MTC-2021 USER Manual

21.5" Fanless Multi-Touch Computer

Vecow

Record of Revision

Version	Date	Page	Description	Remark
0.9	03/06/2015	All	Preliminary Release	
1.0	03/24/2015	All	Offical Release	

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Order Information

Part Number	Description
MTC-2021	21.5" Fanless Multi-Touch Computer with Intel® Bay Trail Quad-Core E3845 Processor

Order Accessories

Part Number	Description
DDR3L8G	Certified DDR3L 8G RAM
DDR3L4G	Certified DDR3L 4G RAM
PWA-60WP3B	60W, 24V/2.5A 100V AC to 240V AC Power Adapter for 3 Pin 5.0mm Terminal Block
Panel-Mount	Panel mount Kit
VESA-Mount	VESA Table Stand
WiFi Module	Mini PCIe WiFi Module with Antenna
3G Module	Mini PCIe 3G/GPS Module with Antenna
4G Module	Mini PCIe 4G/GPS Module with Antenna

Table of Contents

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GENERAL INTRODUCTION

1.1 Overview

MTC-2021 is an ultra-compact 21.5" 1920x1080 Full HD fanless 10-Point Multi-Touch Panel Computer for industrial grade applications. With ultra-low power consumption quad core Intel® Atom™ E3845 CPU engine, single DDR3L SO-DIMM supports up to 8GB memory, VGA/ HDMI display output, built-in dual GbE LAN, 1 USB 3.0, 2 USB 2.0, 6 COM, 8 GPIO, 9V to 28V DC-in, MTC-2021 fits in slim mechanical design, just so thin in 4.3 cm only.

Advanced glove-working 10-Point Projected Capacitive Touch Technology, 7H Hardness LCD Panel, 21.5" 16:9 1920x1080 Full HD LCD Panel with LED Backlight management, optional supports IP65 Front Panel Protection, MTC-2021 integrates advanced multi-touch features, excellent graphics performance and outstanding reliability.

With excellent performance, ultra-slim size and trusted reliability, MTC-2021 is your great choice for Intelligent Manufacturing System, Environmental Monitoring, Point-of-Information, Point-of-Sales, Self-service Kiosk, Transportation, Internet of Things (IoT) or any HMI applications.

1.2 Features

- Intel® Atom™ Quad Core E3845 1.91GHz Processor
- Fanless, Ultra-compact, 4.3 cm Slim Design
- 7H Hardness Anti-scratch Surface
- Touch Screen Works with Gloves
- 10-point Touch Screen (Projected Capacitive)
- 21.5" 16:9 Full HD (1920x1080) LCD Panel with LED Backlight
- 9V to 28V DC Power Input
- 2 GbE LAN, 1 USB 3.0, 2 USB 2.0, 8 GPIO
- 6 COM Ports Including 2 Isolated RS-232/ 422/ 485
- Mounting Methods: Panel/ VESA
- IP65 Front Panel Protection (Optional)
- Supports 3G/ 4G/ GPS/ GPRS/ WiFi/ Bluetooth (Optional)
- Sunlight Readability Requirements (Optional)

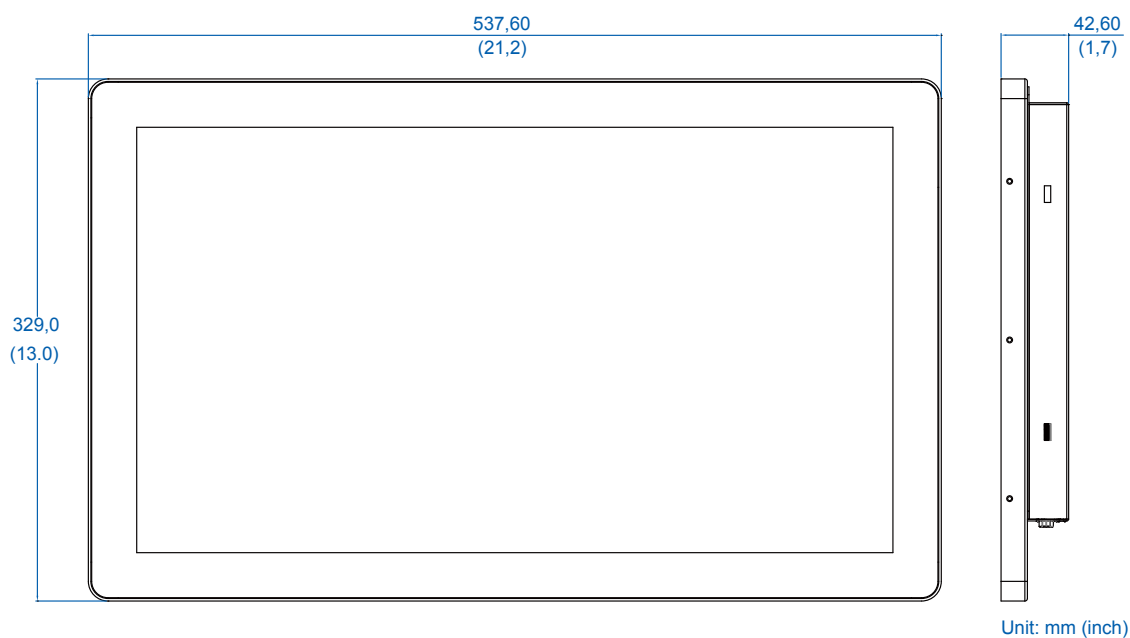# 1.3 Product Specification

1.3.1 Specifications of Vecow MTC-2021

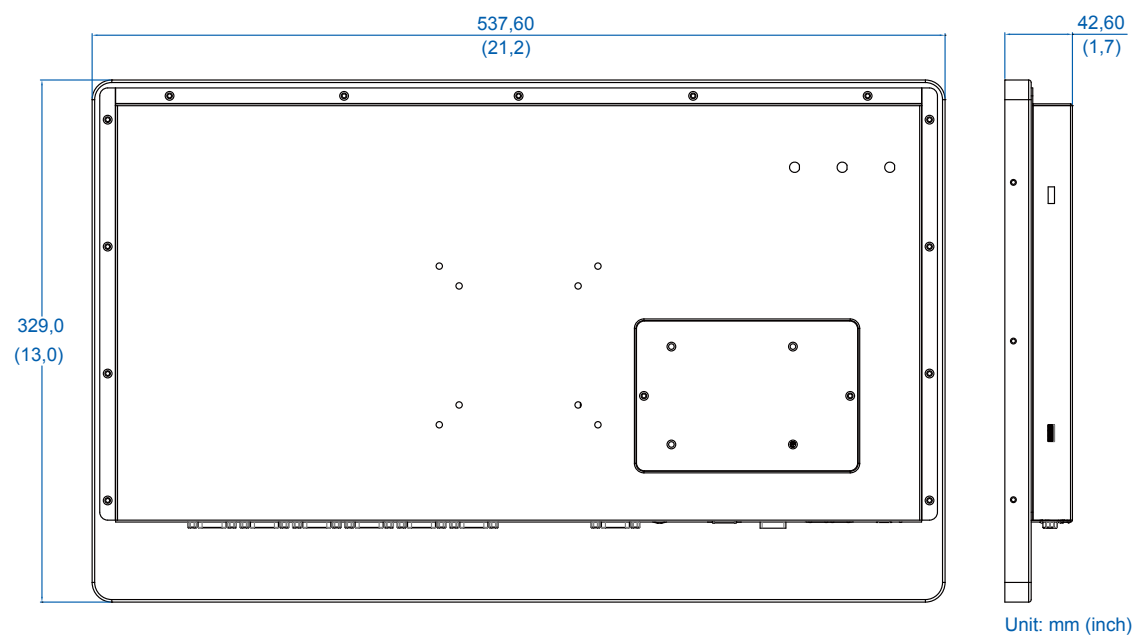| Display Panel	
Type	a-Si TFT-LCD
Size	21.5" (16:9)
Resolution	1920 x 1080 (Full HD)
Display Color	16.7 M (RGB 8 bits)
Backlight	LED
Brightness (cd/m^2)	250 (Optional up to 1200)
Viewing Angles	89/ 89/ 89/ 89 (L/ R/ U/ D)
Contrast Ratio	3000:1
Touch Screen	
Type	10-point Projected Capacitive
Transparency	≥ 85%
Surface Hardness	7H
Control Interface	USB
System	
Processor	Intel® Atom™ Quad Core E3845 1.91GHz Processor
Chipset	Intel® SoC
Memory	1 DDR3L 1333 SO-DIMM, up to 8GB
Video	VGA/ HDMI Output
Audio	1 Mic-in, 1 Line-out
Software Support	Windows 8, Windows 7, WES7, Linux
Storage	
SATA	1 SATA II (3Gbps)
mSATA	1 mSATA (Mini PCIe Type)
I/O Ports	
Serial	6 COM (2 RS-232, 4 RS-232/ 422/ 485)
	2 Isolated RS-232/ 422/ 485 with 5kV DC
Ethernet	2 Gigabit LAN by Intel® WG82574L
USB	1 USB 3.0, 2 USB 2.0
GPIO	8 GPIO
Mini PCIe	1 Mini PCIe Socket (PCIe + USB + SIM Card Socket)
	1 Mini PCIe Socket (PCIe + USB)
	1 mSATA Socket

Others	
Watchdog Timer	Reset : 1 to 255 sec./min. per step
GPS	Onboard GPS Module (Optional)
Power	
Power Input	3-pin Terminal Block; DC-in 9V to 28V
Adapter	AC to DC, 60W (Optional)
Mechanical	
Dimensions (WxHxD)	537.6mm x 329.06mm x 42.6mm (21.2" x 13" x 1.7")
Weight	5.8 kg (12.8 lb)
Mounting	VESA Mount (75mm x 75mm, 100mm x 100mm)
	Panel Mount
Environment	
Operating Temperature	0°C to 50°C (32°F to 122°F)
Storage Temperature	-20°C to 60°C (-4°F to 140°F)
Humidity	5% to 90%, non-condensing
Vibration	IEC 60068-2-64 Non-operation : 1.5 Grms , 10Hz to 200Hz, 30 mins 3 Axis
Shock	IEC 60068-2-27 20G, Half-sine, 11ms
Ingress Protection	Front IP65 Water and Dust Proof (Optional)
EMC	CE, FCC

1.4 Mechanical Dimension

1.4.1 MCT-2021 Front View

537,60
(21,2)

42,60
(1,7)

329,0
(13.0)

Unit: mm (inch)

1.4.2 MTC-2021 Rear View

537,60
(21,2)

42,60
(1,7)

329,0
(13,0)

Unit: mm (inch)

2

GETTING TO KNOW YOUR MTC-2021

2.1 Packing List

| Item	Description	Qty
1	MTC-2021, 21.5" Fanless Multi-Touch Computer (According to the configuration you order, the MTC-2021 may contain SSD/HDD and DDR3L SO-DIMM. Please verify these items if necessary.)	1
2	Accessory box, which contains ● Vecow Drivers & Utilities DVD ● 3-pin pluggable terminal block ● FH M3x4 screws for HDD ● BH M2.5x6 screws for Mini PCIe	1 1 4 6

2.2 I/O Functions

2.2.1 External I/O Connectors
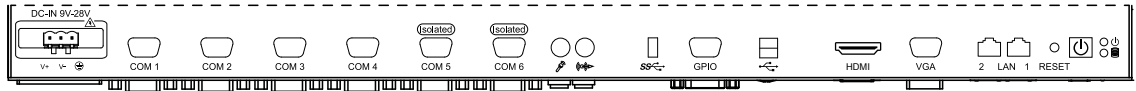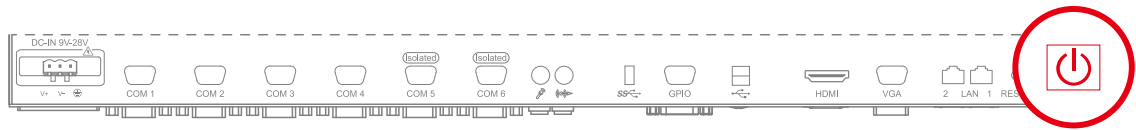

2.2.2 Reset Tact Switch
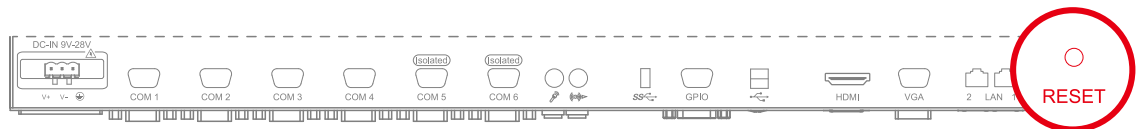
It is a hardware reset switch. Use this switch to reset the system without turning off the power. Momentarily pressing the switch will reset the MTC-2021.

2.2.3 Power Button

The power button is a non-latched switch with dual color LED (Blue/ Orange) for status monitoring : S0, S3 and S5. LED indications of system status are listed as follow :

Status	LED Displayed	System Situation
S0	Blue	System working
S3, S5	Orange	Suspend to RAM, System off with standby power

To turn on the MTC-2021, press the power button and the blue LED is lighted up. To turn off the MTC-2021, you can either issue a shutdown command in OS, or just simply press the power button. In case of system halts, you can press and hold the power button for 4 seconds to compulsorily shut down the system. Please note that a 4 seconds interval is kept by the system between two on/ off operations (i.e. once turning off the system, you shall wait for 4 seconds to initiate another power-on operation).
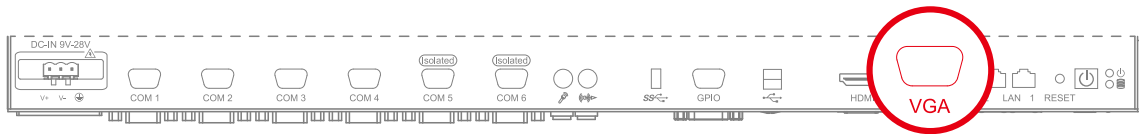
2.2.4 PWR & HDD LED Indicators
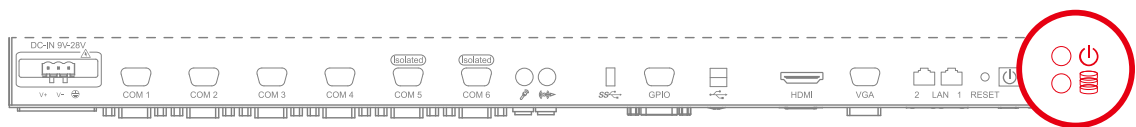
Yellow - HDD LED: A hard disk LED. If the LED is on, it indicates that the system's storage is functional. If it is off, it indicates that the system's storage is not functional. If it is flashing, it indicates data access activities.

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

2.2.5 VGA Connector

The MTC-2021 comes with a DB15 female connector to connect a VGA monitor. To ensure that the monitor image remains clear, be sure to tighten the monitor cable after connecting it to the MTC-2021. The VGA output mode supports up to 2560x1600 resolution. The pin assignments of the VGA connector are shown below.

