



ST-7

7 Inch Rugged Android Vehicle Display Terminal

User Manual

Version 1.0.4



Revision History

Version	Release Time	Description
1.0.0	20250118	Create document
1.0.1	20250313	Change the definition of PORTA&USB interface and add the description of power supply status of AHD camera.
1.0.2	20250603	Change dual Nano sim to single Nano sim, eSIM description, and “3.2.2 Using ADC”
1.0.3	20250619	Modify the battery level in “3.2.4 Using Low Power Mode”
1.0.4	20250715	Add “1.4. All-in-one Cable Interfaces Definition”

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About This Manual

This user’s manual provides the general information and installation instructions for the product. The manual is meant for the experienced users and integrators with hardware knowledge of personal computers. If you are not sure about any description in this manual, consult your vendor before further handling.

We recommend that you keep one copy of this manual for the quick reference for any necessary maintenance in the future. Thank you for choosing 3RTablet products.

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Declaration of Conformity

CE

The CE symbol on your product indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables.

FCC Class B

This device complies with Part 15 of the FCC Rules. Any changes or modifications not expressly approved by the guarantee of this device could void the user's authority to operate the equipment.

RoHS

3RTablet Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2011/65/EU.

Safety Instruction



This symbol of "CAUTION" indicates that there is a danger of injury to the user or a risk of damage to the product, should warning notices be disregarded.



Read the safety instructions carefully and thoroughly. All cautions and warnings on the equipment or user's manual should be noted.



The openings on the enclosure are used for air convection and to prevent the equipment from overheating. Do not cover the openings.



- Make sure the correct voltage (8-36VDC) is connected to the equipment.
 - If the equipment will not be used for a long time, disconnect it from the power source to avoid damage by transient over voltage.
-



- Keep this equipment away from humidity.
 - Disconnect this equipment from the A/C outlet before cleaning it. Use a moist cloth. Do not use liquid or sprayed detergent for cleaning.
 - Never use any of the solvents, such as Thinner Spray-type cleaner, Wax, Benzene, Abrasive cleaner, Acid or Alkaline solvent, on the display. Harsh chemicals may cause damage to the cabinet and the touch sensor.
-



For pluggable equipment, the socket outlet should be near the equipment and should be easily accessible.



Place this equipment on a reliable surface when installing. Dropping it or letting it fall may cause damage.



Do not scratch or rub the screen with a hard object.

If one of the following situations arises, get the equipment checked by service personnel:



- a. The power cord or plug is damaged.
 - b. Liquid has penetrated into the equipment.
 - c. The equipment has been exposed to moisture.
 - d. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - e. The equipment has been dropped or damaged.
 - f. The equipment has obvious signs of breakage.
-

Rechargeable Battery Pack Safety

With very little care, you can optimize the battery life and maximize the lifespan of the battery. Most importantly, use only the equipment in its ideal operating temperature – do not leave it in a hot trunk during the summer.



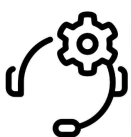
- **Using the Equipment for the First Time**

Be sure to fully charge (approx. 4 hours) the equipment when charging the equipment for the first time.

- **Long-Term Storage & Maintenance**

If you are putting away the battery for more than three months, it is recommended that the battery should be stored separately and fully charged, and get recharged every three months. If you store an uncharged battery, it could fall into a deep worn-out state which would render it incapable of holding any charge. Be sure to store the equipment and battery at the proper temperature.

Additional Information & Technical Support



You can download the related technical documents such as data sheet and user's manual as well as driver on our website.

Please do not hesitate to call or e-mail our customer service when you still cannot get the information you need. www.3Rtablet.com

Warranty

This product is warranted to be in good working order during the warranty period. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it according to 3Rtablet after-sale-service terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

