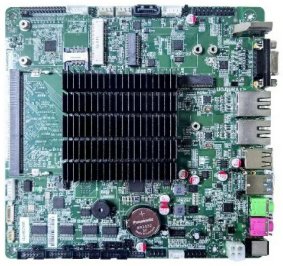
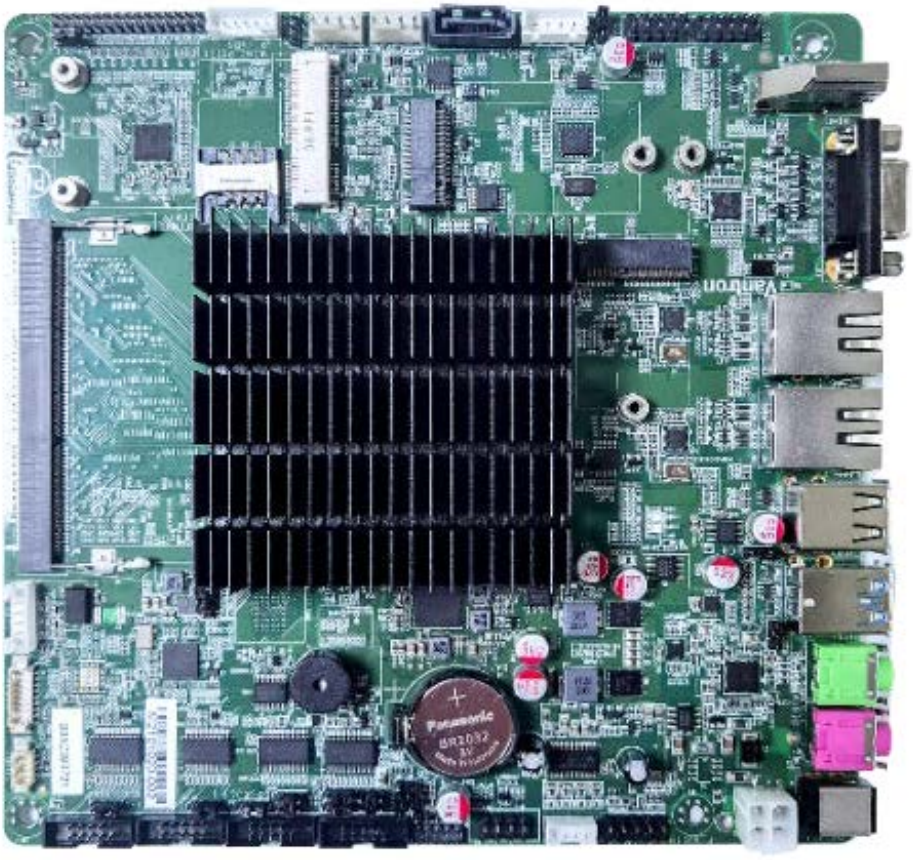


Vantron VT-MITX-APL Single Board Computer User Manual

Contents

Vantron

Vantron VT-MITX-APL Single Board Computer



Product Information

Product Name: VT-MITX-APL Single Board Computer

The VT-MITX-APL Single Board Computer is a product offered by Vantron, a world-leading provider of embedded/IoT products and solutions. It is designed to provide users with a powerful and versatile embedded computing solution.

Version: 1.3

The current version of the User Manual is 1.3. This version includes updated specifications, interface figures, and fan information.

Manufacturer: Vantron Technology, Inc.

Vantron Technology, Inc. is the manufacturer of the VT-MITX-APL Single Board Computer. They are located at 48434 Milmont Drive, Fremont, CA 94538.

Technical Support and Assistance

If you require technical support or assistance with the VT-MITX-APL Single Board Computer, you can contact Vantron Technology, Inc. at the following:

- Phone: (650) 422-3128
- Email: sales@vantrontech.com

Product Usage Instructions

Foreword

Before using the VT-MITX-APL Single Board Computer, it is important to read and understand the User Manual. This manual provides guidance on setting up, operating, and maintaining the product.

Intended Users

The VT-MITX-APL Single Board Computer is intended for users who require an embedded computing solution. It is suitable for both personal and professional use.

Copyright and Disclaimer

While all information in this manual has been carefully checked for accuracy, Vantron does not assume any responsibility for errors or improper use of the manual or the software. Specifications of the product may be subject to change without notice.

Symbology

This manual uses the following signs to prompt users to pay special attention to relevant information:

- Caution sign indicates potential latent damage to the system or harm to personnel.
- Attention sign indicates important information or regulations
  that should be followed.

General Safety Instructions

Before using the VT-MITX-APL Single Board Computer, it is important to review the general safety instructions provided in the User Manual. These instructions ensure the safe and proper operation of the product.

Revision History

No.	Version	Description	Date
1	V1.0	First release	Nov. 5, 2021
2	V1.1	Updated specifications	Apr. 23, 2022
3	V1.2	Updated interface figures	Nov. 20, 2022
4	V1.3	Updated fan information	May 19, 2023

Foreword

Thank you for purchasing VT-MITX-APL single board computer (“the Board” or “the Product”). This manual intends to provide guidance and assistance necessary on setting up, operating or maintaining the Product. Please read this manual and make sure you understand the functionality of the Product before putting it into use.

Intended Users

This manual is intended for:

- Embedded software developer
- Custom development software engineer
- Other technically qualified personnel

Copyright

Disclaimer
While all information contained herein has been carefully checked to assure its accuracy in technical details and typography, Vantron does not assume any responsibility resulting from any error or features of this manual, nor from improper uses of this manual or the software.
It is our practice to change part numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the Product may be changed without notice.

Technical Support and Assistance
Should you have any question about the Product that is not covered in this manual, contact your sales representative for solution. Please include the following information in your question:

- Product name and PO number;
- Complete description of the problem;
- Error message you received, if any.

Vantron Technology, Inc.
Address: 48434 Milmont Drive, Fremont, CA 94538
Tel: (650) 422-3128
Email: sales@vantrontech.com

Symbology
This manual uses the following signs to prompt users to pay special attention to relevant information.

	Caution for latent damage to system or harm to personnel
	Attention to important information or regulations

General Safety Instructions

The Product is supposed be installed by knowledgeable, skilled persons familiar with local and/or international electrical codes and regulations. For your safety and prevention of damage to the Product, please read and observe carefully the following safety instructions prior to installation and operation. Keep this manual well for future reference.

- Do not disassemble or otherwise modify the Product. Such action may cause heat generation, ignition, electronic shock, or other damages including human injury, and may void your warranty.

- Keep the Product away from heat source, such as heater, heat dissipater, or engine casing.
- Do not insert foreign materials into any opening of the Product as it may cause the Product to malfunction or burn out.
- To ensure proper functioning and prevent overheating of the Product, do not cover or block the ventilation holes of the Product.
- Follow the installation instructions with the installation tools provided or recommended.
- The use or placement of the operation tools shall comply with the code of practice of such tools to avoid short circuit of the Product.
- Cut off the power before inspection of the Product to avoid human injury or product damage.

Precautions for Power Cables and Accessories

Use proper power source only. Make sure the supply voltage falls within the specified range.
Place the cables properly at places without extrusion hazards.
There is a coin cell battery for powering the RTC. Therefore, please avoid short circuit of the battery during transportation or operation at high temperatures.

Cleaning instructions:

- Power off before cleaning the Product
- Do not use spray detergent
- Clean with a damp cloth
- Do not try to clean exposed electronic components unless with a dust collector

Power off and contact Vantron technical support engineer in case of the following faults:

- The Product is damaged
- The temperature is excessively high
- Fault is still not solved after troubleshooting according to this manual

Do not use in combustible and explosive environment:

- Keep away from combustible and explosive environment
- Keep away from all energized circuits
- Unauthorized removal of the enclosure from the device is not allowed
- Do not change components unless the power cable is unplugged
- In some cases, the device may still have residual voltage even if the power cable is unplugged. Therefore, it is a must to remove and fully discharge the device before replacement of the components

INTRODUCTION

Product Overview

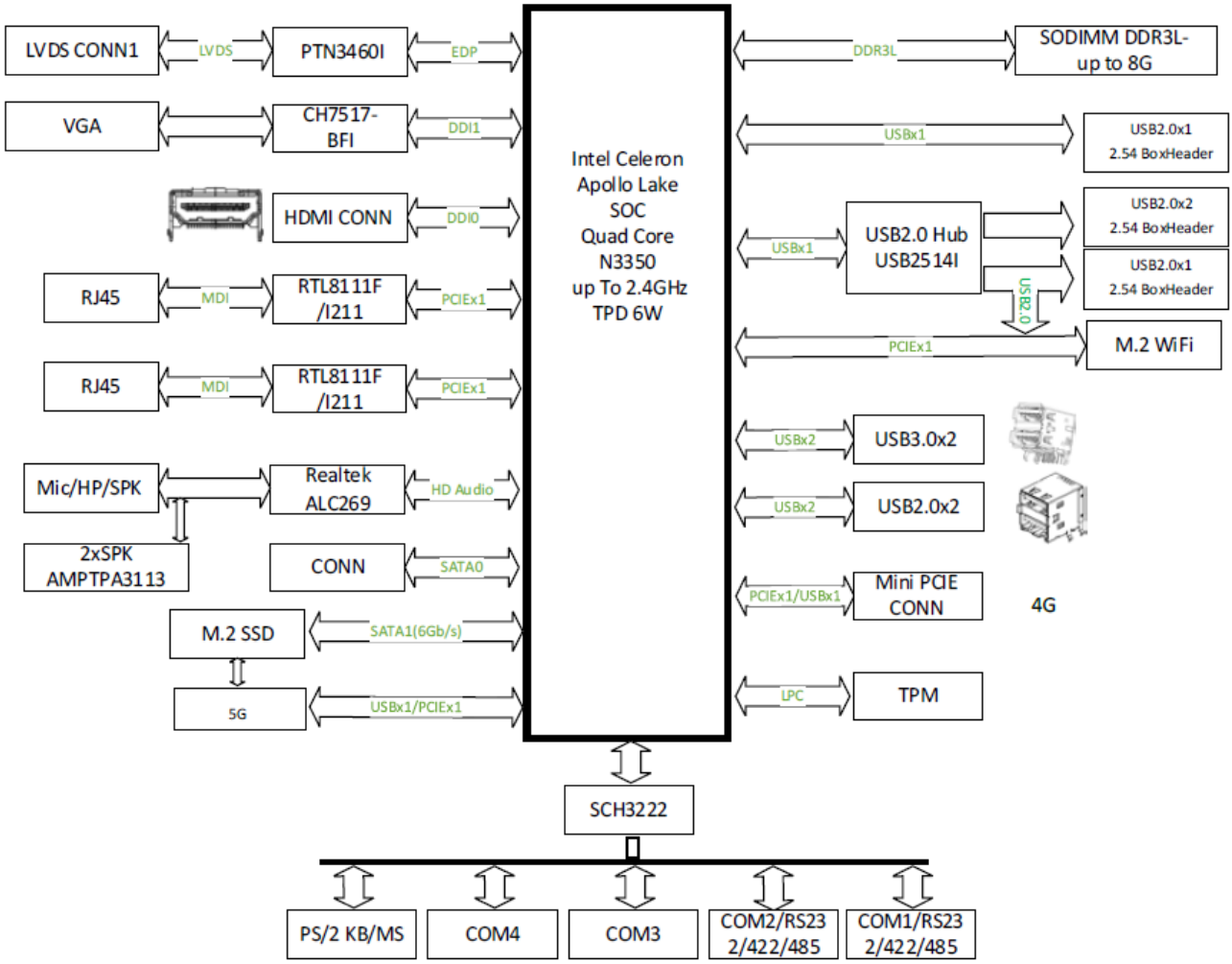
VT-MITX-APL single board computer adheres to the international industry size standards with a 170mm x 170mm form factor. It is powered by Intel® Celeron® APL-N3350 quad core processor, and customers have the choice between Windows 10 and Linux operating systems. The single board computer supports multi-channel display

outputs and high-definition video encoding and decoding technology to provide outstanding visual experience. Better yet, it provides rich on-board interfaces and customer expansion options to meet different application scenarios including smart retail, self-service terminals, industrial automation, intelligent medical health, and digital media.
Featuring high flexibility and high performance, the motherboard could work under extreme environments with extended temperatures ranging from -20℃ to +60℃, making it a reliable industrial IoT solution.

