Vantron VT SBC 35 APL Single Board Computer User Manual

Embedded in your success, Embedded in your better life
World-leading provider of embedded/IoT products and solutions
VT-SBC35-APL Single Board Computer

Contents

VT SBC 35 APL Single Board Computer

Revision History

No.	Version	Description	Date
1	V1.0	First release	Apr. 26, 2021
2	V1.1	Updated GPIO debugging description	May 9, 2022
3	V1.2	Updated hardware description as per the design change	Sep. 29, 2022
4	V1.3	Replaced the block diagram	Apr. 23, 2023

Foreword

Thank you for purchasing VT-SBC35-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

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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.
- Donot 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
- Donot use spray detergent
- Clean with a damp cloth
- Donot 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
- Donot 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.

CHAPTER 1 INTRODUCTION
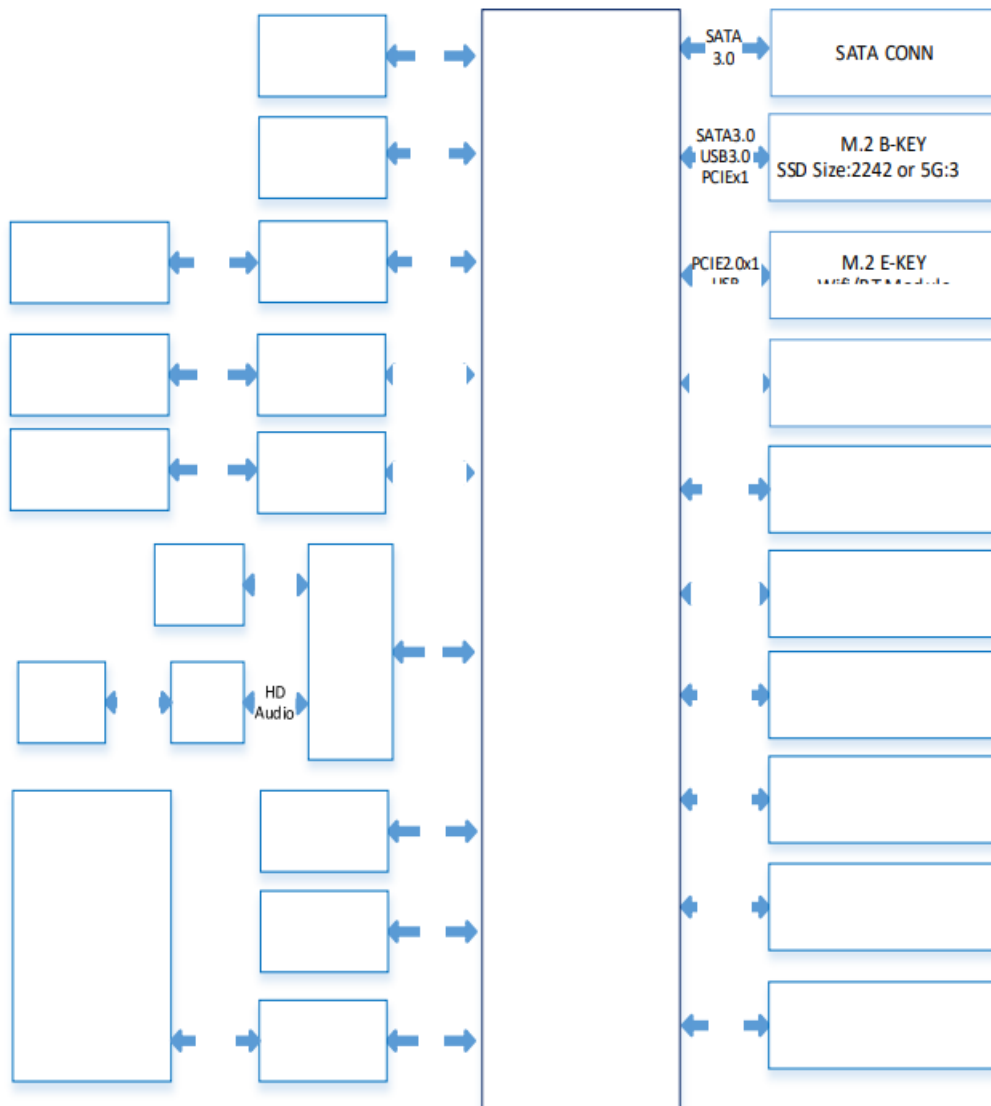
1.1 Product Overview

VT-SBC35-APL single board computer features a thinner and smaller form factor that is easy to integrate. It is powered by the high-performance Intel® Atom TM processor with large storage capacity. It supports multi-channel display outputs and high-definition video encoding and decoding technology to provide outstanding visual experience. Meanwhile customers have the choice between wired and wireless network accesses. The single board computer 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 single board computer could work under extreme environments with extended temperatures ranging from -20°C to +60°C, making it a reliable solution for industrial IoT applications.

1.2 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

1.3 Block Diagram

SATA 3.0
SATA CONN

SATA3.0
USB3.0
PCIEx1

M.2 B-KEY
SSD Size:2242 or 5G:3

PCIE2.0x1
USB

M.2 E-KEY
WiFi/BT Module

HD Audio

1.4 Specifications

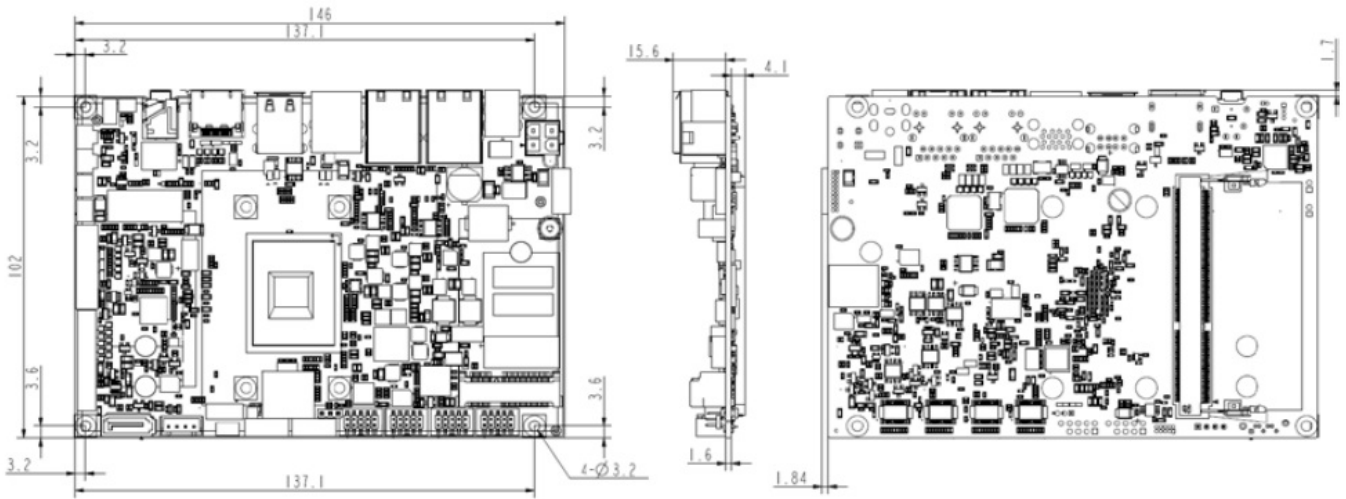| VT-SBC35-APL		
System	CPU	Intel® ATOM^{TM}, APL-I E3940 Quad-core processor, 1.8GHz (Max)
	Memory	DDR3L SO-DIMM socket, up to 8GB
	Storage	64GB eMMC (Optional) 1 x SATA 3.0, 6Gb/s, up to 2TB Expandable by the M.2 B-key slot (2242), up to 256GB
Communi cation	Ethernet	2 x RJ45, 10/100/1000-Base T, Intel I210
Media	Display	1 x HDMI (Standard), 3840 x 2160 @30Hz 1 x Dual LVDS (up to 1.4b), 3840 x 2160 @30Hz 1 x eDP, 4096 x 2160 @60Hz
	Audio	1 x 3.5mm Combo audio jack 1 x Audio connector	1 x Mic connector 2 x Speaker connector
	Serial	2 x RS232/RS422/RS485	2 x RS232

I/Os	USB	2 x USB 2.0 host Type-A 2 x USB 3.0 host Type-A	4 x Built-in USB 2.0
	GPIO	8 x GPIO	
	SM Bus	1 x SM Bus	
	RTC	Supported	
	Watchdog	Supported	
Expansion	M.2/Mini PCIe	1 x Full Mini-PCIe for 4G/LTE expansion 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 module	
Power	Input	12V-36V DC	
	Consumption	10W+	
Software	Operating system	Windows 10, Linux	
	OTA tool	Blue Sphere OTA	
	SDK	Available	
Mechanical	Dimensions	146mm x 102mm	
	Cooling mode	Fan less, heat sink	
Environment Condition	Temperature	Operating: -20℃~+60℃	Storage:-40℃~+85℃
	Humidity	RH 5%-95% (Non-condensing)	
	Certifications	FCC, IC, RoHS	

1.5 Operating System
VT-SBC35-APL supports Windows 10 and Linux operating systems.
1.6 Mechanical Dimensions
• 146mm x 102mm

1.7. Power Supply and Consumption

VT-SBC35-APL works with +12V~36V DC power input supplied alternatively by a DC connector and a DC power jack.

