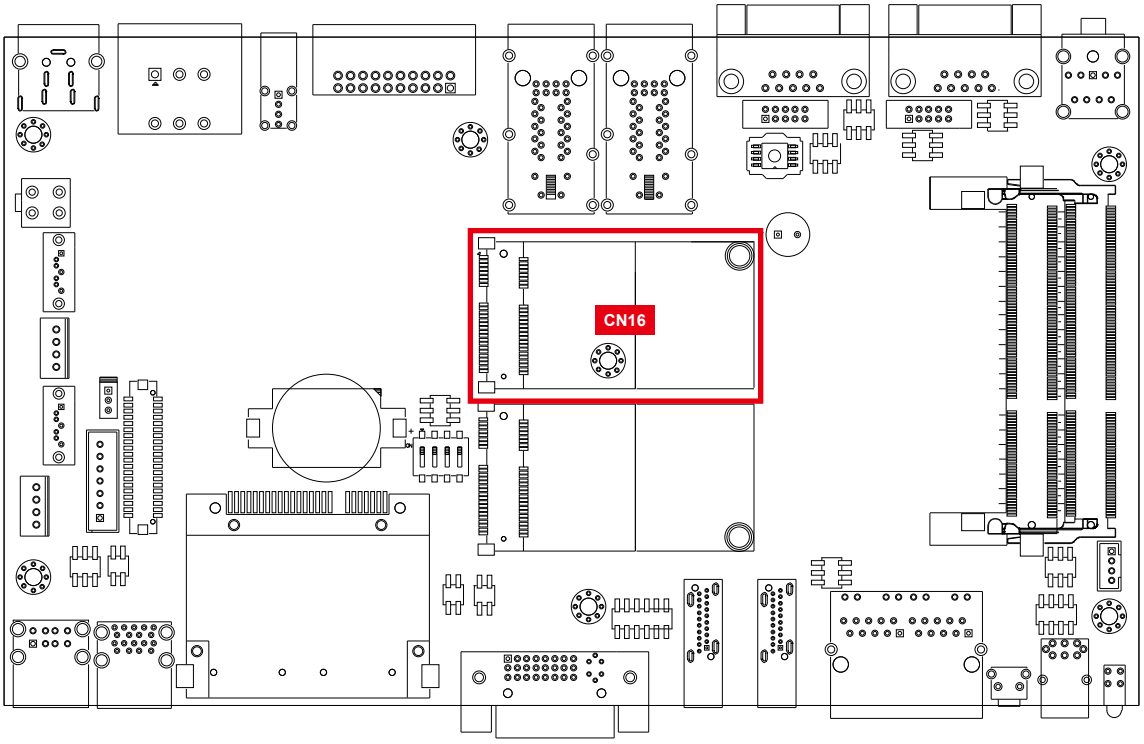
MTC-4015 using JP11 Pin-43 status designed for switching between mSATA drive and Mini PCIe device.

Header	Interface
1-2	Auto Detection
2-4	Mini PCIe
1-3	mSATA

The pin assignments of CN18 are listed in the following table:

Pin No.	Signal Name	Pin No.	Signal Name
1	WAKE#	2	+3.3Vaux
3	Reserved	4	GND
5	Reserved	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND	16	UIM_VPP
Mechanical Key			
17	Reserved	18	GND
19	Reserved	20	reserved
21	GND	22	PERST#
23	PERn0	24	+3.3Vaux
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3Vaux	40	GND
41	+3.3Vaux	42	Reserved
43	GND	44	Reserved
45	Reserved	46	Reserved
47	Reserved	48	1.5V
49	Reserved	50	GND
51	Reserved	52	+3.3Vaux

2.4.9 CN16 : Mini PCIe

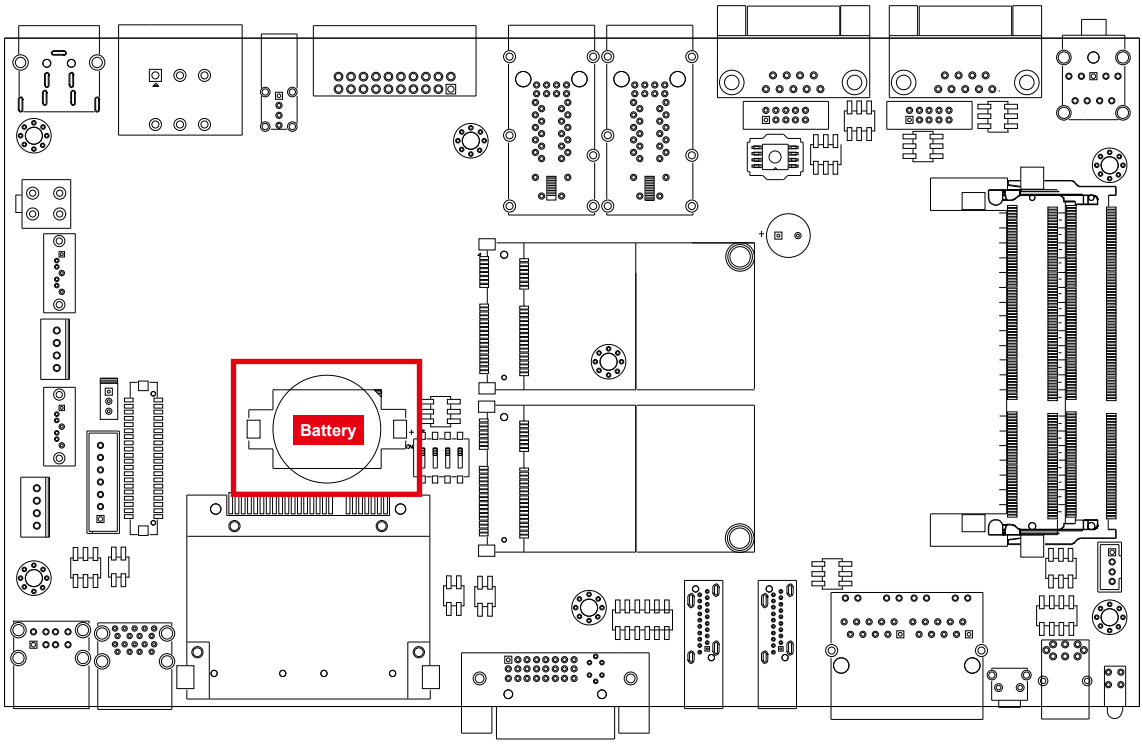


The pin assignments of CN16 are listed in the following table:

Pin No.	Signal Name	Pin No.	Signal Name
1	WAKE#	2	+3.3Vaux
3	Reserved	4	GND
5	Reserved	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND	16	UIM_VPP
Mechanical Key			
17	Reserved	18	GND
19	Reserved	20	reserved
21	GND	22	PERST#
23	PERn0	24	+3.3Vaux
25	PERp0	26	GND
27	GND	28	+1.5V

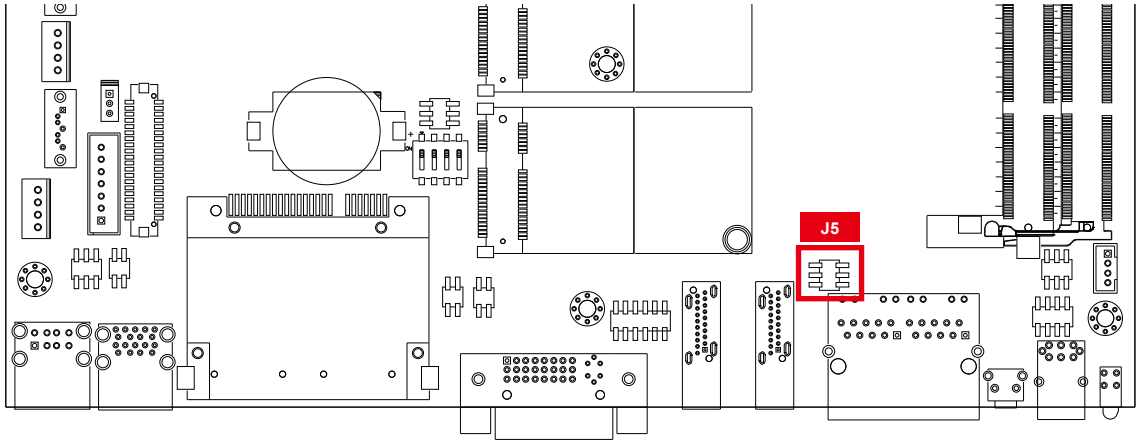
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3Vaux	40	GND
41	+3.3Vaux	42	Reserved
43	GND	44	Reserved
45	Reserved	46	Reserved
47	Reserved	48	1.5V
49	Reserved	50	GND
51	Reserved	52	+3.3Vaux

2.4.10 Battery



The MTC-4015's real-time clock is powered by a lithium battery. It is Equipped with Panasonic BR2032 190mAh lithium battery. It is recommended that you not replace the lithium battery on your own. If the battery needs to be changed, please contact the Vecow RMA service team.

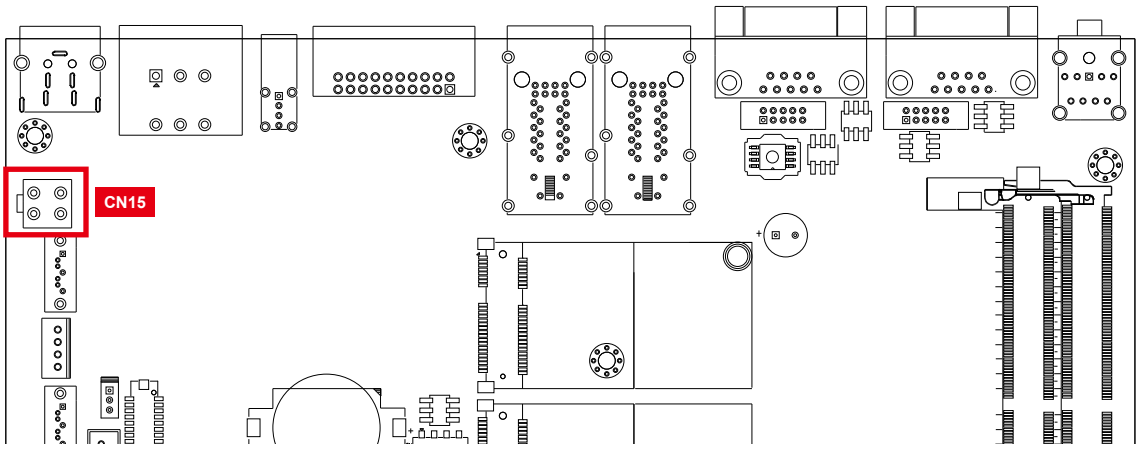
2.4.11 J5 : LAN2 I210 SDP



The pin assignments of J5 are listed in the following table:

Pin No.	Function	Pin No.	Function
1	LAN2_SDP0	4	LAN2_SDP3
2	LAN2_SDP1	5	GND
3	LAN2_SDP2	6	GND

2.4.12 CN15 : +12V_SB Output



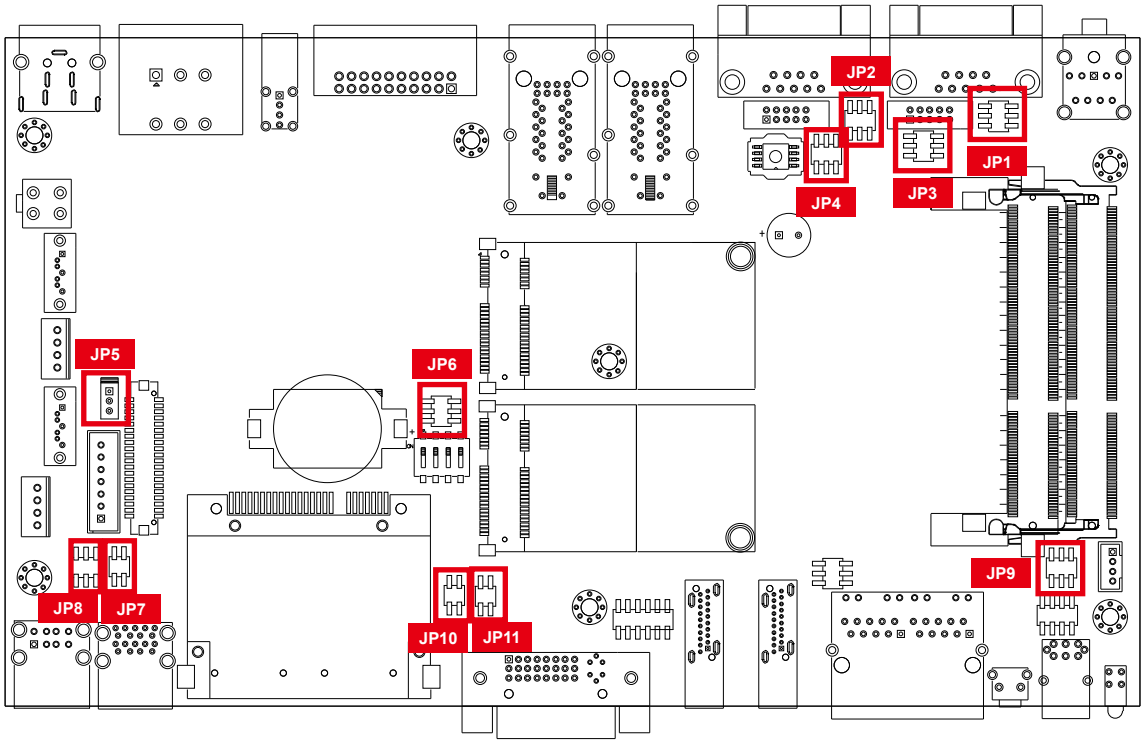
The pin assignments of CN15 are listed in the following table:

Pin No.	Function	Pin No.	Function
1	GND	3	+12V_SB
2	GND	4	+12V_SB

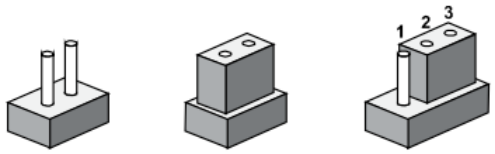
2.5 Main Board Jumper Settings

2.5.1 Front View of MTC-4015 Main Board with Jumper Location

The figure below is the top view of the MTC-4015 main board which is the main board used in the MTC-4015 Series system. It shows the location of the jumpers.

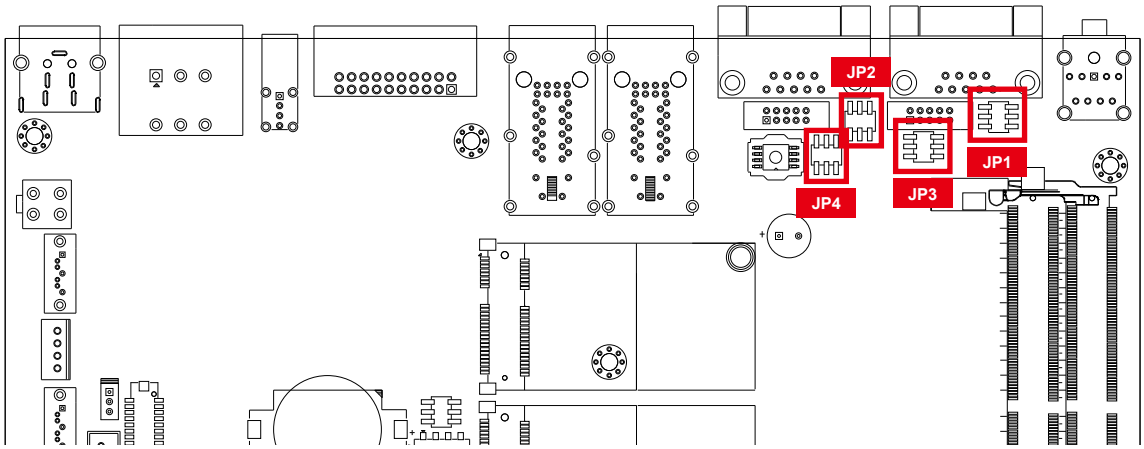


You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To “close” a jumper, you connect the pins with the clip. To “open” a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case you would connect either pins 1 and 2, or 2 and 3.



open closed closed 2-3

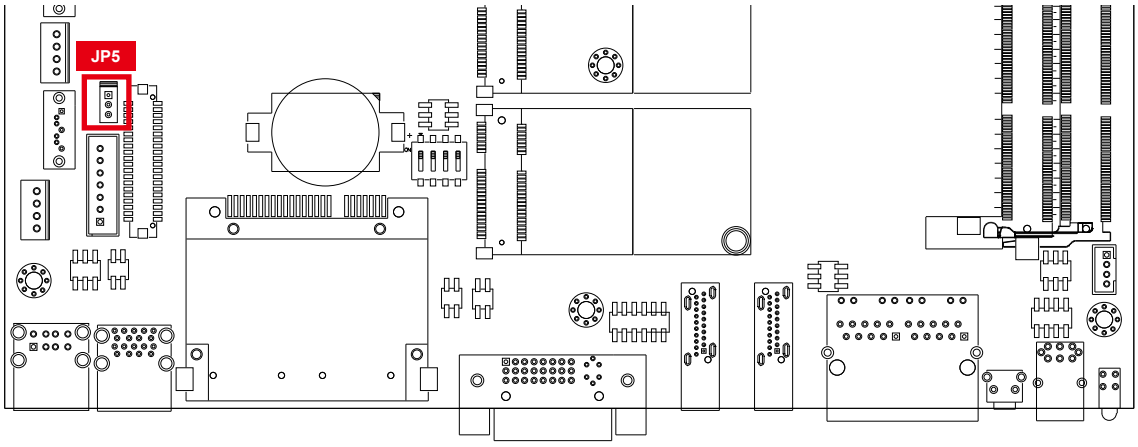
2.5.2 JP1, JP2, JP3, JP4



COM 1 to COM 4 Pin 9 Function:

Pin No.	RI/ +5V/ +12V
1-2	+12V
3-4	+5V
5-6	RI

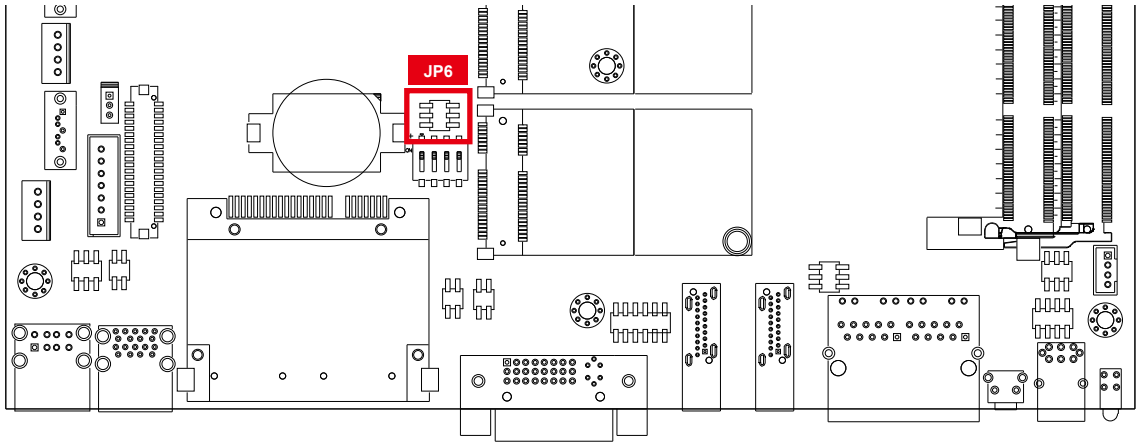
2.5.3 JP5 : LVDS Backlight, Power Selection



JP5 provides LVDS voltage selection function, closing Pin 1, 2 is for 3.3V LVDS power input; closing Pin 2, 3 is for 5V LVDS power input.

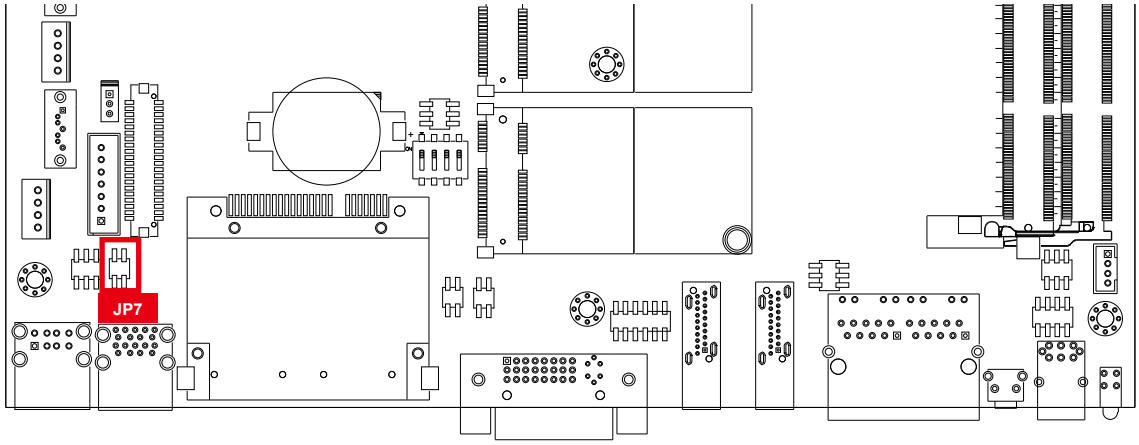
Pin No.	Function	Pin No.	Function
1-2	+3.3V (Default)	2-3	+5V