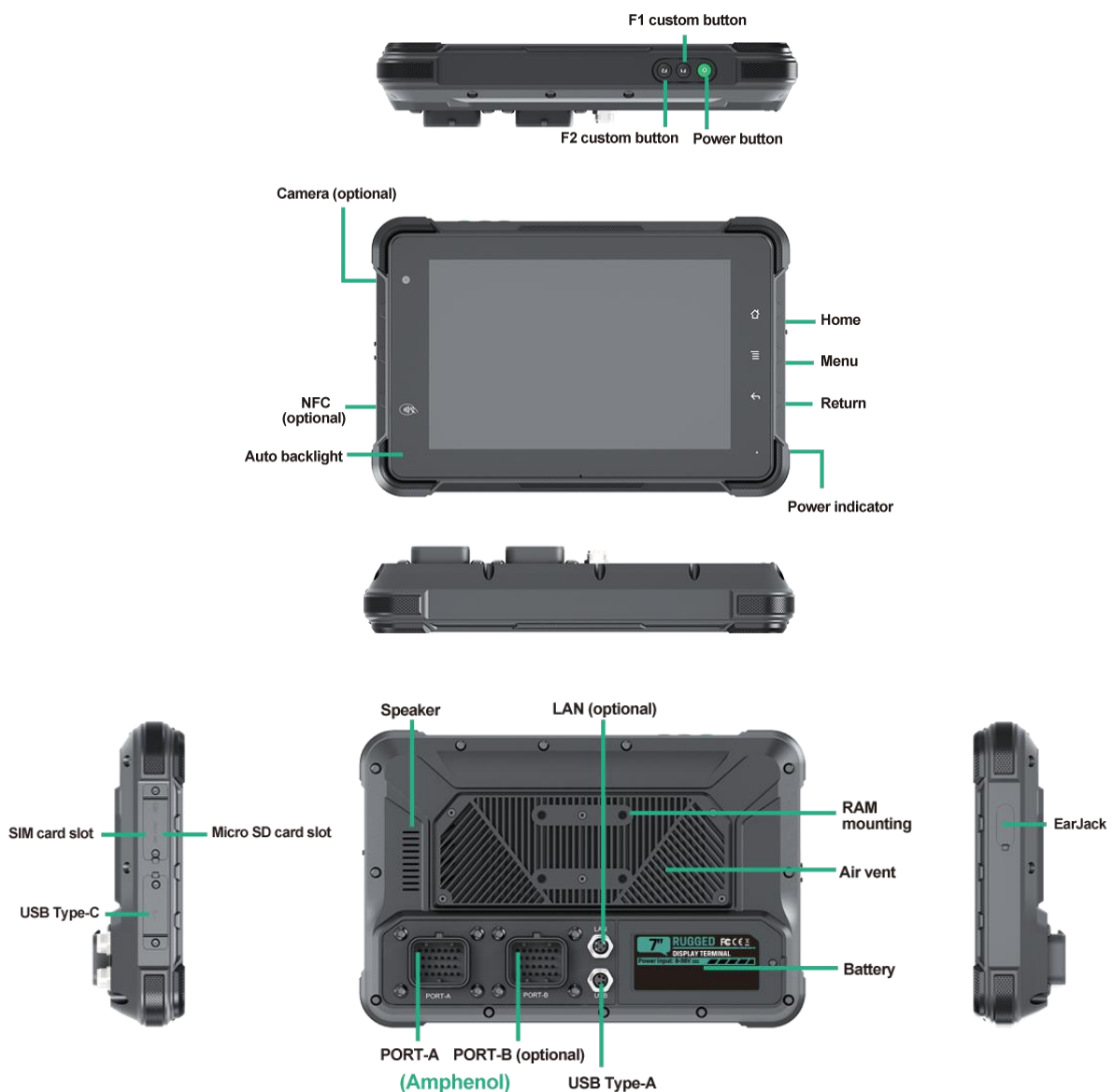
Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or emailing the account representative from vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