The Board consumes 10W+ (without speakers) of power or 40W+ (with speakers) of power.
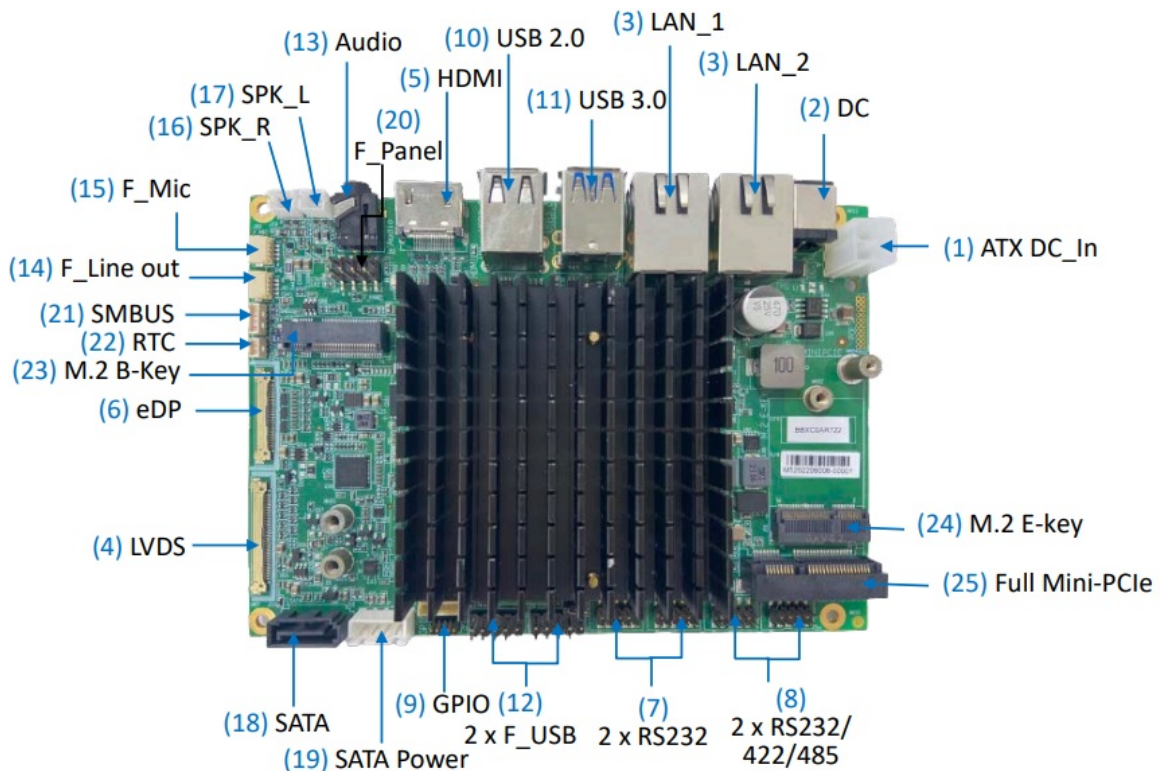
It should be pointed out that power consumption is largely determined by the RAM, storage capacity, and other configurations of the Board.

1.8 Environmental Specifications

VT-SBC35-APL works at a temperature ranging from -20°C to +60°C and at relative humidity of 5%-95% for non-condensing purpose.

CHAPTER 2 HARDWARE DESCRIPTION

Product Layout

(26) DDR3L SO-DIMM socket

(27) Nano SIM

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

Memory

VT-SBC35-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.

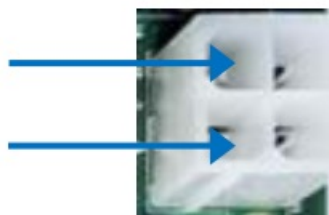

Connectors and Jumpers

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

2.1.1 J2 Power connector (1)

Specification: 2 x 2, 4.2mm, 12.8mm (KH), Male, Vertical, White, WOT, 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 +

2.1.2 J54 Power jack (2)

Specification: 6mm (D), 10mm (H), Male, WDT, RoHS

pinout description:

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

2.1.3 J12/J15 Ethernet jacks (3)
Specification: RJ45, supporting 10M/100M/1000M Base-T, LED: L-¥; R-G
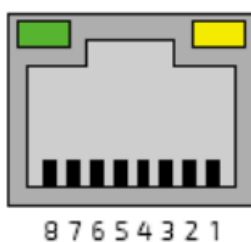
Pinout description:

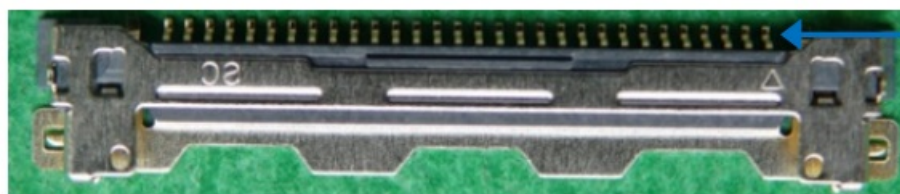| Pin	Name	Type	Description
1	L_MDI_0P	IO	Ethernet MDI0+ Signal
2	L_MDI_0N	IO	Ethernet MDI0- Signal
3	L_MDI_1P	IO	Ethernet MDI1+ Signal
4	L_MDI_1N	IO	Ethernet MDI1- Signal
5	L_MDI_2P	IO	Ethernet MDI2+ Signal
6	L_MDI_2N	IO	Ethernet MDI2- Signal
7	L_MDI_3P	IO	Ethernet MDI3+ Signal
8	L_MDI_3N	IO	Ethernet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

2.1.4 J10 LVDS connector (4)

VT-SBC35-APL implements an LVDS connector, supporting resolution of 3840 x 2160 @30Hz.
Specification: 1 x 40, 0.5mm, 0.5A, 1.05mm (H), Vertical, WOT, SMT, RoHS

Pinout description:

Pin	Name	Type	Description
1	LVDS_B_D0-	O	LVSAE_DATA
2	LVDS_B_D0+	O	LVSAE_DATA
3	LVDS_B_D1-	O	LVSAE_DATA
4	LVDS_B_D1+	O	LVSAE_DATA
5	LVDS_B_D2-	O	LVSAE_DATA
6	LVDS_B_D2+	O	LVSAE_DATA
7	GND	P	Ground
8	LVDS_B_CLK-	O	LVSAE_CLOCK
9	LVDS_B_CLK+	O	LVSAE_CLOCK
10	LVDS_B_D3-	O	LVSAE_DATA
11	LVDS_B_D3+	O	LVSAE_DATA
12	LVDS_A_D0-	O	LVSDO_DATA
13	LVDS_A_D0+	O	LVSDO_DATA
14	GND	P	Ground
15	LVDS_A_D1-	O	LVSDO_DATA
16	LVDS_A_D1+	O	LVSDO_DATA
17	LCD_DETECT-	I	LVDS DETECT
18	LVDS_A_D2-	O	LVSDO_DATA
19	LVDS_A_D2+	O	LVSDO_DATA
20	LVDS_A_CLK-	O	LVSDO_CLOCK
21	LVDS_A_CLK+	O	LVSDO_CLOCK
22	LVDS_A_D3-	O	LVSDO_DATA
23	LVDS_A_D3+	O	LVSDO_DATA
24	GND	P	Ground

25	GND	P	Ground
26	NC		
27	NC		
28	VDD_LCD	P	LCD POWER +5V
29	VDD_LCD	P	LCD POWER +5V
30	VDD_LCD	P	LCD POWER +5V
31	SEL 6/8	O	SELECT 6 OR 8 DEPTH
32	LCD_BKLTEN	O	LCD BKL ENABLE
33	LCD_BKLT_PWM	O	LCD BKL PWM
34	GND	P	Ground
35	GND	P	Ground
36	GND	P	Ground
37	VCC_BLK	P	BKL Power+
38	VCC_BLK	P	BKL Power+
39	VCC_BLK	P	BKL Power+
40	VCC_BLK	P	BKL Power+

2.1.5 J9 HDMI (5)

VT-SBC35-APL implements an HDMI interface, supporting resolution of 3840 x 2160 @30Hz.
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

2.1.6 J11 eDP connector (6)

VT-SBC35-APL implements an eDP connector, supporting resolution of 96 x 2160 @60Hz.
Specification: 1 x 30, 0.5mm, 0.5A, 1.05mm (H)}, Right angle, WDT, SMT, RoHS


Pin 1

Pinout description:

Pin	Name	Type	Description
1	+V3.3DX_EDP1	P	LCD POWER +3.3V
2	+V3.3DX_EDP1	P	LCD POWER +3.3V
3	+V3.3DX_EDP1	P	LCD POWER +3.3V
4	eDP_HPD_CONN	I	LVSAE_DATA
5	GND	P	Ground
6	DDIA_EDP1_LANE0_L_DN	O	LVSAE_DATA
7	DDIA_EDP1_LANE0_L_DP	O	LVSAE_DATA
8	GND	P	Ground
9	DDIA_EDP1_LANE1_L_DN	O	LVSAE_DATA
10	DDIA_EDP1_LANE1_L_DP	O	LVSAE_DATA
11	GND	P	Ground
12	DDIA_EDP1_LANE2_L_DN	O	LVSDO_DATA
13	DDIA_EDP1_LANE2_L_DP	O	LVSDO_DATA
14	GND	P	Ground
15	DDIA_EDP1_LANE3_L_DN	O	LVSDO_DATA
16	DDIA_EDP1_LANE3_L_DP	O	LVSDO_DATA
17	GND	P	Ground
18	DDIA_EDP1_AUX_DN	O	LVSAE_CLOCK
19	DDIA_EDP1_AUX_DP	O	LVSAE_CLOCK
20	GND	O	Ground
21	GND	O	Ground

22	EDP1_BKLT_EN_R	O	BKLT_EN
23	EDP1_BRIGHTNESS_R	O	BRIGHTNESS
24	GND	P	Ground
25	GND	P	Ground
26	GND	P	Ground
27	+VCC_EDP1_BKLT_R	P	LCD POWER +12V
28	+VCC_EDP1_BKLT_R	P	LCD POWER +12V
29	+VCC_EDP1_BKLT_R	P	LCD POWER +12V
30	+VCC_EDP1_BKLT_R	P	LCD POWER +12V

