VT-SBC-I350 Single Board Computer

User Manual

Version: 1.2

Revision History

No.	Version	Description	Date
1	V1.0	First release	Mar. 26, 2021
2	V1.1	Updated pinout description of J19 & J16	Jan. 10, 2022
3	V1.2	Updated procedures on image flashing	Jun. 3, 2023

Table of Contents

Foreword

Thank you for purchasing VT-SBC-I350 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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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.

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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.

CHAPTER 1 INTRODUCTION

1.1 Product Overview

VT-SBC-I350 Single Board Computer features a thinner and smaller form factor that is easy to integrate. It is powered by MTK® MT8365 (I350) processor, which integrates a fast 2GHz quad-core ARM Cortex-53 CPU and a high-performance ARM Mali-G52 GPU to deliver powerful Edge AI processing with extremely low power consumption. The board supports up to 13MP high-definition camera, which, combined with the high-definition video encoding and decoding technology, provides 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 board could work under extreme environments with extended temperatures ranging from -20℃ to +60℃, making it a reliable industrial IoT solution.

1.2 Terminology

Terminology	Description
NC	No connection
VCC	Voltage common collector
GND	Ground
/	Active low signal
+	Positive of difference signal
-	Negative of difference signal
I	Input
O	Output
I/O	Input/output
P	Power or ground
A	Analog
OD	Open drain
CMOS	3.3 V CMOS
LVCMOS	Low Voltage CMOS
LVTTL	Low Voltage TTL
3.3V	3.3 V signal level
5V	5V signal level
USB	5V tolerant signal
PCIe	PCI Express signal, not 3.3 V tolerant
MMC	Multimedia Card