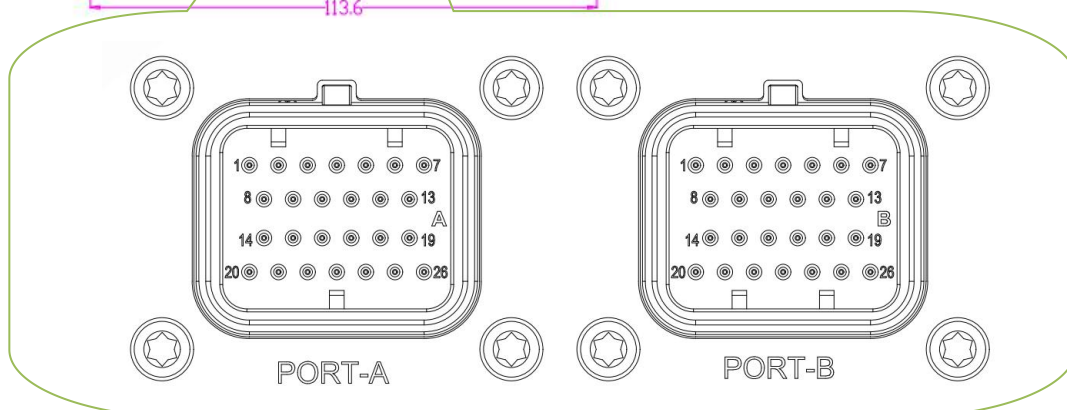
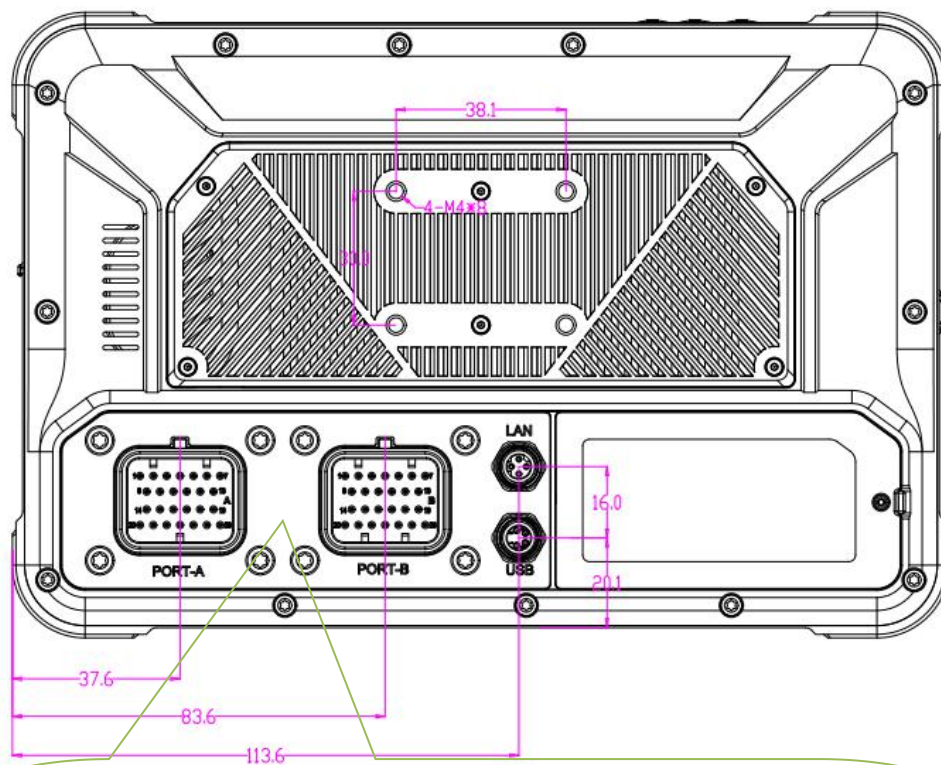
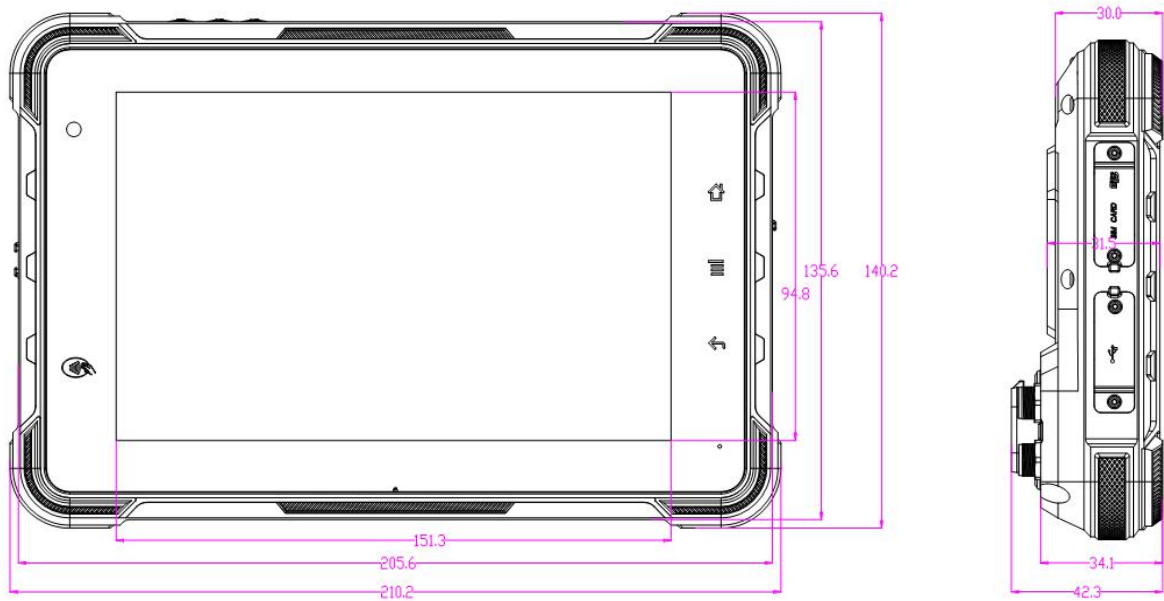
1. Introduction

1.1. Product Highlights

- Qualcomm ARM Kryo TM 260 64-bit Octa-core Processor, 2.0 GHz
- Android 13 Operating System
- Comply with IP67 Rating
- Support WIFI, Bluetooth, LTE, GNSS, NFC and 2800mAh rechargeable battery
- 7 inch IPS Display, physical 1280x800 resolution, 800cd/m², multi-point capacitive touch
- Support Max 4×AHD camera inputs