Terminology/Acronym

Terminology/Acronym	Description
NC	No connection
VCC	Voltage common collector
GND	Ground
P (+)	Positive of difference signal
N (-)	Negative of difference signal
#	Active low signal
I	Input
O	Output
I/O	Input/output
P	Power or ground
A	Analog
OD	Open drain
PCIe	PCI express signal
MDI	Media dependent interface
BKL	Backlight control

Block Diagram



Specifications

VT-MITX-APL			
System	CPU	Intel® Celeron®, APL-N3350, Quad-core processor, 2.4GHz (Max.) (Optional: N4200)	
	Memory	DDR3L SO-DIMM socket, 1866 MHz, up to 8GB	
	Storage	1 x SATA 3.0	
Communication	Ethernet	2 x RJ45, 10/100/1000Mbps	
Media	Display	1 x HDMI 1.4b, 3840 x 2160 @30Hz 1 x Dual-channel LVDS, 1920 x 1200 @30Hz 1 x VGA, 1920 x 1200 @60Hz	
	Audio	1 x 3.5mm Audio jack 1 x 3.5mm Mic jack	1 x Audio connector 2 x Speaker connector
	Serial	2 x RS232 connector	2 x RS232/RS422/RS485 connector

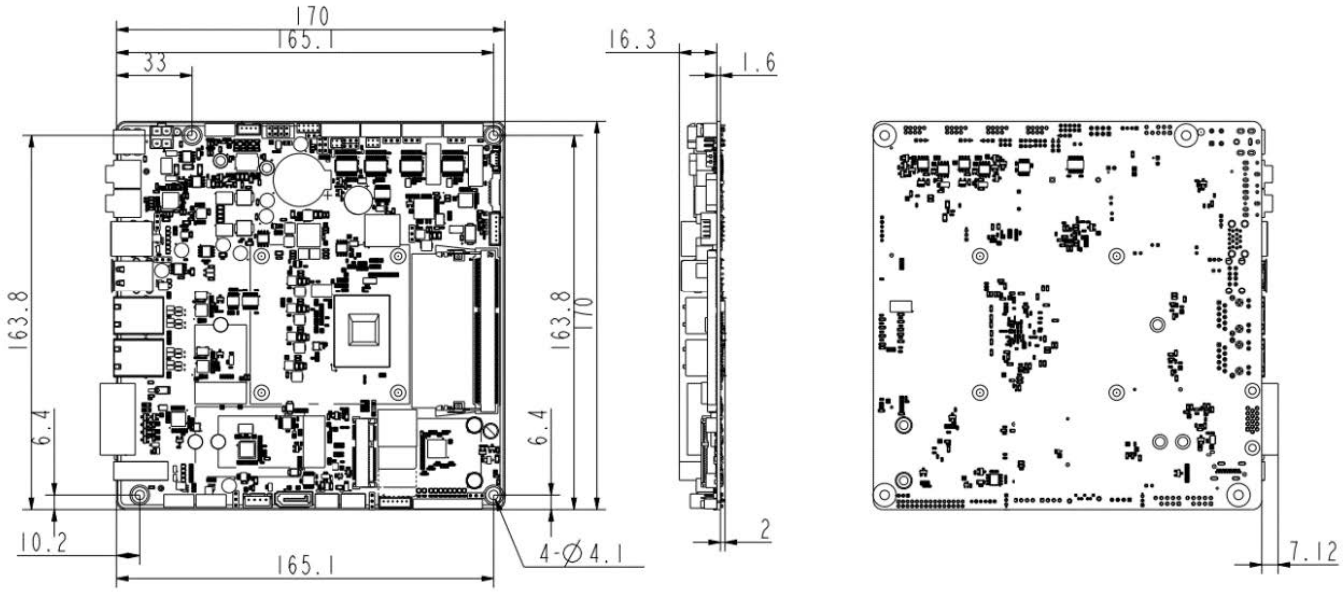
I/Os	USB	2 x USB 2.0 Type-A 2 x USB 3.0 Type-A	4 x Built-in USB 2.0
	GPIO	8 x GPIO	
	SMBus	1 x SMBus	
	RTC	Supported	
	Others	1 x PS/2 connector	2 x Standard fan connector
Expansion	Slot	1 x Full Mini-PCIe for 4G with a SIM slot 1 x M.2 B-key (2242, PCIe x4/SATA for SSD expansion, or 3052, PCIe x1/USB3.1 for 5G expansion) 1 x M.2 E-key (2230, PCIe x1/USB 2.0 for Wi-Fi & BT expansion)	
Security	TPM	1 x TPM	
System Control	Button	1 x Standard power/reset button	
	Indicator	1 x Status LED	
Power	Input	12V DC	
		1 x Power jack	1 x Power connector (2 x 2 x 4.2mm)
	Consumption	10W+	
Software	Operating system	Windows 10, Linux	
	OTA tool	BlueSphere OTA	
Mechanical	Dimensions	MITX standard board, 170mm x 170mm	
	Heat dissipation	2 x Fan connector	
Environment Condition	Temperature	Operating: -20℃~+60℃	
	Humidity	RH 10%-85% (Non-condensing)	
	Certification	RoHS	

Operating System

VT-MITX-APL supports Windows 10 and Linux operating systems.

Mechanical Dimensions

- 170mm x 170mm



Power Supply and Consumption

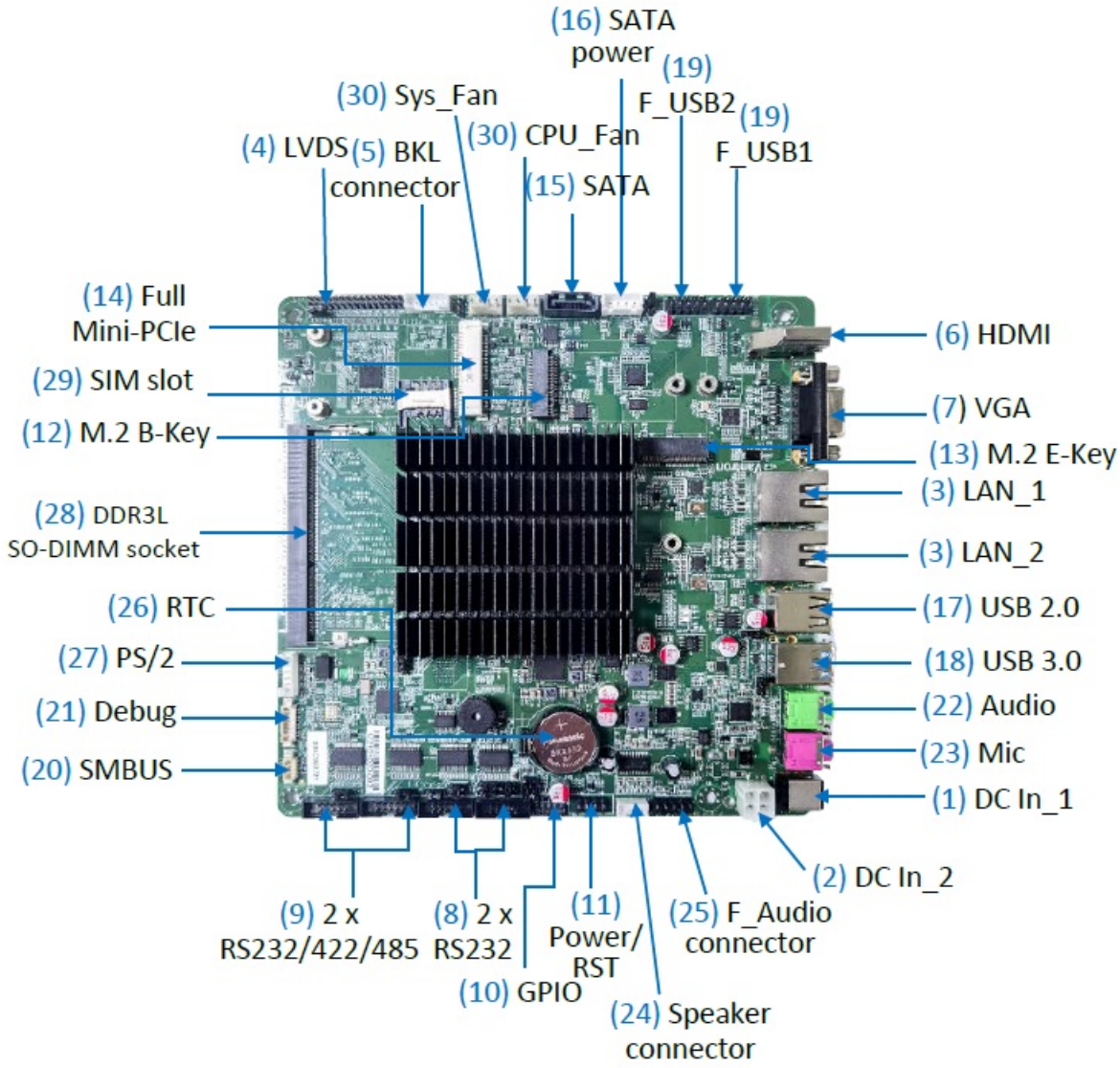
VT-MITX-APL works with +12V DC power input supplied by the power connector or power jack.
The Board consumes 10W+ (without speakers) of power or 40W+ (with speakers) of power. It should be pointed out that power consumption is largely determined by the RAM, storage capacity, and other configurations of the board.

Environmental Specifications

VT-MITX-APL works at a temperature ranging from -20℃ to +60℃ and at relative humidity of 5%-95% for non-condensing purpose.

CONNECTORS AND PIN ASSIGNMENT

Product Layout



The board I/Os will be described in detail in 2.4 Connectors and Jumpers following the sequencing numbers provided here.

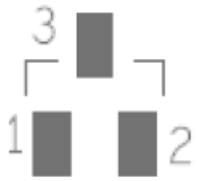
Memory

VT-MITX-APL is equipped with a DDR3L SO-DIMM socket that supports up to 8GB RAM.

Identification of Pin 1

Unless otherwise stated, pin 1 of a connector is seated on a square pad that is different from the round pads used for other pins. Sometimes, pin 1 is next to a trigonal mark on the board. When there are two rows of pins on a connector, the row with pin 1 is composed of odd numbers and the other is composed of even numbers.

Usually, there will be numbers or marks next to the pins of a connector on the board to indicate the pinouts.



Connectors and Jumpers

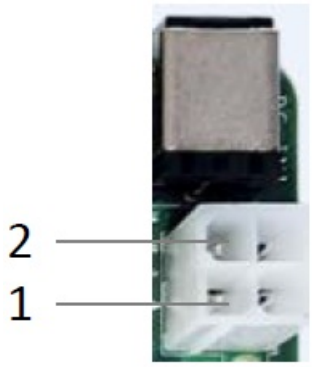
This section is going to brief the connectors/jumpers on the Board with corresponsive pinout description.

Power jack (1)

The power jack supports 12V DC power supply, and the recommended current is 1.5A.

J5 Power connector (2)

Specification: 2 x 2 x 4.2mm, 12.8mm (H), Male, Vertical, White, WDT, THR, RoHS

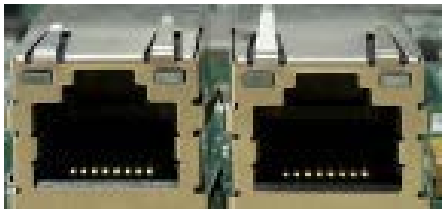


Pinout description:

Pin	Name	Type	Description
1	GND	P	Ground
2	GND	P	Ground
3	+VDC	P	DC-IN POWER +
4	+VDC	P	DC-IN POWER +

J16/J17 Ethernet connector (3)

Specification: RJ45, supporting 10M/100M/1000M Base-T, LED: L-Y; R-G



Pinout description:

Pin	Name	Type	Description
1	L_MDI_0P	IO	Ethernet MDI0+ Signal
2	L_MDI_0N	IO	Ethernet MDI0- Signal
3	L_MDI_1P	IO	Ethernet MDI1+ Signal
4	L_MDI_1N	IO	Ethernet MDI1- Signal
5	L_MDI_2P	IO	Ethernet MDI2+ Signal
6	L_MDI_2N	IO	Ethernet MDI2- Signal
7	L_MDI_3P	IO	Ethernet MDI3+ Signal
8	L_MDI_3N	IO	Ethernet MDI3- Signal

J6 LVDS connector (4)

Specification: 2 x 15 x 2.0mm, 1.5A, 6mm (H), Male, Vertical, WDT, SMT, RoHS

Pinout description:

Pin	Name	Type	Description
1	VDD_LCD	P	LCD POWER +5V
2	VDD_LCD	P	LCD POWER +5V
3	VDD_LCD	P	LCD POWER +5V
4	NC		
5	LCD_DETECT_R	I	LVDS DETECT
6	SEL 6/8	O	SELECT 6 OR 8 DEPTH
7	LVDS_A_D0-_R	O	LVSDO_DATA
8	LVDS_A_D0+_R	O	LVSDO_DATA
9	LVDS_A_D1-_R	O	LVSDO_DATA
10	LVDS_A_D1+_R	O	LVSDO_DATA

11	LVDS_A_D2-_R	O	LVSDO_DATA
12	LVDS_A_D2+_R	O	LVSDO_DATA
13	GND	P	Ground
14	GND	P	Ground
15	LVDS_A_CLK-_R	O	LVSDO_CLOCK
16	LVDS_A_CLK+_R	O	LVSDO_CLOCK
17	LVDS_A_D3-_R	O	LVSDO_DATA
18	LVDS_A_D3+_R	O	LVSDO_DATA
19	LVDS_B_D0-/TX0-	O	LVSAE_DATA
20	LVDS_B_D0+/TX0+	O	LVSAE_DATA
21	LVDS_B_D1-/TX1-	O	LVSAE_DATA
22	LVDS_B_D1+/TX1+	O	LVSAE_DATA
23	LVDS_B_D2-/TX2-	O	LVSAE_DATA
24	LVDS_B_D2+/TX2+	O	LVSAE_DATA
25	GND	P	Ground
26	GND	P	Ground
27	LVDS_B_CLK-/AUX-	O	LVSAE_CLOCK
28	LVDS_B_CLK+/AUX+	O	LVSAE_CLOCK
29	LVDS_B_D3-/TX3-	O	LVSAE_DATA
30	LVDS_B_D3+/TX3+	O	LVSAE_DATA

J10 LCD BKL connector (5)

Specification: 1 x 6, 2.0mm, 2A, 6mm (H), Male, Vertical, WDT, THR, RoHS

Pinout description:

Pin	Name	Type	Description
1	VCC_BLK	P	LCD BACKLIGHT POWER +12V
2	VCC_BLK	P	LCD BACKLIGHT POWER +12V
3	LCD_BKLTEN	P	LCD BACKLIGHT ENABLE
4	LCD_BKLT_PWM	O	LCD BACKLIGHT PWM
5	GND	P	Ground
6	GND	P	Ground

U17 HDMI (6)

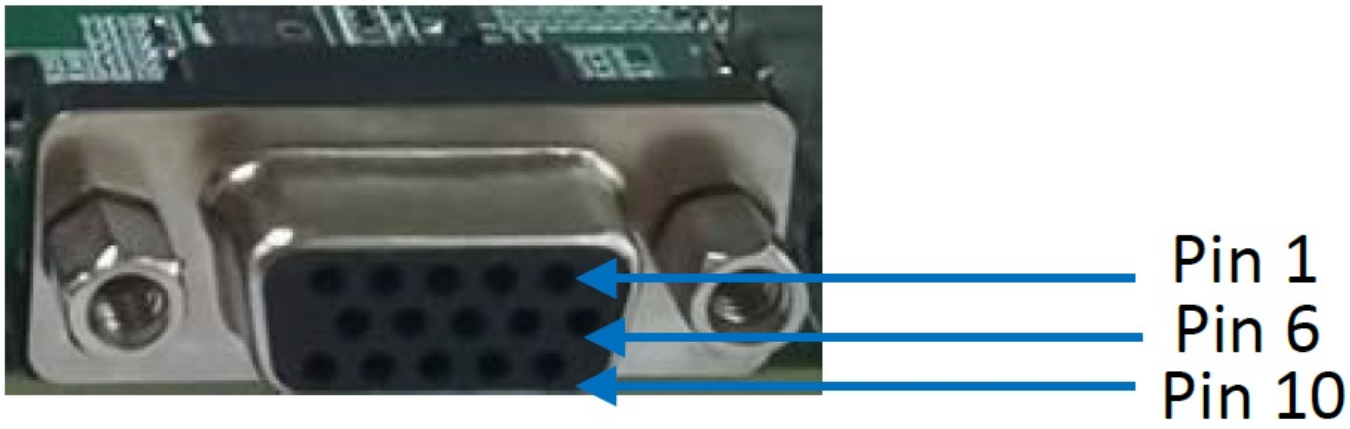
Specification: Type-A, FLN, Female, Right angle, WDT, SMT, RoHS