2.5.4 JP6 CMOS/ME



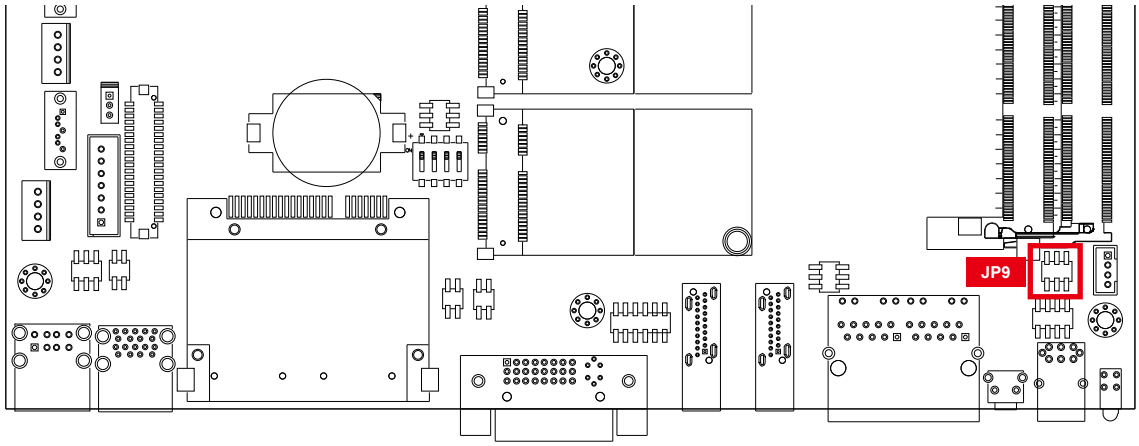
CMOS	Header	ME	Header
1-2	Normal	2-4	Normal
2-3	Clear CMOS	4-6	Clear ME

2.5.5 JP7 External USB3.0/2.0 Power Select



Header	Power	Header	Power
1-2	+5V Standby Power	3-4	+5V System Power

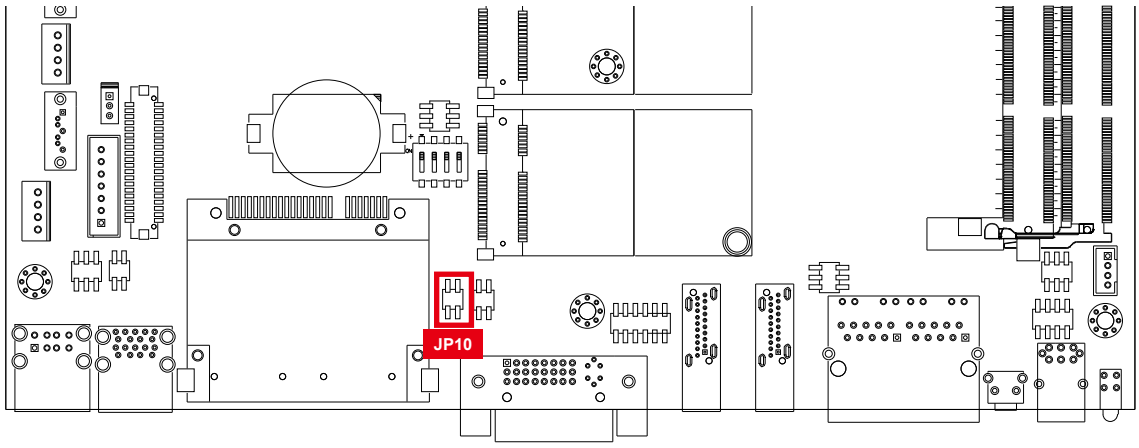
2.5.6 JP9 Internal USB Power Select



Internal USB PWR Select:

JP9	+V5A/ +V5/ +V3.3
1-2	+5V Standby
3-4	+5V
5-6	+3.3V

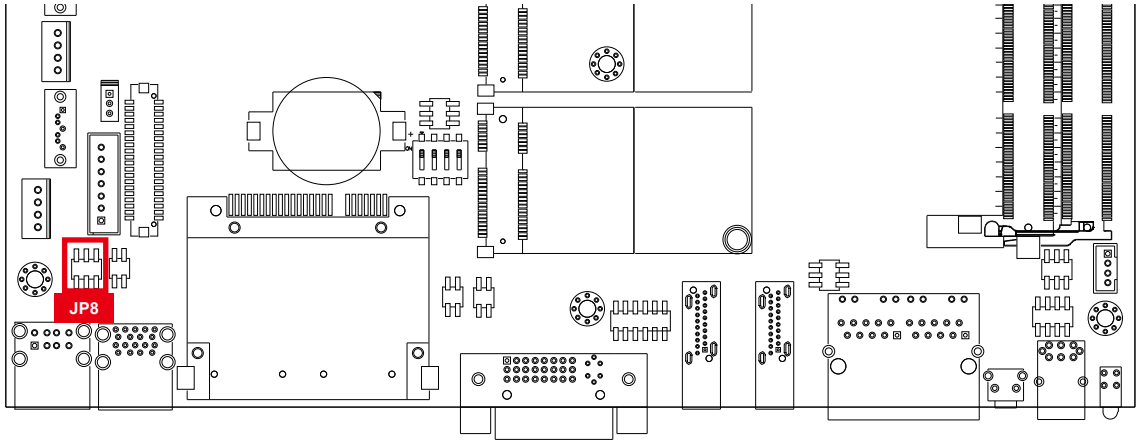
2.5.7 JP10 : MCU Spy-bi Wire Interface for Download FW



The pin assignments of JP10 are listed in the following table:

Pin No.	Function	Pin No.	Function
1	GND	3	3.3V_MCU
2	MCU_RST#	4	MCU_PRG

2.5.8 JP8 Backlight Control Level Select

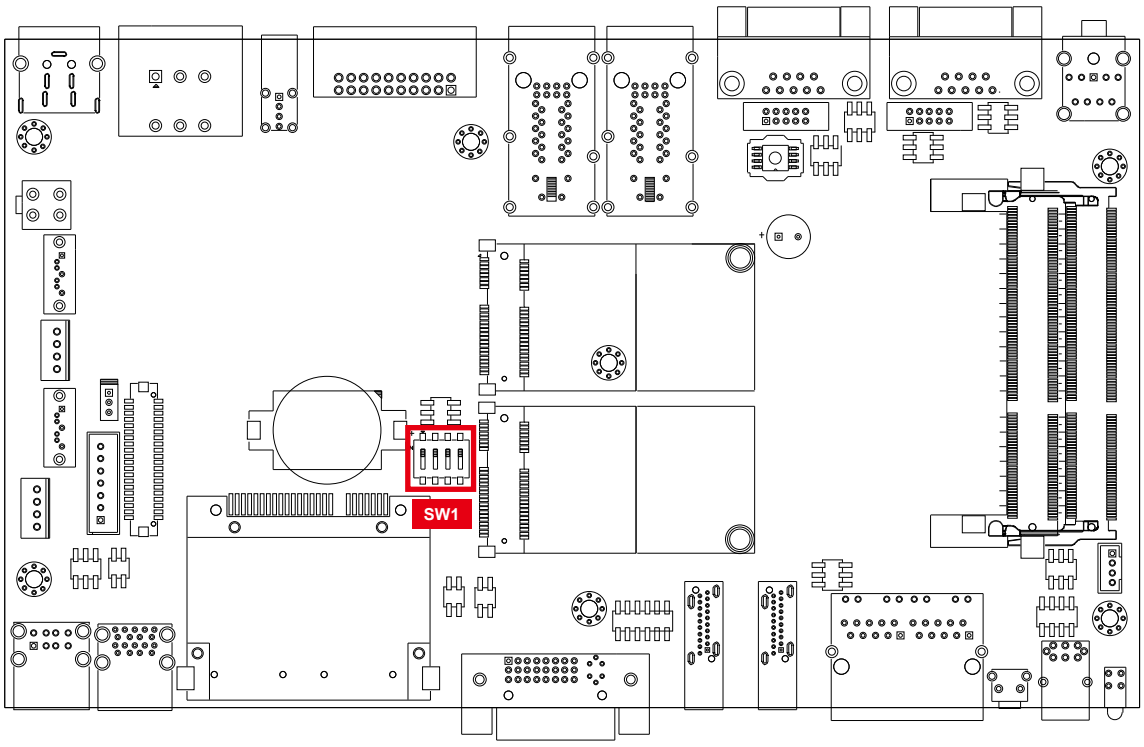


Dimming	Header
1-3	3.3V
3-5	5V

On/ Off	Header
2-4	3.3V
4-6	5V

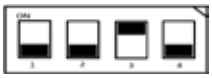
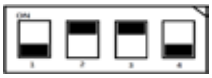
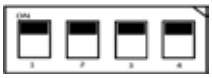
2.6 Ignition Control

MTC-4015 series provides ignition power control feature for in-vehicle applications. The built-in MCU monitors the ignition signal and turns on/ off the system according to pre-defined on/ off delay period.



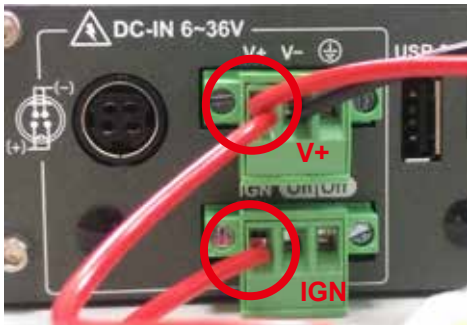
2.6.1 Adjust Ignition Control Modes

MTC-4015 series provides 16 modes of different power on/ off delay periods adjustable via rotary switch. The default rotary switch is set to 0 in ATX/ AT power mode.

DIP-Switch Position	Power on delay	Power off delay	Switch Position
0	ATX/AT mode		
1	No delay	No delay	
2	No delay	5 seconds	
3	No delay	10 seconds	
4	No delay	20 seconds	
5	5 seconds	30 seconds	
6	5 seconds	60 seconds	
7	5 seconds	90 seconds	
8	5 seconds	30 minutes	
9	5 seconds	1 hour	
A	10 seconds	2 hours	
B	10 seconds	4 hours	
C	10 seconds	6 hours	
D	10 seconds	8 hours	
E	10 seconds	12 hours	
F	10 seconds	24 hours	

2.6.2 Ignition Control Wiring

To activate ignition control, you need to provide IGN signal via the 3-pin pluggable terminal block locates in the back panel. Please find below the general wiring configuration.



V+ : Positive polarity of DC power input (Car battery+ for 12/24/36V)
V- : Ground of DC power input (Car battery -/GND line to GND)
IGN : Ignition signal input (ACC power of vehicle)

For testing purpose, you can refer to the picture blow to simulate ignition signal input controlled by a latching switch.