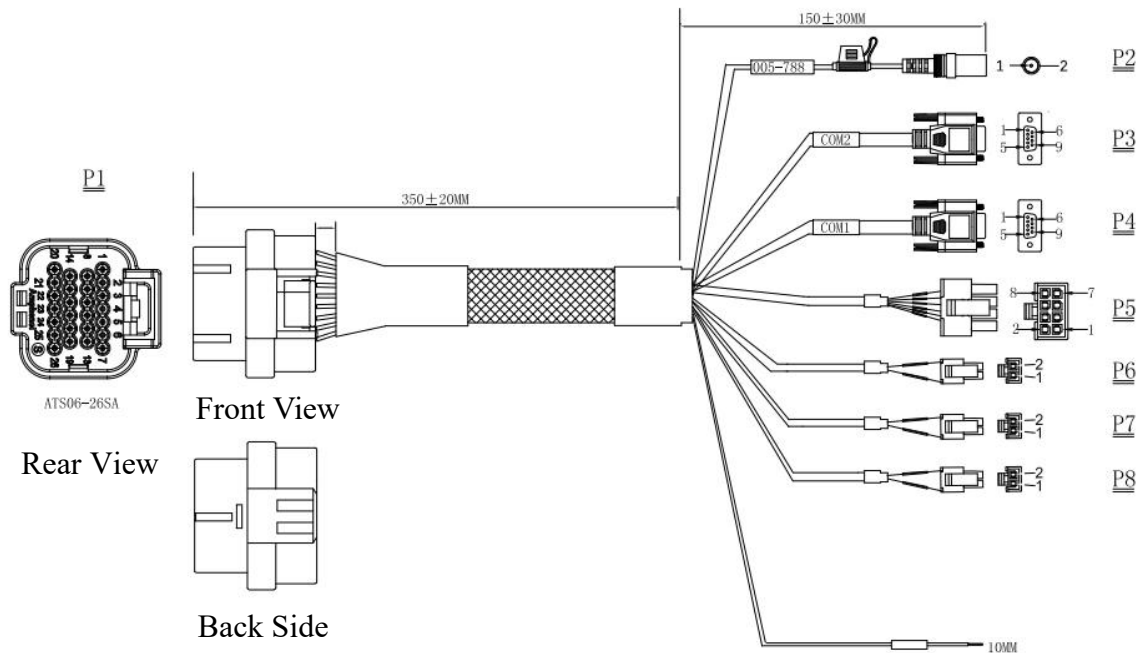
1.2. Parts of the Device





1.3. Extended Cable Definition

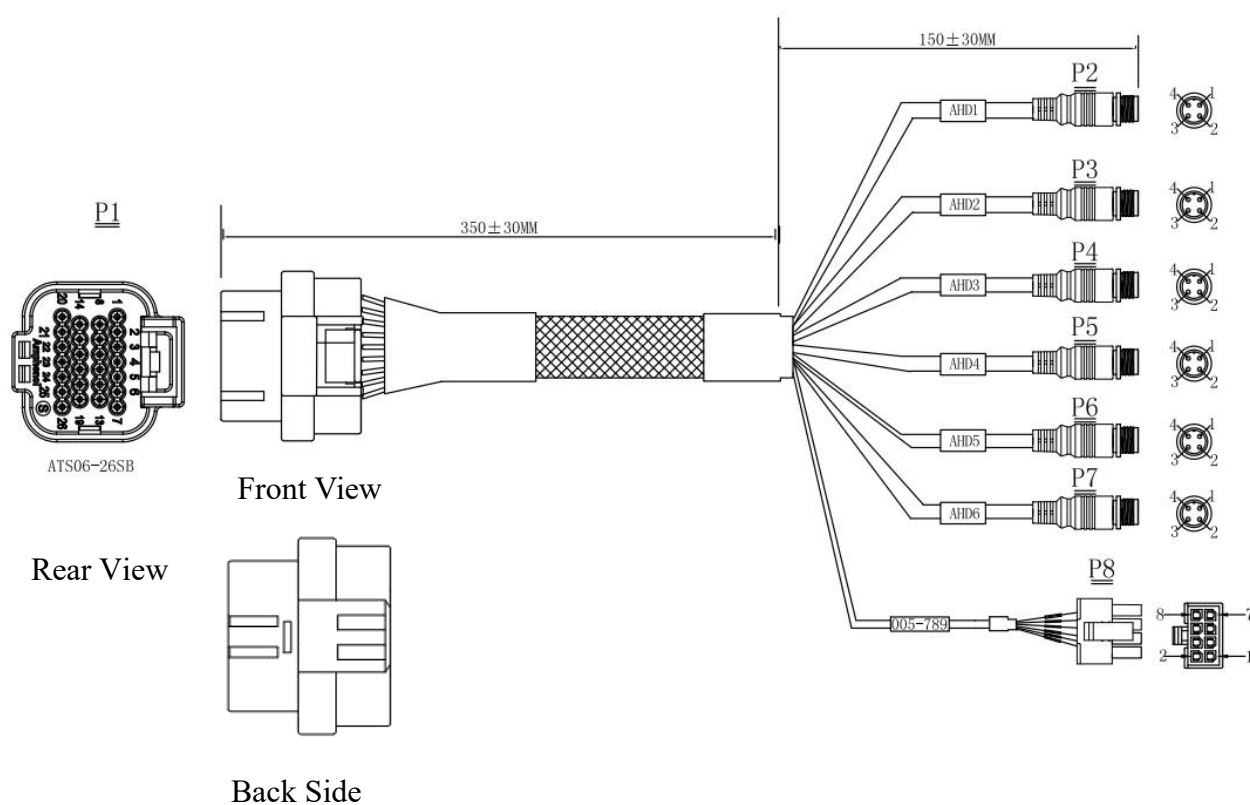
1.3.1. PORT-A Cable (Optional)