Pinout description:

Pin	Name	Type	Description
1	HDMI_DATA2+	O	HDMI DATA
2	GND	P	Ground
3	HDMI_DATA2-	O	HDMI DATA
4	HDMI_DATA1+	O	HDMI DATA
5	GND	P	Ground
6	HDMI_DATA1-	O	HDMI DATA
7	HDMI_DATA0+	O	HDMI DATA
8	GND	P	Ground
9	HDMI_DATA0-	O	HDMI DATA
10	HDMI_CLK+	O	HDMI CLK
11	GND	P	Ground
12	HDMI_CLK-	O	HDMI CLK
13	NC		
14	NC		
15	HDMI_DDC_SCL	IO	HDMI DDC I2C CLK
16	HDMI_DDC_SDA	IO	HDMI DDC I2C DATA
17	GND	P	Ground
18	VCC_HDMI	P	HDMI POWER +5V
19	HDMI_HPD	I	HDMI HOT PLUG DETECTION

J11 VGA (7)

Specification: DB15, 1 Port, NUF, Female, Right angle, WDT, SMT, RoHS

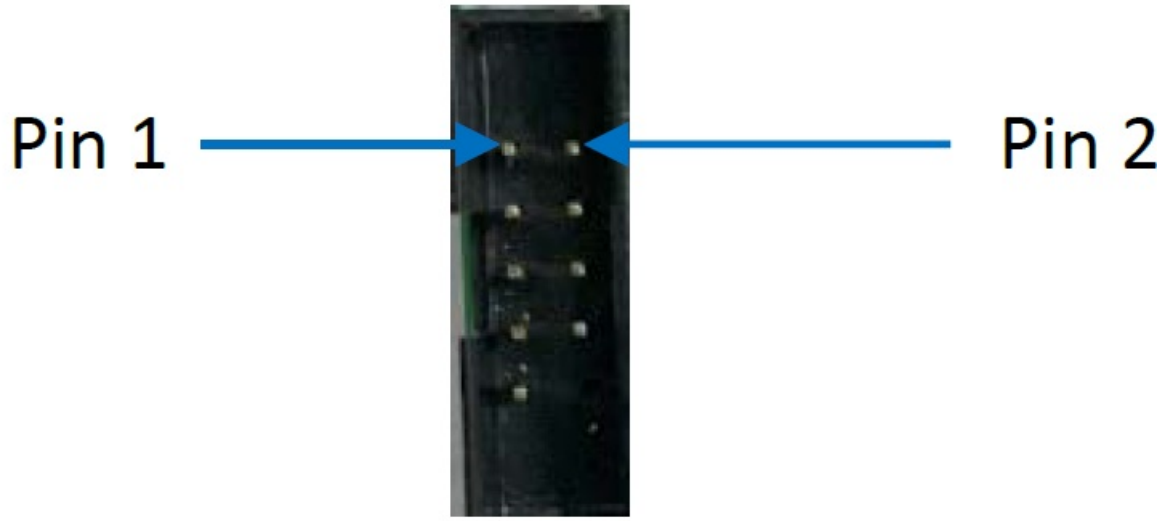


Pinout description:

Pin	Name	Type	Description
1	VGA_R	O	
2	VGA_G	O	
3	VGA_B	O	
4	NC		
5	GND	P	Ground
6	GND	P	Ground
7	GND	P	Ground
8	GND	P	Ground
9	+V5_CRT	P	POWER +5V
10	GND	P	Ground
11	NC		
12	VGA_DDC_DATA	O	
13	VGA_HS	O	
14	VGA_VS	O	
15	VGA_DDC_CLK	O	VGA CLK

J19/J18 RS232 port (8)

VT-MITX-APL implements two RS232 serial ports.
Specification: 2 x 5 x 1.5mm, 5.75mm (H), Male, Vertical, Black, WDT, THR, RoHS

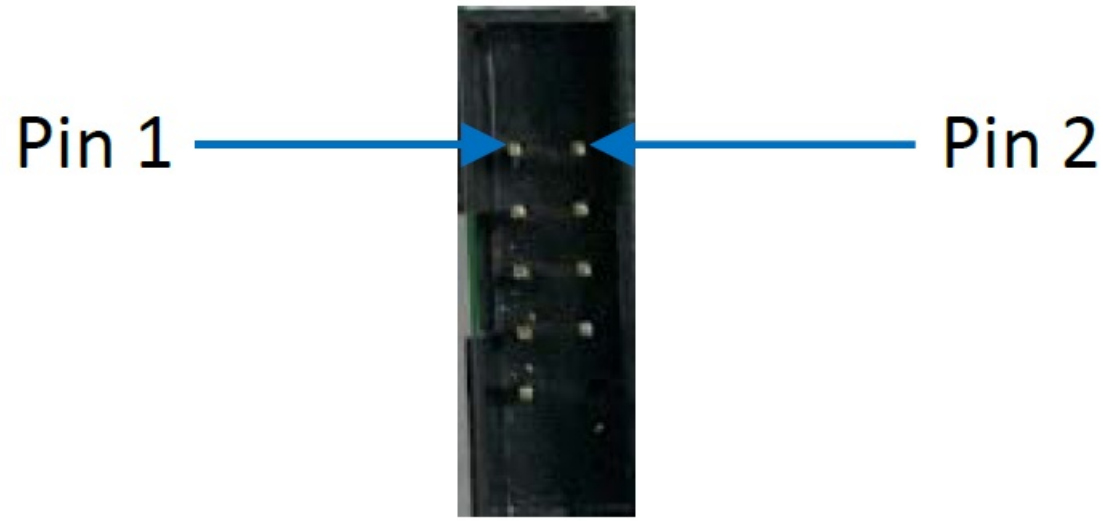


Pinout description:

Pin	Name	Type	Description
1	DCD4_L	P	POWER
2	RXD4_L	I	RS232_RXD
3	TXD4_L	O	RS232_TXD
4	DTR4	I/O	DTR4
5	GND	P	Ground
6	DSR4	I/O	DSR4
7	RTS4	I/O	RTS4
8	CTS4	I/O	CTS4
9	RI4_L	I/O	RI4_L

J20/J21 RS232/RS422/RS485 port (9)

Next to the two RS232 serial ports are another two serial ports that are used as RS232/RS422/RS485.
Specification: 2 x 5 x 1.5mm, 5.75mm (H), Male, Vertical, Black, WDT, THR, RoHS

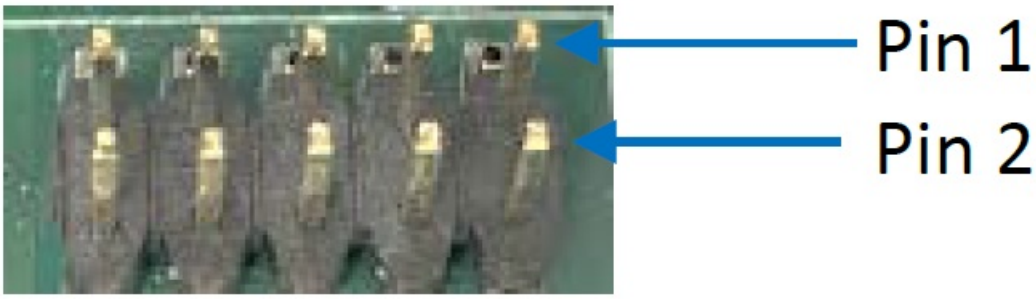


Pinout description:

Pin	Name	Type	Description
1	RS485_A/422TX+	IO	RS485_P
2	RS485_B/422TX-	IO	RS485_N
3	422RX+	IO	DATA
4	422RX-	IO	DATA
5	GND	P	GND
6	DSR1	IO	DATA
7	RTS1	IO	DATA
8	CTS1	IO	DATA
9	RI1_L	IO	DATA

J39 GPIO (10)

VT-MITX-APL implements a GPIO connector, offering 8 GPIO signals.
Specification: 2 x 5, 2.0mm, 1.5A, 4mm (H), Male, Vertical, WDT, THR, RoHS

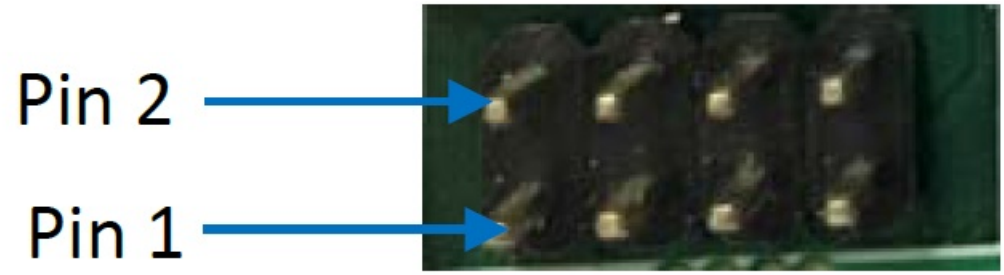


Pinout description:

Pin	Signal	Type	Description
1	GPIO_0_3.3V	IO	GPIO
2	GPIO_1_3.3V	IO	GPIO
3	GPIO_2_3.3V	IO	GPIO
4	GPIO_3_3.3V	IO	GPIO
5	GPIO_4_3.3V	IO	GPIO
6	GPIO_5_3.3V	IO	GPIO
7	GPIO_6_3.3V	IO	GPIO
8	GPIO_7_3.3V	IO	GPIO
9	GND	IO	GPIO
10	VCC_GPIO	IO	+3.3V/+5V POWER

J40 Power/reset connector (11)

Specification: 2 x 4, 2.54mm, 2A, 6mm (H), Male, Vertical, WDT, THR, RoHS



Pinout description:

Pin	Name	Type	Description
1	SATA_ACT+	IO	SATA_ACT+
2	LED_POWER	O	LED_POWER
3	SATA_ACT#	IO	SATA_ACT+
4	GND	P	GND
5	GND	P	GND
6	PBTN_IN#	I	Power Button
7	SYS_REST#	I	SYS_REST
8	GND	P	GND

J25 M.2 B-Key slot (12)

VT-MITX-APL implements an M.2 B-Key that supports a size of 2242 and is compatible with PCIe x4/SATA to connect an SSD for huge data transfer and storage. The slot also supports a size of 3052 and is compatible with PCIe x1/USB 3.1 to connect a 5G module for faster wireless communication.
Specification: Key B, 75P, 0.5mm, 6.7mm (H), WDT, SMT, RoHS
The pinout of the M.2 B-Key slot is in line with the pin assignment of standard M.2 slot for Key B.

J24 M.2 E-Key slot (13)

VT-MITX-APL implements an M.2 E-Key (2230) that is compatible with PCIe x1/USB 2.0 to connect a Wi-Fi & BT module for wireless communication.
Specification: Key E, 75P, 0.5mm, 6.7mm (H), WDT, SMT, RoHS
The pinout of the M.2 E-Key slot is in line with the pin assignment of standard M.2 for Key E.

J23 Mini PCIe slot (14)

VT-MITX-APL also implements a mini PCIe slot for a 4G/LTE module.
Specification: Mini PCIe, 52P, 0.8mm, 6.8mm (H), WDT, SMT, RoHS
The pinout of the mini PCIe slot is in line with the pin assignment of standard mini PCIe slot.

J16 SATA connector (15)

The SATA connector is designed to connect a storage device for capacity expansion. Specification: 7-pin, 1.27mm, 8.4mm (H), WDT, SMT, RoHS

The pinout of the SATA connector is in line with the pin assignment of standard SATA port.

J17 SATA power connector (16)

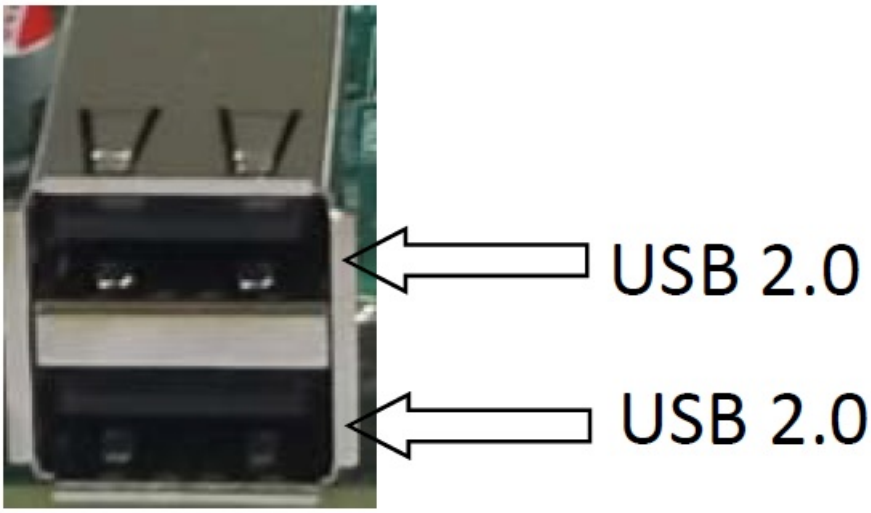
VT-MITX-APL implements a 4-pin power connector to supply power to the SATA device.
Specification: 1 x 4, 2.54mm, 2A, 6mmH, Male, Vertical, WDT, THR, RoHS

Pinout description:

Pin	Name	Type	Description
1	+V5_S	P	POWER +5V
2	GND	P	Ground
3	GND	P	Ground
4	+V12_S	P	POWER +12V

J29 USB 2.0 port (17)

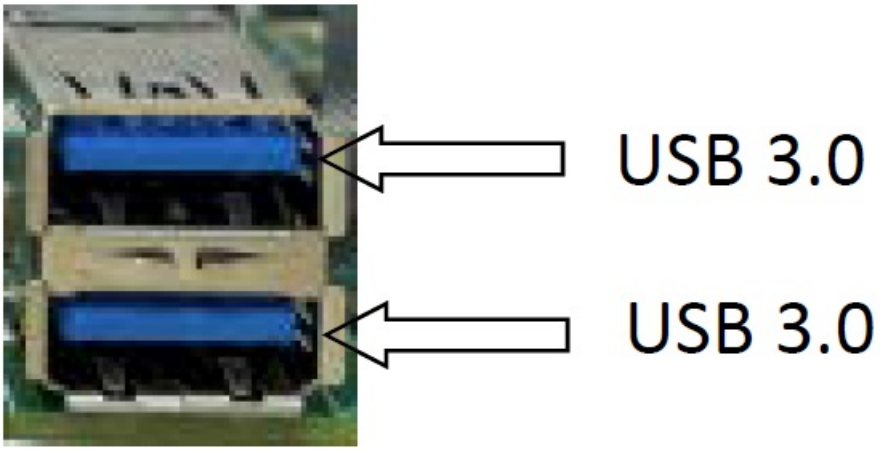
VT-MITX-APL provides two USB 2.0 ports designed to connect peripherals to expand the functions.
Specification: 2.0, Type-A, Female, Right angle, Retention, WDT, THR, RoHS



The pinout of the USB 2.0 port is in line with the pin assignment of standard USB 2.0 connector.