1.3   Block Diagram
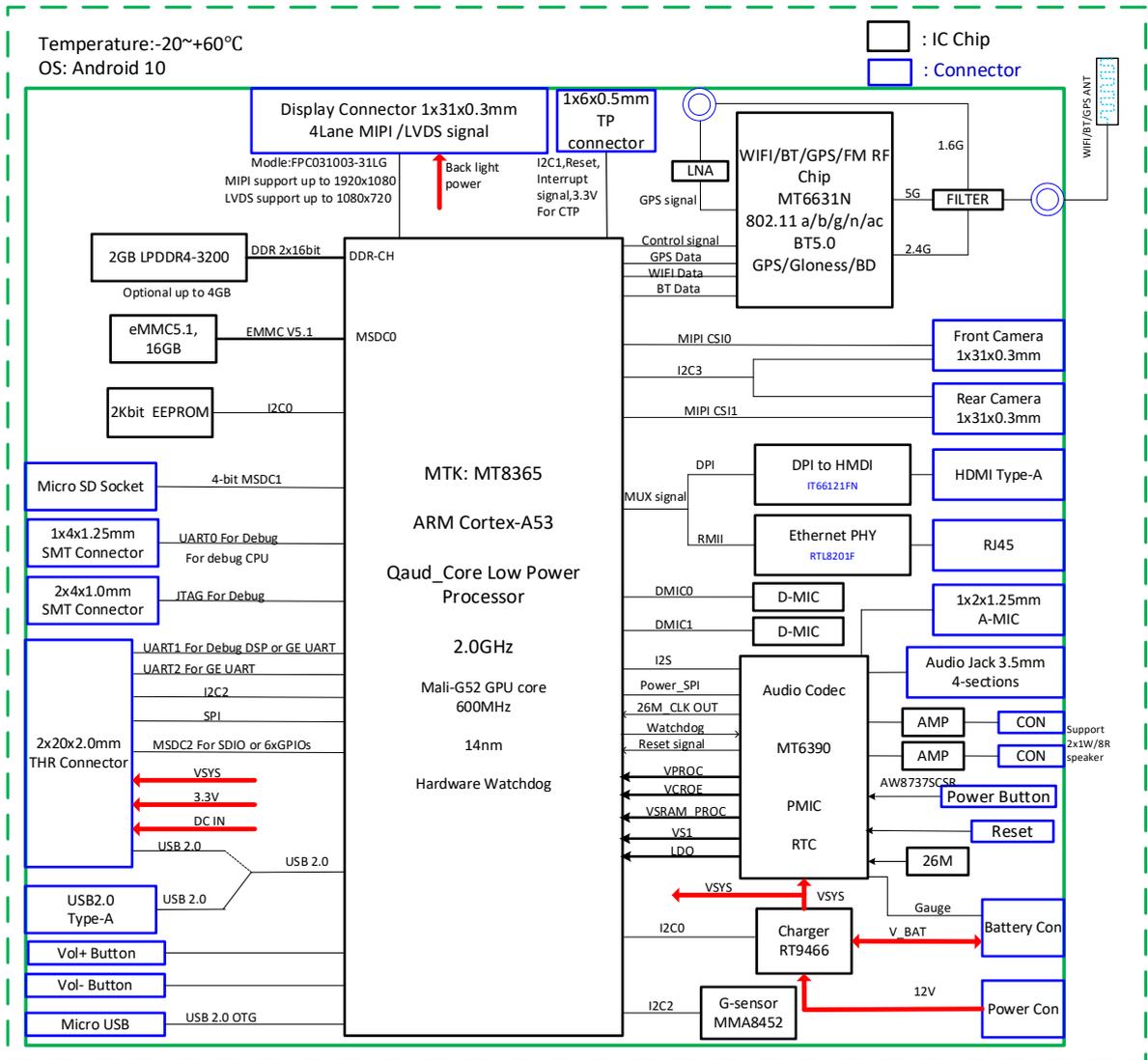
1.4 Specifications

VT-SBC-I350			
System	CPU	MTK MT8365 (I350), Quad-core ARM Cortex-A53, 2.0GHz (Max)	
	GPU	Mali-G52, 3D graphic accelerator, capable of processing 57.6 GFLOPS and 1600M pixel/s, 600MHz	
	Memory	2GB LPDDR4-3200, up to 4GB	
	Storage	16GB eMMC 5.1, up to 64GB 2Kb EEPROM	1 x Micro SD slot (SDIO 3.0)
	PMIC	MT6390	
Communication	Ethernet	1 x RJ45, 10M/100Mbps, RTL8201 (Ethernet PHY)	
	Wi-Fi & BT	Wi-Fi 802.11 a/b/g/n/ac + BT 5.0	
	GNSS	GPS + Glonass + Beidou/Galileo	
Media	Display	1 x 4-Lane MIPI DSI, up to 1920 x 1080 1 x HDMI (Type-A), up to 1920 x 1080	
	Camera	2 x 4-Lane MIPI CSI, 13 MP, 1080P/60fps video decoder	
	Audio	1 x A-Mic to PMIC 2 x D-Mic to AP (CPU), noise reduction 1 x 3.5mm combo audio jack 2 x 1.2W Speaker connector	
I/Os	Serial	2 x UART for communication	1 x UART for debugging
	USB	1 x USB 2.0 Type-C (OTG supported) 1 x USB 2.0 Type-A 1 x USB 2.0 connector (not for use simultaneously with USB Type-A)	
	GPIO	4 x GPIO	
	RTC	Supported, powered by an external battery	
	Watchdog	Supported	
Expansion	I^2C	1 x I^2C for TP	1 x I^2C for external communication
System Control	Button	1 x ON/OFF button 2 x Volume button (+ & -)	1 x Reset button 1 x Button connector
Sensor	G-sensor	3-Axis G-sensor	
Power	Input	12V DC	1 x Power jack
Software	Operating system	Android 10	
	Device management platform	BlueSphere MDM	
	OTA tool	BlueSphere OTA	
Mechanical	Dimensions	100mm x 75mm	
	Cooling mode	Fanless	
Environment Condition	Temperature	Operating: -20℃~+60℃	Storage: -40℃~+85℃
	Humidity	RH 5%-95%	
	Certification	FCC (part 15 class B) ESD (contact: ±4KV and air: ±8KV)	

1.5   Operating system

VT-SBC-I350 supports Android 10 operating systems.

1.6   Mechanical Dimensions

- 100mm x 75mm
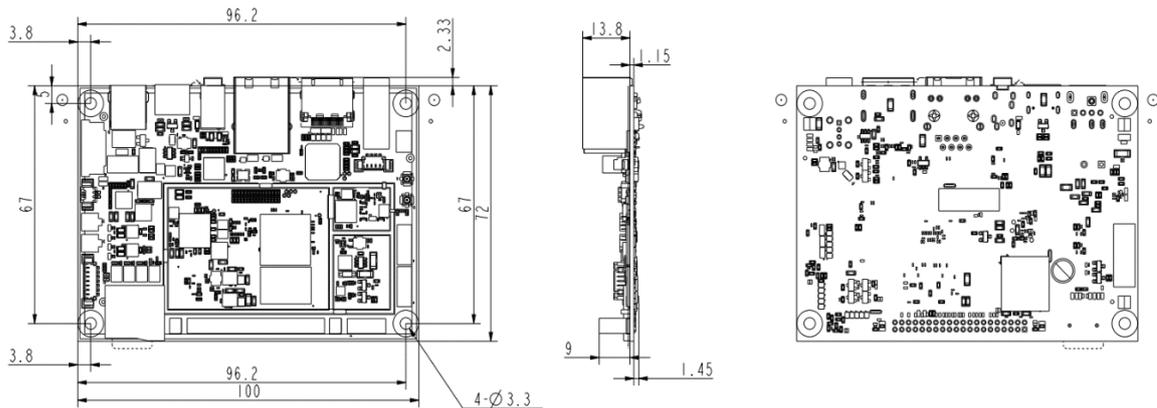
1.7   Power Supply and Consumption

VT-SBC-I350 works at 12V DC power input. It is recommended to use a 12V/2A power adapter for the power supply.

The power consumption of the Board is 5W at the maximum. 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-SBC-I350 works at a temperature ranging from -20℃ to +60℃ and is designed to be stored at a temperature ranging from -40°C to +85°C and at relative humidity of RH 5% to 96% for non-condensing purpose.

CHAPTER 2 CONNECTOR DESCRIPTION

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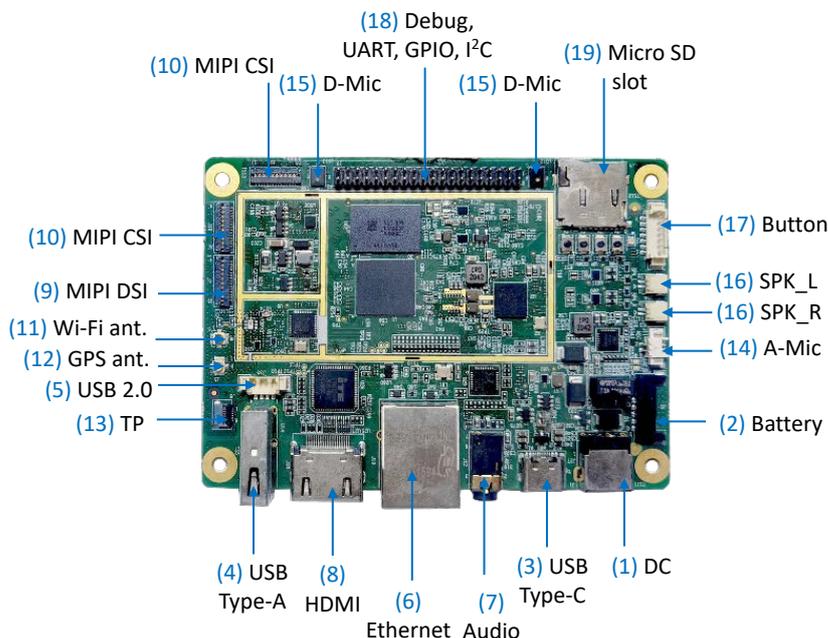
> *The board I/Os will be described in detail in 2.4 Connectors and Jumpers following the sequencing numbers provided here.*

2.2   Memory and Storage

2.2.1   LPDDR4 RAM

VT-SBC-I350 is equipped with a 2GB LPDDR4 RAM (frequency: 3200MHz) by default, and users also have the option of 4GB RAM.

2.2.2   eMMC Flash

VT-SBC-I350 provides an eMMC 5.1 flash up to 64GB using SDIO interface, and the default capacity is 16GB. It is used as the default boot and storage device.

2.2.3   Storage expansion

VT-SBC-I350 provides a Micro SD slot for storage expansion.

2.2.4 EEPROM

The Board implements a 2Kb EEPROM (address 0x50), communicating with the CPU using I^{2}C0. The EEPROM is for storing hardware version, firmware information, and other custom information. The write protection is controlled by software.

2.3   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.
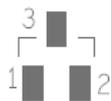
2.4   Connectors and Jumpers

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

2.4.1 J1 Power jack (1)

VT-SBC-I350 works at 12V DC power input (12V/2A power adapter recommended) supplied through the power jack on the board.

2.4.2 J3 Battery connector (2)

VT-SBC-I350 offers a battery connector for connecting an external battery or rechargeable power source. This is useful in situations where there might be a power outage or failure in the main power supply. It ensures key processes or functions not to be interrupted.