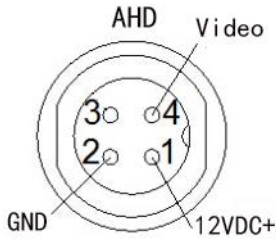
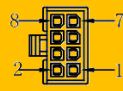
NO.	Item	Definition						
P1	ATS06-26SA	1	2	3	4	5	6	7
		Power IN	Power IN	GPO 3	GPO 2	GPO 1	RS485-A	RS485-B
		8	9	10	11	12	13	
		Power GND	GND	GPI 1	GPI 2	GPI 3	GND	
		14	15	16	17	18	19	
		Power GND	RS232_T X D4	RS232_T XD 0	GND	CAN1_H (optional)	CAN1_L (optional)	
		20	21	22	23	24	25	26
		Power Output	ACC_IN	RS232_R XD4	RS232_TX D0	GND	CAN0_H	CAN0_L

P2	DC Power Input	DC Input Voltage: DC8-36V (ISO 7637-II compliant)							
		Pin		Define					
		1		DC+					
		2		DC-					
P3	COM2 (RS232/CANBUS, DB9- Female)	COM2=/dev/ttyHSL2							
		Pin		Define		Pin		Define	
		1		NC		6		NC	
		2		UART0_TXD		7		NC	
		3		UART0_RXD		8		NC	
		4		NC		9		NC	
		5		GND					
P4	COM1 (RS232,DB9- Female)	COM1=/dev/ttyHSL0							
		Pin		Define		Pin		Define	
		1		NC		6		NC	
		2		DEBUG_TXD		7		NC	
		3		DEBUG_RXD		8		NC	
		4		NC		9		NC	
		5		GND					
P5	GPIO MX3.0, 2×4P	1-orange	2-gray	3-white	4-blue	5-yellow	6-pink	7-brown	8
		GPI 1	GPI 2	GPI 3	GPO 1	GPO 2	GPO 3	GND	NC
P6	Power Output	Pin		Define					
		1		POWER OUTPUT					
		2		GND					
P7	CAN Bus	Pin		Define					
		1		CAN0_H					
		2		CAN0_L					
P8	RS485	RS485=/dev/ttyHSL3							
		Pin		Define					
		1		RS485-A					
		2		RS485-B					
	Yellow Bare Wire ACC Input	Connect with vehicle ACC power. Voltage range: 0-36V. Positive trigger, V(IH) threshold is 4.2V. Note: With ACC function, the tablet could be start up automatically once wire ACC_IN received a voltage more than 4.2 Volts and DC power supply is between 8~36V.							