U46 USB 3.0 port (18)

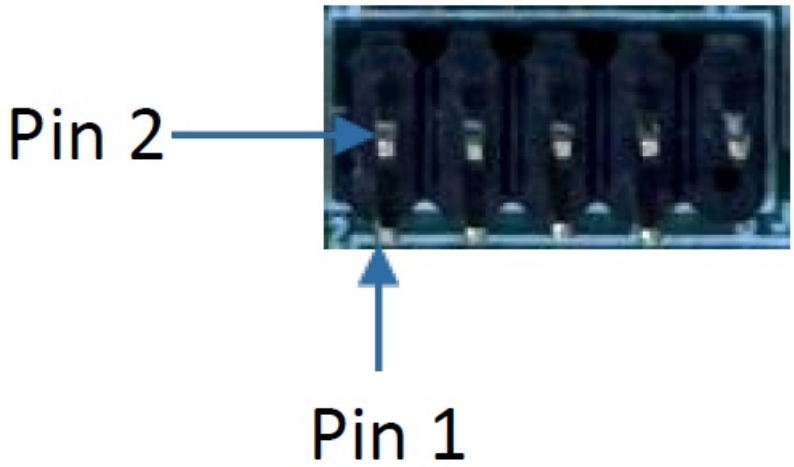
VT-MITX-APL provides two USB 3.0 ports for expansion of functions.
Specification: 3.0, Type-A, Female, 17.5mm (L), Right angle, WDT, THR, RoHS



The pinout of the USB 3.0 port is in line with the pin assignment of standard USB 3.0 connector.

J31/J33 USB2.0 pin header (19)

The Board implements two USB pin headers to allow users for custom development.
Specification: 2 x 5, 2.54mm, 2A, 6mm (H), Male, Vertical, WDT, THR, RoHS



Pinout description:

Pin	Name	Type	Description
1	VCC_USB2.0_HDR	P	USB POWER +5V
2	VCC_USB2.0_HDR	P	USB POWER +5V
3	HUB_USB4N	IO	Reserved usb2.0 Negative
4	HUB_USB3N	IO	Reserved usb2.0 Positive
5	HUB_USB4P	IO	Reserved usb2.0 Negative
6	HUB_USB3P	IO	Reserved usb2.0 Positive
7	GND	P	Ground
8	GND	P	Ground
10	NC		

J3 SMBUS connector (20)

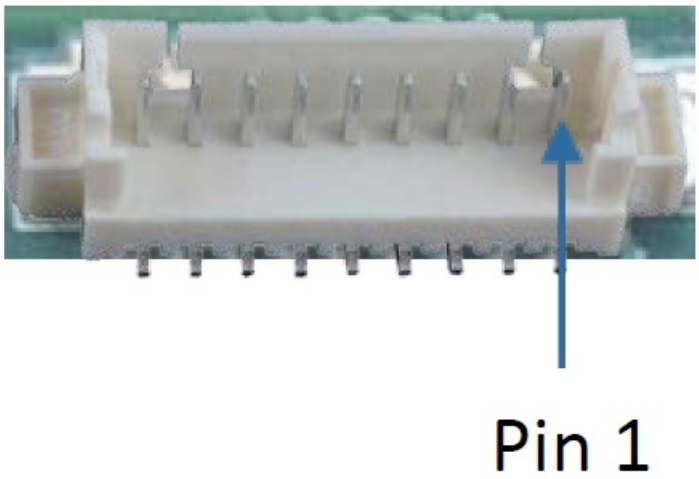
Specification: 1 x 4,1.25mm, 1A, 4.6mm (H), Male, Vertical, THR, RoHS

Pinout description:

Pin	Name	Type	Description
1	+V3.3_A	P	POWER
2	SMB_SCL_3.3V	O	SMB_SCL
3	SMB_SDA_3.3V	O	SMB_SDA
4	GND	P	Ground

J38 Debug connector (21)

VT-MITX-APL implements a debug connector for debugging and troubleshooting purposes.



Pinout description:

Pin	Name	Type	Description
1	LPC_FRAME#	IO	LPC
2	LPC_AD3	IO	LPC
3	LPC_AD2	IO	LPC
4	LPC_AD1	IO	LPC
5	LPC_AD0	IO	LPC
6	GND	P	Ground
7	LPC_CLK1_25M	IO	LPC
8	+V3.3_A	P	+3.3V POWER

J12 Audio jack (22)

Specification: 3.5mm, 5-pole, Female, Right angle, THR, RoHS

Pinout description:

Pin	Name	Type	Description
1	GND	P	Ground
2	HPOUT_L_CRL	O	AUDIO JACK LEFT VOICE
3	HPOUT_R_CRL	O	AUDIO JACK RIGHT VOICE
4	ALOUT_L_SPEAKER	I	LEFT SPEAKER INPUT
5	ALOUT_R_SPEAKER	I	RIGHT SPEAKER INPUT

J14 Microphone jack (23)

Specification: 3.5mm, 5-pole, Female, Right angle, THR, RoHS

Pinout description:

Pin	Name	Type	Description
1	GND	P	Ground
2	MIC1_RRR	I	MIC RIGHT INPUT
3	MIC1_LLL	I	MIC LEFT INPUT
4	GND	P	Ground
5	MIC_JD	I	JD INPUT

J13 Speaker connector (24)

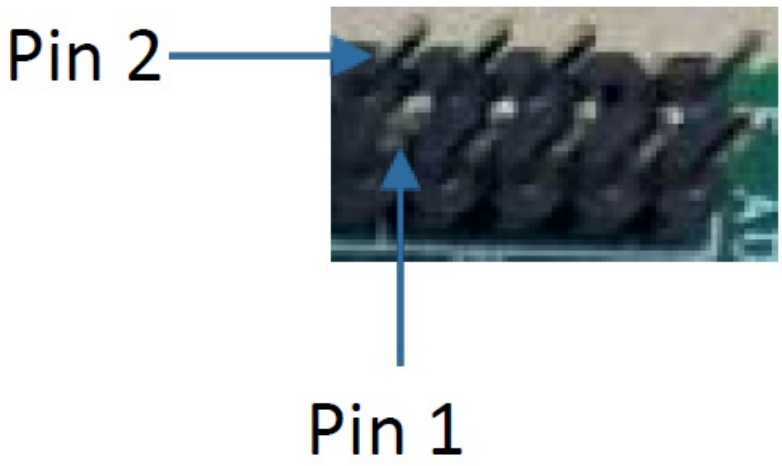
Specification: 1 x 4, 2.54mm, 4A, 10.8mm (H), Male, Vertical, THR, RoHS

Pinout description:

Pin	Name	Type	Description
1	OUTPL+	O	8R/15W SPEAKER ANODE
2	OUTPL-	O	8R/15W SPEAKER CATHODE
3	OUTPR-	O	8R/15W SPEAKER CATHODE
4	OUTPR+	O	8R/15W SPEAKER CATHODE

J50 Front panel audio connector (25)

Specification: 2 x 5, 2.54mm, 3A, 6mm (H), Male, Vertical, THR, RoHS

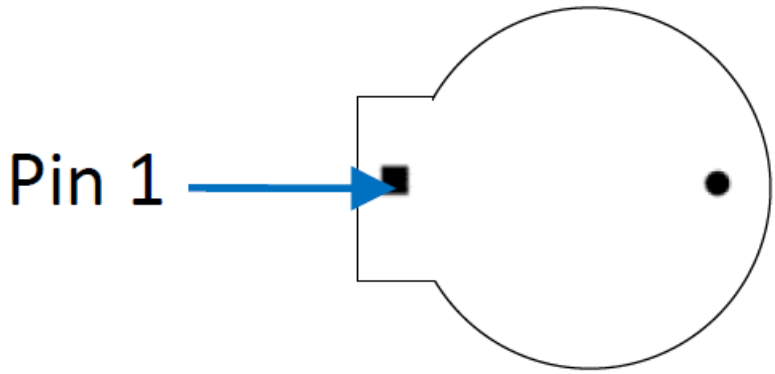


Pinout description:

Pin	Name	Type	Description
1	MIC2_LLL	I	MIC LEFT INPUT
2	GND	P	Ground
3	MIC2_RRR	I	MIC RIGHT INPUT
4	NC		
5	RINP_AMP2	O	AMP2 RIGHT INPUT
6	MIC2_JD	I	MIC2 JD INPUT
7	GND	P	Ground
9	LINP_AMP2	O	AMP2 LEFT INPUT
10	HP2_JD	I	HP2 JD INPUT

B1 RTC connector (26)

Specification: 24mm (D), Female, Right angle, WDT, THR, RoHS

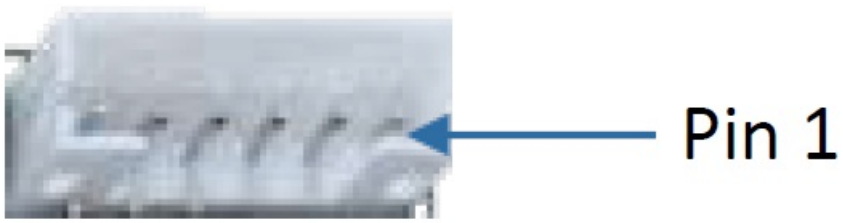


Pinout description:

Pin	Name	Type	Description
1	BAT_PWR	P	RTC +
2	GND	P	RTC –

J38 PS/2 (27)

VT-MITX-APL implements a PS/2 connector for connecting a keyboard or mouse.
Specification: 1 x 6, 2.0mm, 2A, 6mm (H), Male, Vertical, WDT, THR, RoHS



Pinout description:

Pin	Name	Type	Description
1	L_KBD_CLK	IO	KBD_CLK
2	L_KBD_DATA	IO	KBD_DATA
3	L_MOUSE_CLK	IO	MOUSE_CLK
4	GND	P	Ground
5	PS_5V	P	+5V POWER
6	L_MOUSE_DATA	IO	MOUSE_DATA

DDR3L SO-DIMM socket (28)

VT-MITX-APL offers a DDR3L SO-DIMM socket, capable of supporting memory modules with a maximum frequency of 1866 MHz and up to 8GB of memory capacity.

SIM slot (29)

There is a SIM slot on the Board, allowing it to communicate wirelessly via a cellular network and establish a secure data connection.

J36/J37 Fan connectors (30)

VT-MITX-APL implements two fan connectors, one (J37) is to connect a fan to offer active heat dissipation for the system, and the other (J36) is a CPU fan connector for cooling the CPU.
Specification: 1 x 4, 2.54mm, 4A, 11.4mm (H), Male, Vertical, WDT, THR, RoHS

Pinout description of J36:

Pin	Signal	Type	Description
1	GND	P	Ground
2	FAN SUPPLY_+V12	P	+12V POWER
3	CPU_TACHO_R_FAN	IO	FAN SPEED FEEDBACK
4	FAN_CONN_PWM_IN	IO	FAN SPEED CONTROL
Pinout description of J37:			
Pin	**Signal**	**Type**	**Description**
1	GND	P	Ground
2	FAN SUPPLY_+V12	P	+12V POWER
3	NA		
4	+V5S	IO	FAN SPEED CONTROL

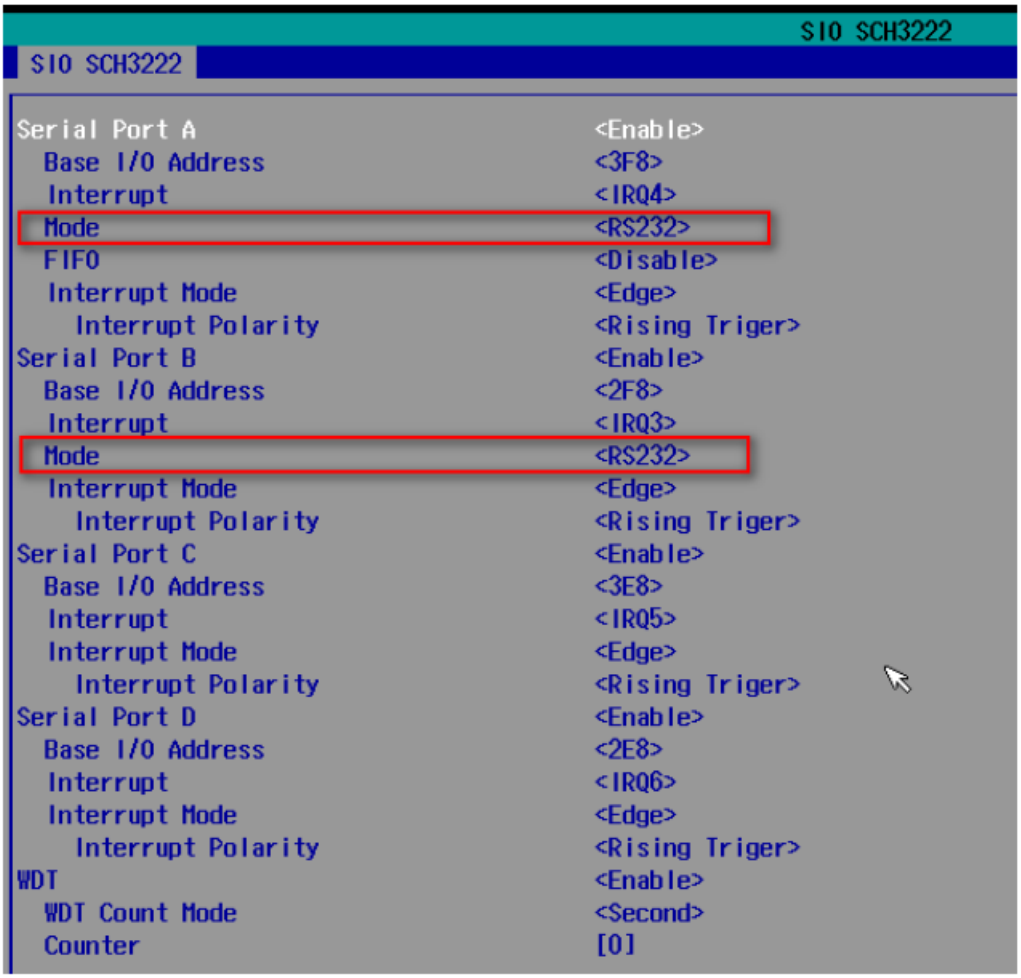
FIRST-USE DEBUGGING

Serial Configuration

VT-MITX-APL implements 4 serial connectors identified as COM1 ~ COM4 by the device manager shown as follows.