Pin No.	Definition	Pin No.	Definition
1	Red Color Signal	11	NC
2	Green Color Signal	12	DDC-DATA
3	Blue Color Signal	13	H-Sync.
4	NC	14	V-Sync.
5	Ground	15	DDC-CLK
6	VGA Detect		
7	Ground		
8	Ground		
9	VCC		
10	Ground		
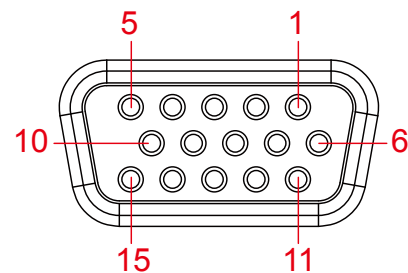
2.2.6 HDMI Connector
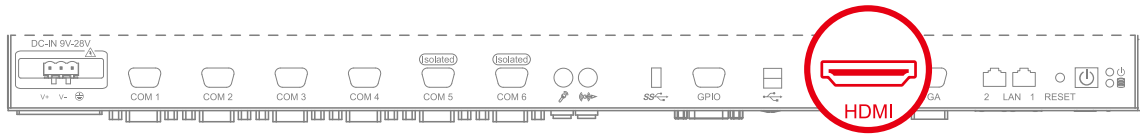
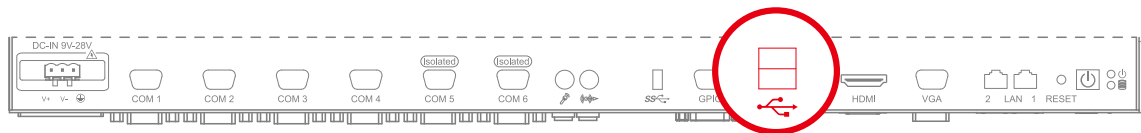The HDMI output mode supports up to 2560x1600 resolution The HDMI mode is automatically selected according to the display device connected.

2.2.7 Dual USB 2.0

The MTC-2021 comes with 2 USB 2.0 hosts. The USB interface supports Plug and Play, which enables you to connect or disconnect a device whenever you want, without turning off the system. The hosts can be used for an external flash disk or hard drive for storing large amounts of data. You can also use these USB hosts to connect to a keyboard or a mouse. The following diagram shows the pinouts for USB 1 and USB 2 ports.

Pin No.	USB 1	USB 2
1	+5V	+5V
2	USB 1-	USB 2-
3	USB 1+	USB 2+
4	GND	GND
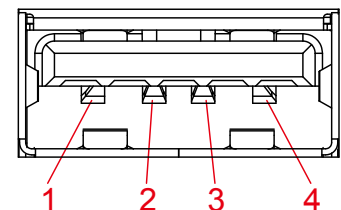
2.2.8 10/100/1000 Mbps LAN Port
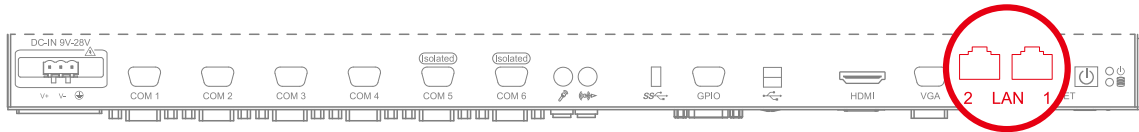
There are two 10/100/1000 Mbps Ethernet LAN ports equipped with 8-pin RJ-45 connector. LAN 1 and LAN 2 are powered by Intel 82574L chipset. Using suitable RJ-45 cable, you can connect MTC-2021 system to a computer, or to any other piece of equipment that has an Ethernet connection, for example, a hub or a switch. Moreover, both of them have Wake-on-LAN and Pre-boot Execution Environment capabilities. The following diagram shows the pinouts for LAN 1 and LAN 2.

Pin No.	10 / 100 Mbps	1000 Mbps
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

The Ethernet ports use standard RJ-45 jack connectors with LED indicators to show Active/ Link status and Speed status.

The LED indicators on the right bottom corners glow a solid green color when the cable is properly connected to a 100 Mbps Ethernet network. The LED indicator on the left bottom corner will flash on and off when Ethernet packets are being transmitted or received.

The LED indicators on the right bottom corners glow a solid orange color when the cable is properly connected to a 1000 Mbps Ethernet network. The LED indicator on the left bottom corner will flash on and off when Ethernet packets are being transmitted or received.

|	10 Mbps	100 Mbps	1000 Mbps
Right Bottom Led	Off	Solid Green	Solid Orange
Left Bottom Led	Flash Yellow	Flash Yellow	Flash Yellow
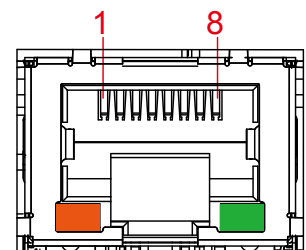
2.2.9 Audio Connector

The MTC-2021 offers stereo audio connector of Mic-in and Line-out. The audio chip controller is by Realtek ALC892 which is compliant with the Intel Azalia standard. To utilize the audio function in Windows, you need to install corresponding drivers for Realtek ALC892 code.

2.2.10 8-bit GPIO
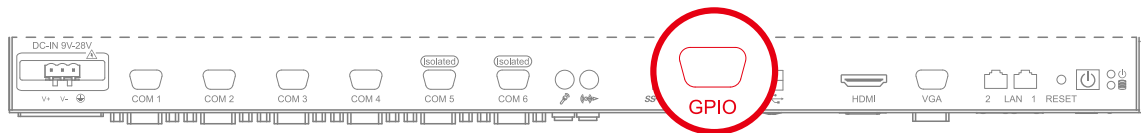
The MTC-2021 offers an 8-bit GPIO connector. Each bit internal pull up a weak resistor to +V3.3_SB. Each bit can be configured for GPI or GPO. You can find the setting in BIOS.

Pin No.	Definition	Mapping to SIO GPIO Function
1	GPIO 0	SIO_GPI70
2	GPIO 1	SIO_GPI71
3	GPIO 2	SIO_GPI72
4	GPIO 3	SIO_GPI73
5	GND	GND
6	GPIO 4	SIO_GPI74
7	GPIO 5	SIO_GPI75
8	GPIO 6	SIO_GPI76
9	GPIO 7	SIO_GPI76
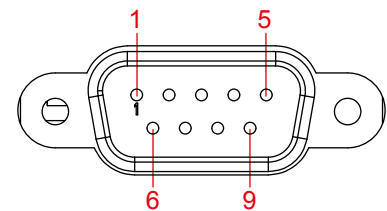
2.2.11 Serial Port COM 1/ COM 2
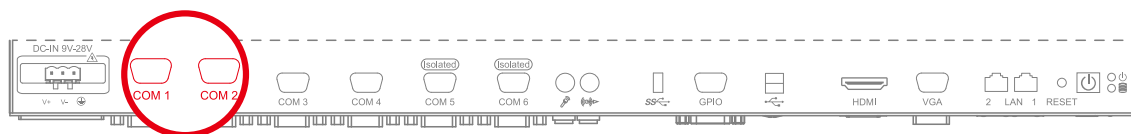
COM 1 and COM 2 are RS-232 only and provide up to 115,200 bps baud rate. The pin assignments are shown in the table as follow.

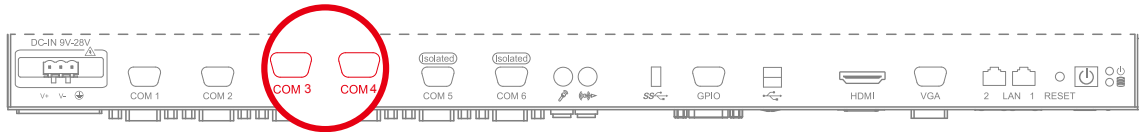| Serial Port	Pin No.	RS-232
1,2	1	DCD
	2	RXD
	3	TXD
	4	DTR
	5	GND
	6	DSR
	7	RTS
	8	CTS
	9	RI

2.2.12 Serial Port COM 3/ COM 4

COM 3 and COM 4 can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. Serial Port 2 default setting is RS-232, if you want to use RS-422 or RS-485, you can find the setting in BIOS.

BIOS Setting	Function
COM 3 / COM 4	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)
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-	-----------

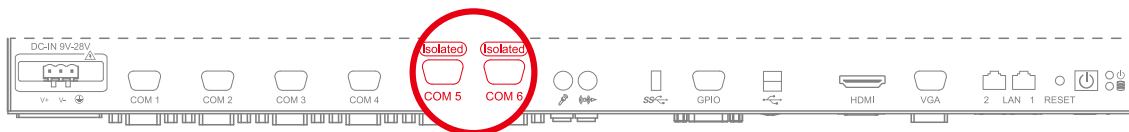## 2.2.13 Isolated Serial Port COM 5/ COM 6

COM 5 and COM 6 can be configured for RS-232, RS-422, or RS-485 with auto flow control communication. Serial Port 2 default setting is RS-232, if you want to use RS-422 or RS-485, you can find the setting in BIOS.

BIOS Setting	Function
COM 5 / COM 6	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)
5,6	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-	-----------

2.2.14 DC-in 9V to 28V Terminal Block
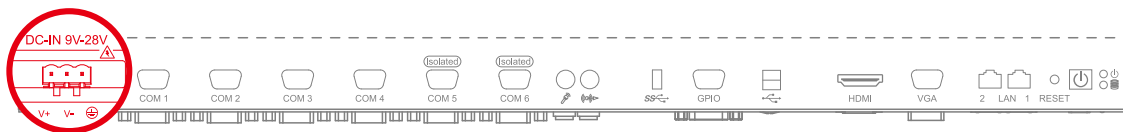
The MTC-2021 offers 9V to 28V DC power input. If the power is supplied properly, the Power LED will light up a solid green.
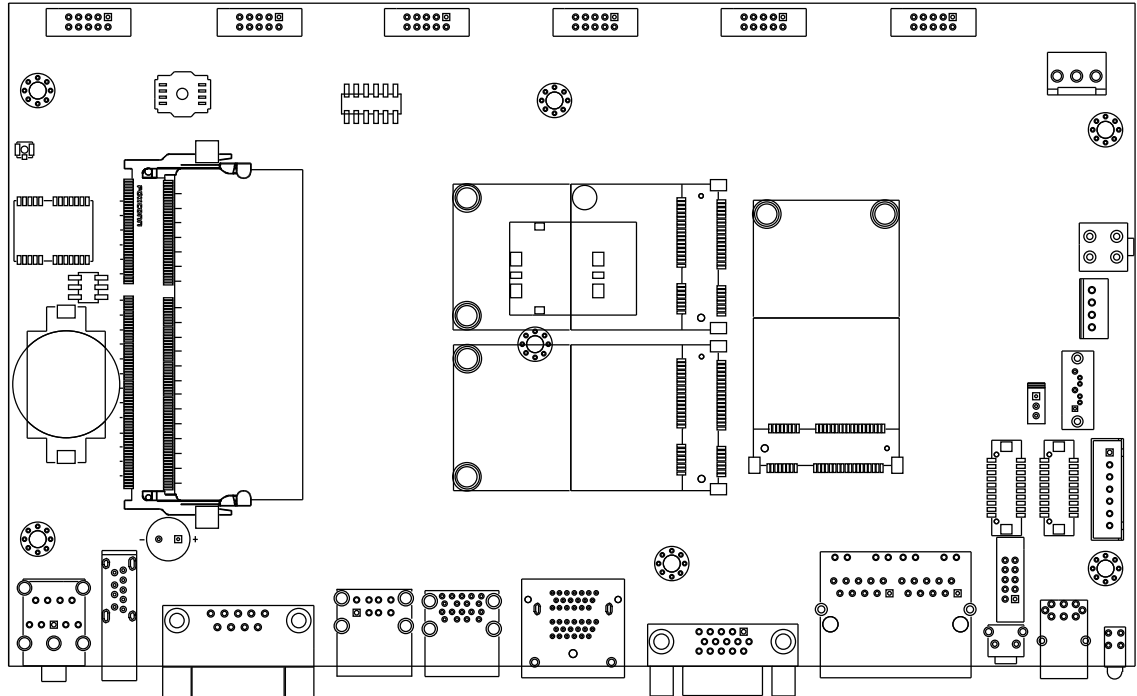
2.2.15 USB 3.0 Ports
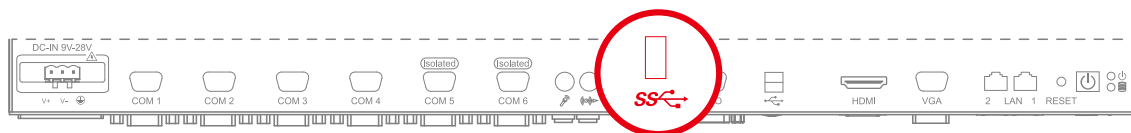
The MTC-2021 comes with 1 USB 3.0 hosts. These USB 3.0 ports allow data transfers up to 5 Gbps. The controller supports SuperSpeed (SS), High-Speed (HS), Full-Speed (FS) and Low-Speed (LS) traffic on the bus.
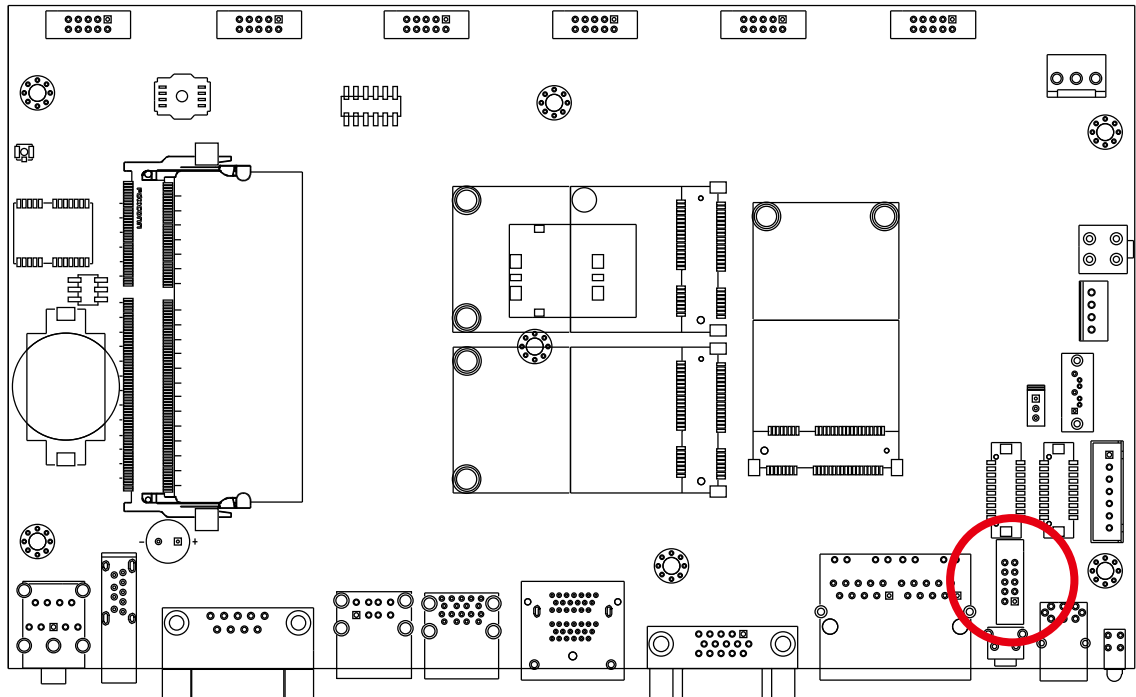
2.3 Mainboard Expansion Connector

The figure below is the top view of the MTC-2021 mainboard. It shows the location of all connectors.