Pin 1
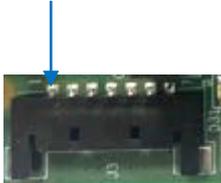
Pinout description:

No.	Signal	Type	Level	Description
1	VCC_BAT	P	3.8V	Battery anode
2	VCC_BAT	P	3.8V	Battery anode
3	VCC_BAT	P	3.8V	Battery anode
4	BAT_GND	P		Battery cathode
5	BAT_GND	P		Battery cathode
6	BAT_GND	P		Battery cathode
7	BATT_TS	AI		Battery temp. input

Note: Only when an external battery is connected, can the RTC feature be enabled.

2.4.3 U60 USB 2.0 Type-C (3)

VT-SBC-I350 has a USB 2.0 Type-C interface, supporting USB OTG feature for data transmission, board debugging, peripheral connection, etc. The maximum output of this interface is 5V/1A.

2.4.4 U14 USB 2.0 Type-A (4)

VT-SBC-I350 has a USB 2.0 Type-A interface, supporting data transmission, peripheral connection, etc. The maximum output of this interface is 5V/1A.

2.4.5   J30 USB 2.0 connector (5)

The USB 2.0 connector cannot be used simultaneously with the USB 2.0 Type-A interface,
You can choose one for peripheral connection.

Pin 1
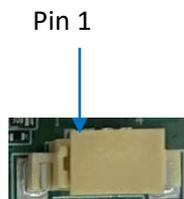
Pinout description:

No.	Signal	Type	Level	Description
1	VBUS1	P		5V output, Max. 1A
2	USB_DM			D-
3	USB_DP			D+
4	GND	P	GND	Ground

2.4.6   J19 Ethernet jack (6)

VT-SBC-I350 offers an RJ45 Ethernet jack, supporting 10/100Mbps transmission rate. The
Ethernet jack has two LED indicators, green for activity indication and yellow for link
indication.

2.4.7   J12 3.5mm audio jack (7)

The on-board 3.5mm combo audio jack is for connecting a headphone or an external
speaker/microphone for audio output or input, such as audio recording, voice call, etc.

2.4.8 J18 HDMI (8)

The Board has an HDMI 1.4 interface for image output, supporting a resolution up to 1920 x 1080.

2.4.9 J7 MIPI DSI (9)

VT-SBC-I350 offers a 4-lane MIPI DSI connector (1 x 31, 0.3mm) for connecting an external display, supporting a resolution up to 1920 x 1080.
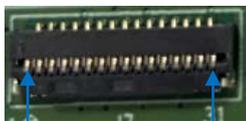
Pin 1   Pin 31

Pinout description:

No.	Signal	Type	Level	Description
1	VCC_LED0_A_MIPI	P		LED anode
2	VCC_LED0_A_MIPI	P		LED anode
3	VCC_LED0_A_MIPI	P		LED anode
4	NC			
5	VCC_LED0_K_MIPI	P		LED cathode
6	VCC_LED0_K_MIPI	P		LED cathode
7	VCC_LED0_K_MIPI	P		LED cathode
8	VCC_LED0_K_MIPI	P		LED cathode
9	GND	P	GND	Ground
10	GND	P	GND	Ground
11	MIPI_DSI_D2P	O		MIPI DSI data 2 +
12	MIPI_DSI_D2N	O		MIPI DSI data 2 -
13	GND	P	GND	Ground
14	MIPI_DSI_D1P	O		MIPI DSI data 1 +
15	MIPI_DSID1N	O		MIPI DSI data 1 -
16	GND	P	GND	Ground
17	MIPI_DSI_CLKP	O		MIPI CSI clock +
18	MIPI_DSI_CLKN	I/O		MIPI CSI clock -

19	GND	P	GND	Ground
20	MIPI_DSI_D0P	O		MIPI DSI data 0 +
21	MIPI_DSI_D0N	O		MIPI DSI data 0 -
22	GND	P	GND	Ground
23	MIPI_DSI_D3P	O		MIPI DSI data 3 +
24	MIPI_DSI_D3N	O		MIPI DSI data 3 -
25	GND	P	GND	Ground
26	NC			
27	LCD_RESET	O	1.8V	MIPI LCD reset output
28	NC			
29	VCC1V8_LCD	P	1.8V	1.8V power output
30	VCC3V3_LCD	P	3.3V	3.3V power output
31	VCC3V3_LCD	P	3.3V	3.3V power output

2.4.10 J9/J10 MIPI CSI (9)

VT-SBC-I350 offers two 4-lane MIPI CSI connectors (1 x 31, 0.3mm) for connecting front and rear cameras, supporting a resolution up to 13MP.

Pin 1   Pin 31
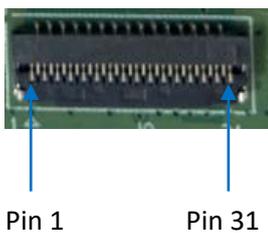
Pinout description of J9:

No.	Signal	Type	Level	Description
1	GND	P	GND	Ground
2	MIPI_CSI0_D3N	I		MIPI CSI data 3 -
3	MIPI_CSI0_D3P	I		MIPI CSI data 3 +
4	GND	P	GND	Ground
5	MIPI_CSI0_D2N	I		MIPI CSI data 2 -
6	MIPI_CSI_D2P	I		MIPI CSI data 2 +
7	GND	P	GND	Ground
8	MIPI_CSI0_D1N	I		MIPI CSI data 1 -
9	MIPI_CSI0_D1P	I		MIPI CSI data 1 +
10	GND	P	GND	Ground
11	MIPI_CSI0_D0N	I		MIPI CSI data 0 -
12	MIPI_CSI0_D0P	I		MIPI CSI data 0 +
13	GND	P	GND	Ground

14	MIPI_CSI0_CLK0N	O		MIPI CSI clock -
15	MIPI_CSI0_CLK0P	O		MIPI CSI clock +
16	GND	P	GND	Ground
17	I2C3_SCL	I	1.8V	I2C3 clock
18	I2C3_SDA	I/O	1.8V	I2C3 data
19	MIPI_CAM0_RST	O	1.8V	Camera reset
20	MIPI_CAM0_PWN	O	1.8V	Camera power down
21	GND	P	GND	Ground
22	MIPI_CAM0_MCLK	O		Camera master clock
23	GND	P	GND	Ground
24	NC			
25	VCC1V8_DVP	O	1.8V	Camera IO power supply
26	VCC1V8_DVP	O	1.8V	Camera IO power supply
27	VCC1V5_DVP	O	1.5V	Camera kernel power supply
28	VCC2V8_DVP	O	2.8V	Camera fixed focus motor power supply
29	VCC2V8_DVP_A	O	2.8V	Camera analog power supply
30	NC			
31	GND	P	GND	Ground