Note:
1. DC power source and IGN share the same ground.
2. MTC-4015 supports 6V to 36V wide range DC power input in ATX/AT mode. In Ignition mode, the input voltage is fixed to 12/24/36V for car battery scenario.
3. For proper ignition control, the power button setting should be “Power Down” mode.

In Windows for example, you need to set “When I press the power button” to Shut down.

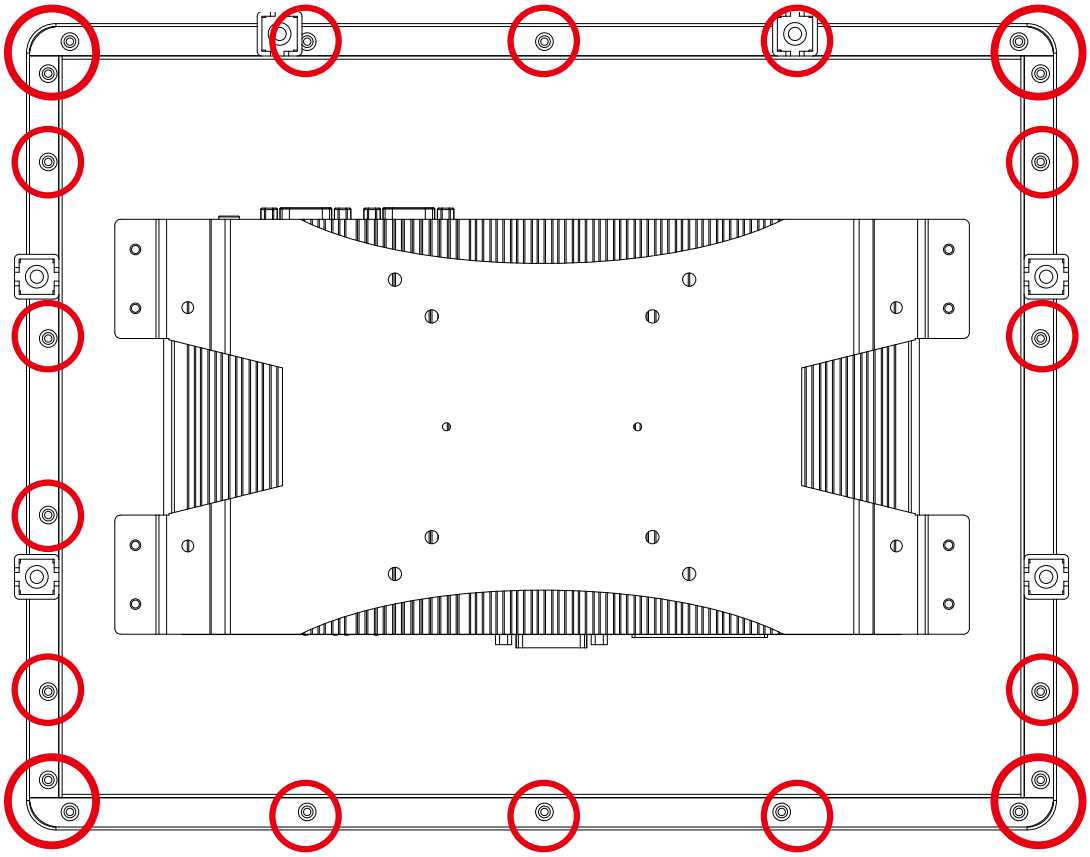
3

SYSTEM SETUP

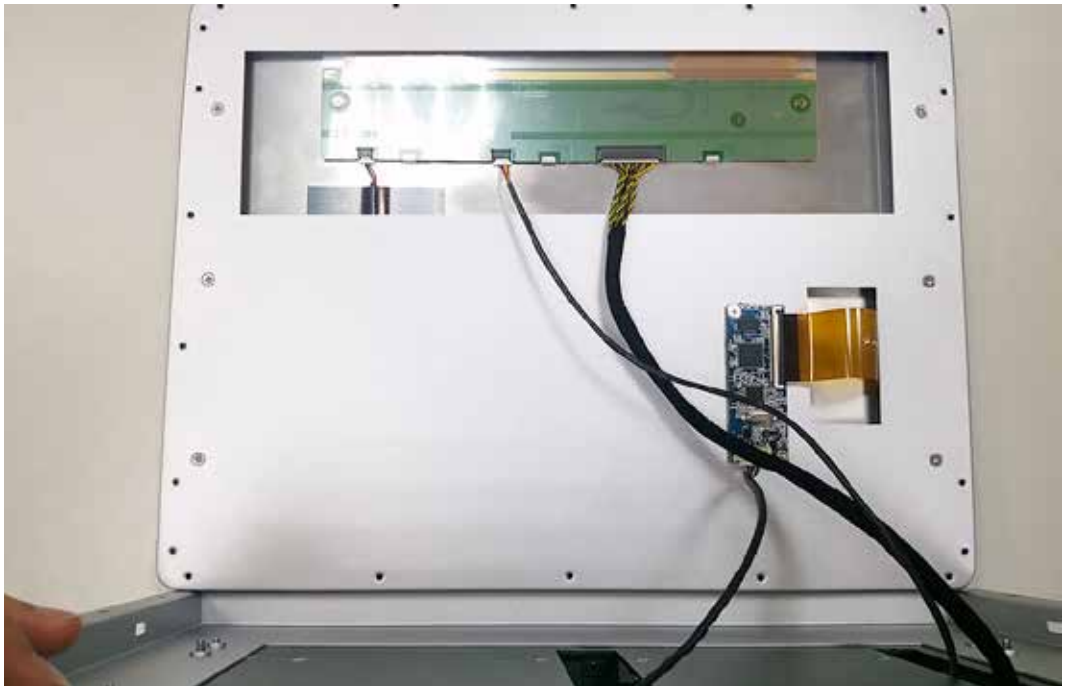
"Please make sure to assemble the system in an anti-static environment."

3.1 How to Open Your MTC-4015/MTC-4015P

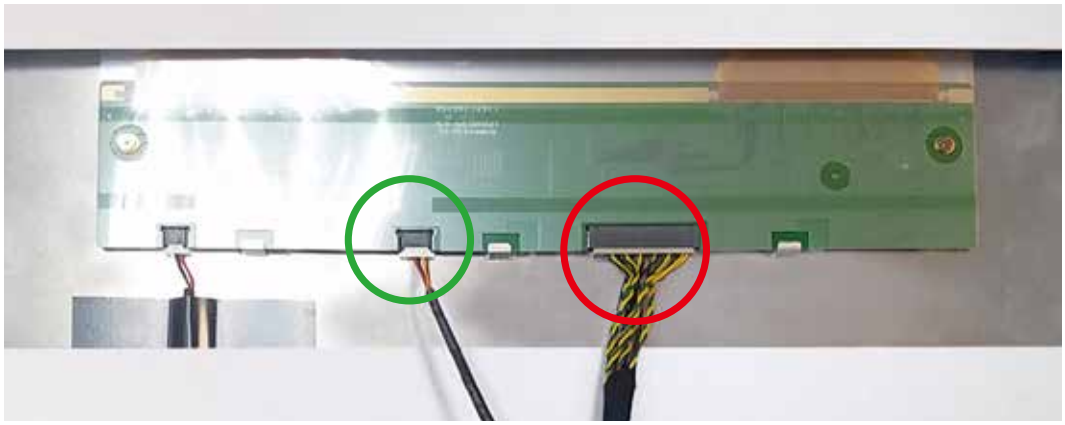
Step 1 Remove 20pcs FH M3 screws (circled in red) from back cover.

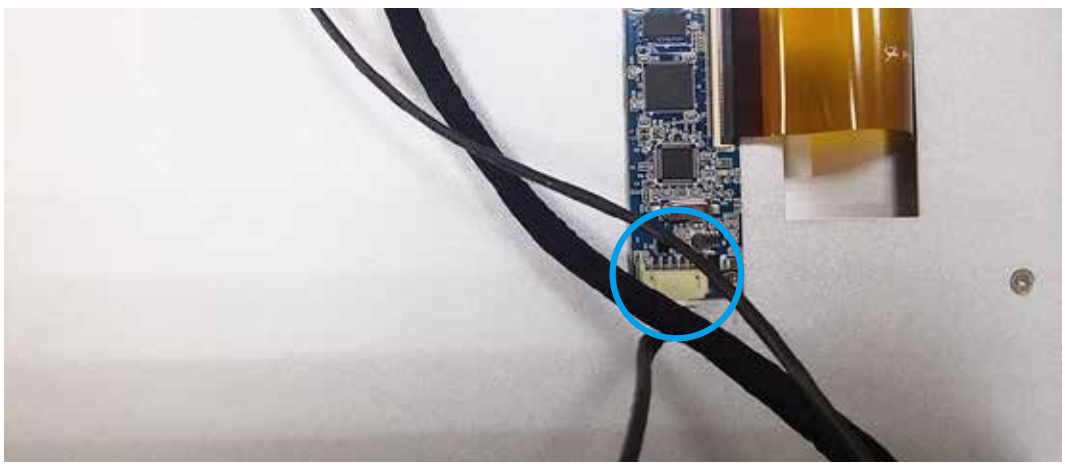


Step 2 Open the cover.

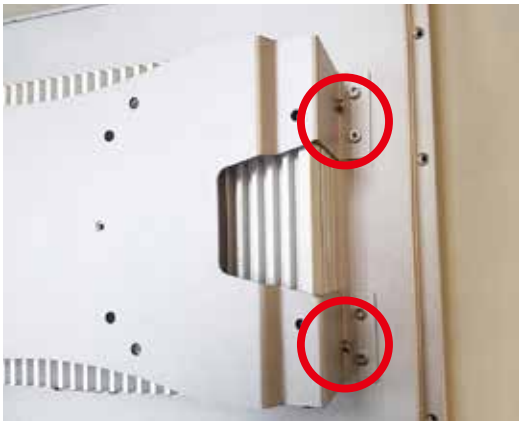


Step 3 Remove LVDS(Red), Inverter(Green) and USB(Blue) cable.





Step 4 Remove 4pcs KSH#6-32 screws (circled in red).



Step 5 Counterclockwise loosen the locks on each SSD/HDD Tray.

Step 6 Remove 5pcs KSH#6-32 screws (circled in red) and 2pcs #4-40 screws (circled in yellow) on the front panel.

Step 7 Take off the front panel.

Step 8 Remove 4pcs F#6-32 screws(circled in red).