The figure below is the bottom view of the MTC-2021 mainboard.
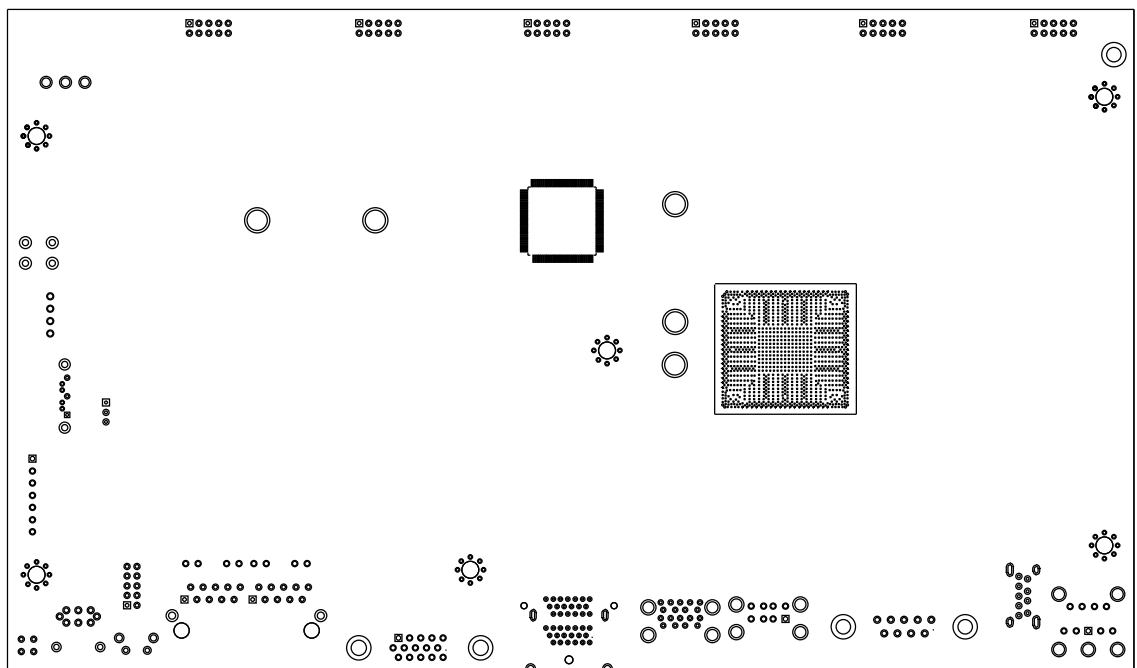
2.3.1 Panel Miscellaneous Pin Header

These pin headers can be used as a backup for the following functions: hard drive LED indicator, reset button, power LED indicator, and Power-on/ Power-off button. The following table shows the pinouts for Miscellaneous port.

J1 Miscellaneous Pin Header

Group	Pin No.	Description
HDD LED	2	HD_LED+
	4	HD_LED-
RESET BUTTON	6	FP_RST_BTN_N
	8	GND
POWER LED	1	PWR_LED+
	3	PWR_LED_N
POWER BUTTON	5	FP_PWR_BTN_N
	7	GND
POWER	9	+V5
	10	+V5_SB

2.3.2 CN24, CN25, J2 LVDS
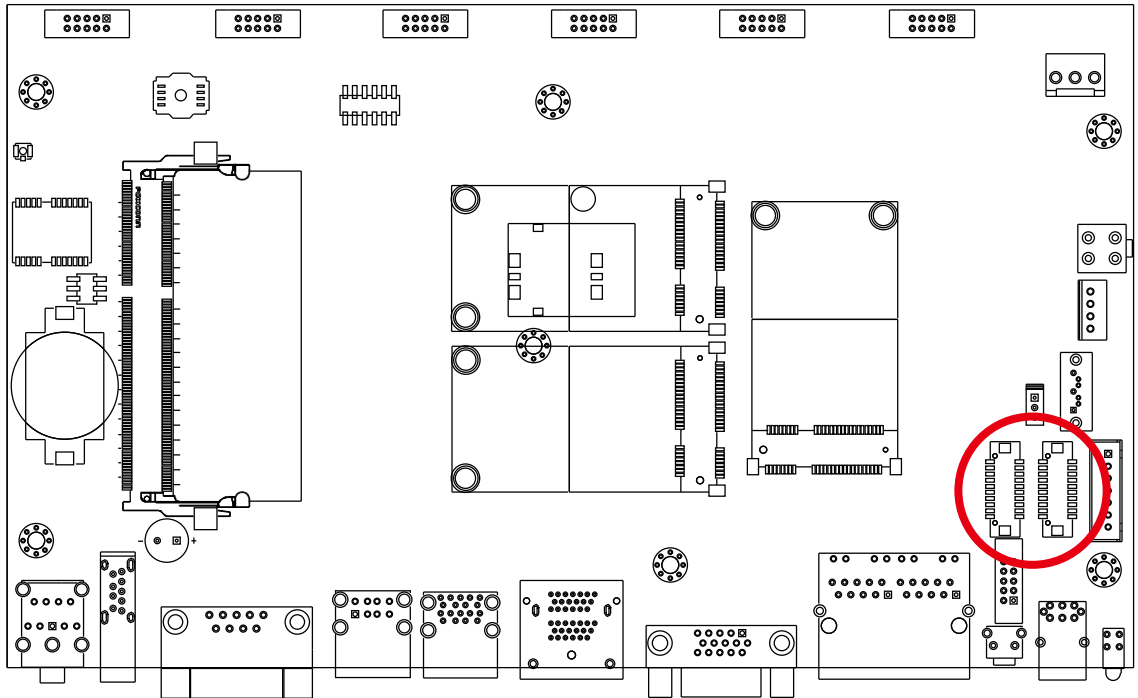
The MTC-2021 supports dual-channel 24-bit LVDS Panel up to 1920x1200 pixels panel resolution.

Pin No.	Definition	
	CN24 Channel A	CN25 Channel B
1	LDDC_CLK	LDDC_CLK
2	LDDC_DATA	LDDC_DATA
3	PANEL_VDD (+3.3V or +5V by JP2 jumper)	PANEL_VDD (+3.3V or +5V by JP2 jumper)
4	LA_ DATA0_P	LB_ DATA0_P
5	LA_ DATA3_P	LB_ DATA3_P
6	LA_ DATA0_N	LB_ DATA0_N
7	LA_ DATA3_N	LB_ DATA3_N
8	PANEL_VDD (+3.3V or +5V by JP2 jumper)	PANEL_VDD (+3.3V or +5V by JP2 jumper)
9	GND	GND
10	LA_ DATA1_P	LB_ DATA1_P
11	LA_ CLKP	LB_ CLKP
12	LA_ DATA1_N	LB_ DATA1_N
13	LA_ CLKN	LB_ CLKN

14	GND	GND
15	GND	GND
16	PANEL_BACKLIGHT (+12V)	PANEL_BACKLIGHT (+12V)
17	LA_ DATA2_P	LB_ DATA2_P
18	PANEL_BACKLIGHT (+12V)	PANEL_BACKLIGHT (+12V)
19	LA_ DATA2_N	LB_ DATA2_N
20	GND	GND
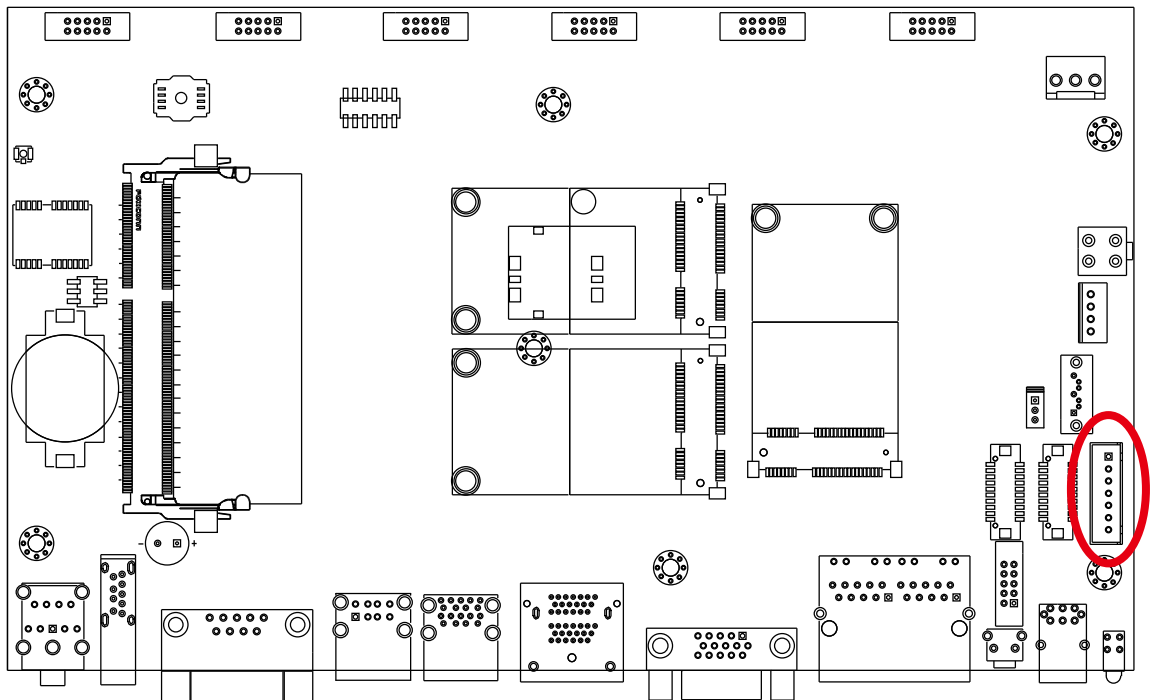
The LCD inverter is connected to J2 via a JST 7-pin, 2.5mm connector to provide +5V/ +12V power to the LCD display.

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

2.3.3 CN21 SATA II Connector, J1 SATA Power Connector
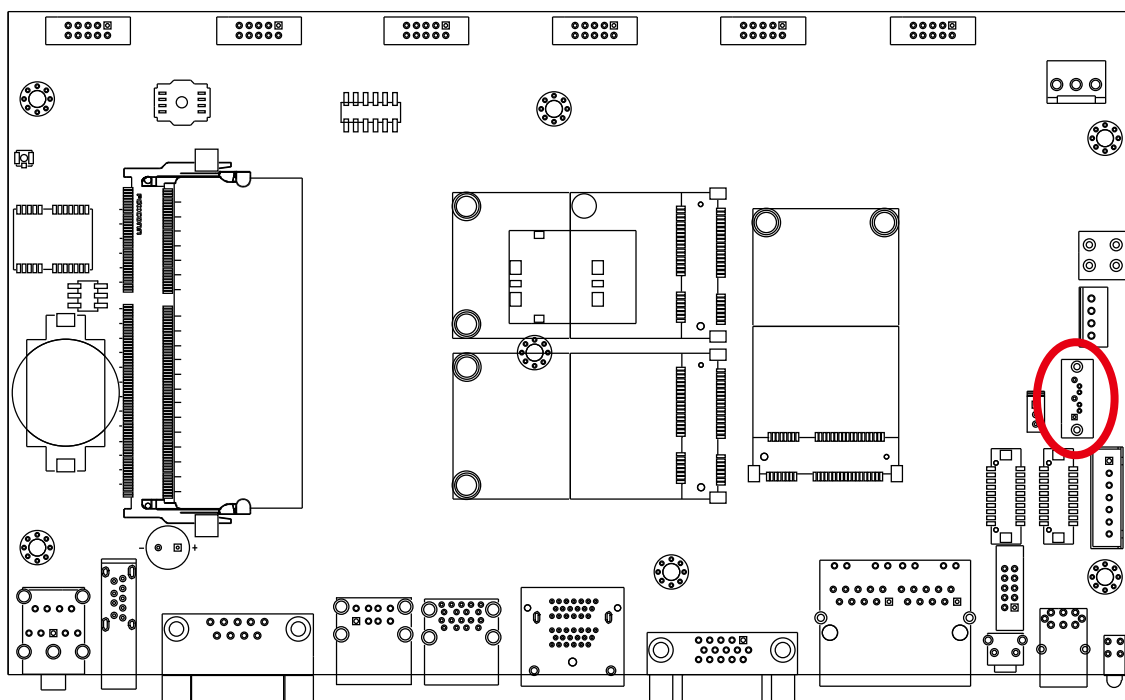
The MTC-2021 features two high performance SATA II interfaces that ease cabling to hard drives or SSD with thin and short cables while application need larger storage capacity.

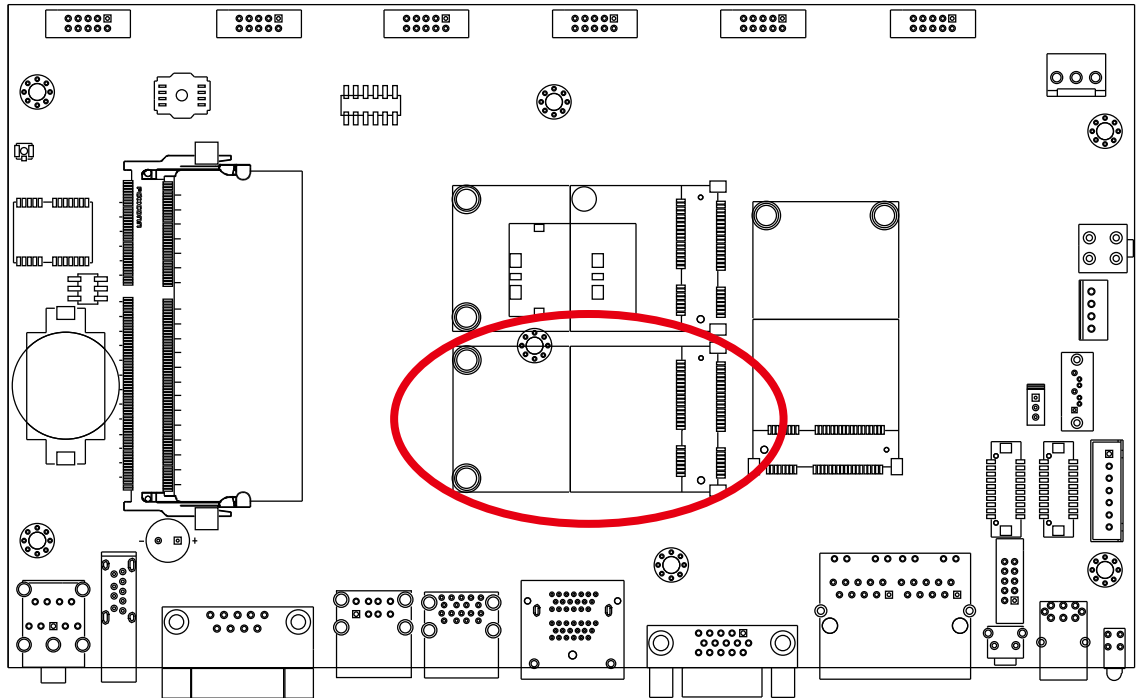| Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND
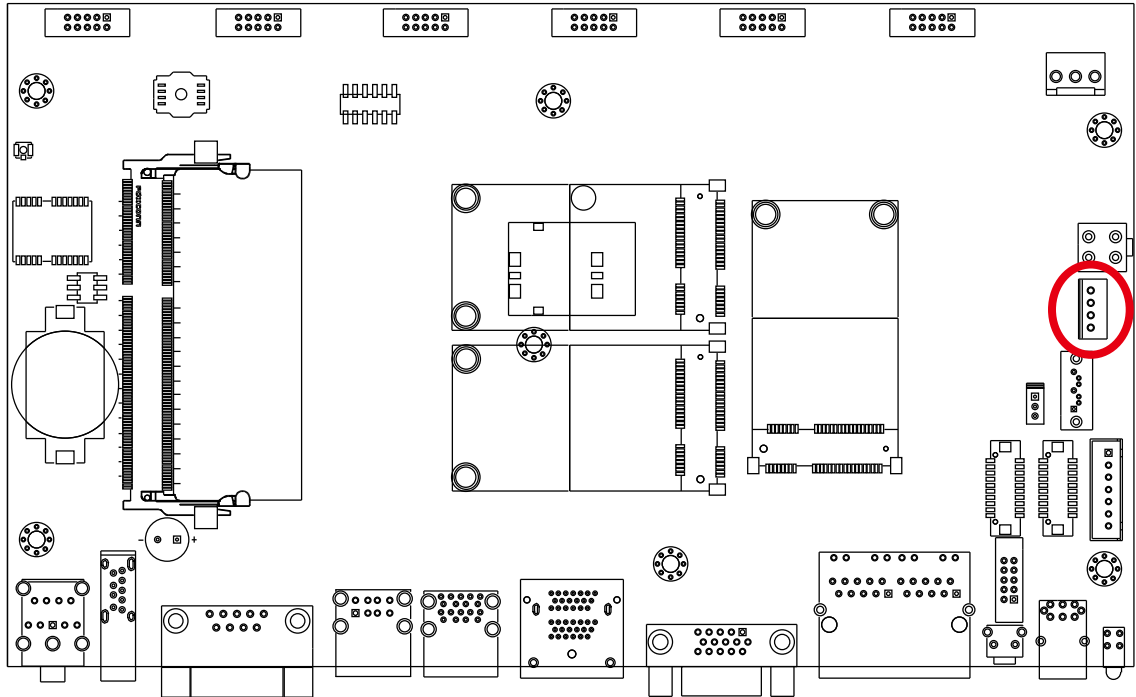
The MTC-2021 also equips one SATA power connector. It supply 5V (1A max.) and 12V (1A max) current to the hard drive or SSD.