Pinout description of J10:

No.	Signal	Type	Level	Description
1	GND	P	GND	Ground
2	MIPI_CSI0_D3N	I		MIPI CSI data 3 -
3	MIPI_CSI0_D3P	I		MIPI CSI data 3 +
4	GND	P	GND	Ground
5	MIPI_CSI0_D2N	I		MIPI CSI data 2 -
6	MIPI_CSI_D2P	I		MIPI CSI data 2 +
7	GND	P	GND	Ground
8	MIPI_CSI0_D1N	I		MIPI CSI data 1 -
9	MIPI_CSI0_D1P	I		MIPI CSI data 1 +
10	GND	P	GND	Ground
11	MIPI_CSI0_D0N	I		MIPI CSI data 0 -
12	MIPI_CSI0_D0P	I		MIPI CSI data 0 +
13	GND	P	GND	Ground
14	MIPI_CSI0_CLK0N	O		MIPI CSI clock -
15	MIPI_CSI0_CLK0P	O		MIPI CSI clock +
16	GND	P	GND	Ground
17	I2C2_SCL	I	1.8V	I2C2 clock
18	I2C2_SDA	I/O	1.8V	I2C2 data

19	MIPI_CAM0_RST	O	1.8V	Camera reset
20	MIPI_CAM0_PWN	O	1.8V	Camera power down
21	GND	P	GND	Ground
22	MIPI_CAM0_MCLK	O		Camera master clock
23	GND	P	GND	Ground
24	NC			
25	VCC1V8_DVP	O	1.8V	Camera IO power supply
26	VCC1V8_DVP	O	1.8V	Camera IO power supply
27	VCC1V5_DVP	O	1.5V	Camera kernel power supply
28	VCC2V8_DVP	O	2.8V	Camera fixed focus motor power supply
29	VCC2V8_DVP_A	O	2.8V	Camera analog power supply
30	NC			
31	GND	P	GND	Ground

2.4.11 J4 Wi-Fi & Bluetooth antenna connector (11)

VT-SBC-I350 implements a 4-in-1 combo chipset that integrates Wi-Fi 802.11 a/b/g/n/ac, Bluetooth 5.0, GPS, and FM.

The Wi-Fi & Bluetooth antenna adopts an U.FL connector for connecting an external antenna with the same connector to improve the signal strength of the wireless connectivity.

2.4.12 J5 GPS antenna connector (12)

VT-SBC-I350 implements a 4-in-1 combo chipset that integrates Wi-Fi 802.11 a/b/g/n/ac, Bluetooth 5.0, GPS, and FM.

The GPS antenna adopts an U.FL connector for connecting an external antenna with the same connector to improve the accuracy of positioning and navigation.

2.4.13 J8 Touch panel connector (13)

VT-SBC-I350 offers a 6-pin I^{2}C connector for connecting an external touch panel.

Pin 1

Pinout description:

No.	Signal	Type	Level	Description
1	I2C1_SCL	I	1.8V	I2C1 clock
2	I2C1_SDA	I/O	1.8V	I2C1 data
3	VLDO28_PMU	P	2.8V	2.8V power output
4	TP_RST	O	1.8V	I2C TP reset output
5	TP_INT	I	1.8V	I2C TP interrupt input
6	GND	P	GND	Ground

2.4.14 J11 A-Mic (14)

VT-SBC-I350 offers an A Mic interface that outputs analog signals and supports basic voice recording and communication.

Pin 1

Pinout description:

No.	Signal	Type	Level	Description
1	MIC_IN1N	AI		AMIC output -
2	MIC_IN1P	AO		AMIC output +

2.4.15 U512/U513 D-Mic (15)

VT-SBC-I350 offers two D Mic interfaces that outputs digital signals and provides pre-processed digital audio stream for high-quality audio effect and noise reduction. These interfaces can be used for audio recognition, high-fidelity audio devices, etc.

2.4.16 J13/J14 Speaker connectors (16)

VT-SBC-I350 provides two speaker connectors. They are used for connecting 1.2W external speakers to amplify the left and right audio channels.

R Pin 1   L Pin 1

Pinout description of J13:

No.	Signal	Type	Level	Description
1	OUTR+	AO		Right channel amplifier AO +
2	OUTR-	AO		Right channel amplifier AO -

Pinout description of J14:

No.	Signal	Type	Level	Description
1	OUTL+	AO		Left channel amplifier AO +
2	OUTL-	AO		Left channel amplifier AO -

2.4.17 J16 Button connector (17)

Apart from the four on-board buttons, VT-SBC-I350 provides a button connector that users can connect external buttons for controlling the Board.

Pin 1

Pinout description:

No.	Signal	Type	Level	Description
1	PWR key			Power key
2	KPCOL0			Volume +
3	FCHR_ENB			Volume -
4	NC			
5	RESET			Reset key
6	GND	P	GND	Ground
7	GND	P	GND	Ground

2.4.18 J15 40-pin header (18)

VT-SBC-I350 implements a 40-pin header, offering multiple signals such as communication UART, debug UART, GPIO, I^{2}C, etc.

Pin 2 ⟶
Pin 1 ⟶

Pinout description:

No.	Signal	Type	Domain	Description
1	VCC_5V	P	5V	5V output, max. total current for pins 1 & 2: 500mA
2	VCC_5V	P	5V	
3	VEMC_PMU	P	3V	3V output, max. total current for pins 3, 4 & 29: 100mA
4	VEMC_PMU	P	3V	
5	VIO18_PMU	P	1.8V	1.8V output, max. total current for pins 5 & 6: 100mA
6	VIO18_PMU	P	1.8V	
7	UTXD1	I/O	1.8V	UART1 transmitting data
8	MSDC2_CLK	I/O	1.8V	MSDC2 clock output
9	URXD1	I/O	1.8V	UART1 receiving data
10	MSDC2_CMD	I/O	1.8V	MSDC2 command
11	GND	P	GND	Ground
12	MSDC2_DSL	I/O	1.8V	MSDC2 data strobe input
13	UTXD2	I/O	1.8V	UART2 transmitting data
14	MSDC2_DAT0	I/O	1.8V	MSDC2 data 0
15	URXD2	I/O	1.8V	UART2 receiving data
16	MSDC2_DAT1	I/O	1.8V	MSDC2 data 1
17	GND	P	GND	Ground
18	MSDC2_DAT2	I/O	1.8V	MSDC2 data 2
19	SCL2	I/O	1.8V	I2C serial clock
20	MSDC2_DAT3	I/O	1.8V	MSDC2 data 3
21	SDA2	I/O	1.8V	I2C serial data
22	GND	P	GND	Ground
23	GPIO105	I/O	1.8V	General purpose input & output
24	GPIO107	I/O	1.8V	General purpose input & output
25	SPDIF_IN	I/O	1.8V	SPDIF input
26	GPIO106	I/O	1.8V	General purpose input & output
27	GND	P	GND	Ground
28	SPDIF_OUT	I/O	1.8V	SPDIF output