2.1.7 J59/J23 RS232 (7)

VT-SBC35-APL implements four serial connectors, including two RS232 connectors and two RS232/RS422/RS485 multiplexers.
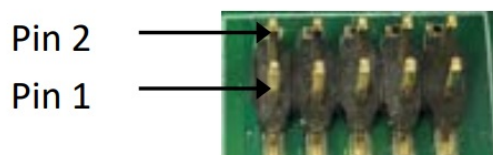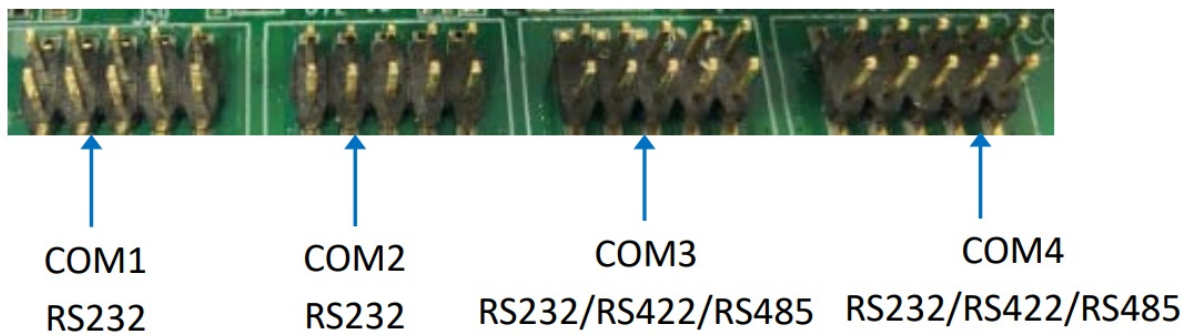
RS232 specification: 2 x 5, 2.0mm, 5.5mm (H), Male, Vertical, Black, WDT, THR, ROHS
RS232Pinout description:

Pin	Name	Type	Description
1	DCD3	I	RS232_R1IN
2	RXD3	I	RS232_RXD1
3	TXD3	O	RS232_TXD1
4	DTR3	I	RS232_DTR3
5	GND	P	Ground
6	DSR3	I	RS232_DSR3
7	RTS3	O	RS232_D1OUT
8	CTS3	I	RS232_R4IN
9	RI3	I	RS232_R5IN
10	+V5_S	P	+5V Power

2.1.8 J20/J21 RS232/RS422/RS485 (8)

The picture in 2.4.7 presents the layout of the four serial connectors on the VT-SBC35-APL.
Specification: 2 x 5, 2.0mm, 5.5mm (H)}, Male, Vertical, Black, WOT, THR, ROHS
RS232/RS422/RS485 pinout description:

Pin	Name	Type	Description
1	DCD1	I0	RS422_TX+
2	RXD1	IO	RS422_TX-
3	TXD1	IO	RS422_RX+
4	DTR1	IO	RS422_RX-
5	GND	P	Ground
6	DSR1	I	RS422_R2IN
7	RTS1	O	RS422_D1OUT
8	CTS1	I	RS422_R4IN
9	RI1	I	RS422_R5IN
10	+V5_S	P	+5V Power

2.1.9 J39 GPIO (9)
VT-SBC35-APL implements 8 GPIOs for external communication or control/collection of external hardware.
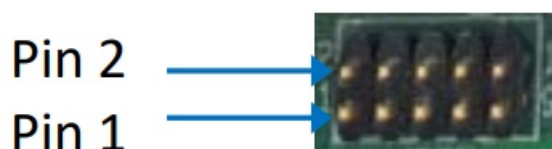
Pinout description:

Pin	Name	Type	Description
1	GPIO_0	IO	3.3V TTL GPIO
2	GPIO_1	IO	3.3V TTL GPIO
3	GPIO_2	IO	3.3V TTL GPIO
4	GPIO_3	IO	3.3V TTL GPIO
5	GPIO_4	IO	3.3V TTL GPIO
6	GPIO_5	IO	3.3V TTL GPIO
7	GPIO_6	IO	3.3V TTL GPIO
8	GPIO_7	IO	3.3V TTL GPIO
9	GND	P	Ground
10	VCC_GPIO	P	3.3 POWER +

2.1.10 J11 USB 2.0 Type-A (10)
The two stacked USB 2.0 interfaces on the Board are designed to connect peripherals to expand the functions.
Specification: 2.0, dual-port, Type-A, Female, Right angle, retention, WOT, THR, RoHS

The pinout description of the interfaces is in line with the pin assignment of standard USB 2.0 Type-A.

2.1.11 U21 USB 3.0 Type-A (11)

VT-SBC35-APL also implements two stacked USB 3.0 interfaces.
Specification: 3.0, dual-port, Type-A, Female, 17.5mm (H), retention, WDT, THR, ROHS

The pinout description of the interfaces is in line with the pin assignment of standard USB 3.0 Type-A.

2.1.12 J55/J56 USB2.0 connectors (12)

VT-SBC45-APL implements two 9-pin USB2.0 connectors, for connection of peripherals to expand the functions.
Specification: 2 x 5, 2.54mm, 2A, 6mm (H), Male, Vertical, WOT, THR, RoHS
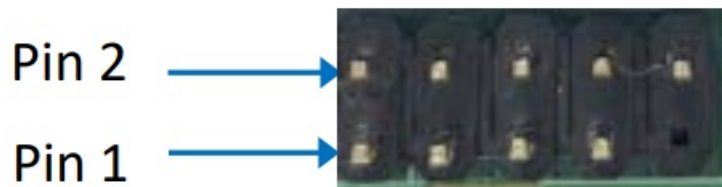
Pinout description:

Pin	Name	Type	Description
1	VCC_USB2.0_2	P	USB POWER +5V
2	VCC_USB2.0_2	P	USB POWER +5V
3	USBHUB_3N	IO	Reserved USB2.0 Negative
4	USBHUB_2N	IO	Reserved USB2.0 Positive
5	USBHUB_3P	IO	Reserved USB2.0 Negative
6	USBHUB_2P	IO	Reserved USB2.0 Positive
7	GND	P	Ground
8	GND	P	Ground
9	NC		
10	VCC_USB2.0_2	P	USB POWER +5V

2.1.13 J8 Audio jack (13)
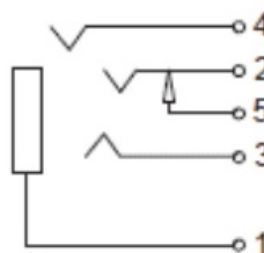
Specification: 3.5mm, 5-pole, Female, Right angle, THR, ROHS
Pinout description:

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

2.1.14 J61 F_Line out (14)
There is a front-panel line out connector on the Board, through which you can connect a line out jack to the front panel.
Specification: 1 x 4, 1mm, 1A, 2.9mm (H), Male, Vertical, THR, ROHS
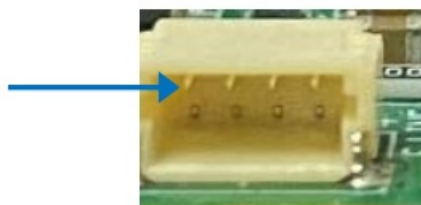
Pinout description:

Pin	Name	Type	Description
1	LINP_AMP2	O	AMP OUTPUT
2	RINP_AMP2	O	AMP OUTPUT
3	HP_JD	I	AMP JD INPUT
4	GND	P	GROUND

2.1.15 J60 F_Mic (15)

VT-SBC45-APL implements a front-panel microphone connector, through which you can connect a microphone jack to the front panel.

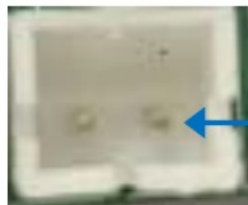Specification: 1 x 4, 1mm, 1A, 2.9mm (H), Male, Vertical, THR, ROHS
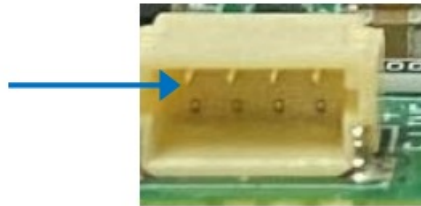
Pinout description:

Pin	Name	Type	Description
1	MIC2_LLL	I	MIC LEFT INPUT
2	MIC2_RRR	I	MIC RIGHT INPUT
3	MIC2_JD	I	MIC INPUT
4	GND	P	GROUND

2.1.16 J22 Speaker_R connector (16)

There are two speaker connectors on the Board, providing left and right stereo sound experience to users when connected to the speakers.