1.3.2. PORT-B Cable (Optional)

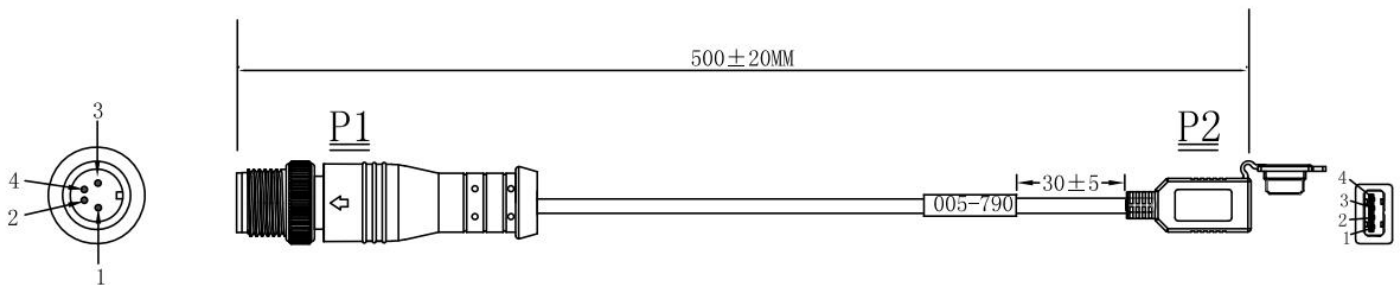


NO.	Items	Definition						
P1	ATS06-26SB	1	2	3	4	5	6	7
		GND	AHD6 (optional)	AHD5 (optional)	AHD4	AHD3	AHD2	AHD1
		8	9	10	11	12	13	
		GND	GND	GND	GND	GND	GND	
		14	15	16	17	18	19	
		V_GPI1	V_GPI2	V_GPI3	V_GPI 4	V_GPI 5	V_GPI 6	
		20	21	22	23	24	25	26
		GND	AHD1_PWR	AHD2_PW R	AHD3_PW R	AHD4_P WR	AHD5_PWR (optional)	AHD6_PWR (optional)

P2 - P5	AHD1 to AHD4	PIN		Define				
		1		12V DC Output				
		2		GND				
P6	AHD5 (optional)	3		NC				
P7	AHD6 (optional)	4		Video Input				
P8	GPIO 	1	2	3	4	5	6	7
		V_GPI1	V_GPI2	V_GPI3	V_GPI 4	V_GPI 5	V_GPI 6	GND

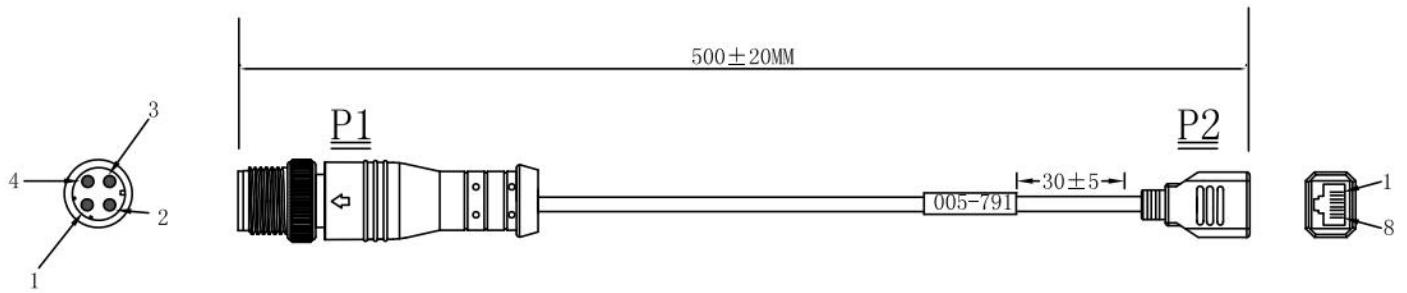
1.3.3. M8 Cable (Optional)

1. USB (Optional)



NO.	Item	Definition	
P1	M8-A	Pin	Define
		1	GND
		2	Data-
		3	VBUS
		4	Data+
P2	USB	USB2.0 Type-A (can't be used simultaneously with USB Type-C on the device)	
		Pin	Define
		1	VBUS
		2	Data-
		3	Data+
		4	GND