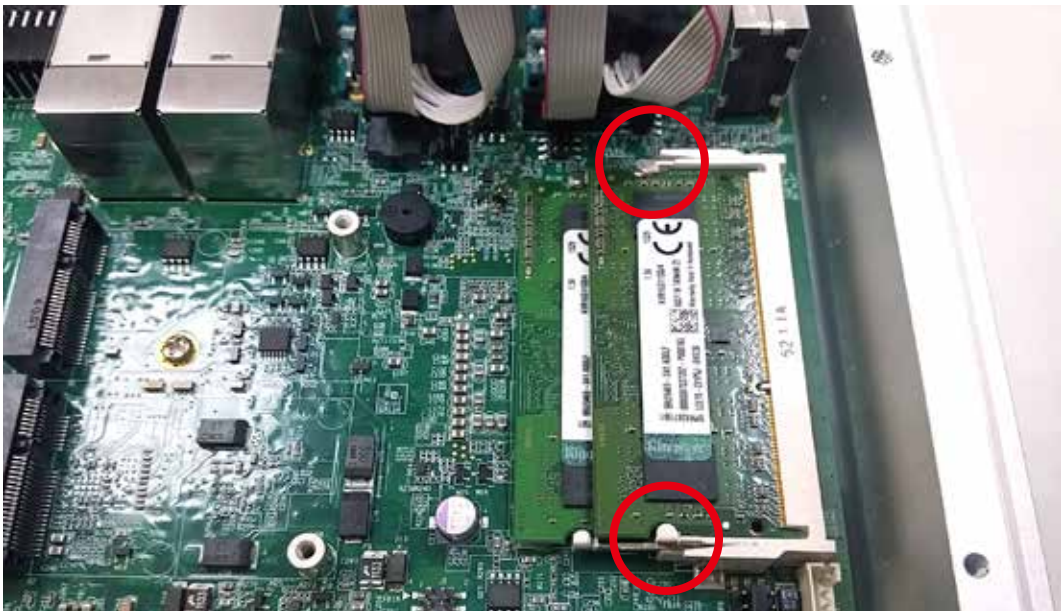
Step 9 Remove 1pcs KSH#6-32 screws(circled in red).

Step 10 Then do open the bottom cover carefully.

3.2 Installing DDR3L SO-DIMM Modules

Step 1 Install DDR3L RAM module into SO-DIMM slot.

Step 2 Make sure the RAM module is locked by the memory slot.



3.3 Installing Mini PCIe Cards

Step 1 Install Mini PCIe card into the Mini PCIe socket.

Step 2 Fasten 2pcs M2.5 screws.

3.4 Installing Antenna Cable

Step 1 Check Antenna cable and washers.

Step 2 Remove 3pcs rubber cork on rear panel.
(Pick up the location you want)

Step 3 Put Antenna cable connector into the hole on rear panel.

Step 4 Fasten the washer 1, washer 2 and washer 3 on Antenna cable connector.

3.5 Installing CFast Card and SIM Card

Step 1 Remove 2pcs M3x4 Flat head screws on CFast & SIM Card cover on front panel.

Step 2 Make sure the system is power-off and unplugged.

Step 3 Insert CFast card and push to lock.

Step 4 Before Inserting SIM card, make sure the system power is not plugged.

Step 5 Insert SIM card and push to lock.

3.6 Installing SSD/HDD

Step 1 Counterclockwise loosen the locks on each SSD/HDD Tray. Then remove the SSD/HDD Tray.

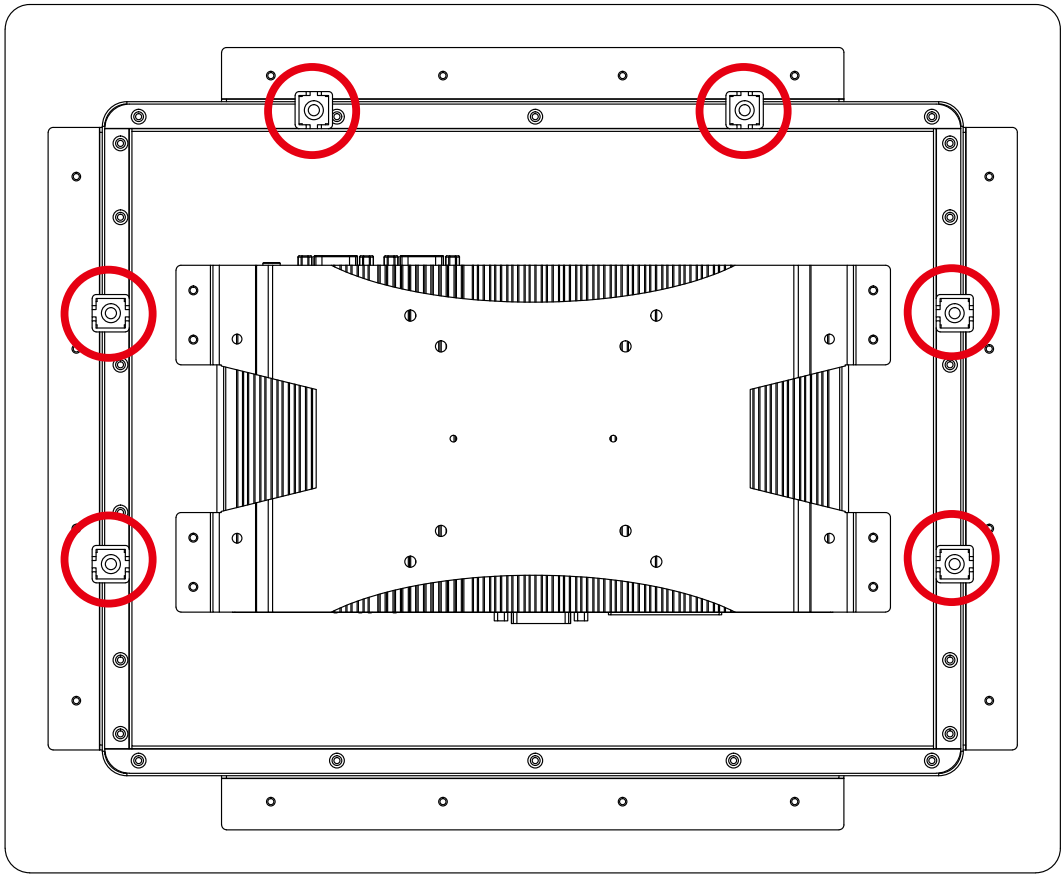
Step 2 Fix the SSD/HDD on the SSD/HDD Tray with 2pcs M3x4 Flat head screws.

Step 3 Put the SSD/HDD Tray back.

Step 4 Clockwise fasten the locks on each SSD/HDD Tray.

3.7 Mounting MTC-4015

Panel mount position



Step 1 Make sure your M5x20 screws and screw tongues for Panel mount.

Step 2 Make sure the screw tongues match MTC-2021 back cover.

Step 3 Fasten the M5x20 screw.

4

BIOS AND DRIVER

4.1 BIOS Settings

The board uses UEFI BIOS that is use Serial Peripheral Interface (SPI) Flash. The SPI Flash contains the BIOS Setup program, POST, the PCI auto-configuration utility, LAN, EEPROM information, and Serial port support. The BIOS setup program is accessed by pressing the <Del> key after the Power-On Self-Test (POST) memory test begins and before the operating system boot begins. The menu bar is shown below.

Figure 4 1: BIOS Menu Bar

4.2 Main Menu

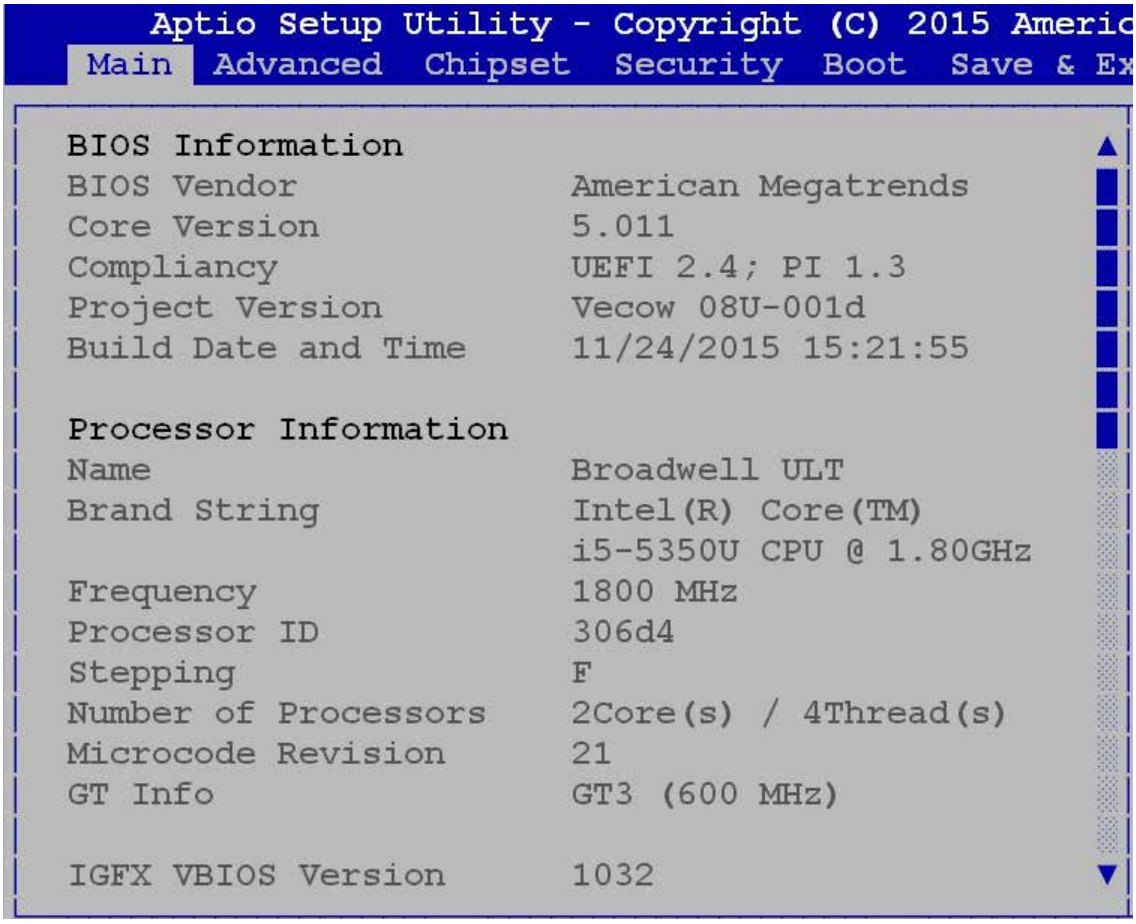


Figure 4 2: BIOS Main screen

In this page, you could make sure you CPU type and DRAM type that you are install into this system.

4.2.1 System Time/Date Setting

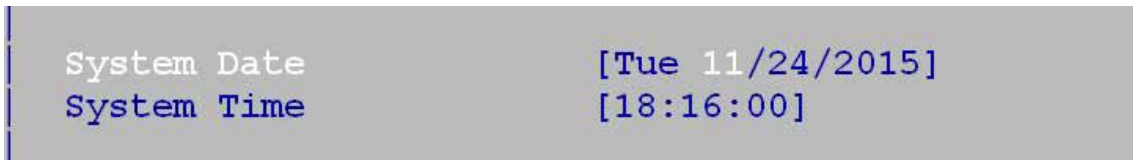


Figure 4 2-1: System Time / Date setting

System Time/ Date

Press “TAB” key to switch sub-items of value .Then press “+” key or “-“ key number key for modify value.