29	VEMC_PMU	I/O	3V	3V output, max. total current for pins 3, 4 & 29: 100mA
30	GND	P	GND	Ground
31	URXD0	I/O	1.8V	UART0_RX debug
32	TDM_TX_BCK	I/O	1.8V	TDM clock
33	UTXD0	I/O	1.8V	UART0_TX debug
34	TDM_TX_LRCK	I/O	1.8V	TDM LRCK
35	GND	P	GND	Ground
36	TDM_TX_MCK	I/O	1.8V	TDM master clock
37	NC			
38	TDM_TX_DATA0	I/O	1.8V	TDM data 0 output
39	GND	P	GND	Ground
40	GND	P	GND	Ground

2.4.19 J3 Micro SD slot (19)

VT-SBC-I350 offers a Micro SD slot that adopts SDIO 3.0 interface for storage expansion.

2.4.20 Buttons (20)

VT-SBC-I350 offers four on-board buttons, namely a power button, a volume up button, a volume down button, and a reset button.

CHAPTER 3 ANDROID SYSTEM MANUAL

3.1   Enable Developer Options

To enable Developer Options of VT-SBC-I350, follow the steps below:

1. Connect the Board to a mouse, a keyboard, and a display for easier operations;

2. Click **Settings** > **About <device>** in sequence;

3. Scroll down to **Build number**, and click it consecutively for at least 7 times to enable **Developer options**;

4. Go back to **Settings > System > Advanced > Developer options** and toggle on **USB debugging**, then you can customize the Board settings.

▷ *Depending on the Android version, the entry might vary slightly.*

3.2 ADB Setup

Android Debug Bridge (ADB) is a tool that is designed to connect your development workstation directly to your Android device for debugging, device upgrading, app installation, etc.

Make sure you have enabled **Developer Options** and toggled on **USB debugging** before you proceed with the ADB setup as follows.

1. Unzip the software release package and navigate to the following directory: SW \ tools;

2. Extract the **adb_fastboot_and_other_tools_for_windows** zip file;

3. Navigate to the **Android** folder, and locate the **adb.exe** program and extension files;

▷ *Running the adb.exe program directly offers a **one-time use** of the ADB tool. However, if you want to use the ADB tool from any location without having to navigate to the tool's folder every time, you can add the folder to the **PATH** environment variable. Go through steps 4-6 to add the tool folder.*

4. Press "Win + R" and input "sysdm.cpl" in the dialogue box to open the settings interface;
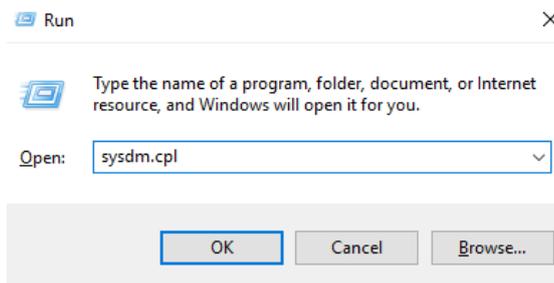
5. Click in sequence **Advanced > Environment Variables > Path > Edit**, and click **New** in the pop-up;
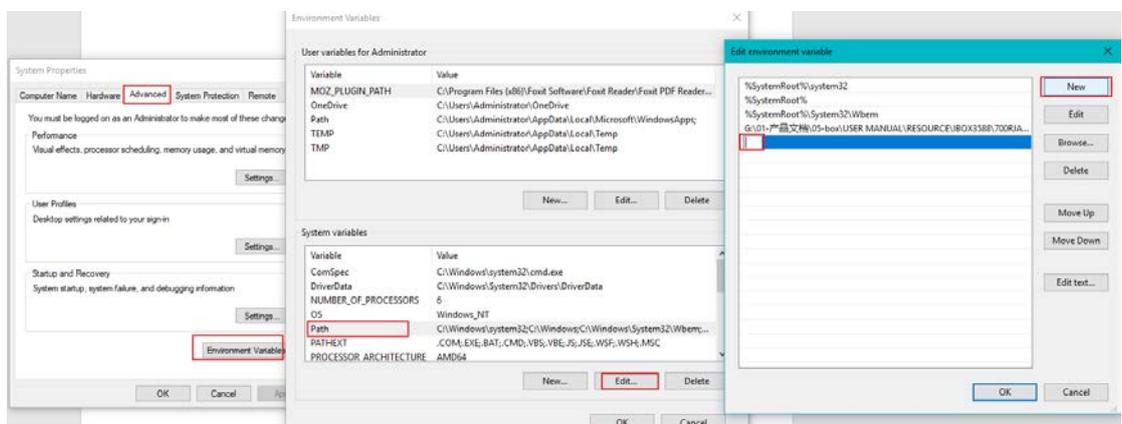
6. Copy the folder path of **adb.exe**, and click **OK** to confirm;
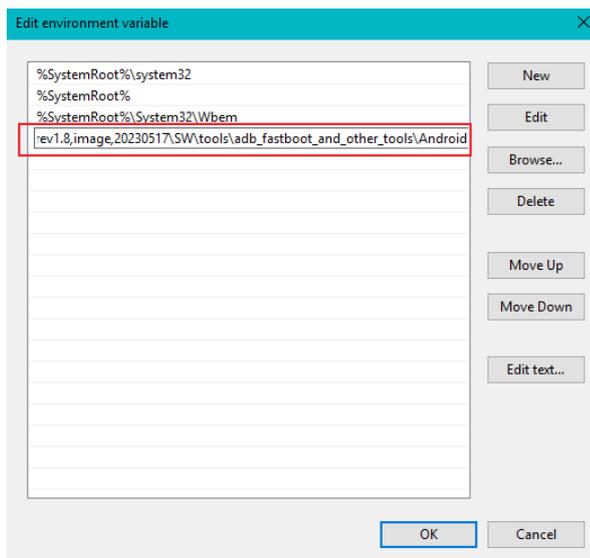
7. Press "Win + R" and input "cmd" in the dialogue box;