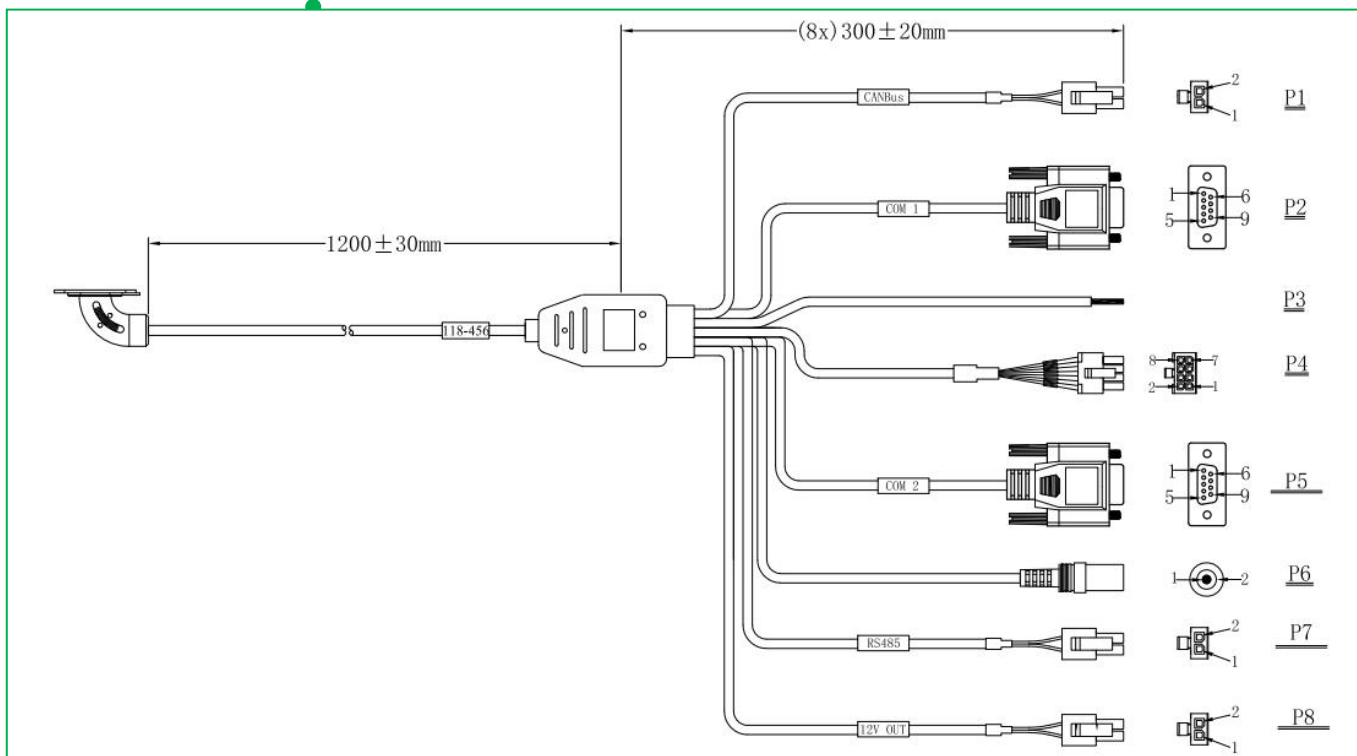
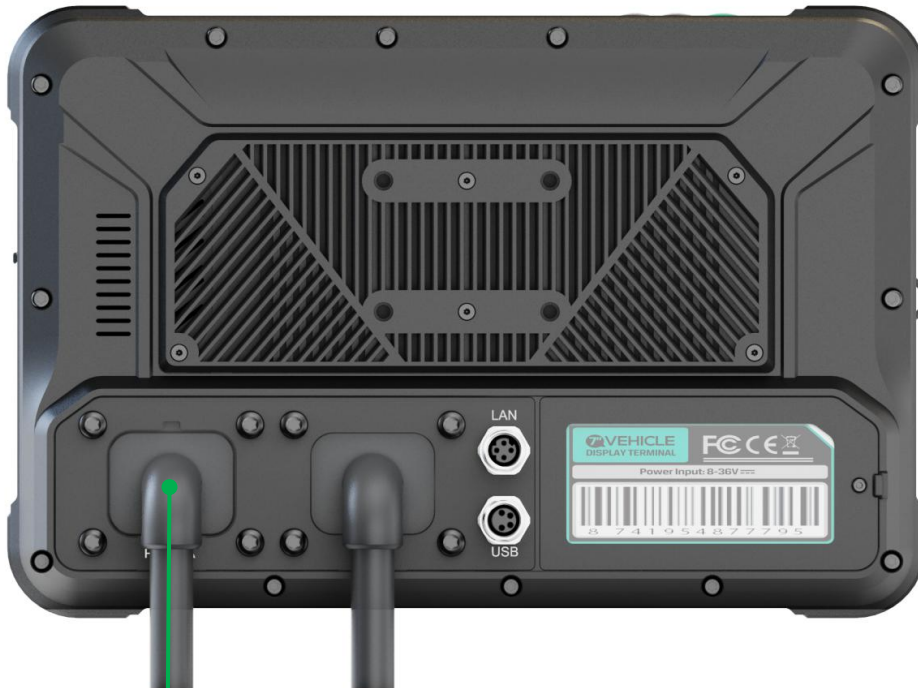
2. RJ45 (Optional)

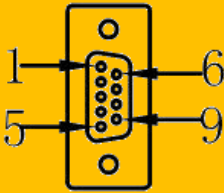
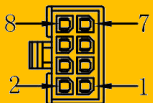
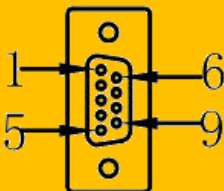


NO.	Item	Definition				
P1	M8-D	Pin	Define			
		1	TXP			
		2	TXN			
		3	RXP			
		4	RXN			
P2	RJ45	Pin	Define	Pin	Define	
		1	TXP	5	NC	
		2	TXN	6	RXN	
		3	RXP	7	NC	
		4	NC	8	NC	