4.3 Advanced Function

4.3.1 ACPI Setting

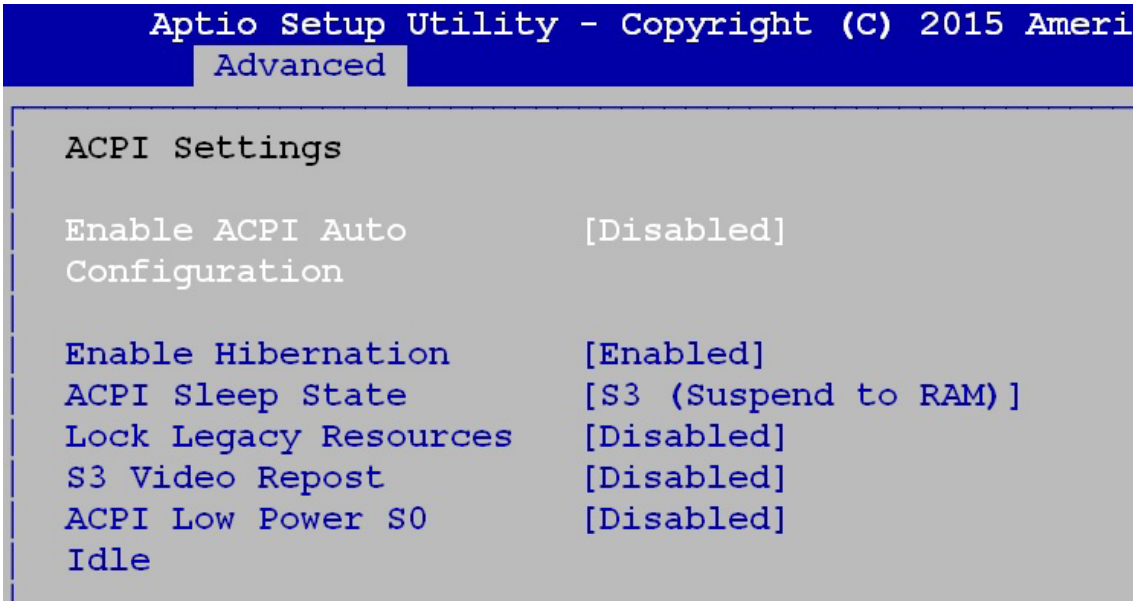


Figure 4 3-1: ACPI Setting setup screen

Enable ACPI Auto Configuration
This system support ACPI function as auto process. You should Enable / Disable that depend as your O.S.

Enable Hibernation
It is able to use Hibernate function if O.S support. But some O.S maybe not effective with this function.

4.3.2 CPU Configuration

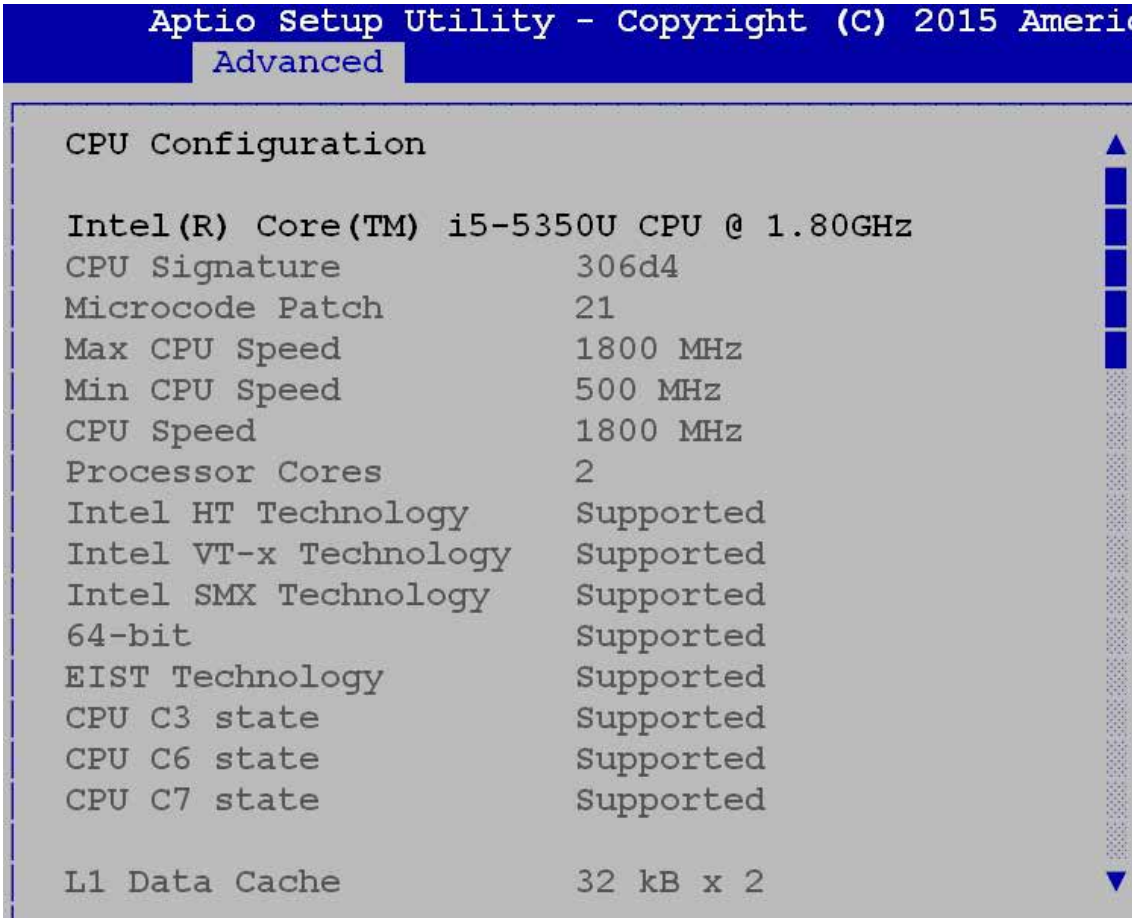


Figure 4-3-2: CPU Configuration setup screen

Intel Virtualization Technology

This for Virtualization Application or platform usage, when enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

4.3.3 SATA Configuration

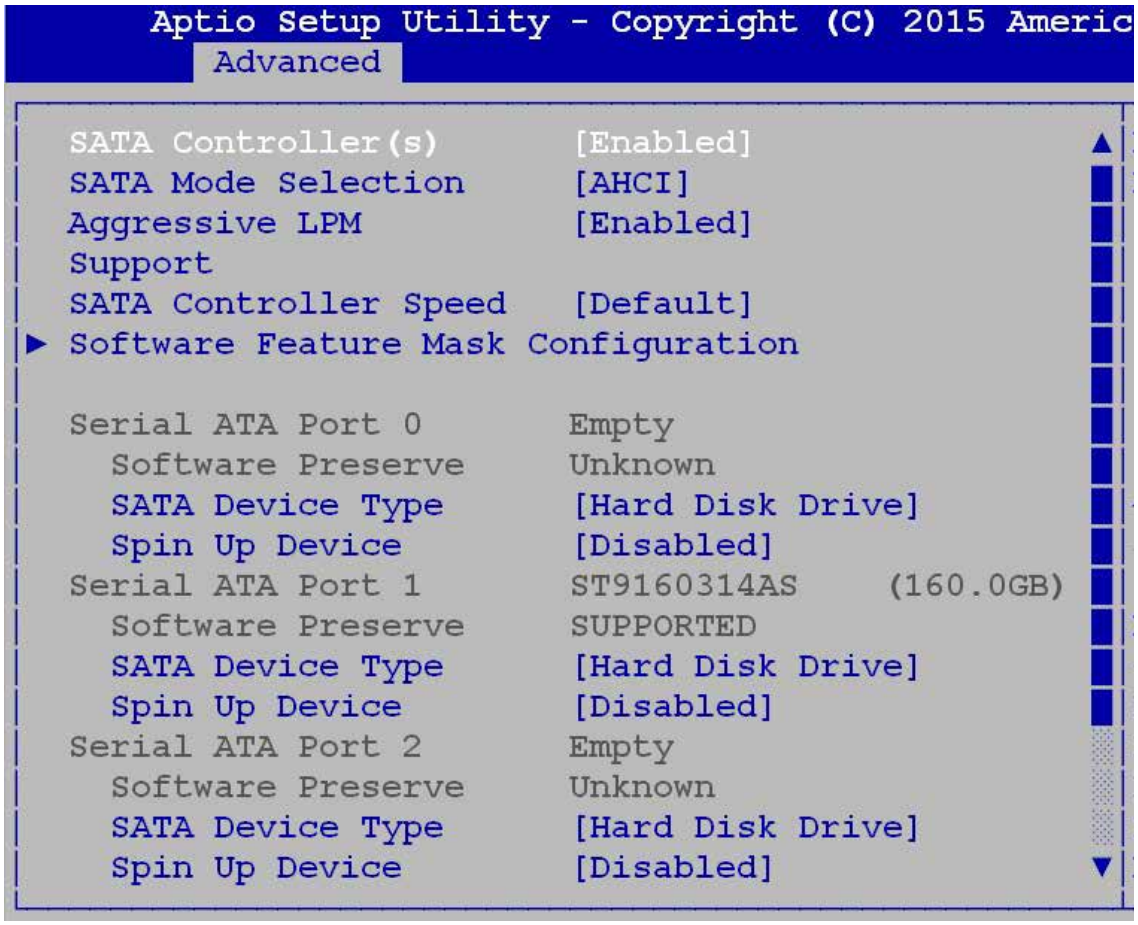


Figure 4-3-3: SATA Configuration setup screen

SATA Controller(s)
Enables or Disables integrate SATA controller for Storage device use.

SATA Mode Selection
Determines how the SATA transfer mode for operate. Here has two options for choice [AHCI] / [RAID].

Serial ATA Port 0 to Port 3
This system offers four SATA port for SATA device connection.