8. Input "adb version" in the command prompt to check if the ADB tool is installed.
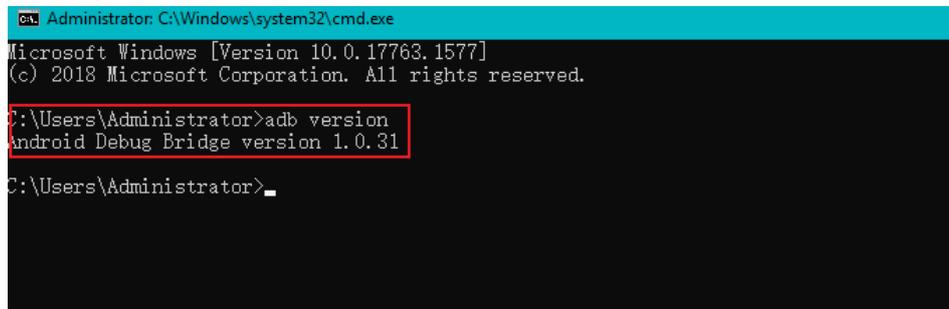
3.3   App Installation via ADB Commands

In addition to the standard pre-installed Android applications, users can install their own applications on the Board. All tools to be used for the installation are available in the product release package provided by Vantron.

You can install the apps either in the Windows environment or Linux environment as long as the Android SDK Platform Tools are installed and accessible on the host computer. The commands for the installation are the same. The Windows environment is used for illustration in the following section.

3.3.1 Prerequisites

- VT-SBC-I350 running Android operating system

- A host computer running Windows 7 or later (Ubuntu 18.04 or later recommended for Ubuntu environment)

- A USB cable (Type-A to Type-C)

3.3.2 App installation

1. Connect VT-SBC-I350 and the host computer via the USB cable;

2. Input "adb devices -I" in the command prompt to check if the Board is connected to the host computer;

▷ *The screenshot is for illustration only and is not intended to represent the actual device number and other information of the device currently in your possession.*

3. When the device information is displayed under the command, the Board is an ADB device and you can copy the serial number (squared as shown above) for the next step;

4. Input the following command line to install the app;

adb -s <serial number> install <APP path>

5. The installation will be executed after the command line is input and the result of installation will be displayed below;

```
C:\Users\Administrator>adb -s 674cc0aaede7d049 install "C:\Users\Administrator\Desktop\Libraries for
developers_v3.83_apkpure.com.apk"
Performing Streamed Install
Success
```

6. The newly installed app will be displayed on the App drawer in the Alphabetic order.

▷ *In step 4 shown above, you can drag the .apk file from the local directory to the command line to replace the <App path> you typed in manually.*

3.4   Image Flashing on a Windows Host

Whenever a new image is available, Vantron will provide a release package consisting of all the tools/files necessary so that you can flash the image as needed.

3.4.1 Prerequisites

- VT-SBC-3588

- A host computer running Windows 7 or later

- A USB cable (Type-A to Type-C)

3.4.2 Driver installation

1. Unzip the release package and open the directory of the upgrade driver **DriverInstall.exe** (path: \SW\Androidtool\ Driver_Auto_Installer_SP_Drivers_xxx);

« SW › AndroidTool › Driver_Auto_Installer_SP_Drivers_20160804			
Name ^	Date modified	Type	Size
DriverInstall.exe	8/4/2016 9:54 AM	Application	9,087 KB
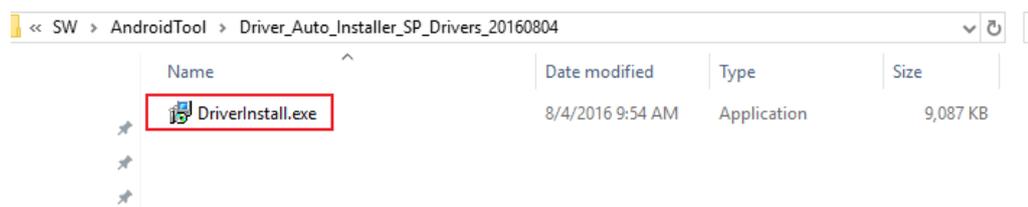
2. Right click the mouse and run the program as administrator;

3. Click **Install** and wait;
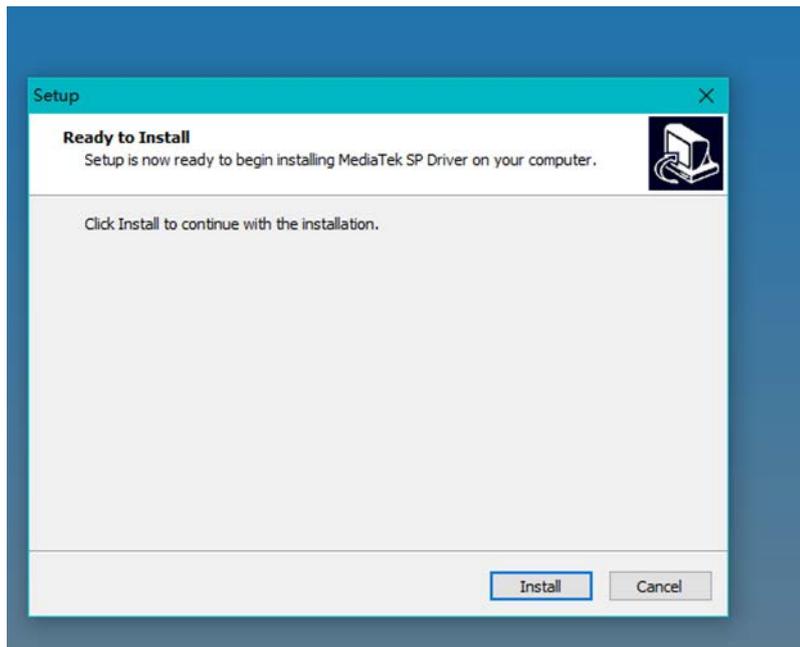
4. Remove all USB devices from the host computer as prompted;