The ports displayed here may not necessarily match the ones that are identified by your device manager, so please be aware of any discrepancies. To differentiate between the ports, connect one serial port to the host PC at a time.
In this case, COM1 and COM2 support RS232, RS485, RS422 protocols, and COM3 and COM4 support RS232 protocol. COM1 ~ COM4 correspond to serial port A, B, C, D in BIOS system.
If you wish to change the mode of COM1 and COM2,

1. Enter BIOS;
2. Click Device Manager > SIO SCH3222;
3. Move the cursor to Serial Port A / Serial Port B > Mode, and use the up & down arrows to change the mode;



4. Press F10 to save and exit.

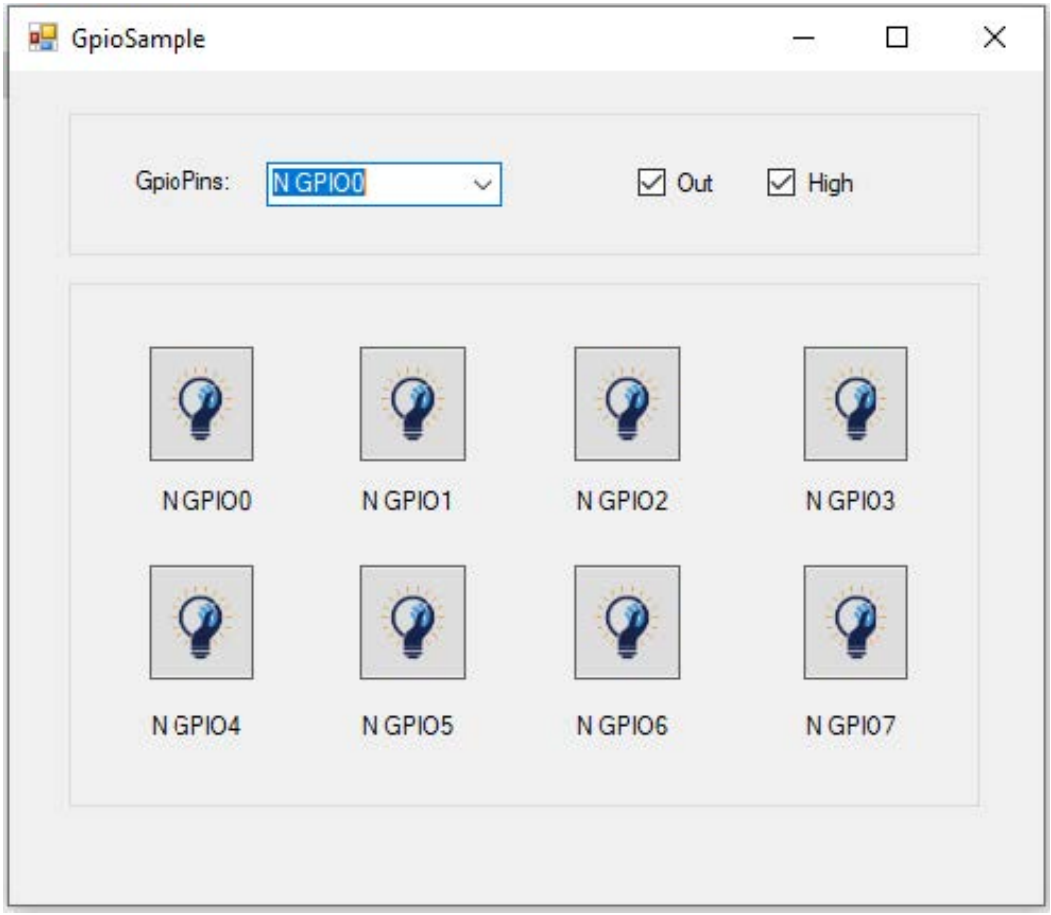
You can then use the TestCommPC Vxxx tool in the directory of SW Guide > COM test in the release package for serial debugging.

GPIO Setup

VT-MITX-APL implements 8 GPIO pins with details shown below:

Name	Default mode	Default level
GPIO_0	Output	High
GPIO_1	Input	/
GPIO_2	Output	High
GPIO_3	Input	/
GPIO_4	Output	High
GPIO_5	Input	/
GPIO_6	Output	High
GPIO_7	Input	/

You can use the GPIO Sample.exe program under the directory of SW Guide > GPIO Test > GPIO Sample in the release package for GPIO debugging (to run as administrator).



In the above figure:

1. GpioPins: You can select a pin of the GPIO header from the drop-down list for the configuration;
2. Out: Set the mode of the selected GPIO pin as output (checked)/input (unchecked);
3. High: Set the level of the selected GPIO pin as high (checked)/low (unchecked).
   Please run this program as administrator.

Enabling Watchdog Timer

If you need enable the Watchdog Timer,

1. Enter BIOS;
2. Click Device Manager > SIO SCH3222;
3. Move the cursor to WDT > Enable (Disabled by default), then set the Count Mode and Counter (time length);

- The Counter shall be set more than 80 if the Count Mode is second;
- The Counter shall be set more than 3 if the Count Mode is minute;

4. Press F10 to save the settings;
5. Press Ctrl + Alt + Delete to restart the system to get the settings take effect.

4 BIOS AND WINDOWS

BIOS Introduction

BIOS initializes hardware like CPU and memory, and saves hardware settings for installation and loading of the operating system (OS).
Users may need to run BIOS Setup program when:

- An error message appears suggesting that the user should run BIOS Setup;
- Default settings need to be customized.

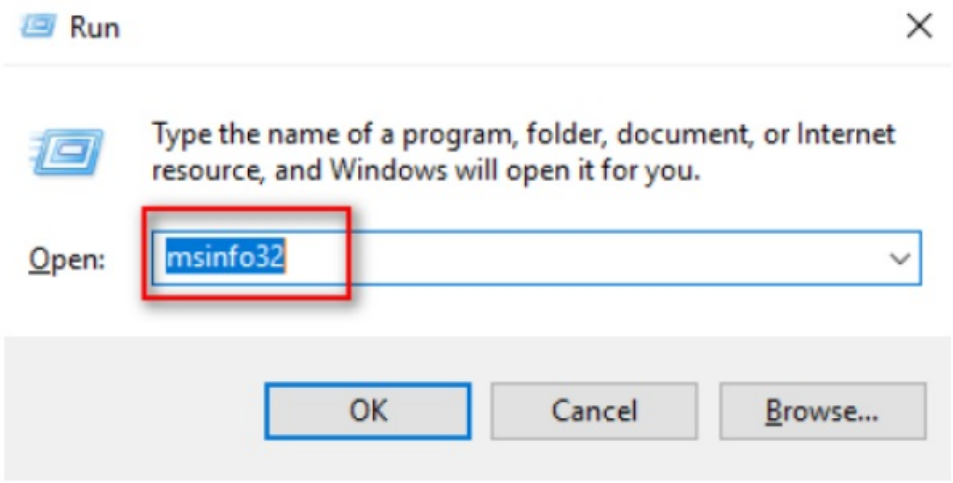
  Please be aware that BIOS will be under continuous update for better system performance, therefore the description in this chapter might vary slightly and is for reference only.

Make sure to connect a keyboard, a mouse and a display to the Board before you proceed with any further operations.

Check BIOS Version

The Board supports Windows operating system. You can check the BIOS version of the Board in Windows system in accordance with the following steps:

1. Press “Win + R” on the keyboard to call the command box;
2. Input msinfo32 in the command box and click “OK” to confirm;



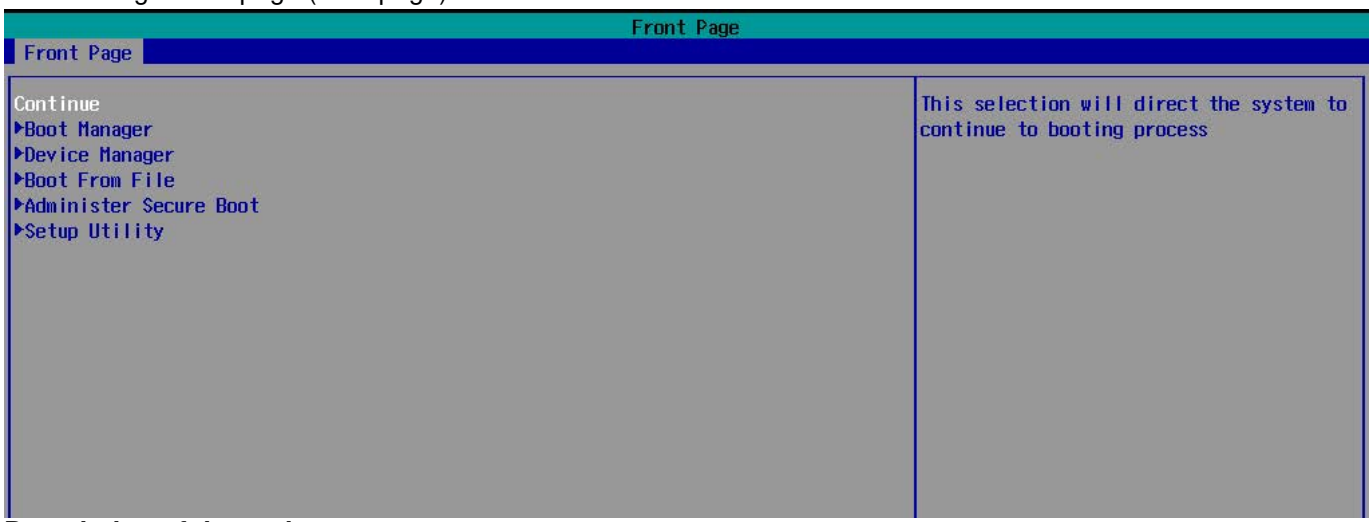
3. Move to BIOS Version/Date on the open page to check the detailed information.

Item	Value
OS Name	Microsoft Windows 10 Enterprise LTSC
Version	10.0.17763 Build 17763
Other OS Description	Not Available
OS Manufacturer	Microsoft Corporation
System Name	DESKTOP-0QGJIDR
System Manufacturer	Insyde
System Model	ApolloLake
System Type	x64-based PC
System SKU	Type1 - SKU0
Processor	Intel(R) Celeron(R) CPU N3350 @ 1.10GHz, 1101 Mhz, 2 Core(s), 2 Logical Pro...
BIOS Version/Date	INSYDE Corp. RBXC09B011_v1.0, 2/5/2021
SMBIOS Version	3.0
Embedded Controller Version	0.00
BIOS Mode	UEFI
BaseBoard Manufacturer	Vantron Technology,Inc.
BaseBoard Product	Vantron MITX-APL
BaseBoard Version	1.0
Platform Role	Mobile
Secure Boot State	Off

BIOS Setup

Entering Setup

Power on the Board and the system will start the power-on self-test process. Then press the ESC key to enter BIOS configuration page (front page) as shown below.