4.3.4 AMT Configuration

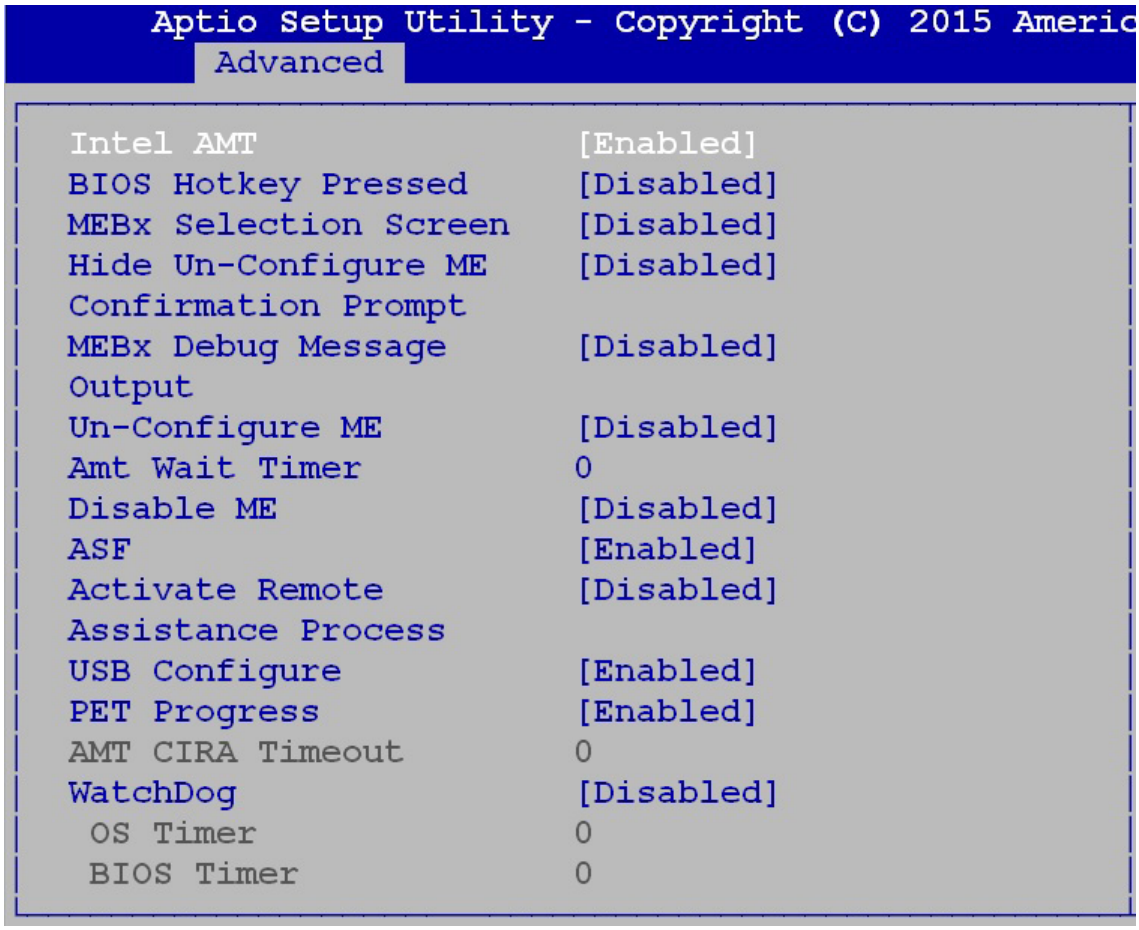


Figure 4-3-4: AMT Setup screen

Intel AMT

Enables or Disables Intel(R) Active Management Technology BIOS extension. This option just controls the BIOS extension executes.

4.3.5 Serial Port 1 Configuration

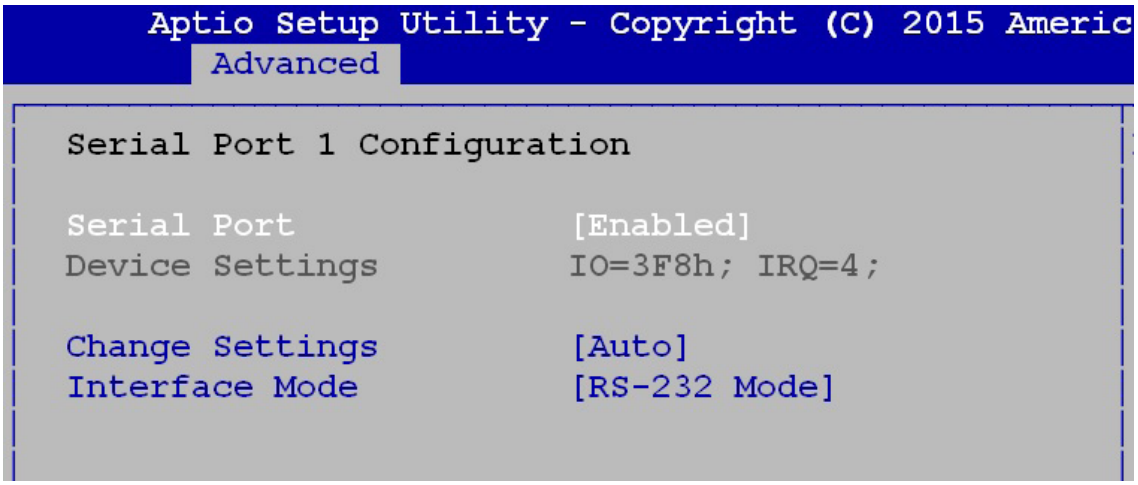


Figure 4-3-5: Serial Port 1 Setup screen

Serial Port
Enable or Disable Serial Port.

Device Setting
Current IO address and interrupt resource of Serial Port.

Change Settings
Select another device setting.
There are 6 options as follow :

- Auto
- IO=3F8h; IRQ=4;
- IO=3F8h; IRQ=3,4,12;
- IO=2F8h; IRQ=3,4,12;
- IO=3E8h; IRQ=3,4,12;
- IO=2E8h; IRQ=3,4,12;

Interface Mode
There are 3 options as follow :

- RS-232 Mode
- RS-422 Mode
- RS-485 Mode

4.3.6 Serial Port 2 Configuration

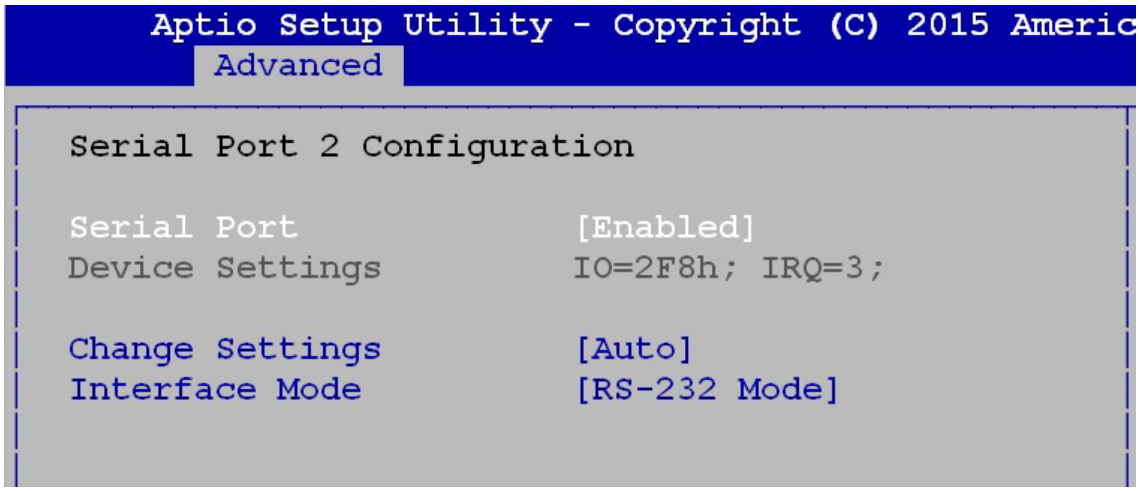


Figure 4-3-6 : Serial Port 2 Setup screen

Serial Port
Enable or Disable Serial Port.

Device Setting
Current IO addresses and interrupts resource of Serial Port.

Change Settings
Select another device setting.
There are 6 options as follow :

- Auto
- IO=2F8h; IRQ=3;
- IO=3F8h; IRQ=3,4,12;
- IO=2F8h; IRQ=3,4,12;
- IO=3E8h; IRQ=3,4,12;
- IO=2E8h; IRQ=3,4,12;

Interface Mode
There are 3 options as follow :

- RS-232 Mode
- RS-422 Mode
- RS-485 Mode

4.3.7 Serial Port 3 Configuration

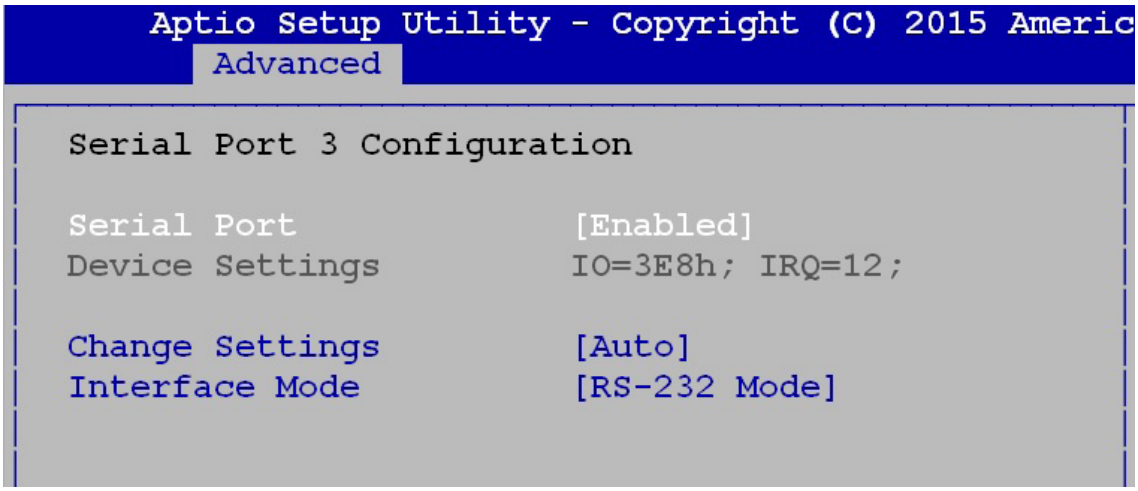


Figure 4-3-7: Serial Port 3 Setup screen

Serial Port
Enable or Disable Serial Port.

Device Setting
Current IO address and interrupt resource of Serial Port.