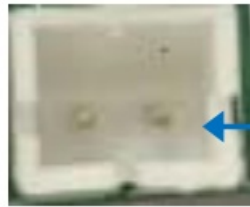Specification: 1 x 2, 2.00mm, 4A, 6mm (H}), Male, Vertical, White, THR, RoHS

Pinout description:

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

2.1.17 J19 Speaker_L connector (17)

Specification: 1 x 2, 2.00mm, 4A, 6mm (H), Male, Vertical, White, THR, RoHS

Pinout description:

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

2.1.18 J16 SATA connector (18)
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 description of the connector is in line with the pin assignment of standard SATA connector.
2.1.19 J17 SATA power connector (19)
VT-SBC35-APL implements a 4-pin power connector to supply power to the storage device.
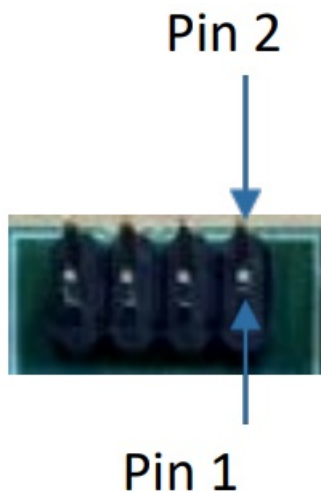Specification: 1 x 4, 2.54mm, 2A, 6mm (H), Male, Vertical, WOT, THR, RoHS

Pin 1

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

2.1.20 J40 F_panel connector (20)
The front panel connector provides signals for system power/reset and LED power.
Specification: 2 x 4, 2.54mm, 2A, 6mm (H), Male, Vertical, WOT, THR, ROHS

Pinout description:

Pin	Name	Type	Description
1	SATA_ACT+	P	SATA_ACT+
2	LED_POWER	P	LED POWER
3	SATA_ACT#	P	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

2.1.21 J57 SMBUS (21)
Specification: 1 x 4, 1.25mm, 1A, 4.2mm (H), Male, Vertical, WOT, THR, RoHS

Pinout description:

Pin	Name	Type	Description
1	+V3.3_A	P	+3.3V POWER
2	SMB_SCL_3.3V-	I	SMB_SCL
3	SMB_SDA_3.3V	I	SMB_SDA
4	GND	P	Ground

2.1.22 J28 RTC connector (22)

VT-SBC35-APL implements an RTC connector.

Specification: 1 x 2, 1.25mm, 4.2mm (H), Male, Vertical, White, WDT, THR, ROHS

Pinout description:

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

2.1.23 J13 M.2 B-Key (23)

VT-SBC35-APL offers an M.2 B-Key socket 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 high-speed wireless communication.

The pinout of the M.2 B-Key socket is in line with the pin assignment of standard M.2 for Key B.

2.1.24 J51 M.2 E-Key (24)

VT-SBC35-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.

The pinout of the M.2 E-Key socket is in line with the pin assignment of standard M.2 for Key B.

2.1.25 J53 Full Mini PCIe (25)

VT-SBC35-APL implements a full Mini PCIe slot for connection of a 4G module.

Specification: 52-pin, 0.8mm, 6.8mm (H), WDT, SMT, RoHS The pinout of the Mini-PCIe socket is in line with the pin assignment of standard Mini-PCIe socket.
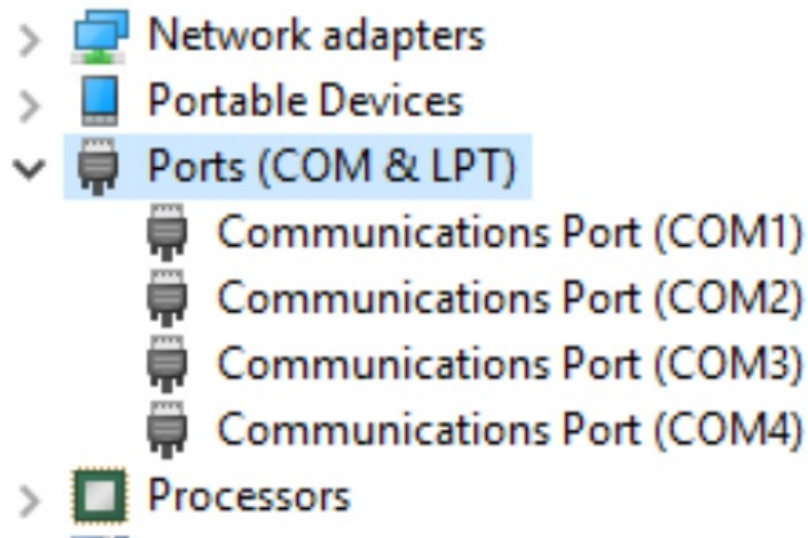
2.1.26 U3 DDR3L SO-DIMM (26)

VT-SBC35-APL implements a DDR3L SO-DIMM socket, supporting up to 8GB RAM in total with transfer rate at 1867MHz.

CHAPTER 3 FIRST – USE DEBUGGING

3.1 Serial Configuration

VT-SBC35-APL implements 4 serial connectors identified as COM1 ~ COM4 by the device manager shown as follows.

ℹ 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 protocol, and COM3 and COM4 support RS232, RS485, RS422 protocols. COM1 ~COM4 correspond to serial port A, B, C, Din BIOS system.

If you wish to change the mode of COM3 and COM4,

1. Enter BIOS;

2. Click Device Manager > SIO SCH3222 in sequence;

3. Move the cursor to Serial Port C / Serial Port D > Mode, and use the up & down arrows to change the mode;
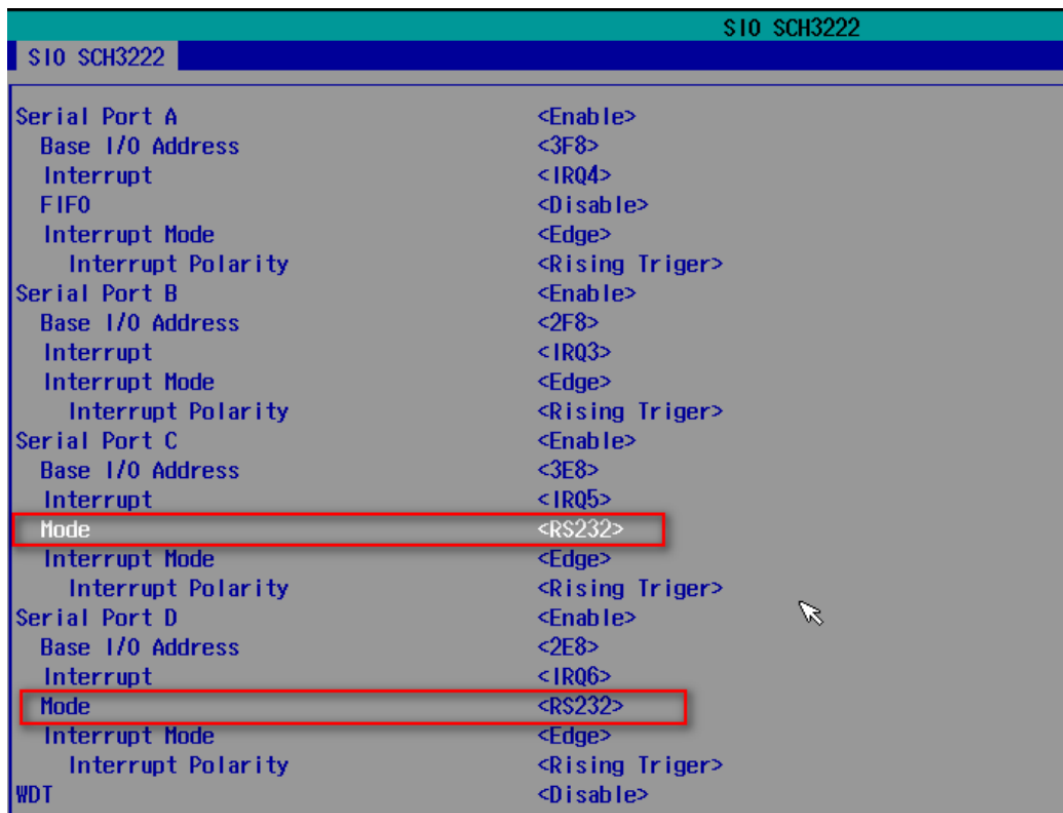

4. Press F10 to save and exit.

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

3.2 GPIO Setup
VT-SBC35-APL implements 8 GPIOs with details shown below:

Pin	Name	Default mode	Default level
J39.1	GPIO_0	Output	High
J39.2	GPIO_1	Input	/
J39.3	GPIO_2	Output	High
J39.4	GPIO_3	Input	/
J39.5	GPIO_4	Output	High
J39. 6	GPIO_5	Input	/
J39.7	GPIO_6	Output	High
J39.8	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).
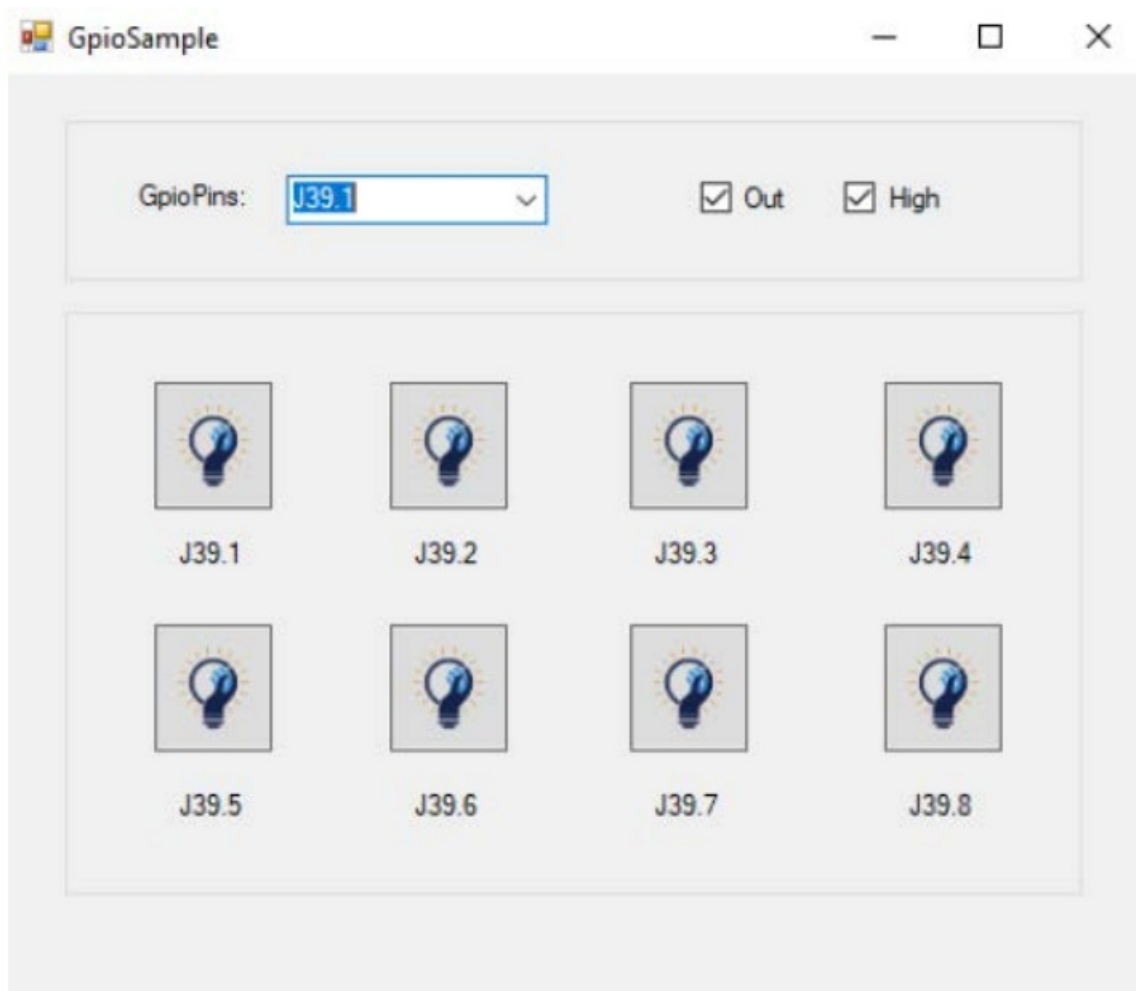
In the above figure:

1. Gpio Pins: 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).

3.3 Enabling Watchdog Timer

If you need enable the Watchdog Timer,

1. Enter BIOS;
2. Click Device Manager > S10 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 + Del to restart the system to get the settings take effect.

CHAPTER 4 BIOS AND WINDOWS

4.1 BIOS Brief
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:

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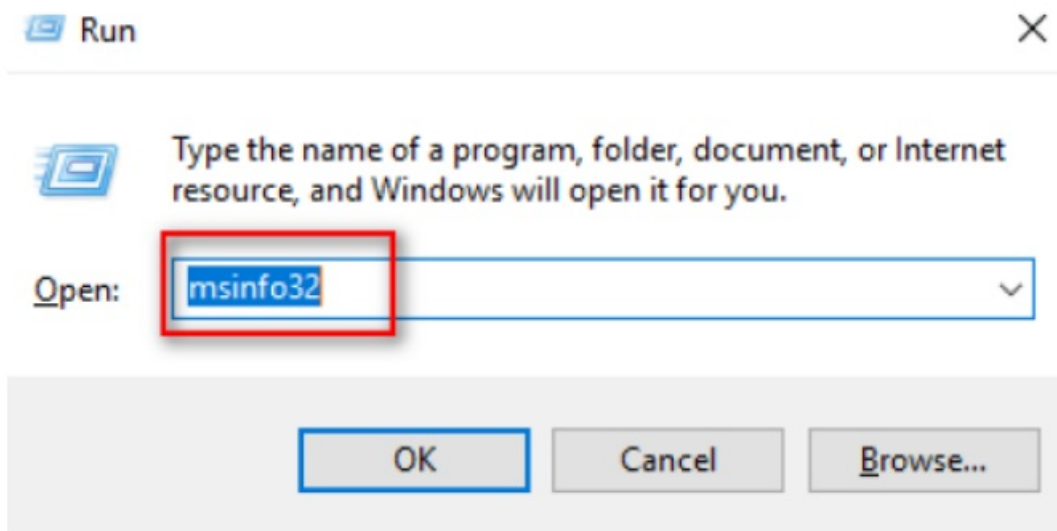- Default settings need to be customized.

 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.

4.2 Check BIOS Version
The Board supports Windows operating system. You can check the BIOS version of the Board in Windows 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.

4.3 BIOS Setup
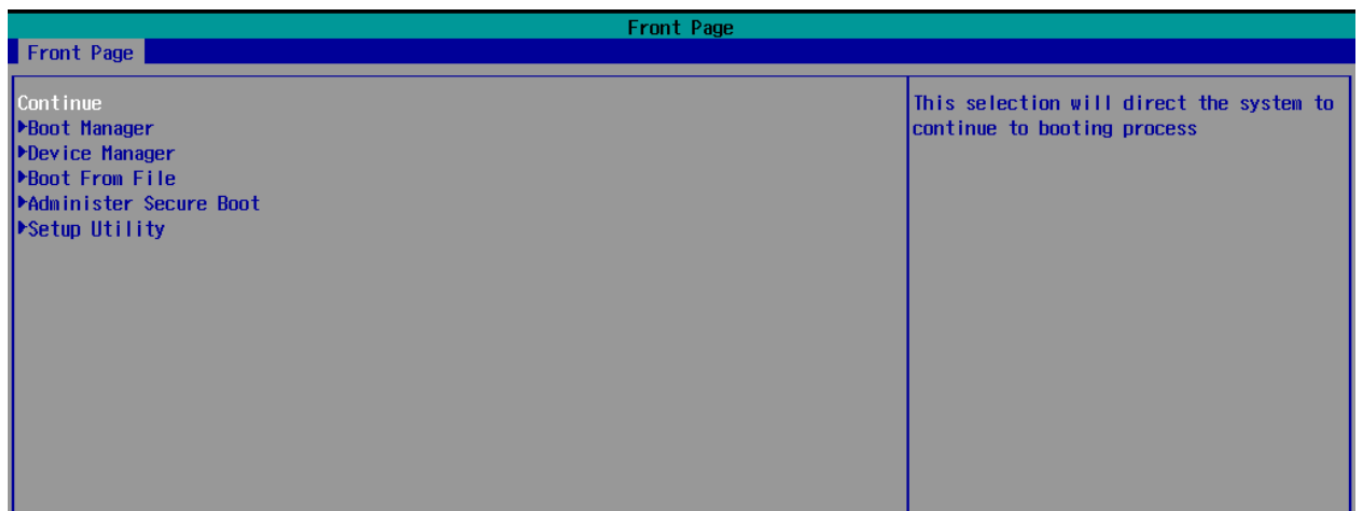
4.3.1 Entering setup

Power on the Board and the system will start the power-on self-test process. Then press ESC to enter the BIOS front page where you can unfold the menus for more system configuration options.

```
                              Front Page
 Front Page

Continue                                        This selection will direct the system to
▶Boot Manager                                   continue to booting process
▶Device Manager
▶Boot From File
▶Administer Secure Boot
▶Setup Utility
```

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.

4.3.2 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;
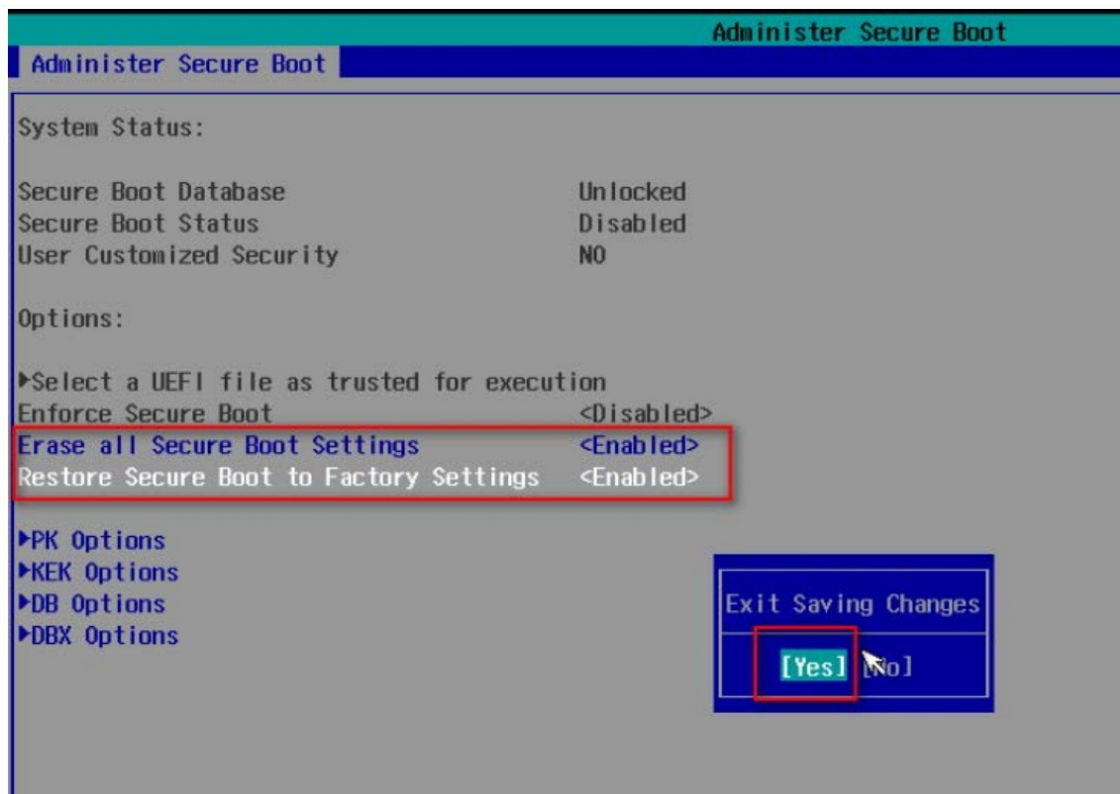
4. Press F10 to save and exit;