CN21 SATA HDD Power Connector

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

2.3.4 CN23 mSATA Connector

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 re-define 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.

CN23 mSATA Connector Pin Out

| Pin No.	Signal Name	Pin No.	Signal Name
51	NC	52	+3.3Vaux
49	NC	50	GND
47	NC	48	+1.5V
45	NC	46	NC
43	GND	44	NC
41	+3.3Vaux	42	NC
39	+3.3Vaux	40	GND
37	GND	38	NC
35	GND	36	NC
33	SATA_TXp	34	GND
31	SATA_TXn	32	NC
29	GND	30	NC
27	GND	28	+1.5V
25	SATA_RXp	26	GND
23	SATA_RXn	24	+3.3Vaux
21	GND	22	NC
19	NC	20	NC
17	NC	18	GND
Mechanical Key			
15	GND	16	NC
13	NC	14	NC
11	NC	12	NC
9	GND	10	NC
7	NC	8	NC
5	NC	6	1.5V
3	NC	4	GND
1	NC	2	3.3Vaux

2.3.5 CN20, CN22 Mini PCIe Connector
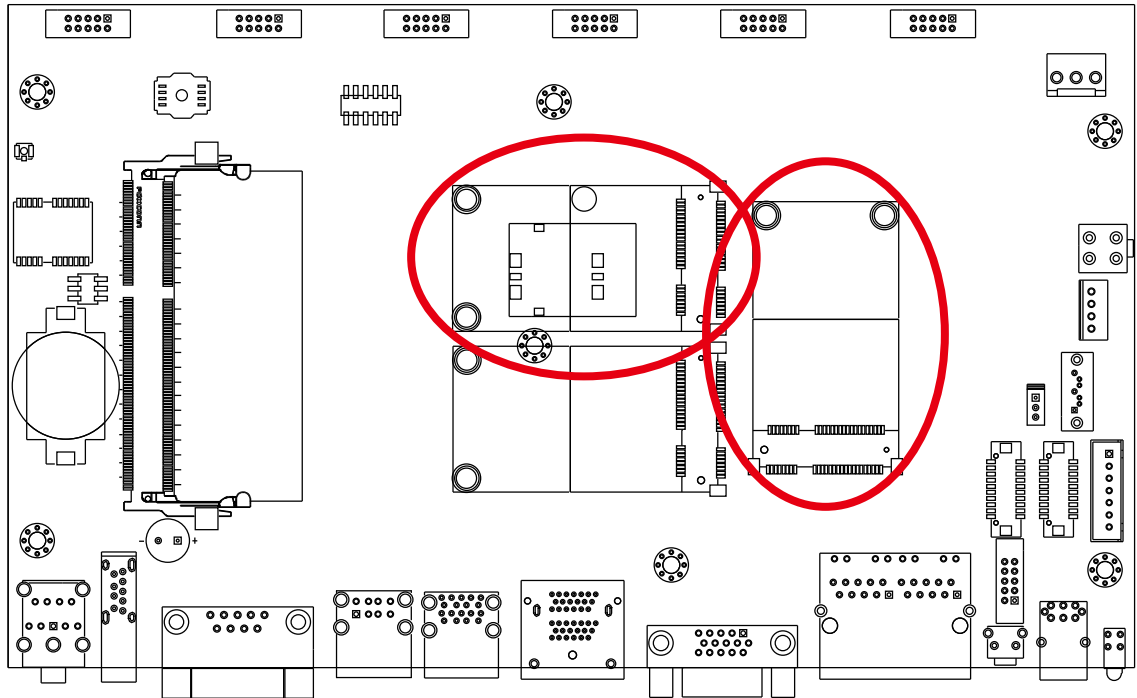
CN20/22 Mini PCIe Connector Pin Out

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

2.3.6 Battery
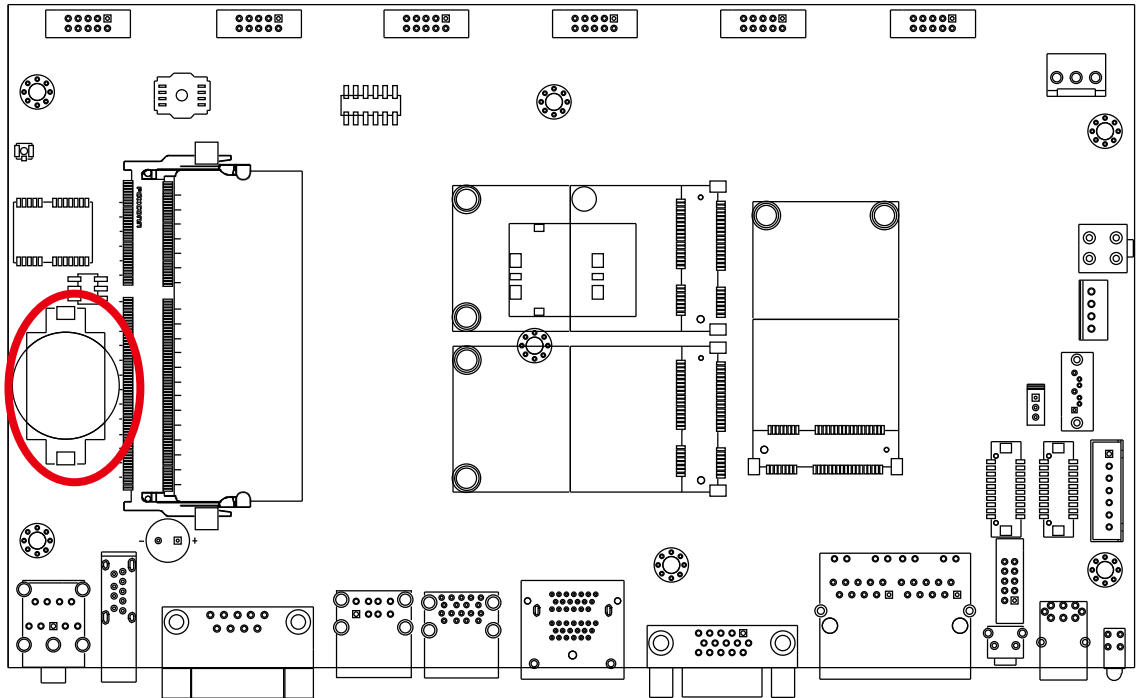
The real-time clock of MTC-2021 is powered by a lithium battery. It is Equipped with Panasonic BR2032 190mAh lithium battery. It is recommended that you not replace the lithium battery on your own. If the battery needs to be changed, please contact the Vecow RMA service team.
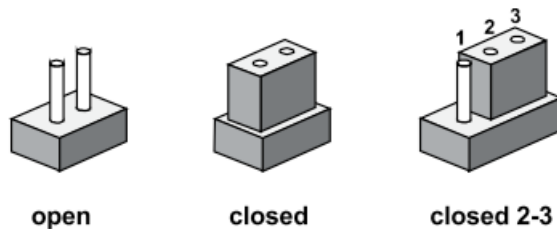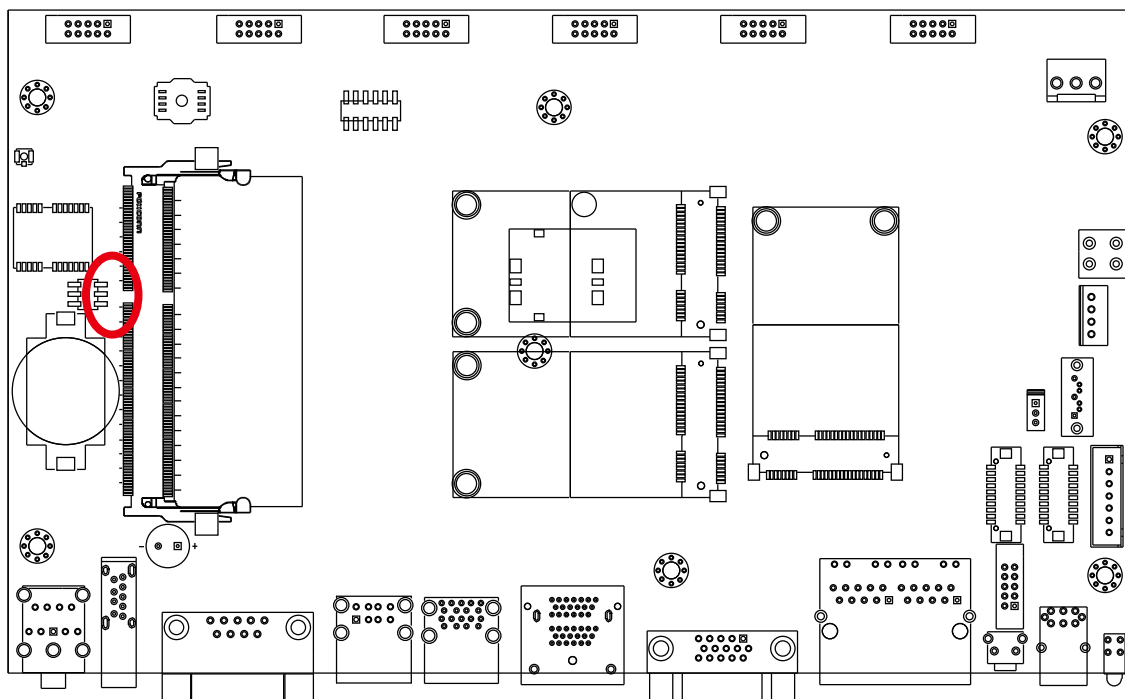
2.4 Jumper Setting

The figure below is the top view of the MTC-2021 mainboard. It shows the location of all jumpers.
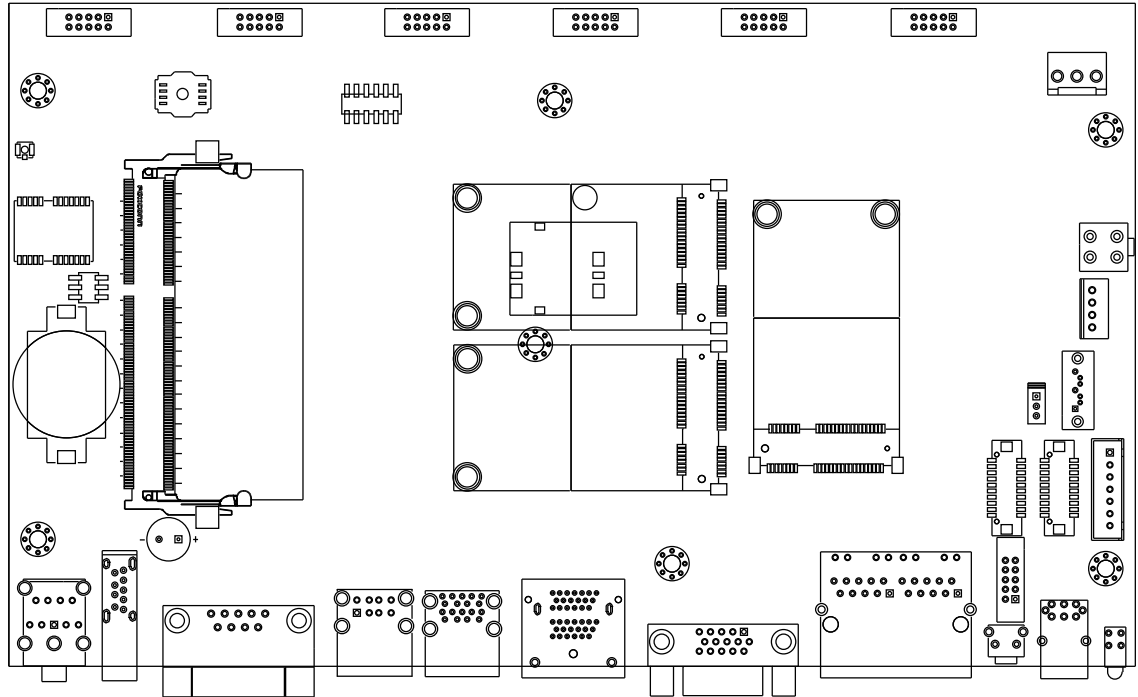
You may configure your card to match the needs of your application by setting jumpers. A jumper is a metal bridge used to close an electric circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper, you connect the pins with the clip. To "open" a jumper, you remove the clip. Sometimes a jumper will have three pins, labeled Pin 1, Pin 2 and Pin 3. In this case you would connect either Pin 1 and Pin 2, or Pin 2 and Pin 3.
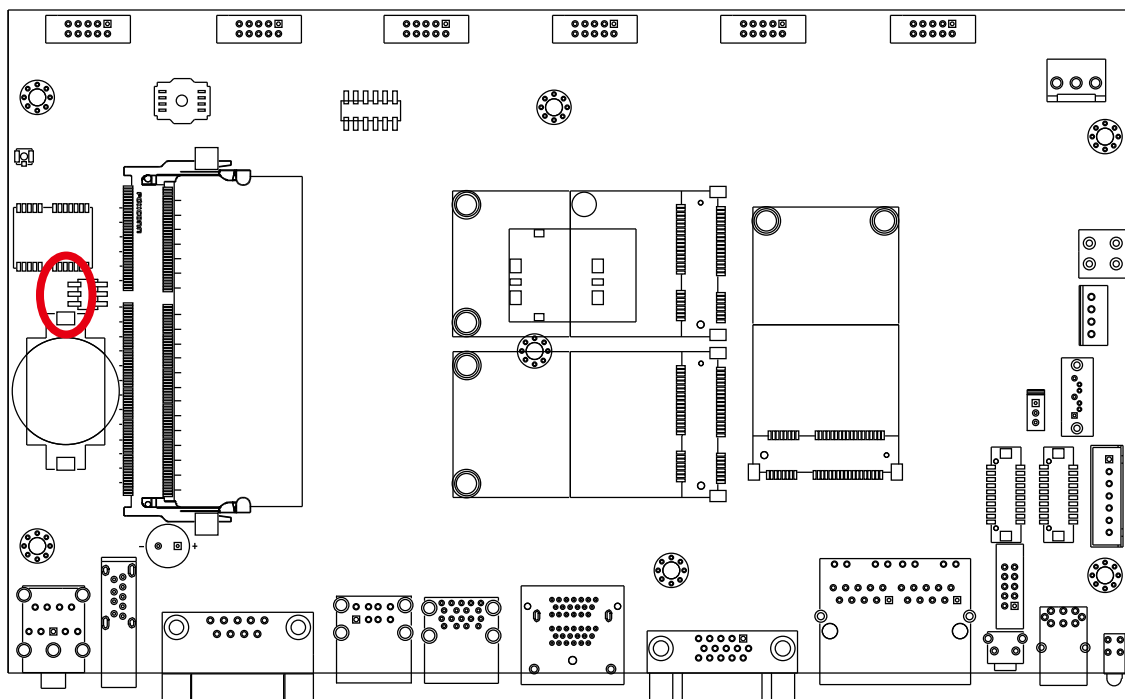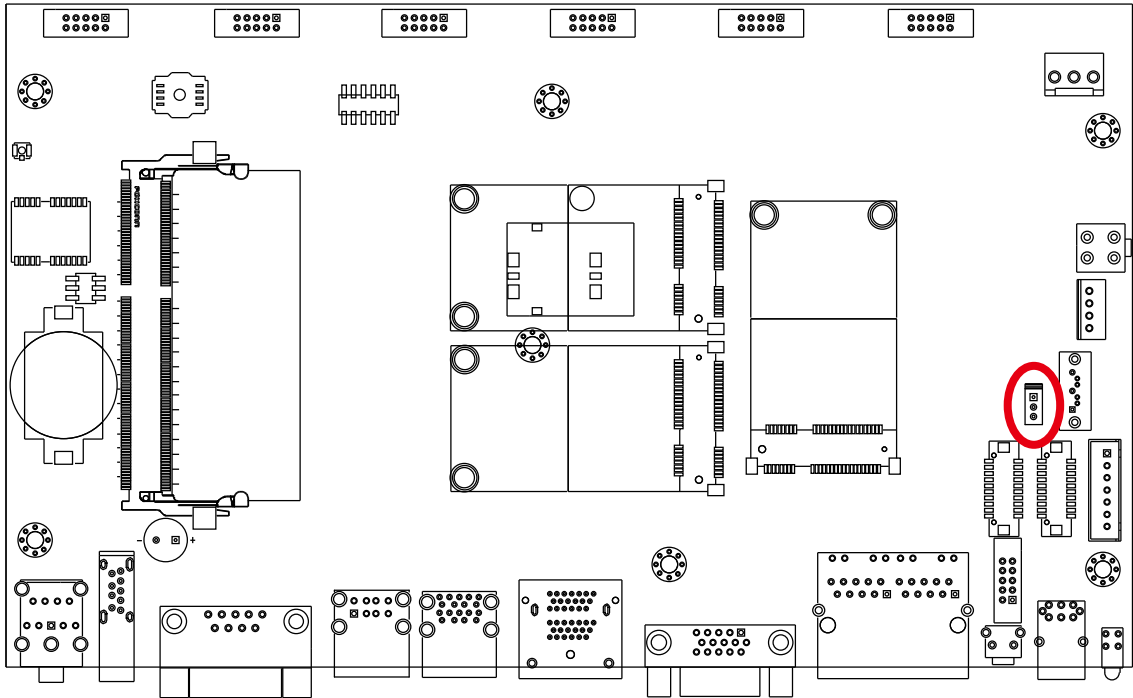