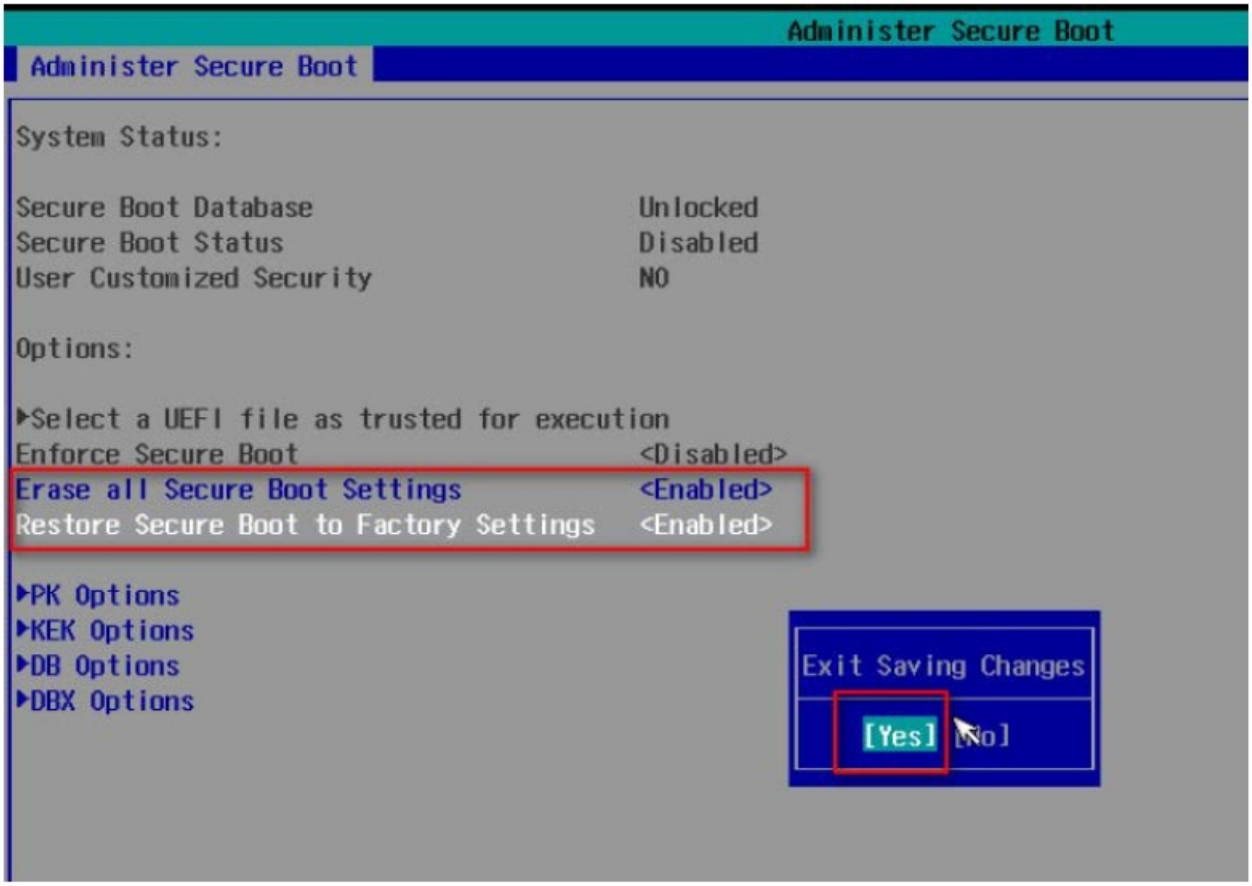
Description of the options:

Option	Description
Continue	Proceed with the booting process
Boot Manager	View all boot devices, including USB drives, SSD, etc.
Boot From File	Choose to boot from an internal file, only for EFI partition
Administer Secure Boot	Configure secure boot function, and enable/disable secure boot
Setup Utility	Overview of all BIOS setup options. You must be very careful when modifying the default settings.

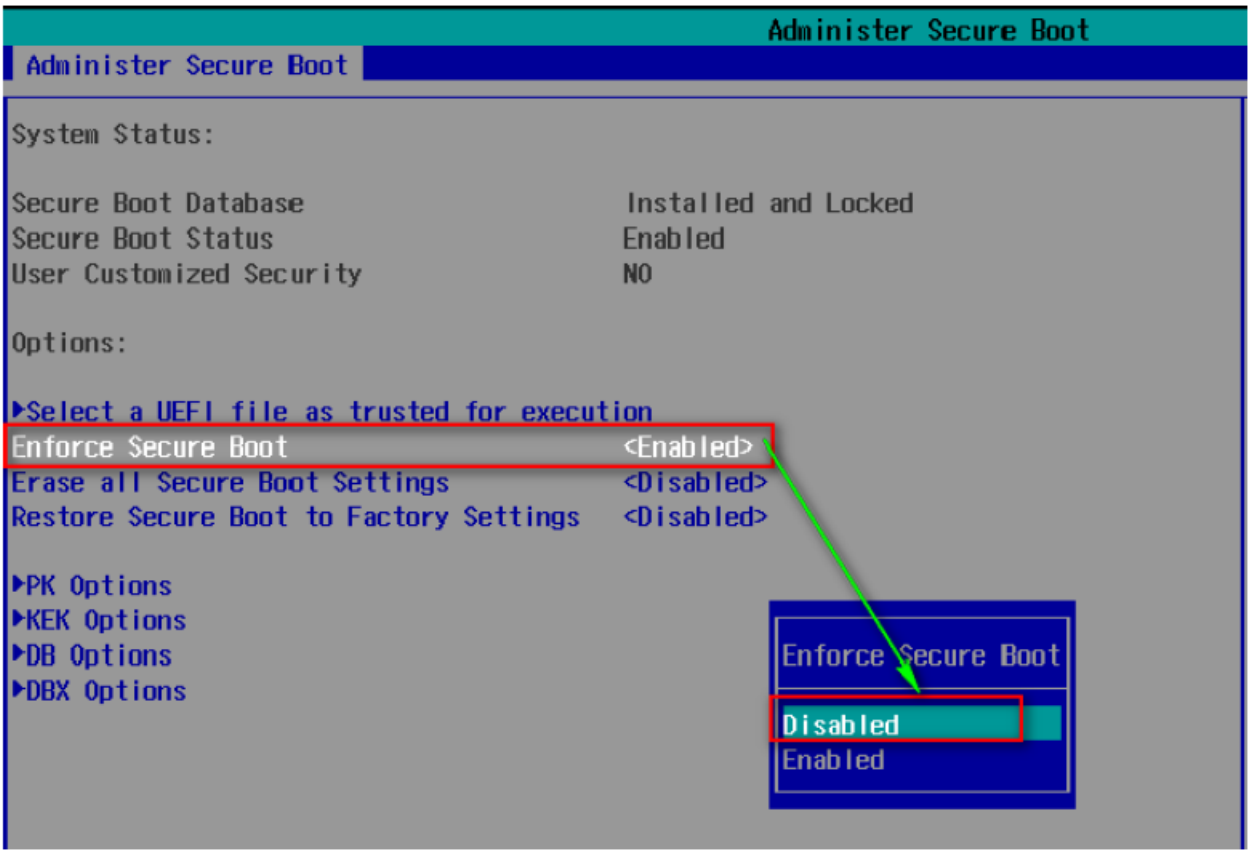
Secure Boot

Secure Boot is firmware-dependent and requires that the computer BIOS is set to UEFI mode. It is disabled by default.

1. Power on the Board and press ESC to enter BIOS;
2. Select Administer Secure Boot on the front page;
3. Set Erase all Secure Boot Settings and Restore Secure Boot to Factory Settings to Enabled;

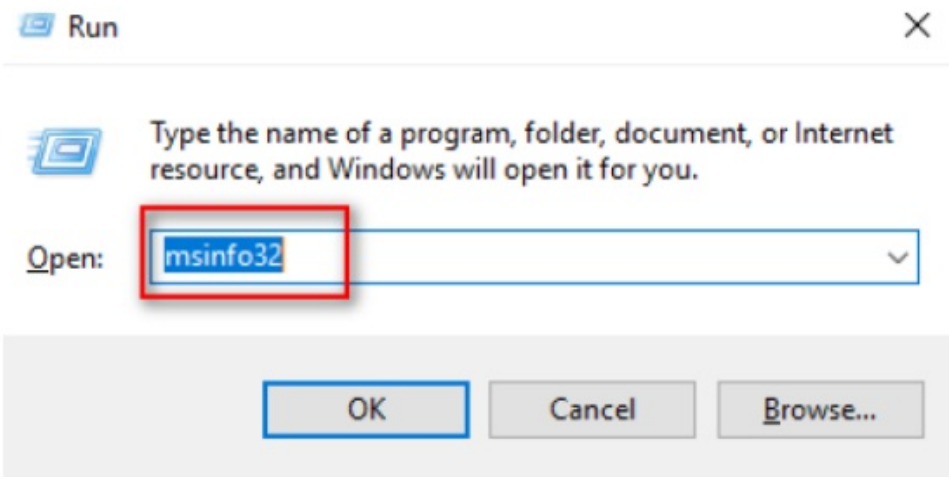


4. Press F10 to save and exit;
5. There will be a dialog box indicating the system will be reset. Click OK, and the system will reboot;
6. If you need to disable Secure Boot after that, set Enforce Secure Boot to Disabled.

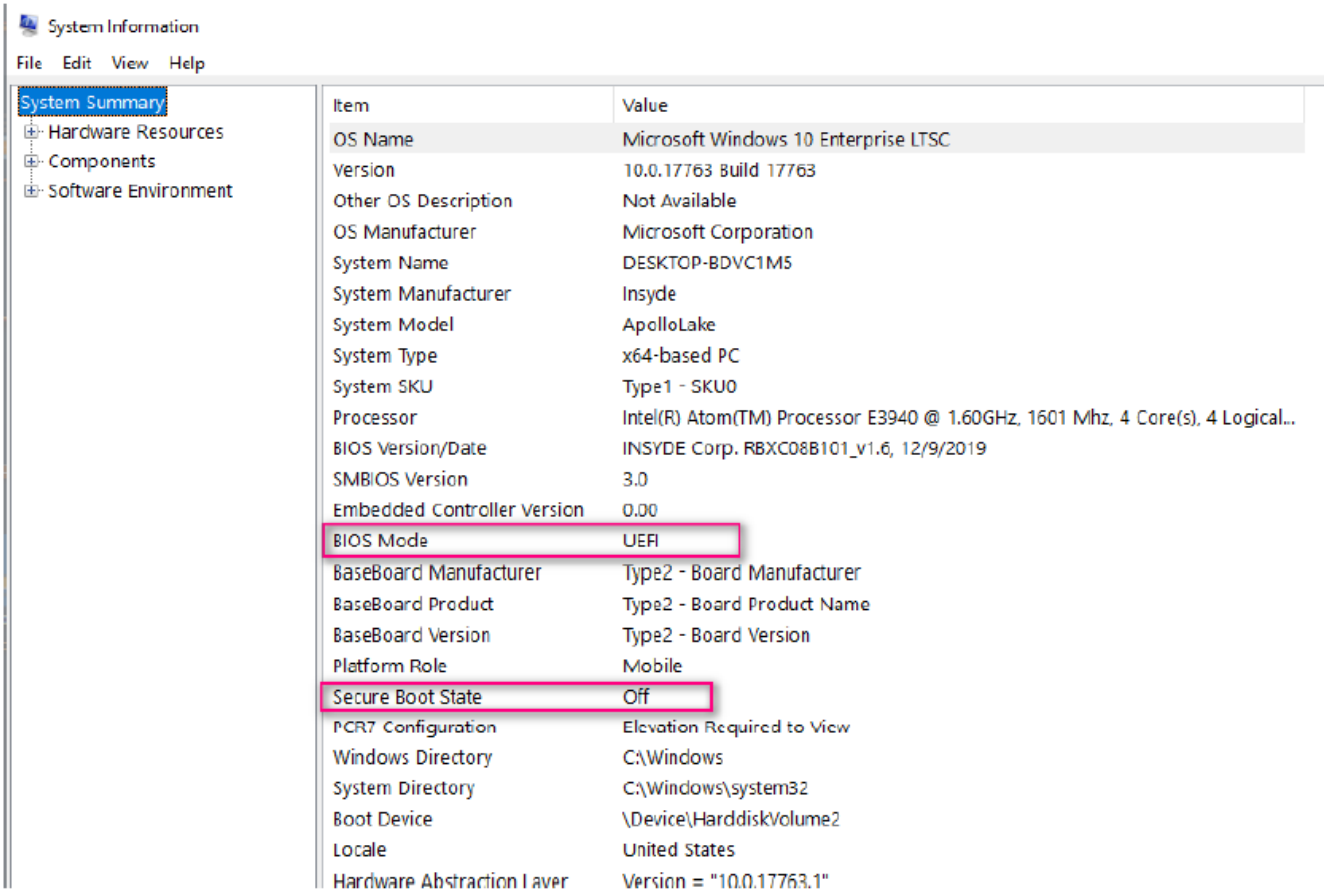


Check the Secure Boot State in the Windows system:

1. Press the “Win + R” on the keyboard to call the command box;
2. Input msinfo32 in the command box and click “OK” to confirm;



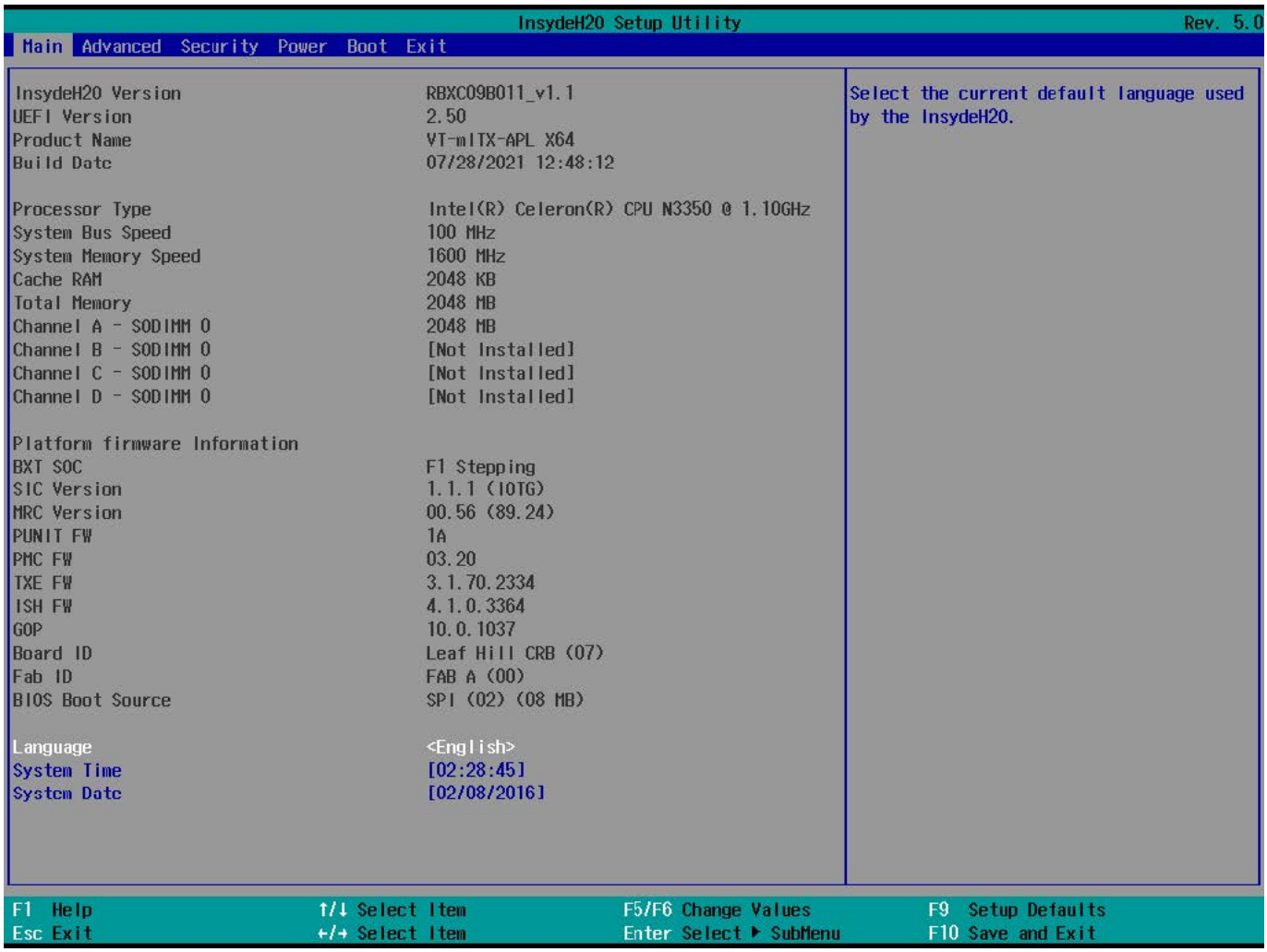
3. Move to BIOS Mode and Secure Boot State on the open page to check the detailed information.