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.
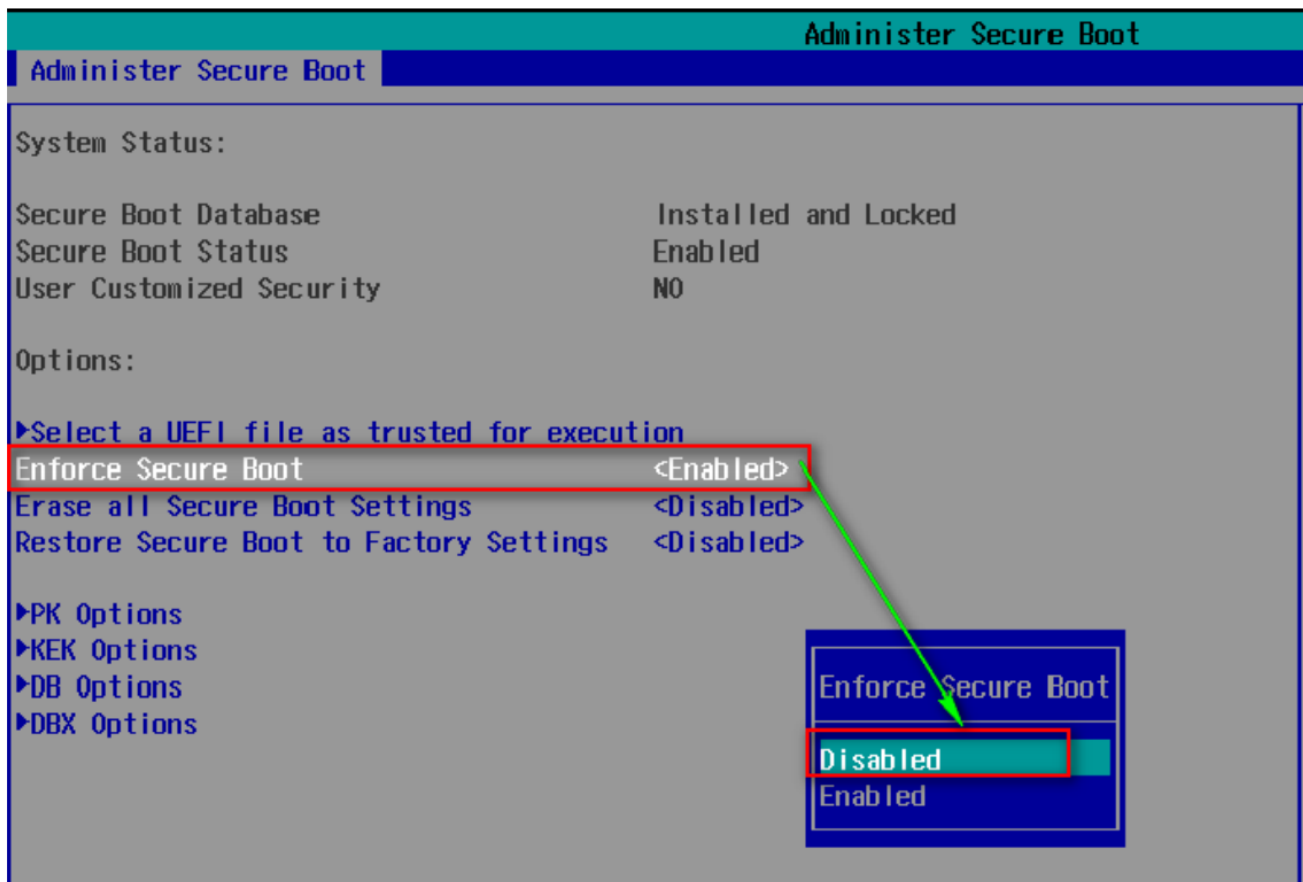
Check the Secure Boot State in the Windows system:

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;
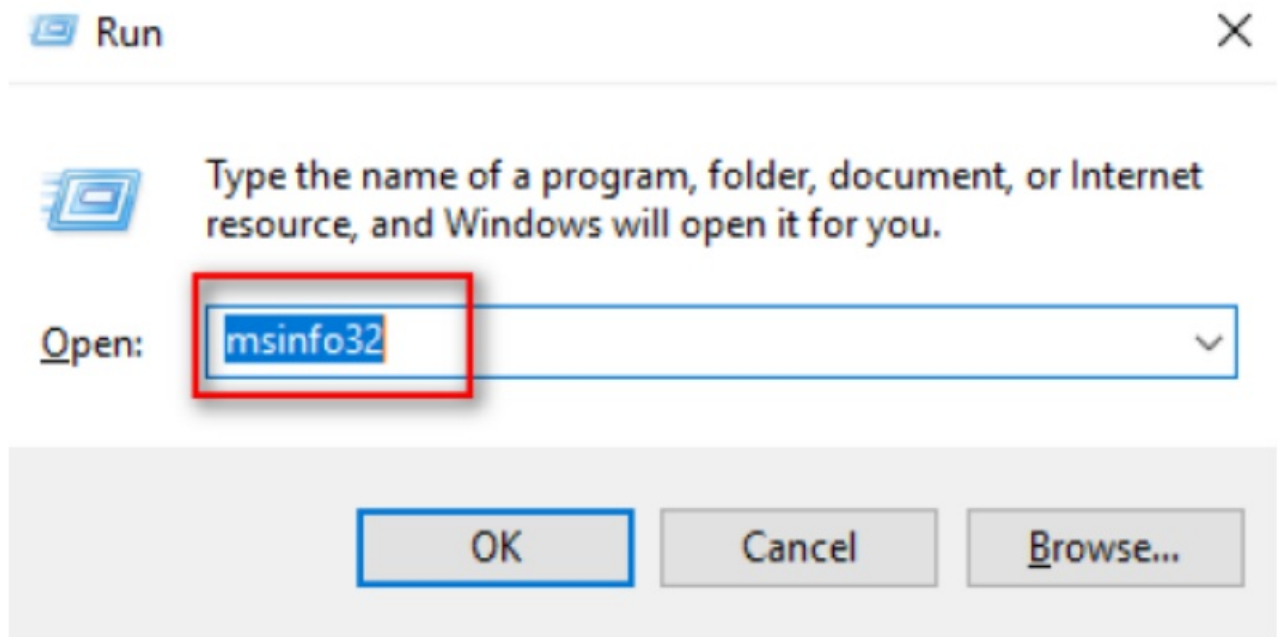
3. Move to BIOS Mode and Secure Boot State on the open page to check the detailed information.
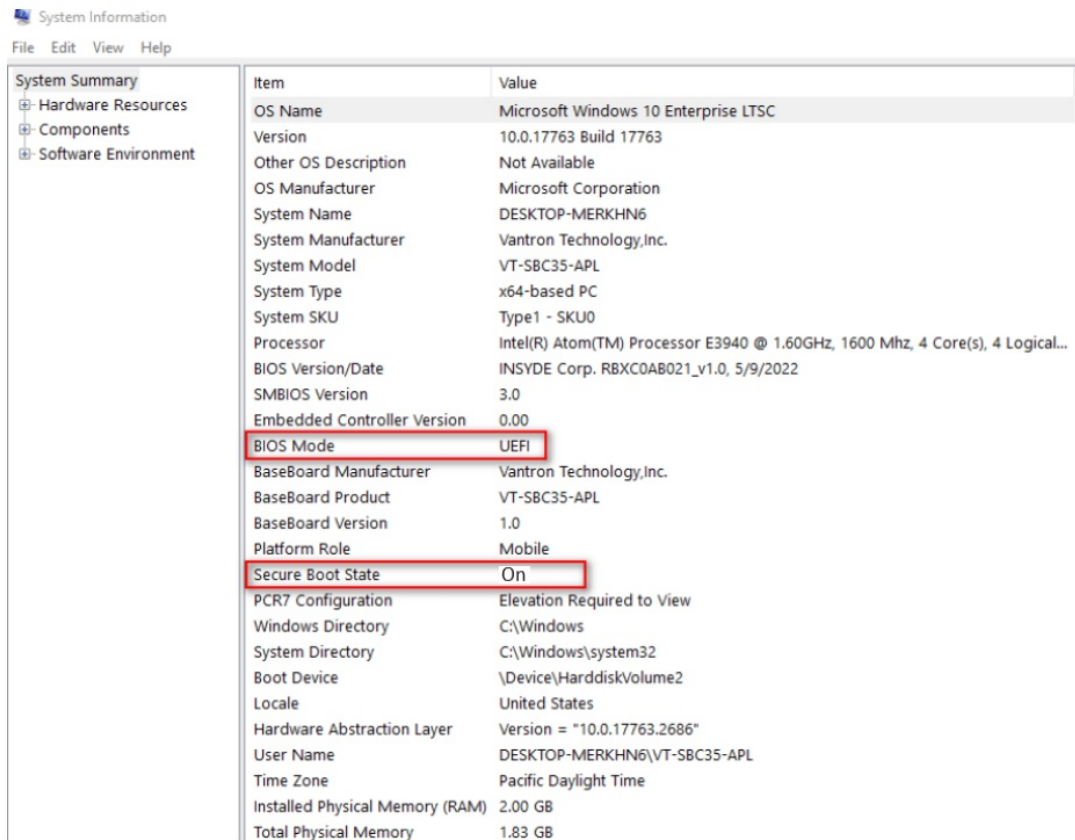
Use the up and down arrow keys on the keyboard to enter BIOS Setup Utility, which features the following menus in the menu bar:

- 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

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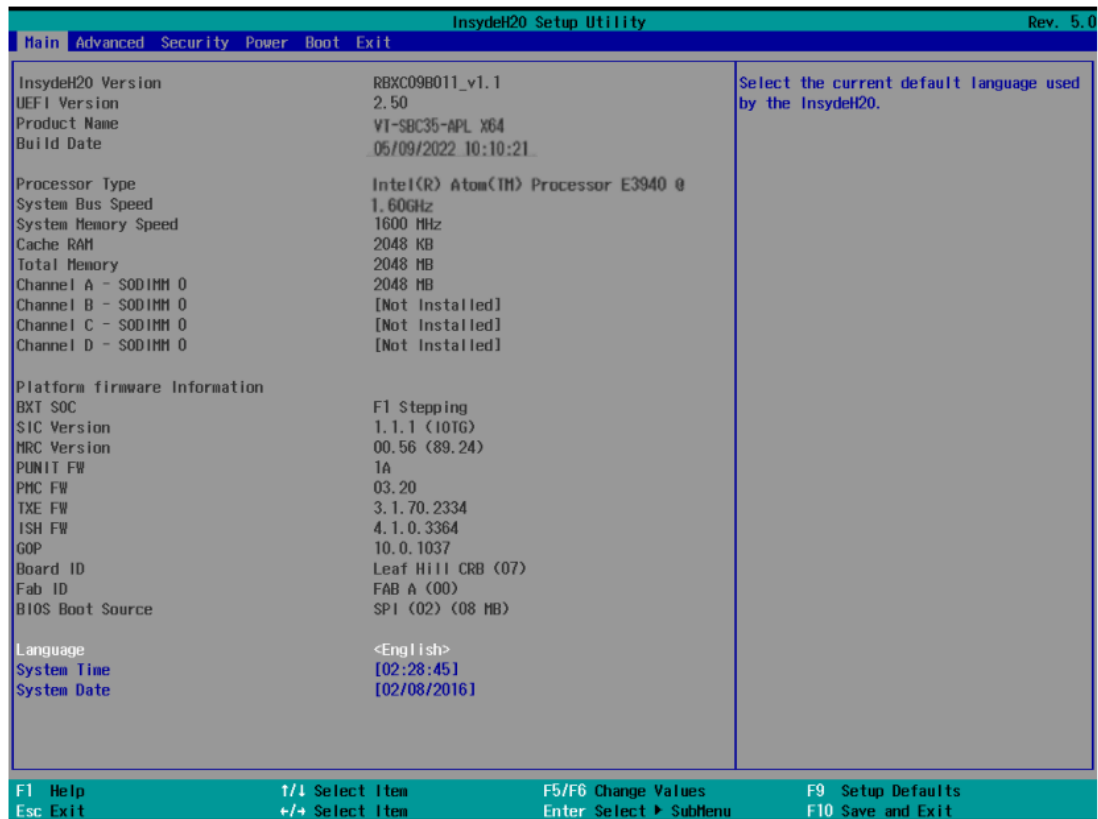
- Language: You can select from English, French, Chinese, and Japanese for system language.
- System Time: The time format is <Hour>: <Minute>: <Second>.
- System Date: The date format is <Month>/ <Day>/<Year>.

4.3.4 Setup Utility —- Advanced
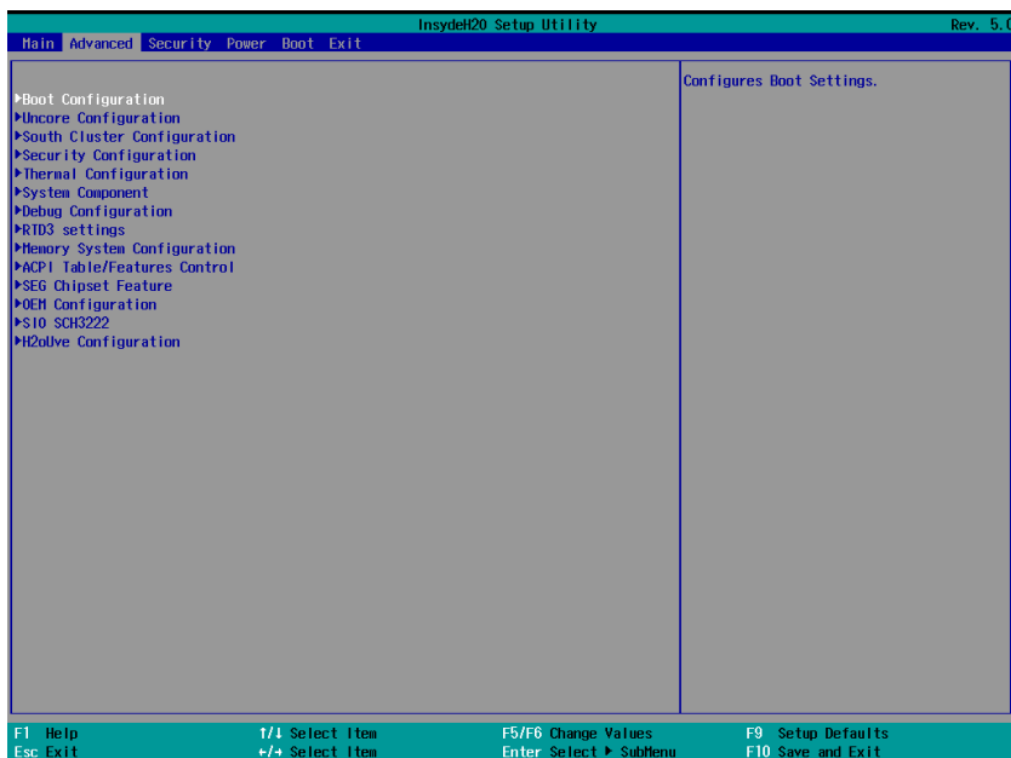
- Boot Configuration: You can select the operating system that you would like the Board to run on.
- Uncore Configuration: You can customize the video settings, GOP settings, IGD settings, and IPU PCI device settings here.
- South Cluster Configuration: This page provides configuration options for audio, 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 $4 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.
- S10 SCH 3222: Serial ports are configured here.
- H2OUVE Configuration: You can enable/disable the configuration interface of H2OUVE tool.

4.3.5 Setup Utility — Security

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

                                                  TrEE Protocol Version: 1.0 or 1.1
  Current TPM Device            <TPM 2.0 (FTPM)>
  TPM State                     All Hierarchies Enabled, UnOwned
  TPM Active PCR Hash Algorithm  SHA1
  TPM Hardware Supported Hash Algorithm  SHA1, SHA256
  TrEE Protocol Version         <1.0>
  TPM Availability              <Available>
  TPM Operation                 <No Operation>
  Clear TPM                     [ ]

  Supervisor Password           Not Installed

  Set Supervisor Password




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

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

4.3.6 Setup Utility — Power

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

  ▶CPU Configuration

  Wake on PME                   <Disabled>
  Wake on RTC from S5           <Disabled>