open   closed   closed 2-3

2.4.1 JP1(A) CMOS Clear Jumper Setting

Pin Setting	Description	Pin Setting	Description
1-3	Normal (Default)	3-5	Clear CMOS

2.4.2 JP1(B) ME Clear Jumper Setting

Pin Setting	Description	Pin Setting	Description
2-4	Normal (Default)	4-6	Clear ME

2.4.3 JP2 LVDS Panel Power Selection

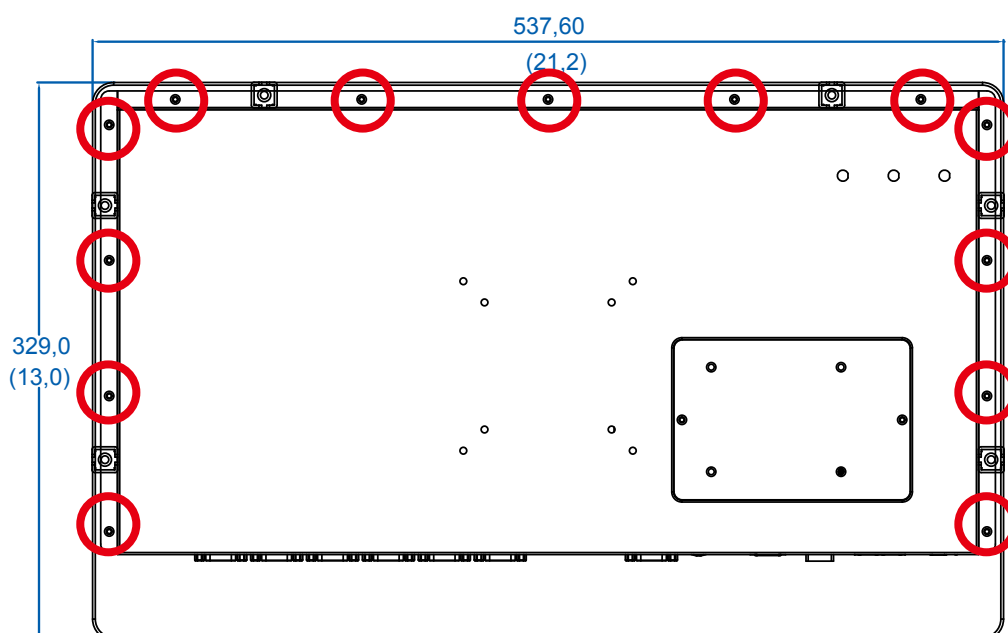| Pin Setting	Description	Pin Setting	Description
1-2	+3.3V (Default)	2-3	+5V

JP2 provides LVDS voltage selection function, when closing Pin 1, Pin 2 is for 3.3V LVDS power input; when closing Pin 2, Pin 3 is for 5V LVDS power input.

3

HARDWARE INSTALLATION

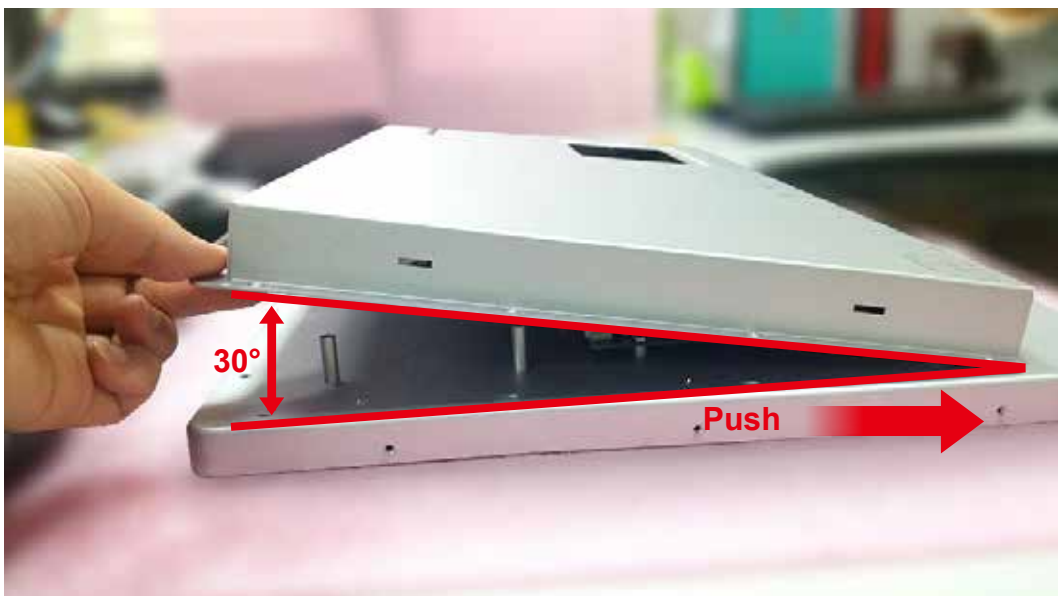## 3.1 How to Open Your MTC-2021 Chassis

Step 1. Remove 13 pcs FH M3x4 screws from back panel.

Step 2. Remove 4 pcs #4-40 screws from GPIO and VGA.

Step 3. Open and lift the back panel about 30° and then push the back panel in the way as the image as follow.

3.2 Install DDR3L SO-DIMM Modules

Step 1. Install RAM module into RAM socket.

Step 2. Make sure RAM socket and RAM module are locked well in both sides.
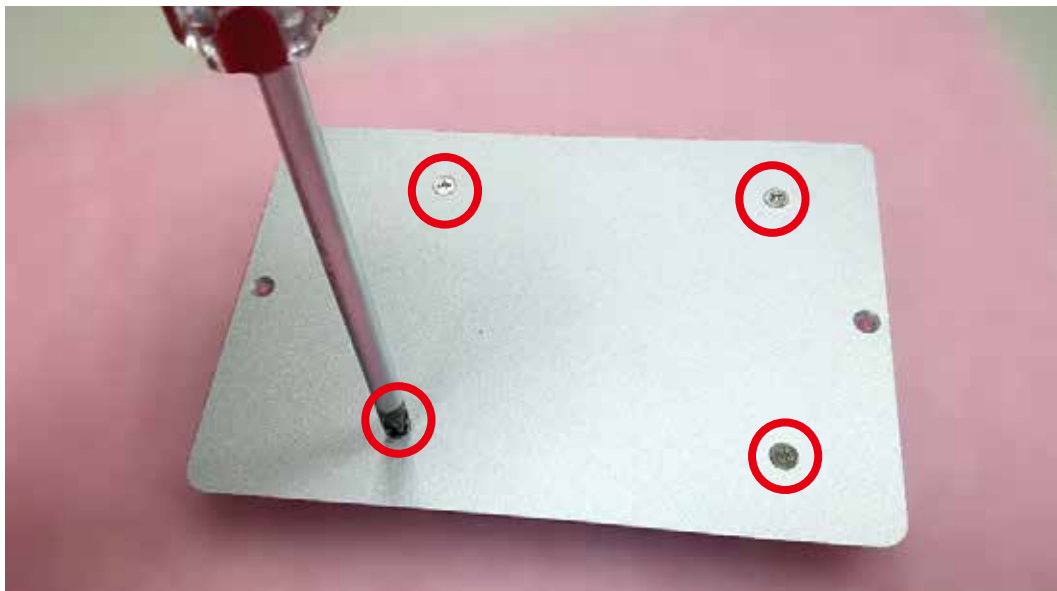
3.3 Install SSD/ HDD

Step 1. Make sure the screw holes on SSD/ HDD cover match the ones on SSD/ HDD.
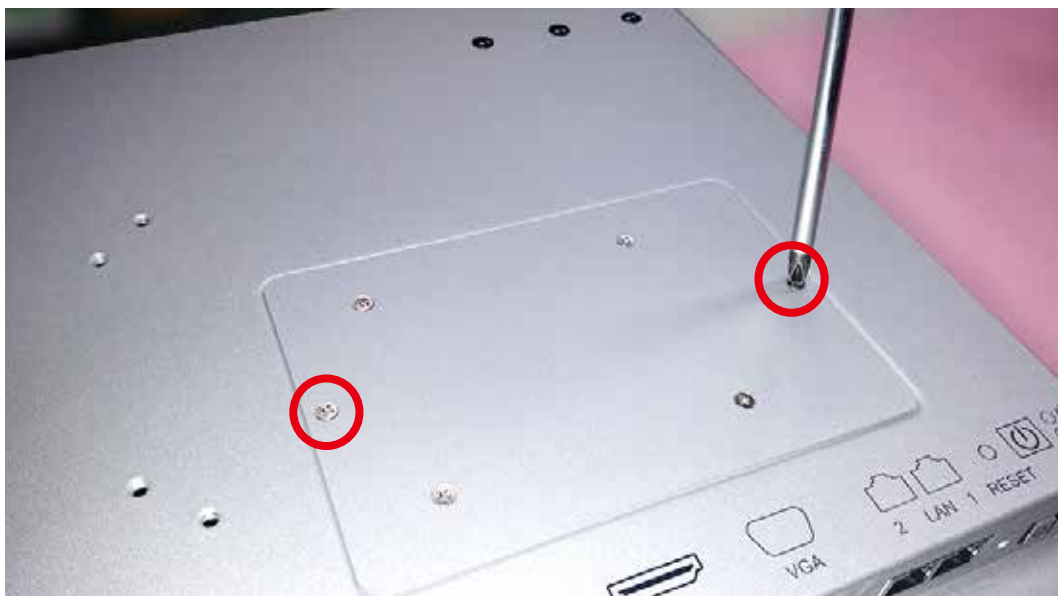

Step 2. Fasten 4 pcs FH M3x4 screws for SSD/ HDD cover and SSD/ HDD.

Step 3. Plug-in SATA cable to SSD/ HDD.

Step 4. Fasten 2 pcs KH M3x4 screws.

3.4 Install Mini PCIe Module

Step 1. Insert Mini PCIe module into Mini PCIe socket.

Step 2. Fasten 2 pcs BH M2.5x6 screws.

3.5 Install WiFi Module and Antenna

Step 1. Make sure the screw holes on half-length Mini PCIe card match the ones on the bracket.
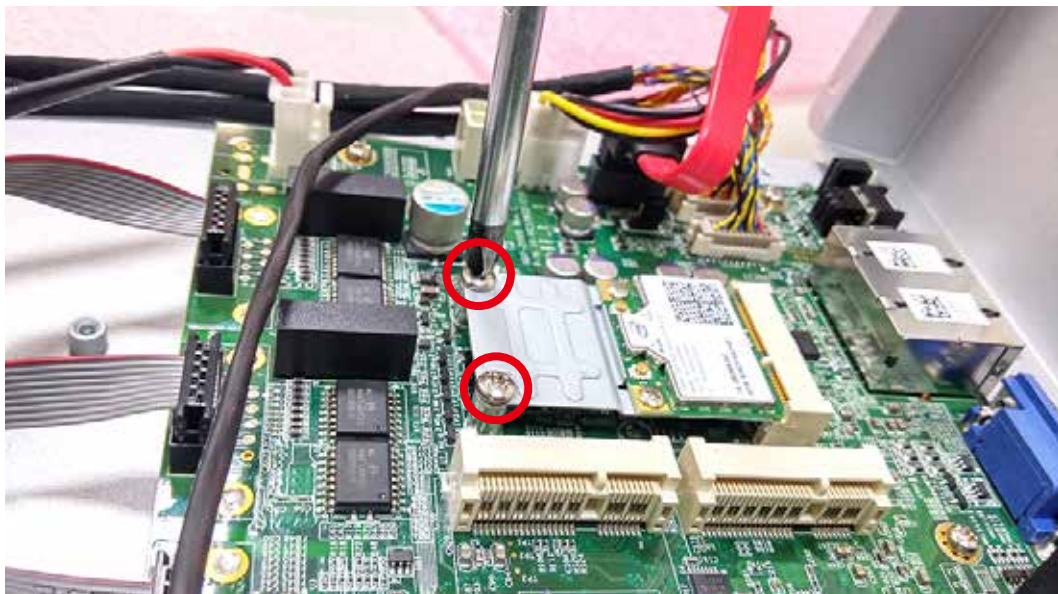

Step 2. Fasten 2 pcs M2 screws for the half-length Mini PCIe card and the bracket.