Use the up and down arrow keys on the keyboard to enter BIOS Setup Utility, which features the following menus in the menu bar:

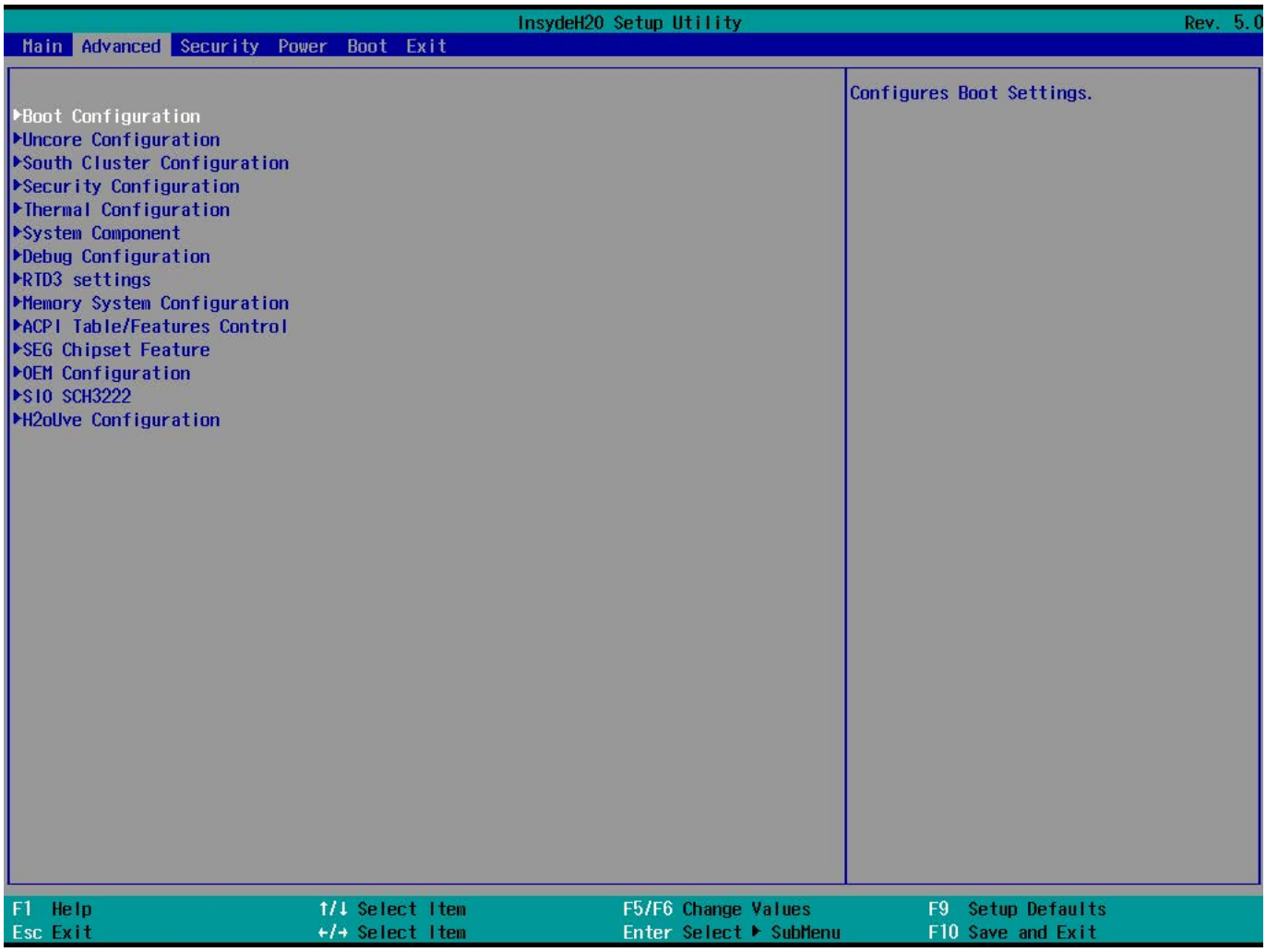
- Main (basic system configurations, like BIOS version, processor information, system language, system time and date)
- Advanced (advanced configurations to allow users to customize the system)
- Security (system security settings where users can set supervisor passwords)
- Power (CPU power settings for power management purpose)
- Boot (system boot options)
- Exit (BIOS load or exit options with or without changes saved)

Main



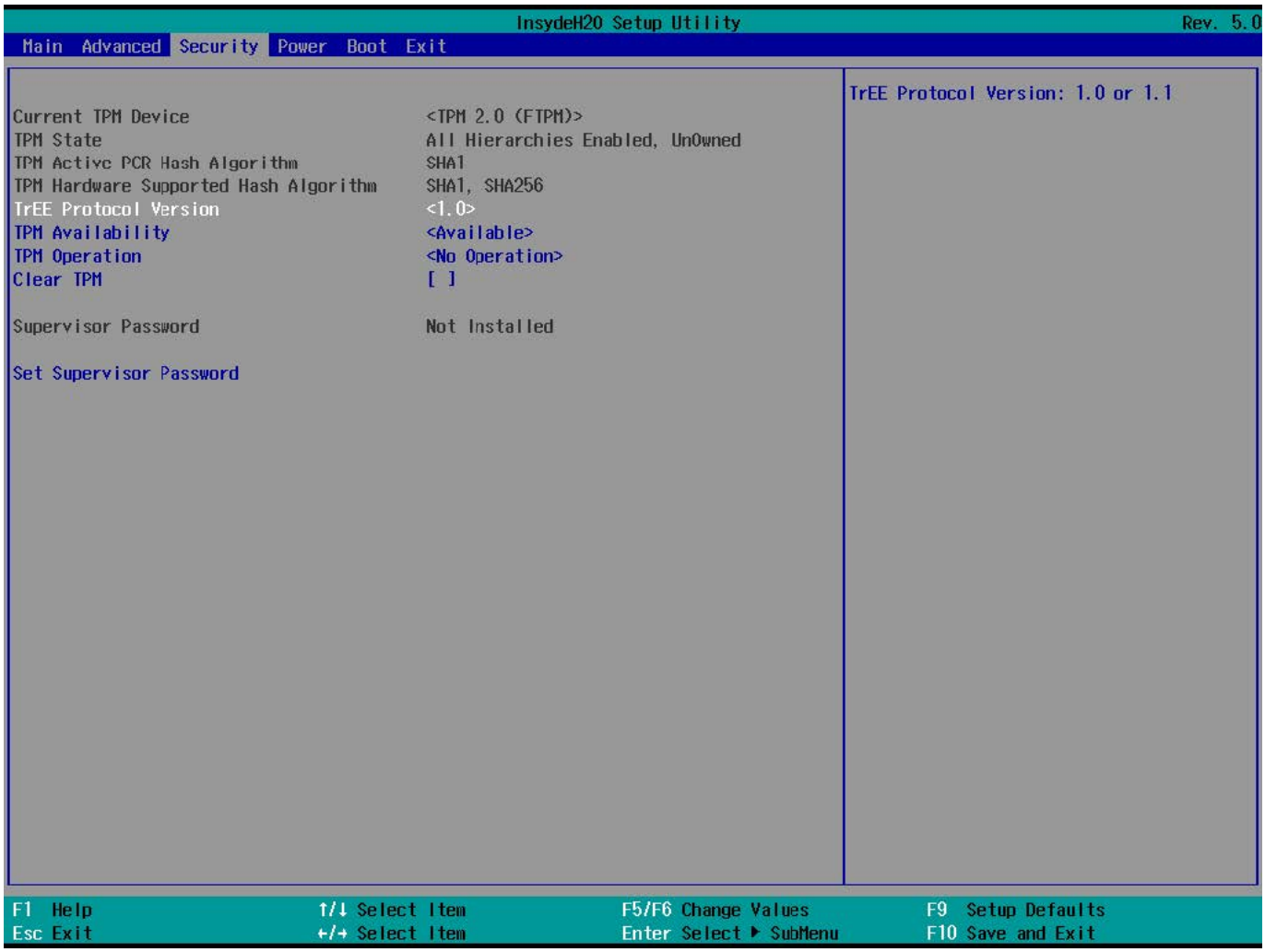
- Language: You can select from English, French, Chinese, and Japanese for system language.
- System Time: The time format is <Hour>: <Minute>: <Second>.
- System Date: The date format is <Month>/ <Day>/<Year>.

Advanced



- Boot Configuration: You can select the operating system that you would like the Board to run on.
- Uncore Configuration: You can customize the video settings, GOP settings, IGD settings, and IPU PCI device settings here.
- South Cluster Configuration: This page provides configuration options for audio, GMM, ISH, LPSS, PCIe, SATA, SCC, USB, Timer, etc.
- Security Configuration: TPM device settings are made here.
- Thermal Configuration: Thermal management settings are customized here.
- System Component: Spread spectrum clocking configurations could be accessed from here.
- Debug Configuration: You can enable/disable the debugger here.
- Memory System Configuration: You can enable/disable the memory scrambler and other memory-related settings here.
- ACPI Table/Features Control: This option allows you to enable/disable S4 wakeup from RTC (only available for ACPI).
- SEG Chipset Feature: This option allows you to enable/disable wakeup on USB from S5 state.
- OEM Configuration: LVDS configurations are available to change.
- SIO SCH 3222: Serial ports are configured here.
- H2OUVE Configuration: You can enable/disable the configuration interface of H2OUVE tool.

Security

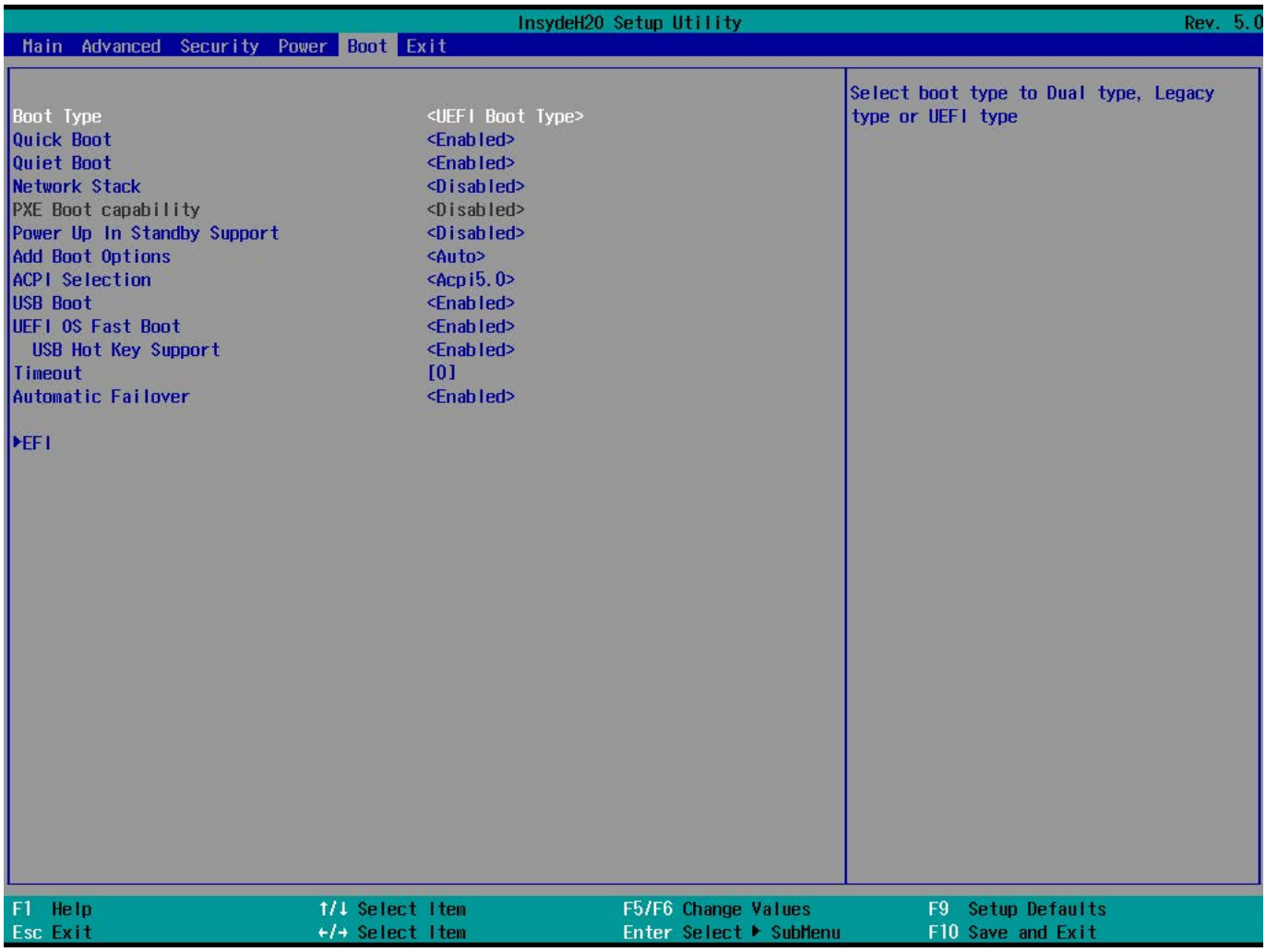


- Information of current TPM device is available here and you can set the supervisor passwords as well.