5. A pop-up will appear in a few seconds suggesting you restart the computer and the driver is installed on the host computer;
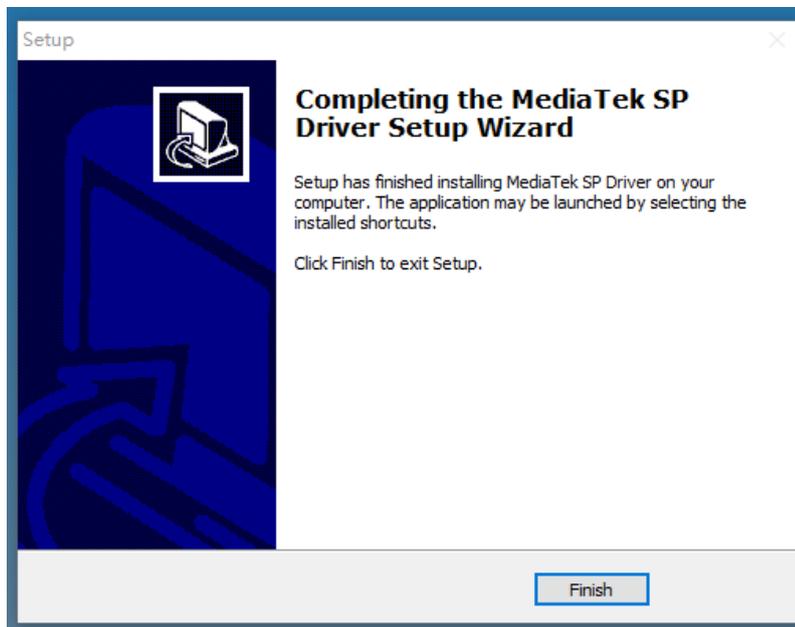
6. Reset the host computer.

3.4.3　Image flashing

1. Open the following directory in the unzipped release package: SW\AndroidTool\SP_Flash_Tool_exe_ Windows_vxxx ;

2. Double click **flash_tool.exe** 📇 flash_tool to open the flash tool program;

3. Click the **Download** tab from the option pane (open by default);
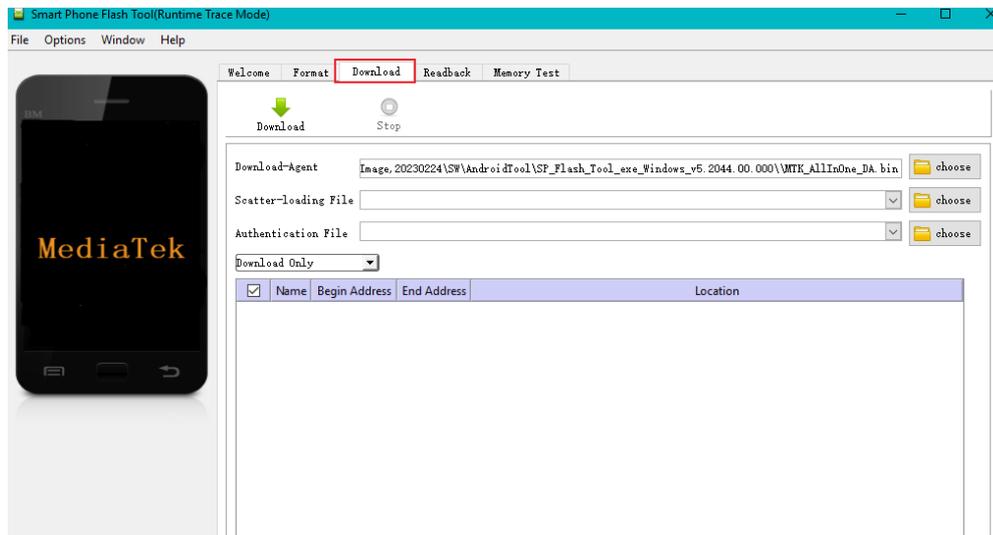
4. Click the **choose** button behind the **Scatter-loading File** menu, and select the image file in the pop-up (path: **SW\image\MTxxxx_Android_scatter.txt**);

5. Click **Open** to load the image file;

6. Select an upgrade strategy from the drop-down menu ("format all + download" for the first-time flashing, and either of the other two options for non-first-time flashing);

7. Uncheck the pre-loader option unless the Board is in dead condition;

8. Click the **Download** button under the **Download** tab;
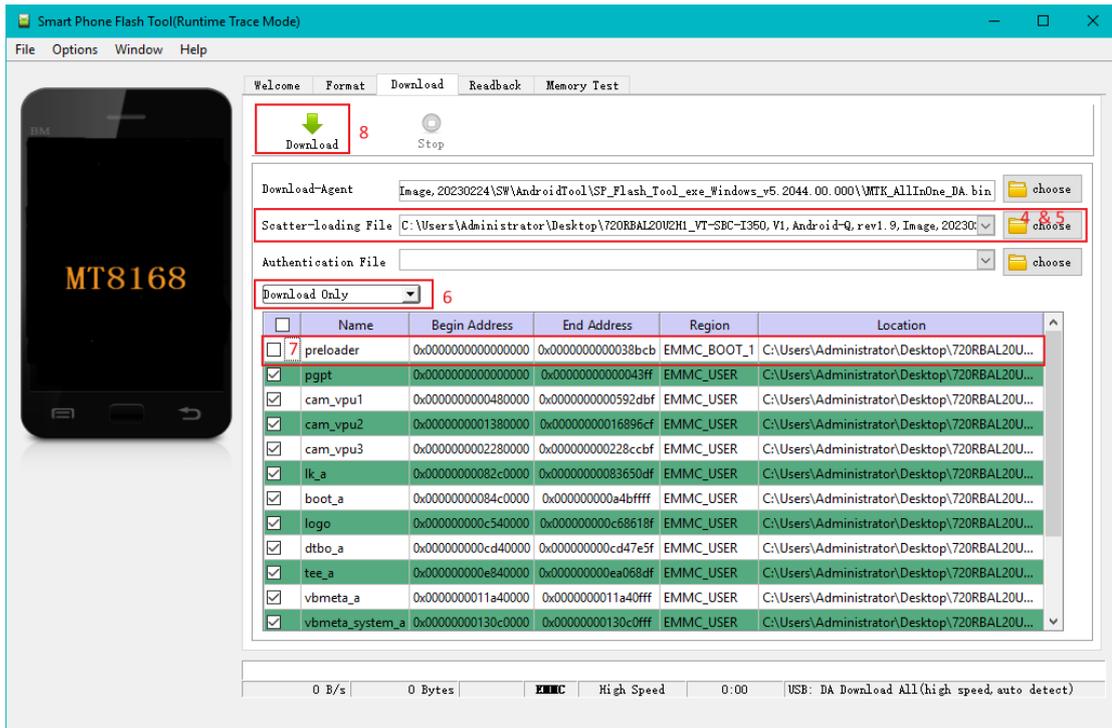
9. Press the Volume + button on the Board and hold, and use the USB cable to connect the Board and the host computer;