Step 3. Insert the half-length Mini PCIe module into Mini PCIe socket.

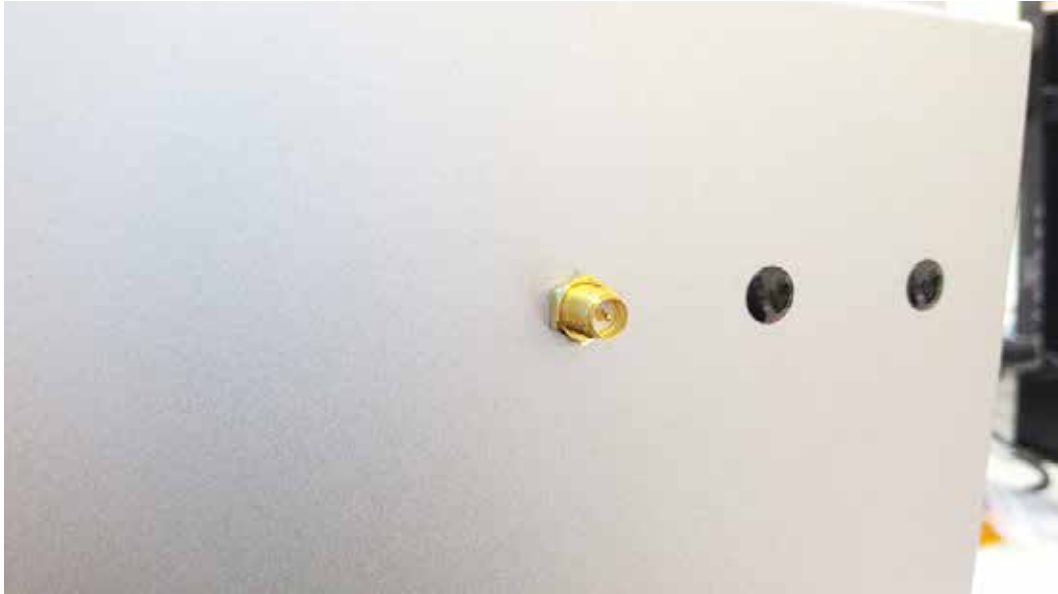**Step 4.** Fasten 2 pcs BH M2.5x6 screws.

Step 5. Make sure the parts of antenna cable. It includes 1 tooth washer, 1 hexagon nut and 1 spring washer.

Step 6. Remove the plastic cup on rear cover of MTC-2021 and plug-in the antenna through the hole. Ensure the tooth washer and spring washer in the inner side.
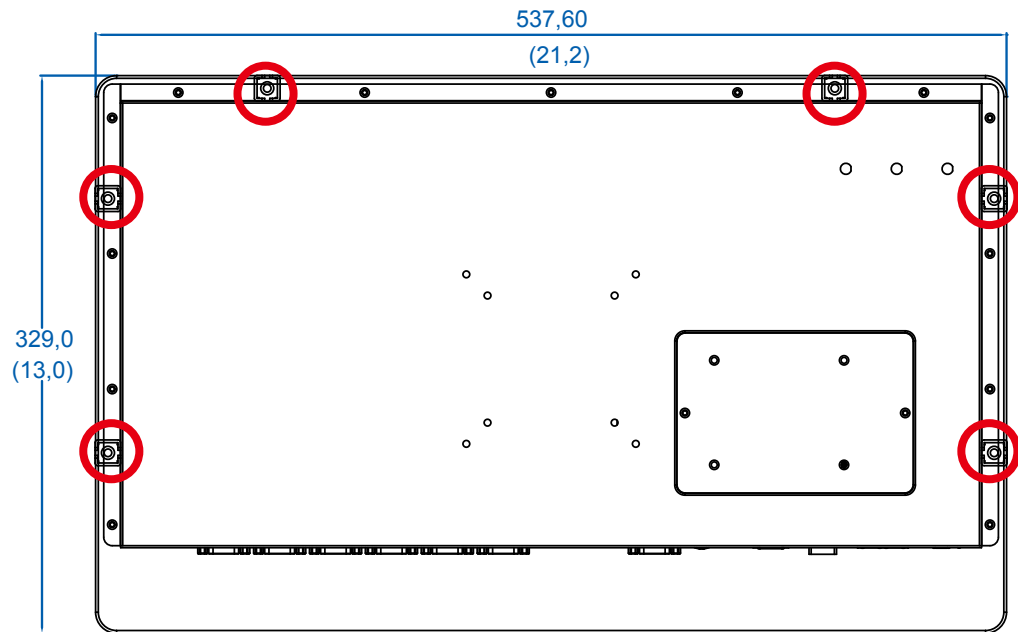
Step 7. Fasten the hexagon nut.

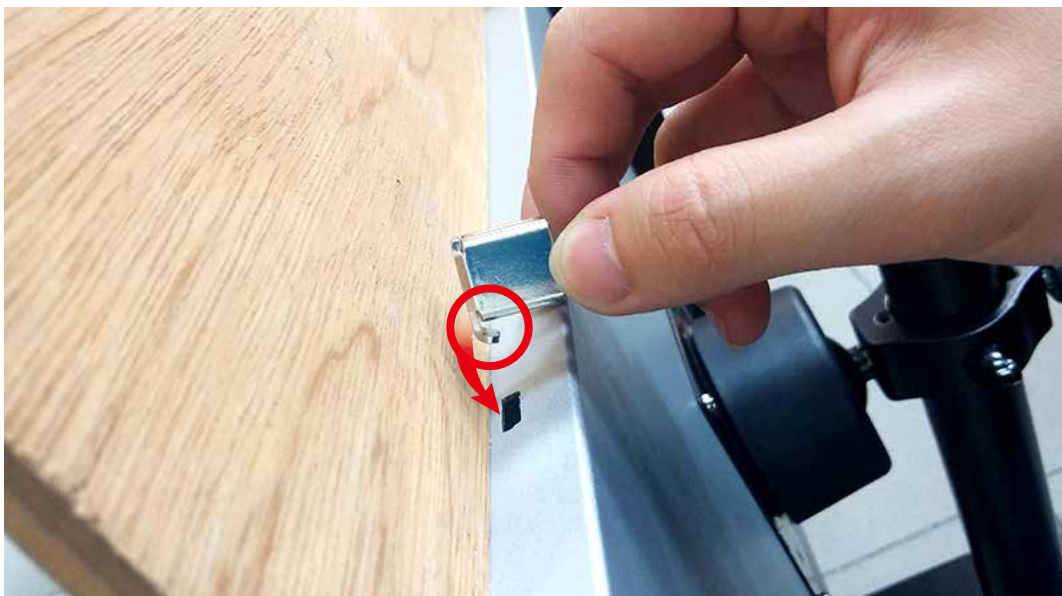**Step 8.** Plug antenna pigtail to Mini PCIe card.

3.6 Mount Your MTC-2021

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

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

Step 3. Fasten the M5x20 screw.

4

BIOS AND DRIVER SETTING

4.1 BIOS Settings

4.1.1 BIOS Setup

With onboard Serial Peripheral Interface (SPI) Flash, MTC-2021 supports UEFI BIOS. The SPI Flash contains BIOS Setup program, POST, 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.

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.					
Main	Advanced	Chipset	Security	Boot	Save & Exit

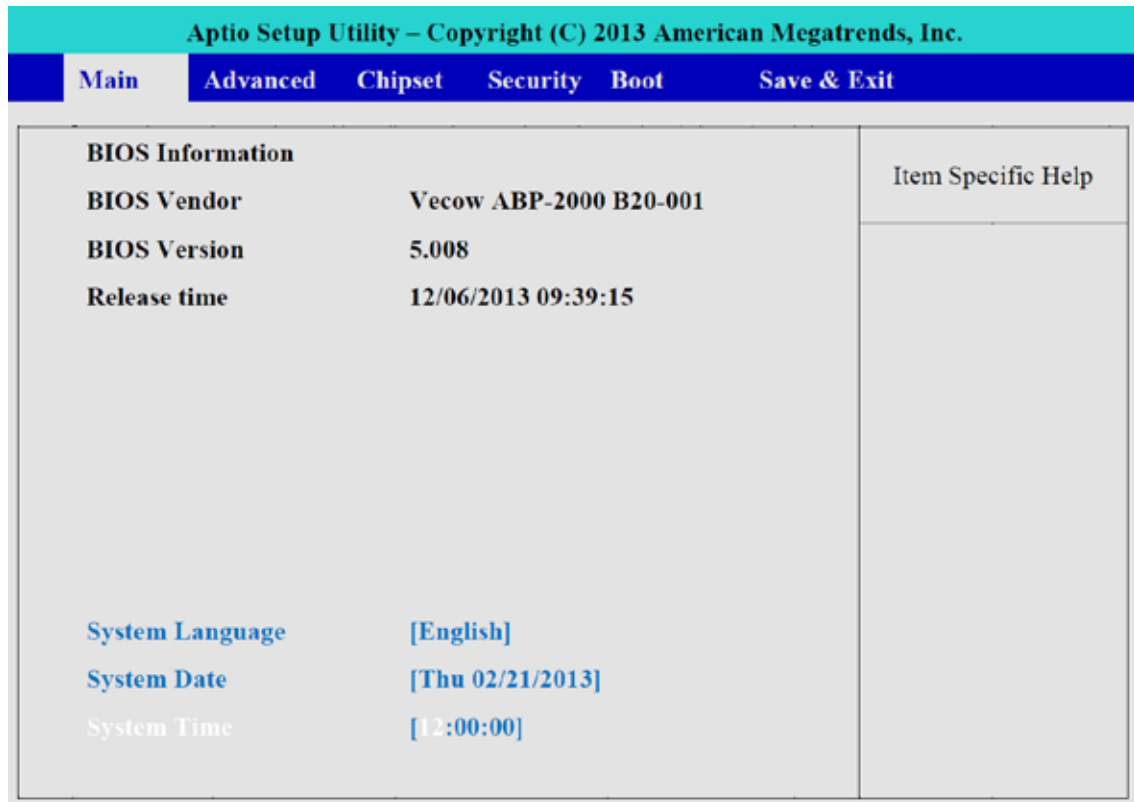Figure 4-1-1: BIOS Menu Bar

4.2 Main Menu

4.2.1 BIOS Main Menu

Figure 4-2-1: BIOS Menu Bar

System Time/ Date :

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

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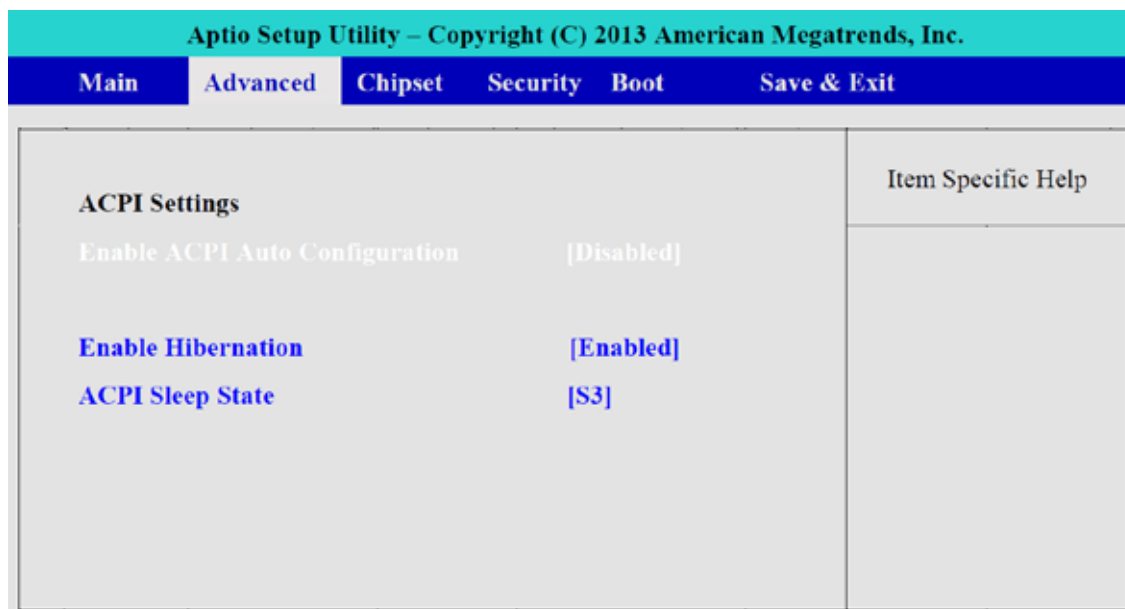
4.3 Advanced Function

4.3.1 ACPI Setting

Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.					
Main	Advanced	Chipset	Security	Boot	Save & Exit

```
ACPI Settings                                               Item Specific Help

Enable ACPI Auto Configuration        [Disabled]


Enable Hibernation                    [Enabled]
ACPI Sleep State                      [S3]
```

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 Operation system maybe not effective with this function.

ACPI Sleep state:
Select sleep state while SUSPEND button pressed.