Power

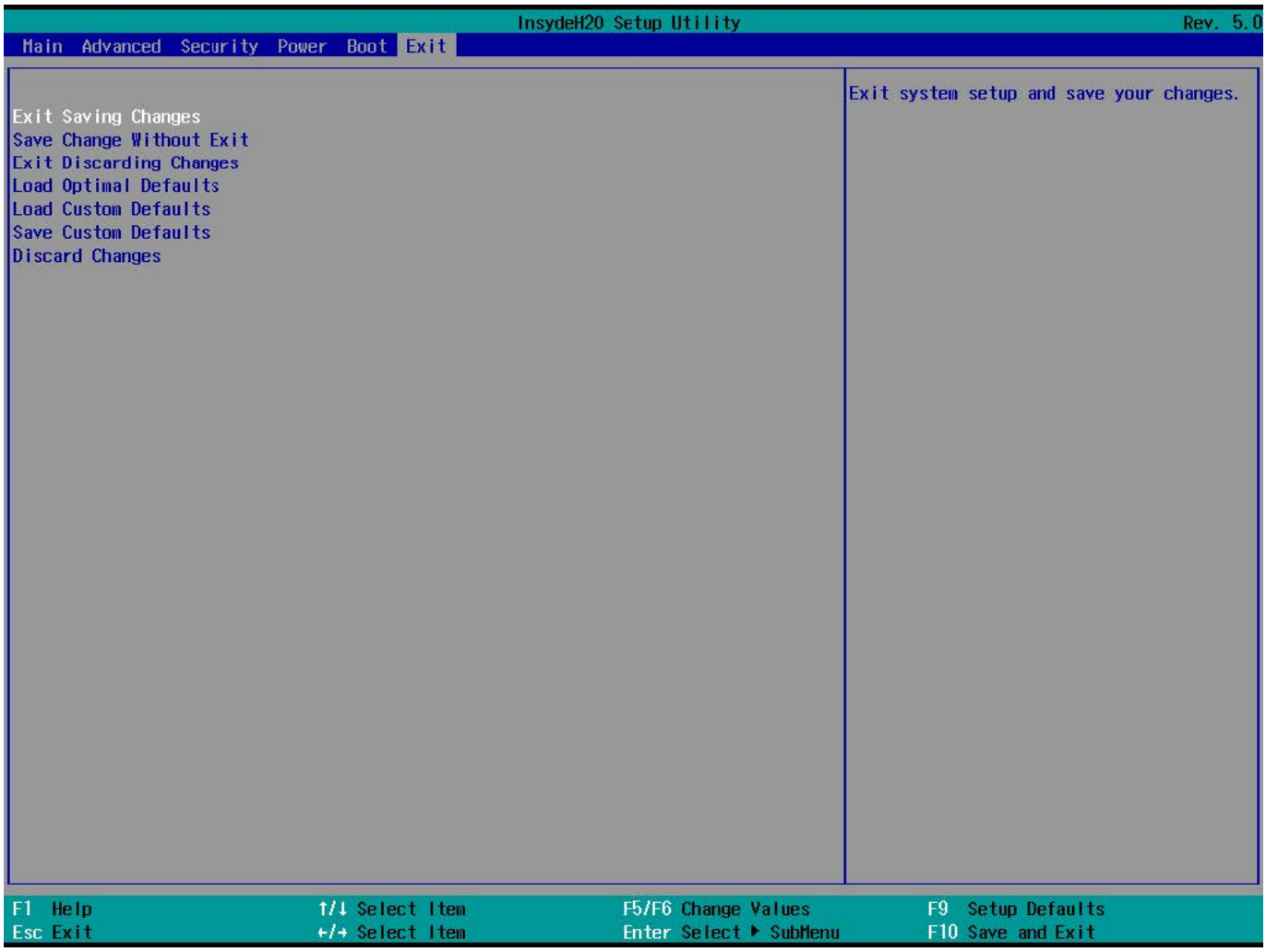
- CPU configurations are customizable.
- Options for wakeup on PME/RTC from S5 are available.

Boot



- Users can set the boot mode, the sequence, timeout, and automatic failover of boot devices when BIOS attempts to load the operating system.

Exit



- Options for users to load or exit BIOS Setup include loading system optimal defaults or loading custom settings, exiting with custom changes save or not saved.

Windows 10 System Flashing

Prerequisites

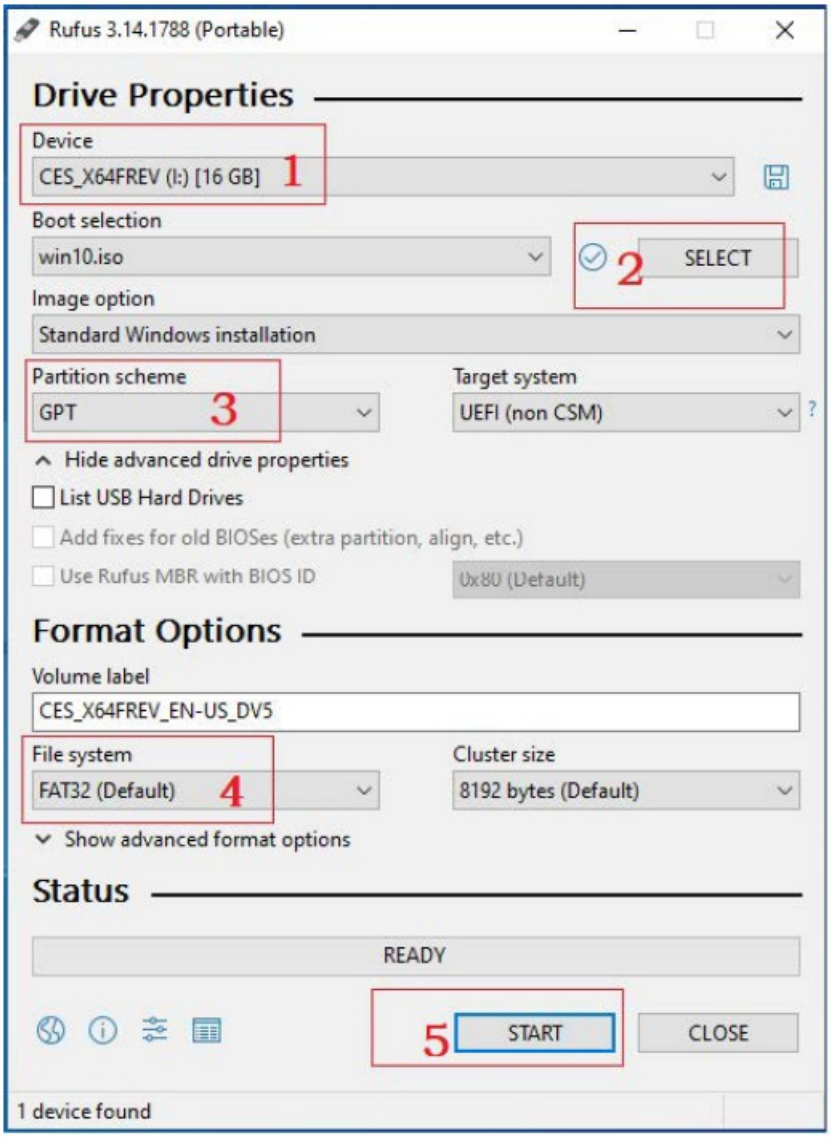
- A USB drive with capacity no less than 8GB, preferably supporting USB 3.0
- Bootable USB tool: rufus-xxx .exe (available in the release package under image directory)
- Windows 10 image
- A host PC running Windows 7 or later
- A display cable to connect the Board and the host PC

Making a Bootable USB Drive for Windows 10

Plug the USB drive into the host PC. Run rufus-xxx .exe and it will automatically detect the USB. Then follow the steps below to make a bootable USB drive.

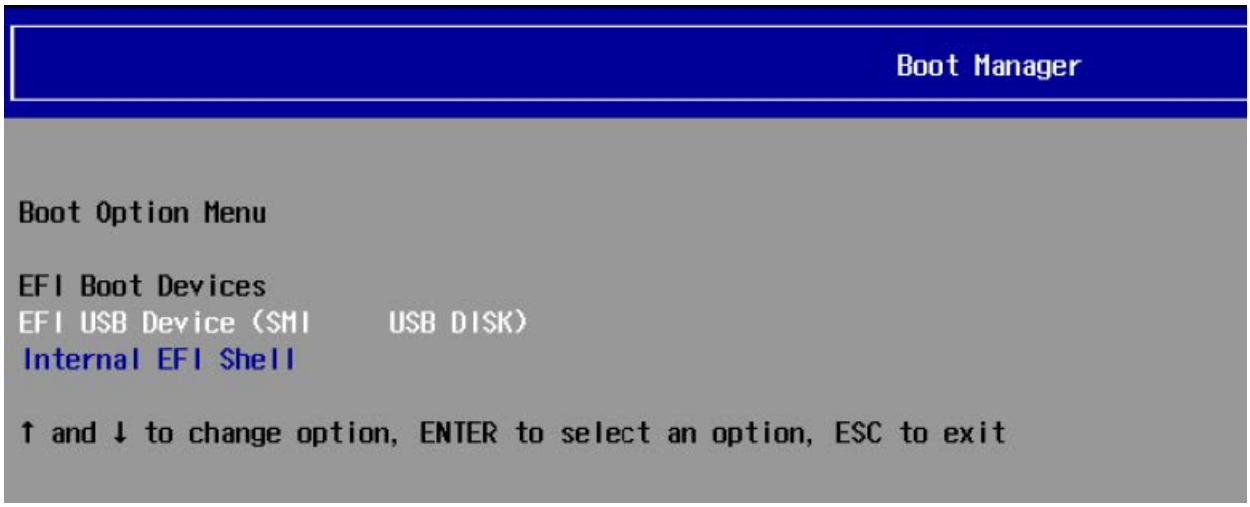
1. Click on Device and choose the USB you want to use from the drop-down;
2. Select the ISO image you want to burn onto the USB from the drop-down and click Select;
3. Generally, users would like to create a Standard Windows installation, and Rufus will automatically detect the correct Partition Scheme based on the USB drive. Yet make sure the partition scheme is GPT;

4. Set the Target system as UEFI and the File system as FAT32 or NTFS;
5. Click START to make the bootable USB drive.



Installing Windows 10

1. Plug the bootable USB drive into the Board;
2. Connect the Board to the host PC and power the Board on;
3. Press F7 to enter the BIOS boot manager menu;
4. Select the bootable USB drive you created for Windows 10 and press ENTER;



5. Wait for the installation of Windows 10 on the Board. When the installation finishes,there will be a Windows 10 icon on the desktop.

DISPOSAL AND WARRANTY

Disposal

When the device comes to end of life, you are suggested to properly dispose of the device for the sake of the environment and safety.
Before you dispose of the device, please back up your data and erase it from the device.
It is recommended that the device is disassembled prior to disposal in conformity with local regulations. Please ensure that the abandoned batteries are disposed of according to local regulations on waste disposal. Do not throw batteries into fire or put in common waste canister as they are explosive. Products or product packages labeled with the sign of “explosive” should not be disposed of like household waste but delivered to specialized electrical & electronic waste recycling/disposal center.
Proper disposal of this sort of waste helps avoid harm and adverse effect upon surroundings and people’s health. Please contact local organizations or recycling/disposal center for more recycling/disposal methods of related products.

Warranty

Product warranty
VANTRON warrants to its CUSTOMER that the Product manufactured by VANTRON, or its subcontractors will conform strictly to the mutually agreed specifications and be free from defects in workmanship and materials (except that which is furnished by the CUSTOMER) upon shipment from VANTRON. VANTRON’s obligation under this warranty is limited to replacing or repairing at its option of the Product which shall, within 24 months depending on the Product after shipment, effective from invoice date, be returned to VANTRON’s factory with transportation fee paid by the CUSTOMER and which shall, after examination, be disclosed to VANTRON’s reasonable satisfaction to be thus defective. VANTRON shall bear the transportation fee for the shipment of the Product to the CUSTOMER.

Out-of-Warranty Repair
VANTRON will furnish the repair services for the Product which are out-of-warranty at VANTRON’s then-prevailing rates for such services. At customer’s request, VANTRON will provide components to the CUSTOMER for non-warranty repair. VANTRON will provide this service as long as the components are available in the market; and the CUSTOMER is requested to place a purchase order up front. Parts repaired will have an extended warranty of 3 months.

Returned Products
Any Product found to be defective and covered under warranty pursuant to Clause above, shall be returned to VANTRON only upon the CUSTOMER’s receipt of and with reference to a VANTRON supplied Returned

Materials Authorization (RMA) number. VANTRON shall supply an RMA, when required within three (3) working days of request by the CUSTOMER. VANTRON shall submit a new invoice to the CUSTOMER upon shipping of the returned products to the CUSTOMER. Prior to the return of any products by the CUSTOMER due to rejection or warranty defect, the CUSTOMER shall afford VANTRON the opportunity to inspect such products at the CUSTOMER's location and no Product so inspected shall be returned to VANTRON unless the cause for the rejection or defect is determined to be the responsibility of VANTRON. VANTRON shall in turn provide the CUSTOMER turnaround shipment on defective Product within fourteen (14) working days upon its receipt at VANTRON. If such turnaround cannot be provided by VANTRON due to causes beyond the control of VANTRON, VANTRON shall document such instances and notify the CUSTOMER immediately.

www.vantrontech.com

Documents / Resources

	**Vantron VT-MITX-APL Single Board Computer** [pdf] User Manual VT-MITX-APL Single Board Computer, VT-MITX-APL, Single Board Computer, Board Computer, Computer

References

- Vantron **Vantron Technology**
- Vantron **Vantron Technology**