10. Plug in the power adapter to power on the Board and then release the Volume + button;

11. The flashing process starts automatically when the host computer detects the Board;
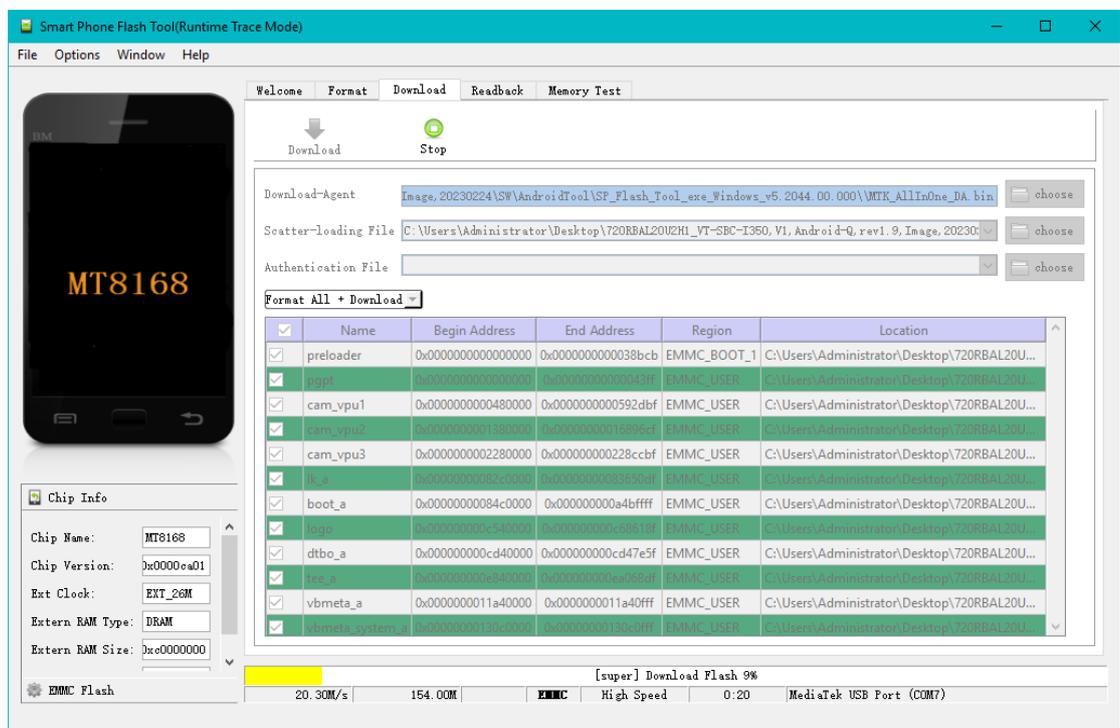
12. When the **Download Ok** message pops up, close the flash tool;
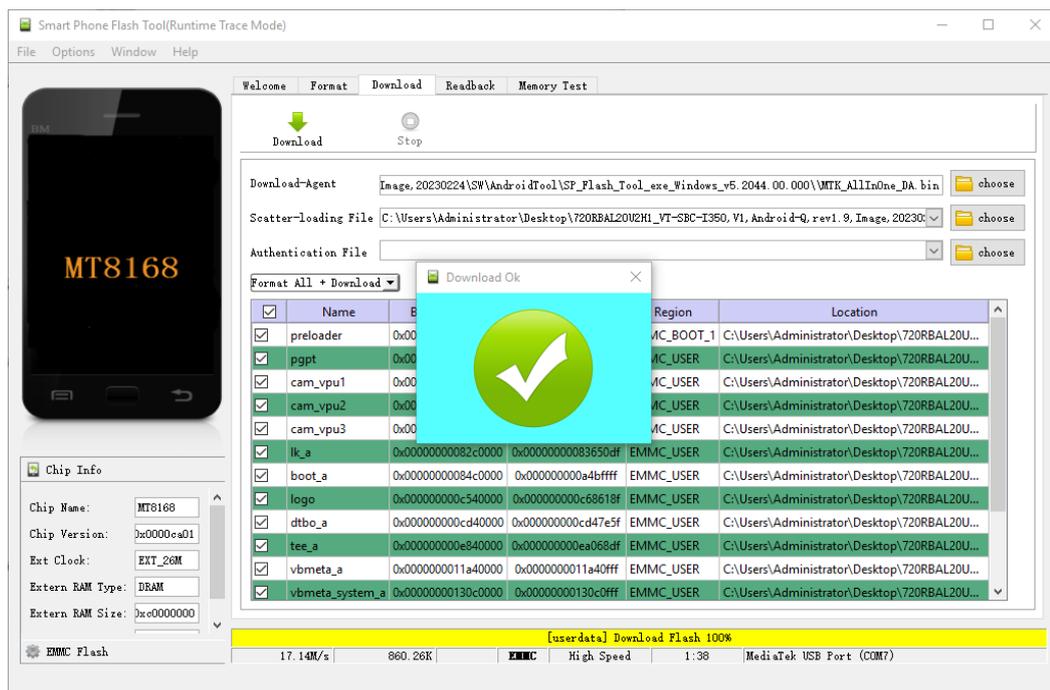
13. Disconnect the Board from the host computer after the upgrade, and press the power button to restart the Board.

▷ *To ensure a smooth upgrade process, please make sure that the folder path of the unzipped release package does not contain any special characters.*

3.5 Using the Serial Ports

VT-SBC-I350 offers two communication UART interfaces (UART1 & UART2), mapped as /dev/ttyS1 and /dev/ttyS2 respectively in the system.

You can refer to 2.4.18 for the pinout description of UART1 and UART2.

When debugging the serial ports, you can connect the Board to the host computer with a proper USB to serial adapter and use a serial communication program to test if the serial port functions properly.

Use the following commands to test the serial ports (UART1 for illustration) and verify if there is any issue in serial communication. The default parameters of the serial ports include a baud rate of 115200 bps and None parity bits.

1. Open the settings of a serial communication program (e.g., minicom);

```
$ sudo minicom -s
```

2. Select port ttyS1 and change the parameters to conform with those of the serial port: 115200 8N1;

3. Save the parameters as the default and exit minicom;

4. Open the serial port;

```
# minicom -D /dev/ttyS1 -b 115200
```

5. Send data oxaa;

```
# echo 0xaa > /dev/ttyS1
```

6. Receive data:

```
# cat /dev/ttyS1
```

▷ *You cannot expect to receive and send data on a single serial port at the same time.*

CHAPTER 4 DISPOSAL AND WARRANTY

4.1   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.

4.2   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** 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 a 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.