4.3.2 Serial Port 1 Configuration

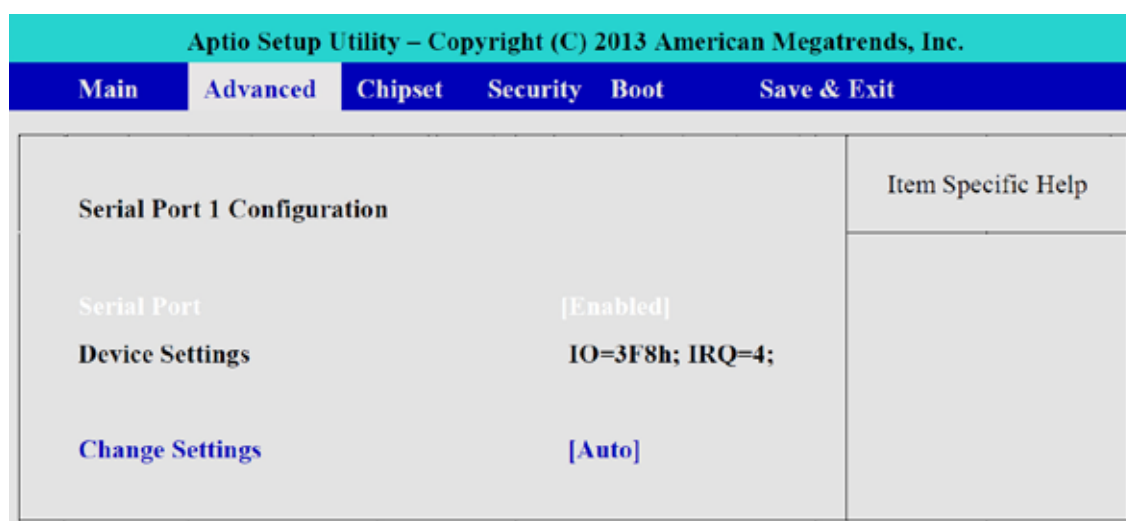Advanced → IT8786E Super IO Configuration → Serial Port 1 Configuration

Figure 4-3-2 : Serial Port 1 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.
 Here have 6 options :
   Auto
IO=3F8h; IRQ=4;
IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

4.3.3 Serial Port 2 Configuration

Advanced → IT8786E Super IO Configuration → Serial Port 2 Configuration

Figure 4-3-3 : 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.
 Here have 6 options :
   Auto
IO=3F8h; IRQ=4;
IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

4.3.4 Serial Port 3 Configuration

Advanced → IT8786E Super IO Configuration → Serial Port 3 Configuration
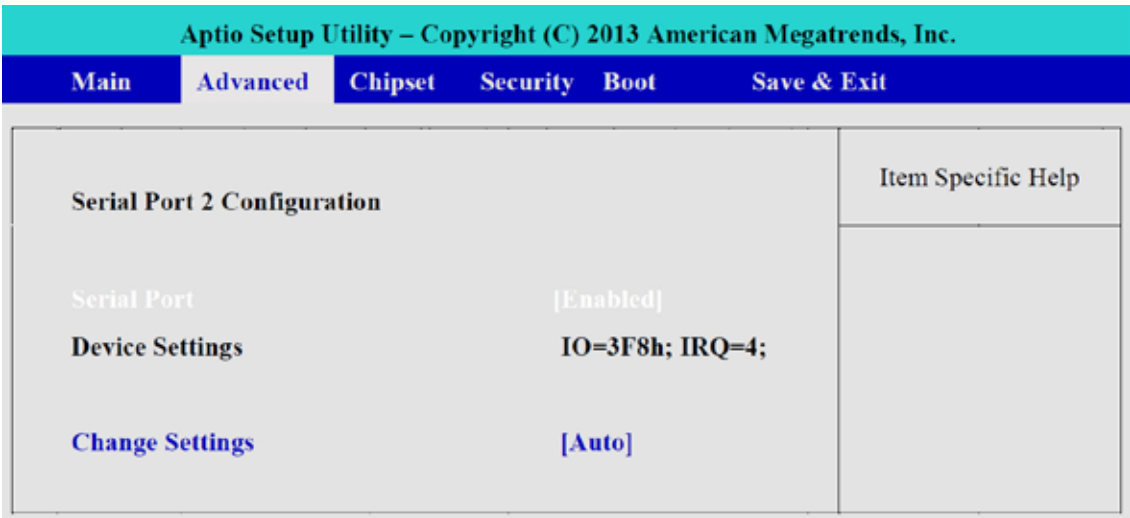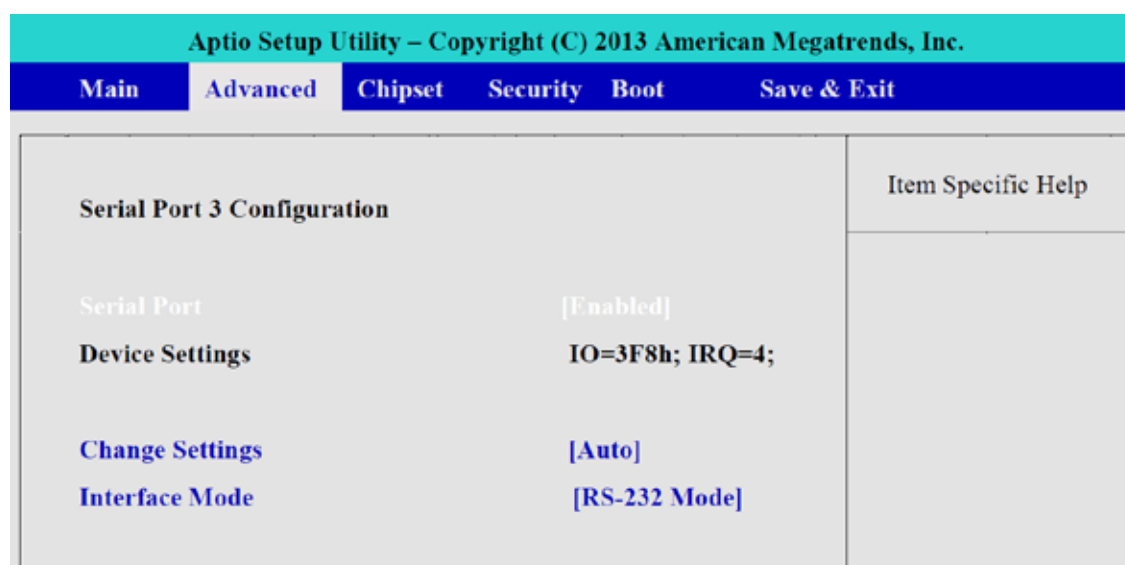

Figure 4-3-4 : Serial Port 3 Setup screen

Serial Port :
Enable or Disable Serial port.

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

Change Settings :
Select another device setting.
Here have 6 options :
   Auto
IO=3F8h; IRQ=4;
IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

Interface Modes :
Select UART transfer and receive protocol
Here have 3 options :
   RS-232 Mode
   RS-422 Mode
      RS-485 Mode

4.3.5 Serial Port 4 Configuration

Advanced → IT8786E Super IO Configuration → Serial Port 4 Configuration
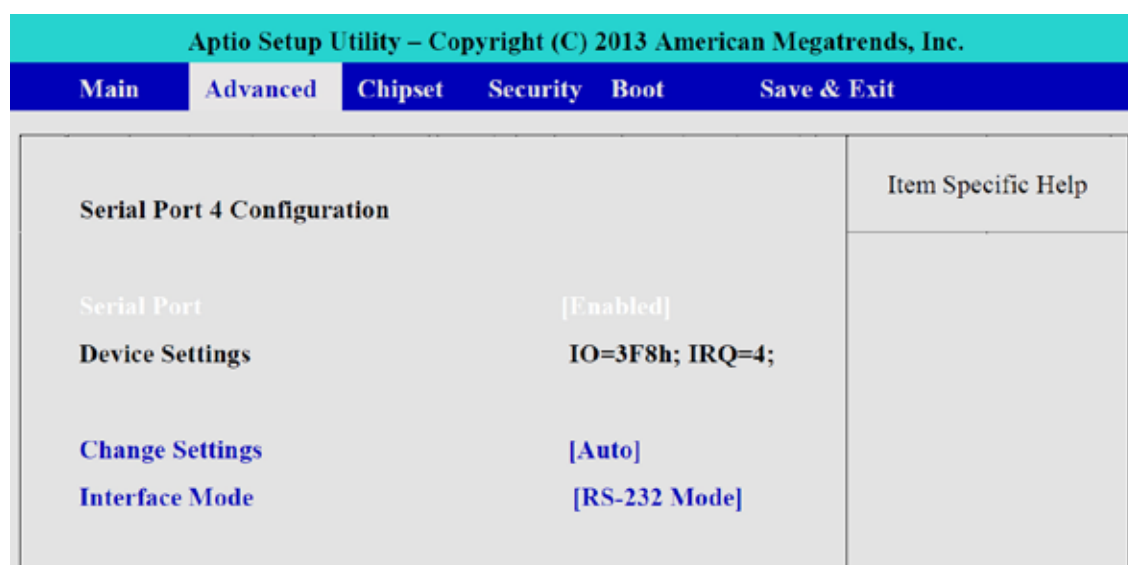
Figure 4-3-5 : Serial Port 4 Setup screen

Serial Port :
 Enable or Disable Serial port.

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

Change Settings :
 Select another device setting.
 Here have 6 options :
   Auto
IO=3F8h; IRQ=4;
IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

Interface Modes :
 Select UART transfer and receive protocol
 Here have 3 options :
   RS-232 Mode
   RS-422 Mode
      RS-485 Mode

4.3.6 Serial Port 5 Configuration

Advanced → IT8786E Super IO Configuration → Serial Port 5 Configuration

| Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc. |
| Main | Advanced | Chipset | Security | Boot | Save & Exit |

Serial Port 5 Configuration

| | | Item Specific Help |

Serial Port   [Enabled]
Device Settings   IO=3F8h; IRQ=4;

Change Settings   [Auto]
Interface Mode   [RS-232 Mode]

Figure 4-3-6 : Serial Port 5 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.
 Here have 6 options :
   Auto
IO=3F8h; IRQ=4;
IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

Interface Modes :
 Select UART transfer and receive protocol
 Here have 3 options :
   RS-232 Mode
   RS-422 Mode
      RS-485 Mode

4.3.7 Serial Port 6 Configuration

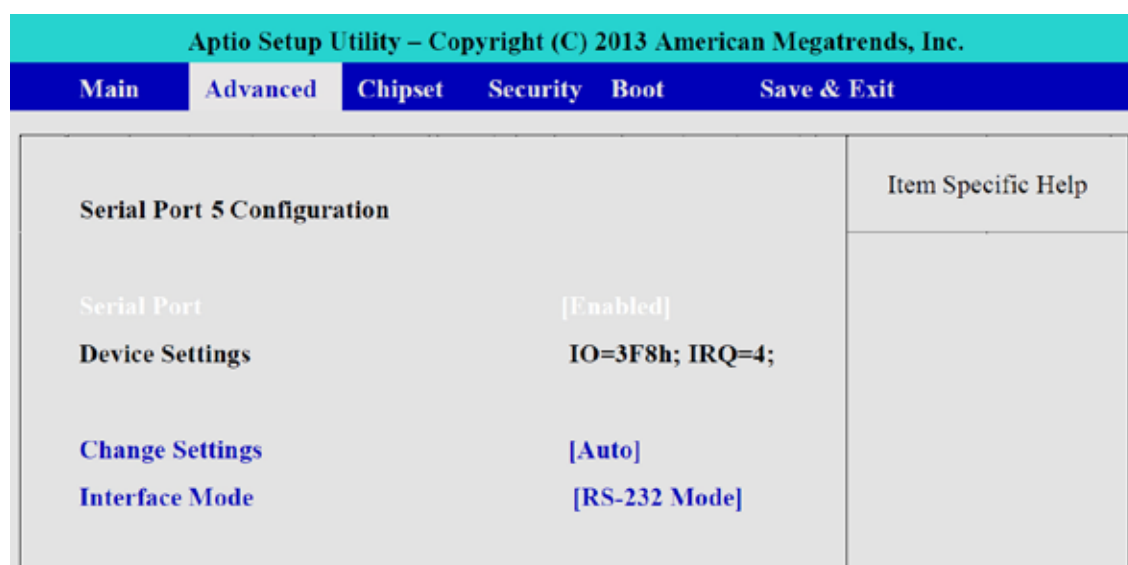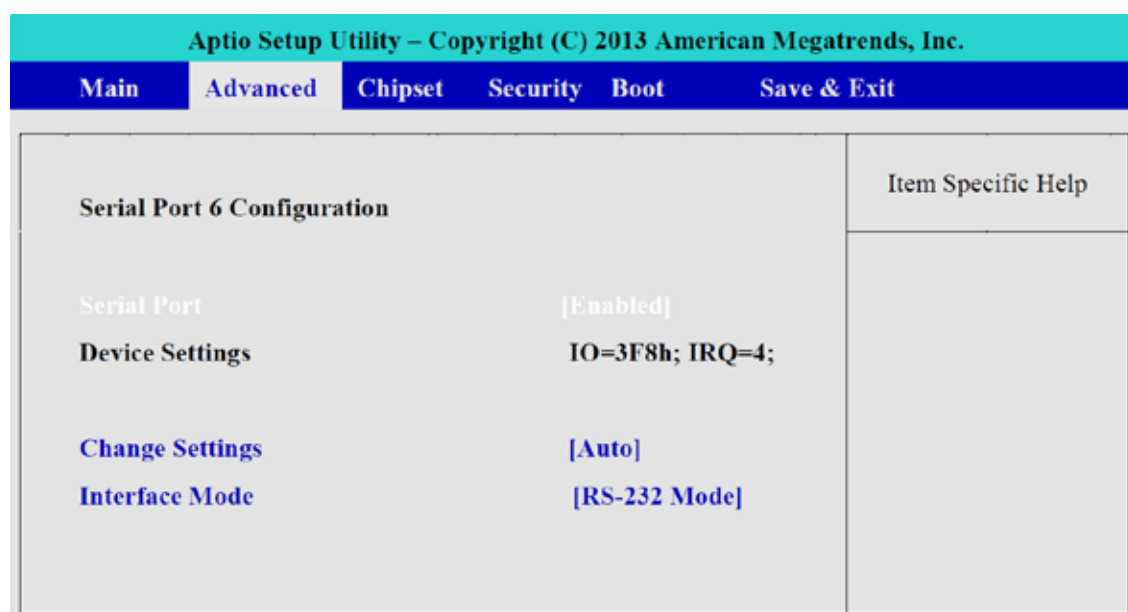Advanced → IT8786E Super IO Configuration → Serial Port 6 Configuration

Figure 4-3-7 : Serial Port 6 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.
Here have 6 options :
Auto
IO=3F8h; IRQ=4;
IO=3F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2F8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=3E8h; IRQ=3,4,5,6,7,8,9,10,11,12;
IO=2E8h; IRQ=3,4,5,6,7,8,9,10,11,12;

Interface Modes :
Select UART transfer and receive protocol
Here have 3 options :
RS-232 Mode
RS-422 Mode
RS-485 Mode

4.3.8 PPM Configuration

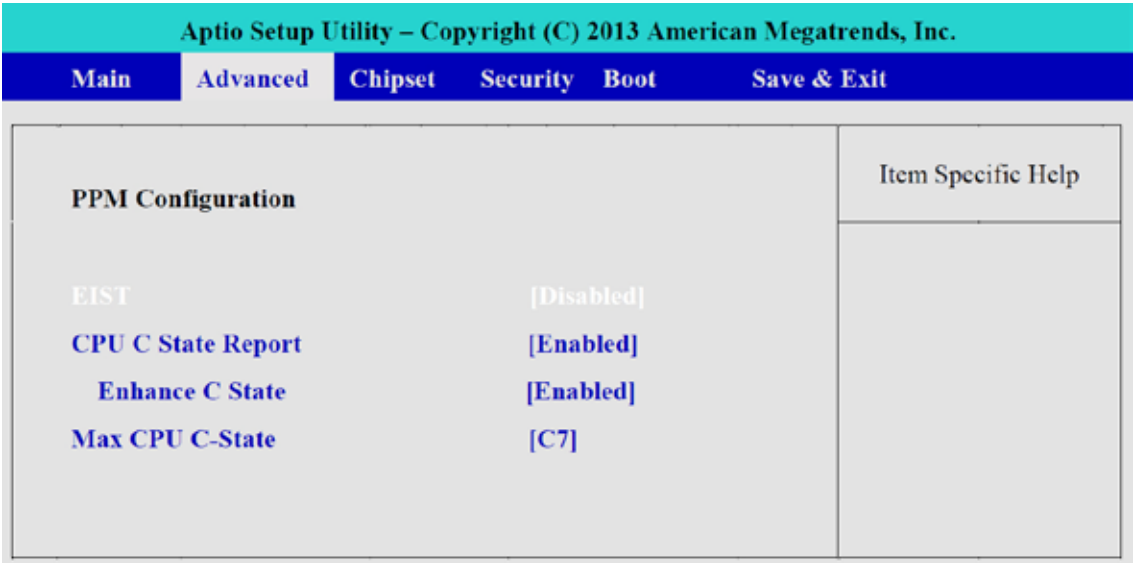| Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc.	
Main Advanced Chipset Security Boot Save & Exit	
PPM Configuration	Item Specific Help
EIST [Disabled]	
CPU C State Report [Enabled]	
Enhance C State [Enabled]	
Max CPU C-State [C7]	

Figure 4-3-8 : Trusted Computing setup screen

EIST :
Enables or Disables Intel Speed function , once you enabled it , you could use the Intel Turbo Boost software to monitor you CPU performance. Please refer to CPU check list.