Change Settings
Select another device setting.
There are 6 options as follow :

- Auto
- IO=3E8h; IRQ=12;
- IO=3E8h; IRQ=3,4,12;
- IO=2E8h; IRQ=3,4,12;
- IO=2F0h; IRQ=3,4,12;
- IO=2E0h; IRQ=3,4,12;

Interface Mode
There are 3 options as follow :

- RS-232 Mode
- RS-422 Mode
- RS-485 Mode

4.3.8 Serial Port 4 Configuration

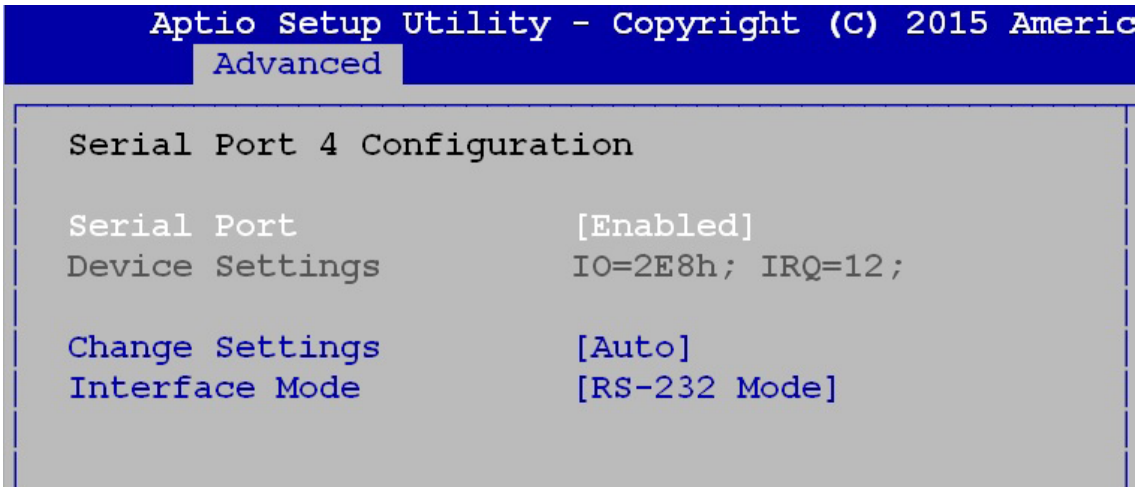


Figure 4-3-8: Serial Port 4 Setup screen

Serial Port
Enable or Disable Serial Port.

Device Setting
Current IO address and interrupt resource of Serial Port.

Change Settings
Select another device setting.
There are 6 options as follow :

- Auto
- IO=2E8h; IRQ=12;
- IO=3E8h; IRQ=3,4,12;
- IO=2E8h; IRQ=3,4,12;
- IO=2F0h; IRQ=3,4,12;
- IO=2E0h; IRQ=3,4,12;

Interface Mode
There are 3 options as follow :

- RS-232 Mode
- RS-422 Mode
- RS-485 Mode

4.4 Chipset Function

Figure 4-4: Chipset Function Setup screen

4.4.1 WOL Configuration

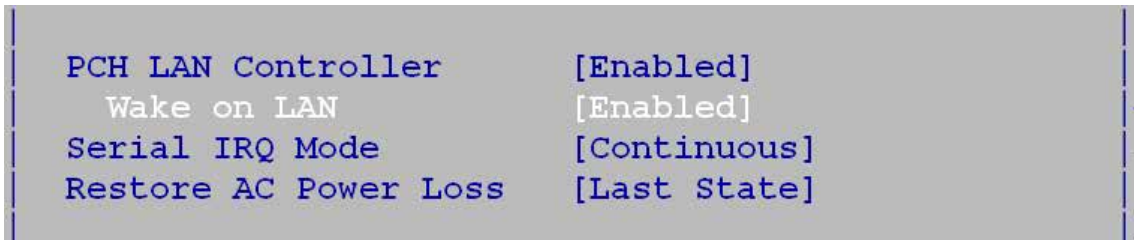


Figure 4-4-1 : Network Setup screen

PCH LAN Controller
Enable or Disable on board network device.

Wake on LAN
Enable or Disable integrated LAN to wake the system.

4.5 Boot Function

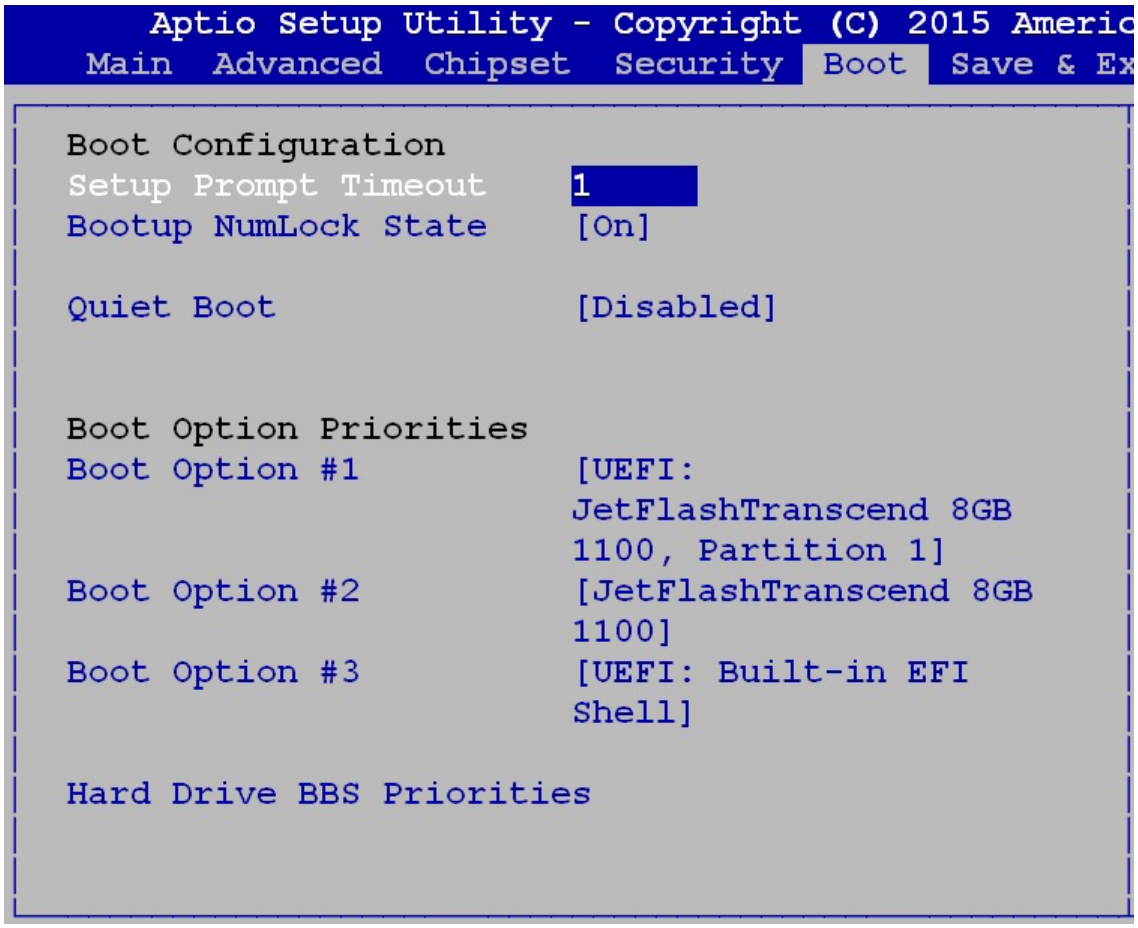


Figure 4-5: Boot function Setup screen

4.5.1 Boot Option

Figure 4-5-1 Boot Option Setup screen

Boot option

You can select boot device priority in this page.

4.6 Save & Exit

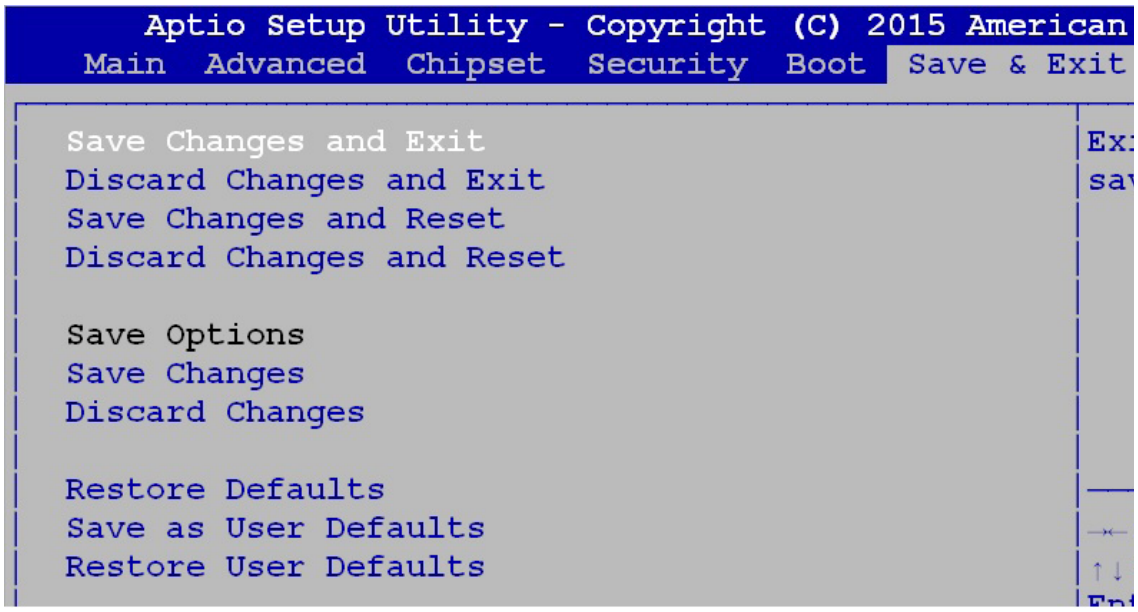


Figure 4-6 Save & Exit Setup screen

Save Changes and Exit / Save Changes and Reset

Choose this setting to exit the BIOS setup program and save changes to the BIOS NVRAM memory. Make sure you select this in order to keep your changes.

Discard Changes and Exit / Discard Changes and Reset

Choose this setting to exit the BIOS SETUP program discarding all changes made.

APPENDIX A : GPIO and WDT Functions

A.1 Function Description

The WDT are using internal Super IO function. However, you must entry super I/O configuration mode to set it.

Super I/O special address port = 0x2E
Super I/O special data port = 0x2F
GPIO Logical device is 0x07

A.2 Entry Functions

1. Entry MB PnP Mode.

//write twice 0x87 value.
outportb(Super I/O special address port, 0x87);
outportb(Super I/O special address port, 0x01);
outportb(Super I/O special address port, 0x55);
outportb(Super I/O special address port, 0x55);

2. Located on Logical Device 7(LOGIC_DEVICE_WDT)

//write 0x07 on Reg [0x07] , this setup must follow Step A. that can be workable.
outportb(Super I/O special address port, 0x07);
outportb(Super I/O special data port, 0x07);

3. Config the WDT Register

outb(WDT_Config,SPECIAL_ADDRESS_PORT);
outb(WDT_As_Second|WDT_Pin_PWRGD,SPECIAL_DATA_PORT);

4. Start WDT TimeOut Value

Here have 2 Byte for WDT timing count, MSB and LSB should be write the value separate.

WDT_TimeOut_MSB,SPECIAL	***WDT_TimeOut_LSB,SPECIAL***

outb(WDT_TimeOut_LSB,SPECIAL_ADDRESS_PORT);
outb(WDT_TimeOutValue,SPECIAL_DATA_PORT);

Vecow

For further support information, please visit www.vecow.com