  F1  Help           ↑/↓ Select Item      F5/F6 Change Values      F9  Setup Defaults
  Esc Exit           ←/→ Select Item      Enter Select ▶ SubMenu   F10 Save and Exit
```
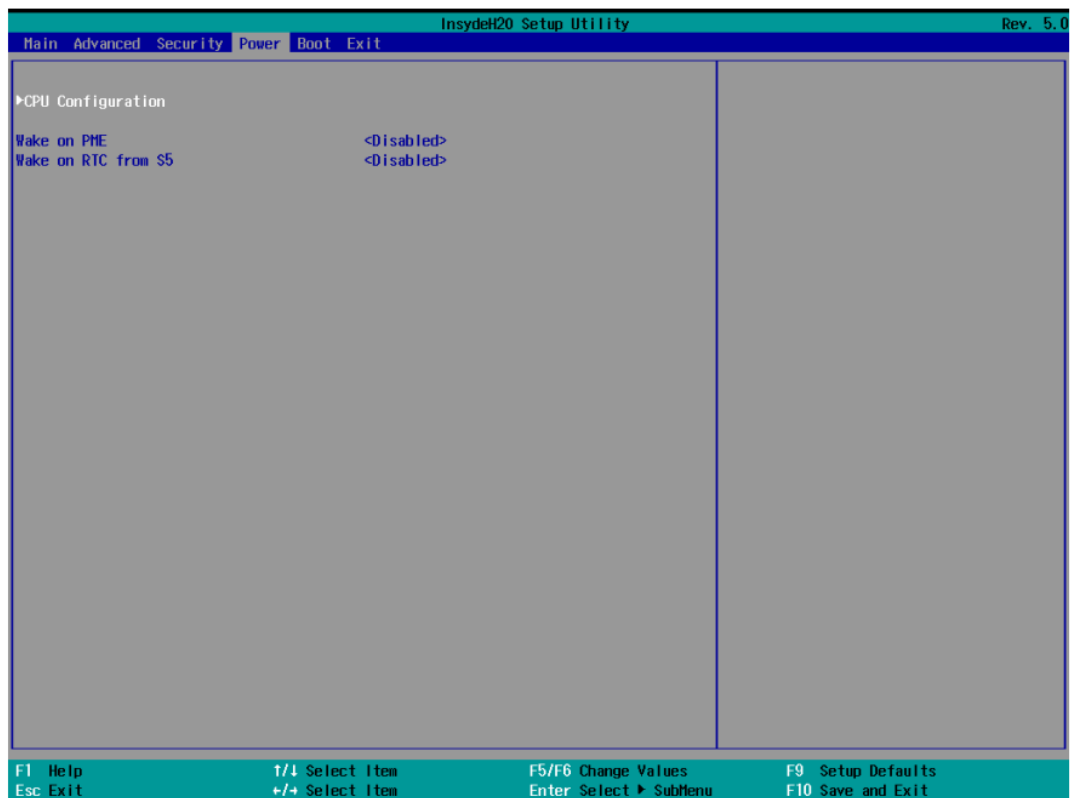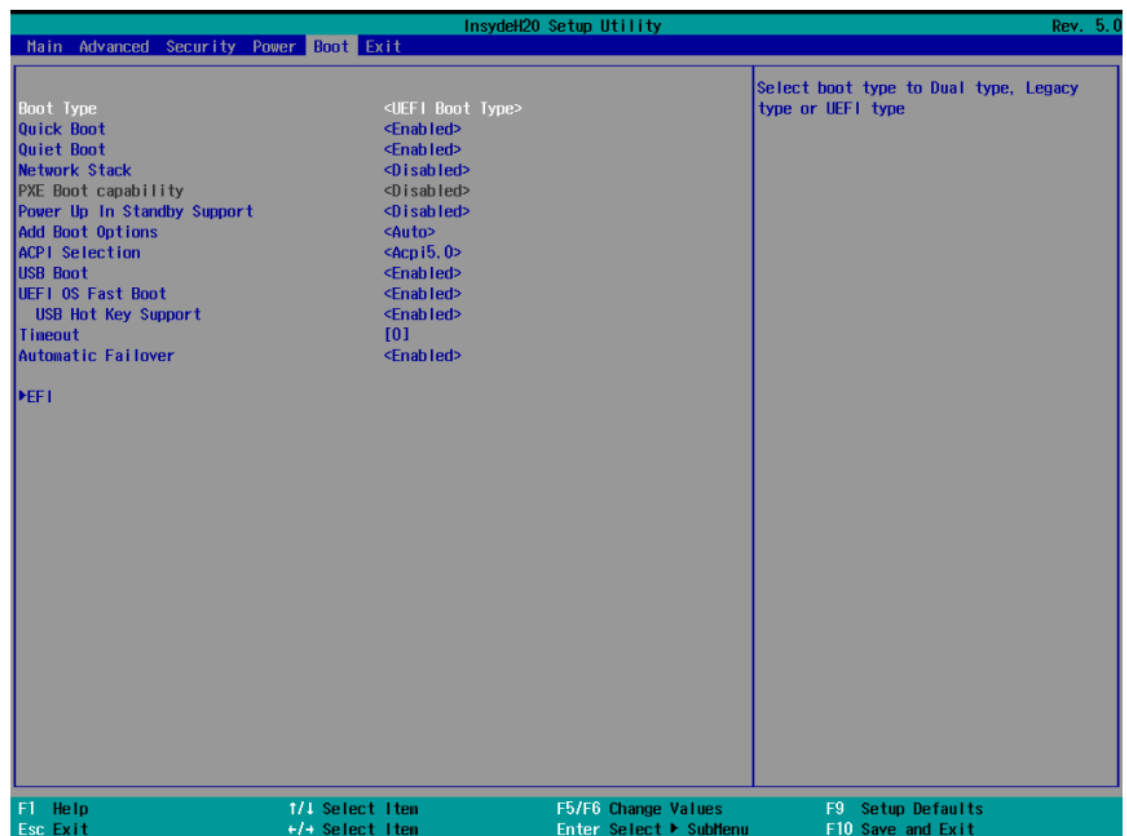
- CPU configurations are customizable.

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

4.3.7 Setup Utility — Boot

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

                                                         Select boot type to Dual type, Legacy
  Boot Type                    <UEFI Boot Type>          type or UEFI type
  Quick Boot                   <Enabled>
  Quiet Boot                   <Enabled>
  Network Stack                <Disabled>
  PXE Boot capability          <Disabled>
  Power Up In Standby Support  <Disabled>
  Add Boot Options             <Auto>
  ACPI Selection               <Acpi5.0>
  USB Boot                     <Enabled>
  UEFI OS Fast Boot            <Enabled>
    USB Hot Key Support        <Enabled>
  Timeout                      [0]
  Automatic Failover           <Enabled>

  ►EFI




  F1  Help           ↑/↓ Select Item      F5/F6 Change Values        F9  Setup Defaults
  Esc Exit           ←/→ Select Item      Enter Select ► SubMenu     F10 Save and Exit
```

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

4.3.8 Setup Utility — Exit

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

                                                    Exit system setup and save your changes.
 Exit Saving Changes
 Save Change Without Exit
 Exit Discarding Changes
 Load Optimal Defaults
 Load Custom Defaults
 Save Custom Defaults
 Discard Changes

 F1  Help              ↑/↓ Select Item      F5/F6 Change Values        F9  Setup Defaults
 Esc Exit              ←/→ Select Item      Enter Select ▶ SubMenu     F10 Save and 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.

4.4 Windows 10 System Flashing
4.4.1 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 \Win10 Image directory)
- Windows 10 image (available in the release package under \Win10 Image directory)
- Ahost PC running Windows 7 or later
- Adisplay cable to connect the Board and the host PC

**4.4.2 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.
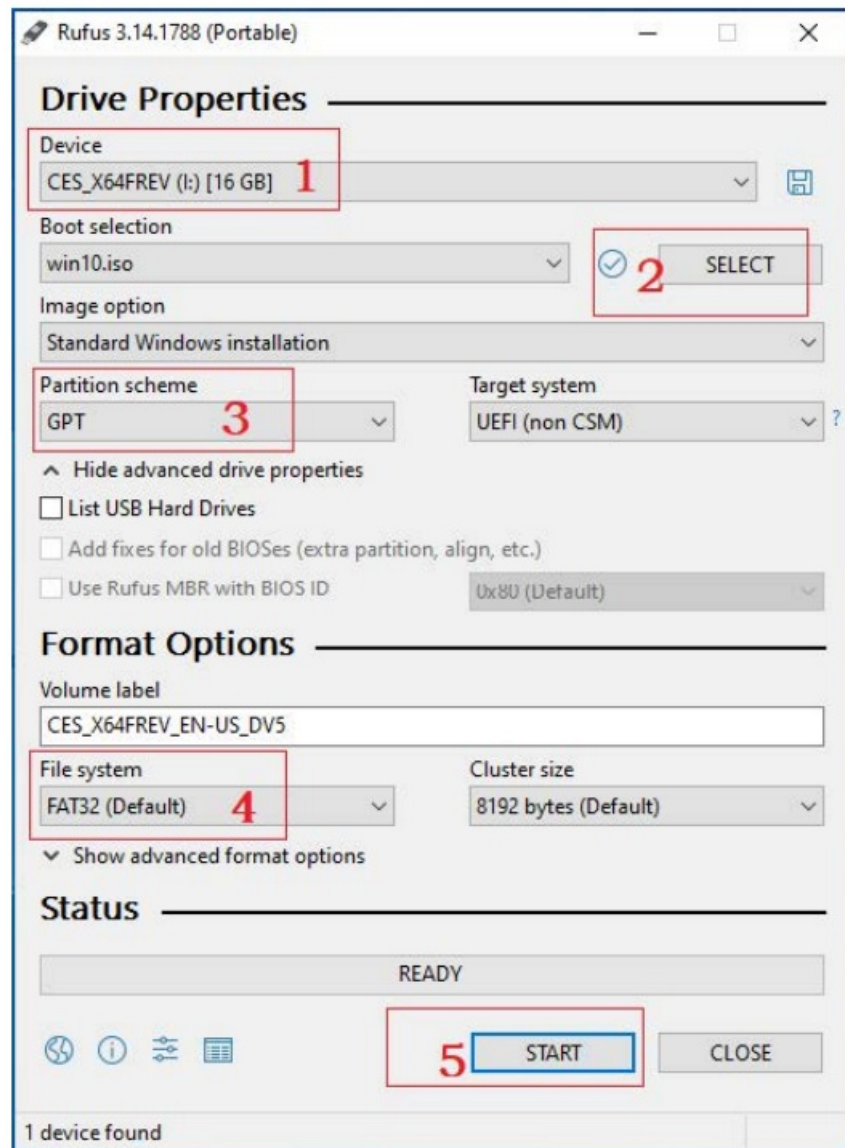
4.4.3 Installing Windows 10

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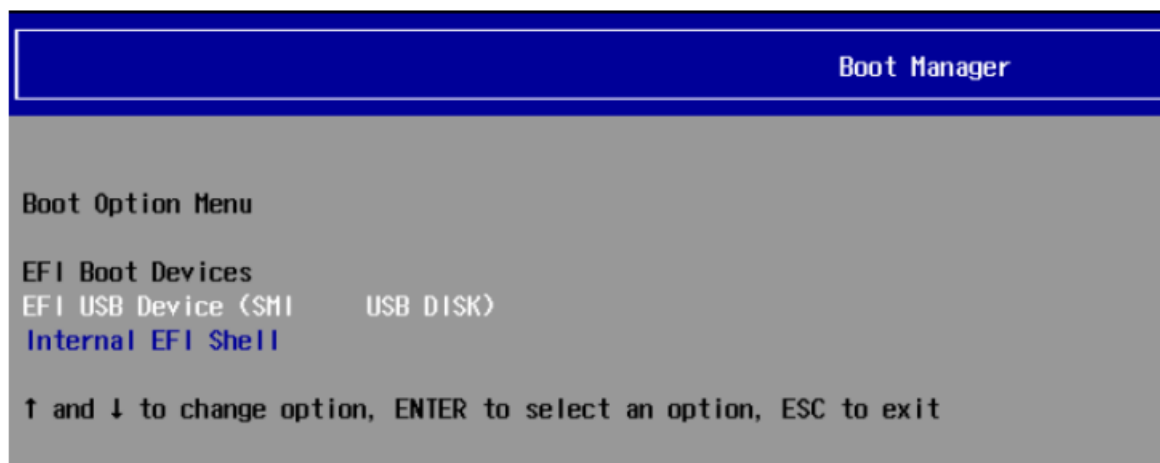
5. Wait for the installation of Windows 10 on the Board. When the installation finishes, there will be a Windows 10 icon on the desktop.

CHAPTER 5 DISPOSAL AND WARRANTY

5.1 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.

5.2 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.

Vantron

www.vantrontech.com

Documents / Resources

Vantron VT SBC 35 APL Single Board Computer [pdf] User Manual
VT SBC 35 APL Single Board Computer, VT SBC 35, APL Single Board Computer, Board Computer, Computer

References

- Vantron **Vantron Technology**