4.3.9 CPU Configuration
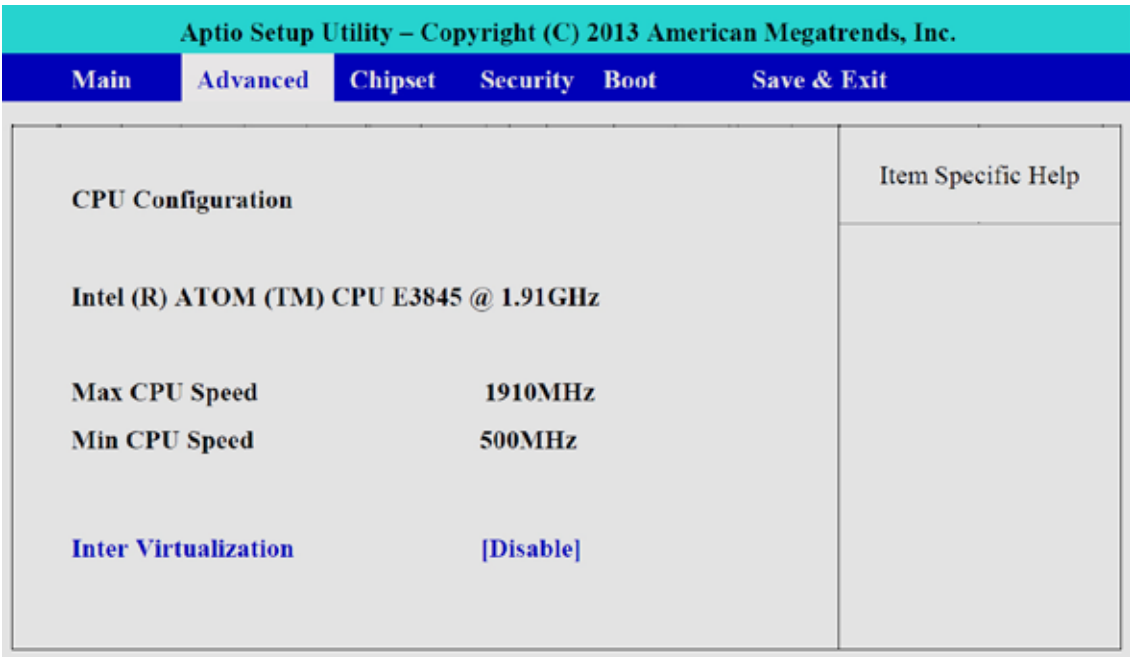
Advanced → CPU Configuration → Socket 0 CPU Information

| Aptio Setup Utility – Copyright (C) 2013 American Megatrends, Inc. |
| Main   Advanced   Chipset   Security   Boot   Save & Exit |

CPU Configuration

Intel (R) ATOM (TM) CPU E3845 @ 1.91GHz

| Max CPU Speed | 1910MHz |
| Min CPU Speed | 500MHz |

| Inter Virtualization | [Disable] |

Item Specific Help

Figure 4-3-9 : Trusted Computing setup screen

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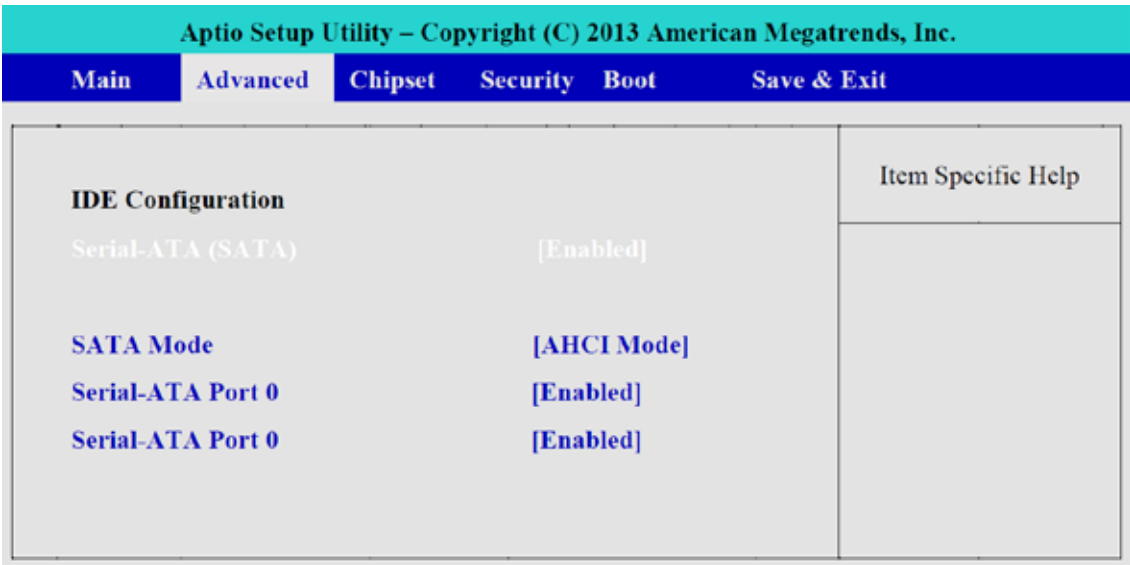
4.3.10 IDE Configuration

Figure 4-3-10 : SATA Configuration setup screen

Serial-ATA (SATA) :
Enables or Disables integrate SATA controller for Storage device use.

SATA Mode Selection :
Determines how the SATA transfer mode for operate. Here have three option for choice [IDE] / [AHCI] .

Serial Port 0~1 :
This system offers two SATA port for connection SATA device.

4.4 Chipset Function

4.4.1 Display Configuration

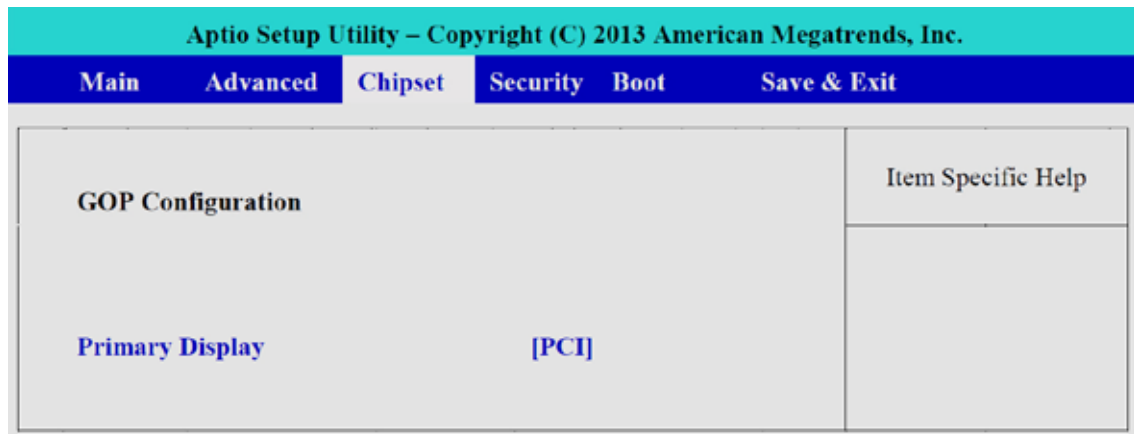Chipset → North Bridge → Intel IGD Configuration → Primary Display

Figure 4-4-1 : Network Setup screen

Primary Display :
Select which Display module you would like to you on current system.
[PCI] : System display function will be change to internal PCI or PCIe bus.
[IGD] : Use Internal Intel HD Graphics unit for unique display output.

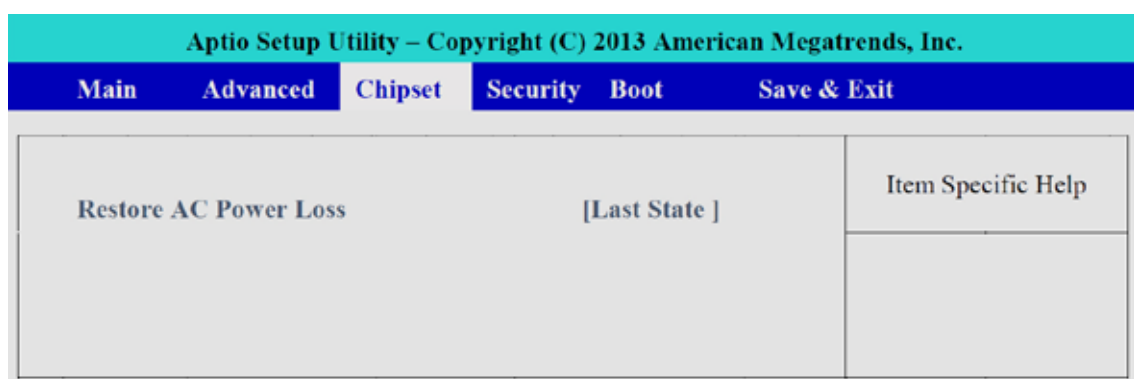### 4.4.2 Power Loss Configuration

Chipset → South Bridge

Figure 4-4-2 : Power Loss Setup screen

Restore AC Power Loss :
[Power Off] : When plug-in the power source, system will keep on SB mode.
[Power On] : When plug-in the power source, system will auto booting .
[Last State] : When plug-in the power source, system will keep on last power
status.

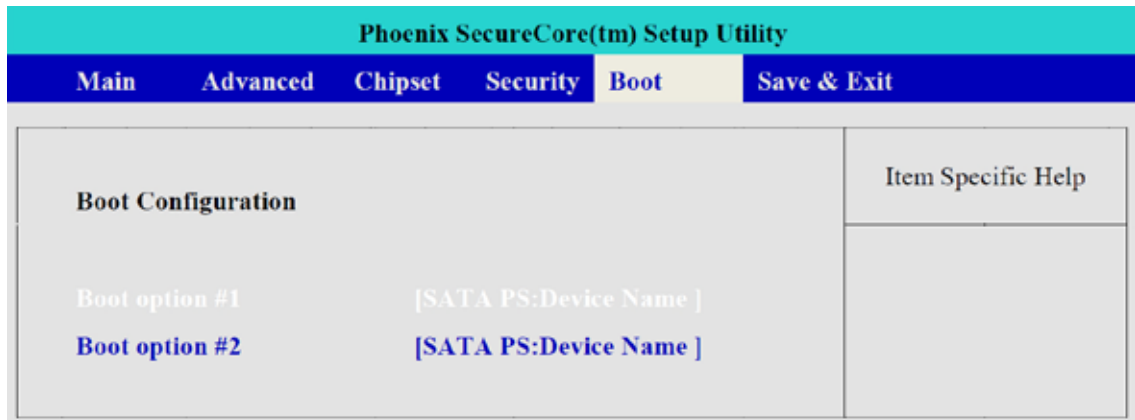# 4.5 Boot Function

4.5.1 Change Boot Configuration

Figure 4-5-1 : Boot Setup screen

Boot option:
 When you press "Enter", you can select which device you would like to boot.

4.6 Save & Exit
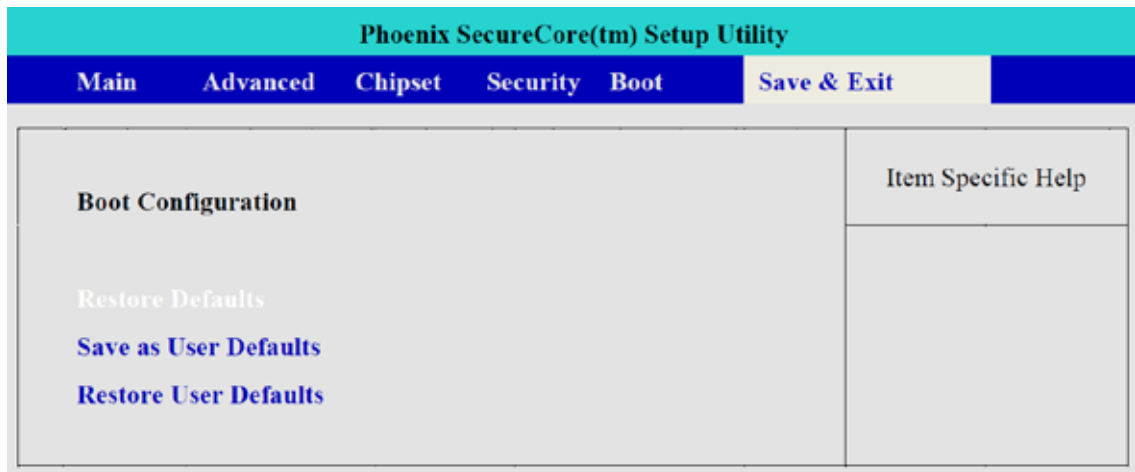
4.6.1 Reload Default BIOS Value

Figure 4-6-1 : Boot Setup screen

Restore Default :
 Use the function to restore all BIOS setting, but not include administrator password and system RTC value.
Save as Use Default :
 Uses can use this function to match the target system.
Restore as Use Default :
 Restore all BIOS setting to User Default.

A

APPENDIX : GPIO AND WDT

A.1 Super I/O Definition

Pin No.	SIO GPIO function
1	SIO_GPIO77
2	SIO_GPIO76
3	SIO_GPIO75
4	SIO_GPIO74
5	SIO_GPIO73
6	SIO_GPIO72
7	SIO_GPIO71
8	SIO_GPIO70
9	GND

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

The output port is set as GPIO 1 on CN13, reg. index = 0x60

The input port is set as GPIO 4 on CN12, reg. index = 0x62.

Super I/O special address port = 0x2E

Super I/O special data port = 0x2F

GPIO Logical device is 0x07

A.2 GPIO and WDT Setup

A.2.1 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);
```

A.2.2 Located on Logical Device 7

```
//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);
```

A.2.3 Access the Super I/O register

Base control for write Super I/O register
```
outportb (Super I/O special address port, Register Index.);
outportb (Super I/O special data port, update_value);
```

Base control for read Super I/O register
```
outportb (Super I/O special address port, Register Index.);
inportb (Super I/O special data port); //It will return a BYTE value.
```

A.2.4 Start to Access the MTC-2021 GPIO port

Please refer to source code for set_data () and get_data () function.
Write data to GPO (output) port
        set_data (Register Index, update_value);

example :
unsigned char data = 0x82;
set_data (0xE5, data);
//Set bit 7 & bit 1 of GPO output port as High level, another bit is Low
Read data to GPI (input) port
get_data (Register Index) //It will return a BYTE value.
example :
unsigned char data
get_data (0xF1, data);
//Get GPI (input) port status on input_data variable.

A.2.5 WDT ON/ OFF and Timer-Counter setting

Refer to GPIO setting of Step A and B, located Logical 0x08 for WDT function.

Reg [0x72] is WatchDog ON/OFF control.
WatchDog On : set_data (0x30, 0x01);
WatchDog Off : set_data (0x30, 0x00);

Reg [0x73] is WatchDog timer – For WDT Timer out value

WatchDog counter start : set_data (0xF0, 0x02);
WatchDog counter start : set_data (0xF0, 0x00);

Reg [0x72] is WatchDog time-out value, "Reading" this register returns the current value in the Watch Dog Counter, not the Watch Dog Timer Time-out value..

WatchDog time-out value : set_data(0xF1 ,);

* If more help is needed, please contact Vecow Technical Support

Vecow

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