1.4. All-in-one Cable Interfaces Definition

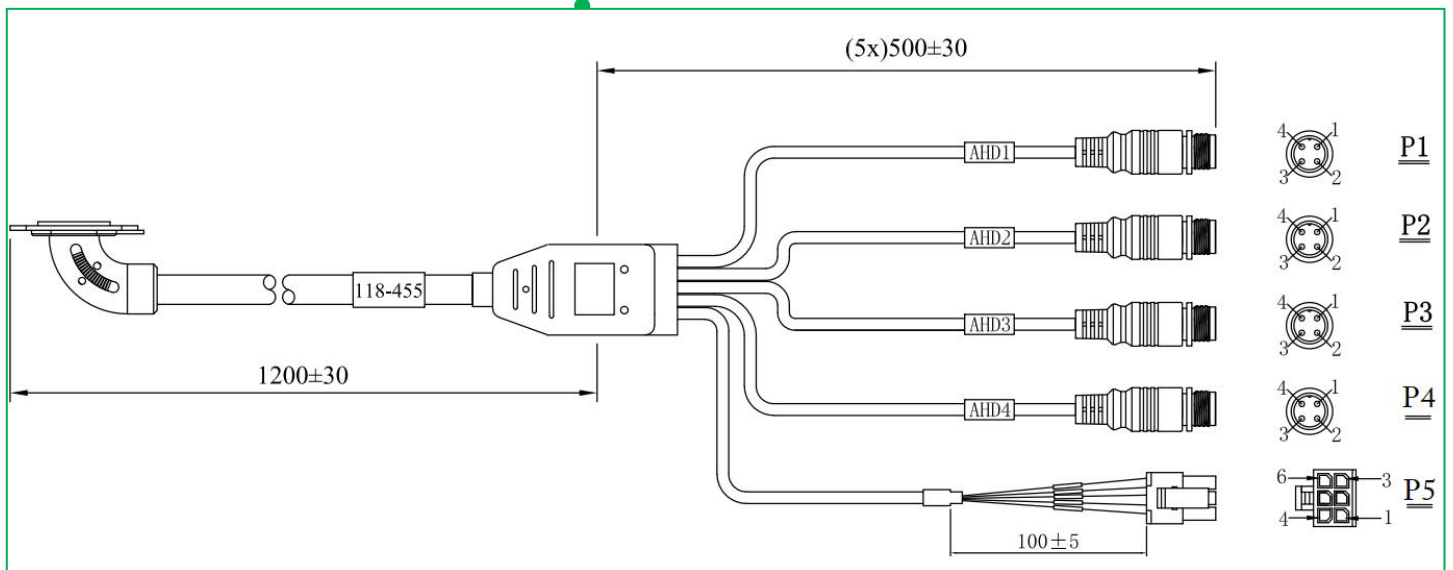
1.4.1. Standard Version

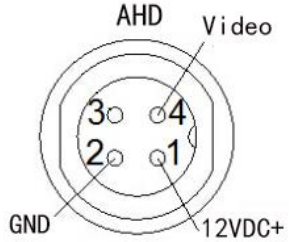
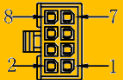


NO.	Item	Definition							
P1	CAN Bus 	Pin	Define		Color				
		1	CAN0_H		red				
		2	CAN0_L		black				
P2	COM1 (RS232,DB9-female) 	COM1=/dev/ttyHSL0							
		Pin	Define		Pin	Define			
		1	NC		6	NC			
		2	DEBUG_TXD		7	NC			
		3	DEBUG_RXD		8	NC			
		4	NC		9	NC			
		5	GND						
P3	Yellow Bare Wire ACC Input	Connect with vehicle ACC power. Voltage range: 0-36V. Positive trigger, V(IH) threshold is 4.2V. Note: With ACC function, the tablet could be start up automatically once wire ACC_IN received a voltage more than 4.2 Volts and DC power supply is between 8~36V.							
P4	GPIO MX3.0 2×4P 	1-red	2-brown	3-orange	4-yellow	5-green	6-blue	7-black	8
		GPI 1	GPI 2	GPI 3	GPO 1	GPO 2	GPO 3	GND	NC
P5	COM2 (RS232, DB9-female) 	COM2=/dev/ttyHSL2							
		Pin	Define		Pin	Define			
		1	NC		6	NC			
		2	UART0_TXD		7	NC			
		3	UART0_RXD		8	NC			
		4	NC		9	NC			
		5	GND						
P6	DC	DC input Voltage: DC8-36V (ISO 7637-II compliant)							
		Pin	Define						
		1	DC+						
		2	DC-						
P7	RS485 	RS485=/dev/ttyHSL3							
		Pin	Define		Color				
		1	RS485-A		red				
		2	RS485-B		black				
P8	Power Output 	Pin	Define		Color				
		1	POWER OUTPUT		red				
		2	GND		black				

1.4.2. Optional Cable

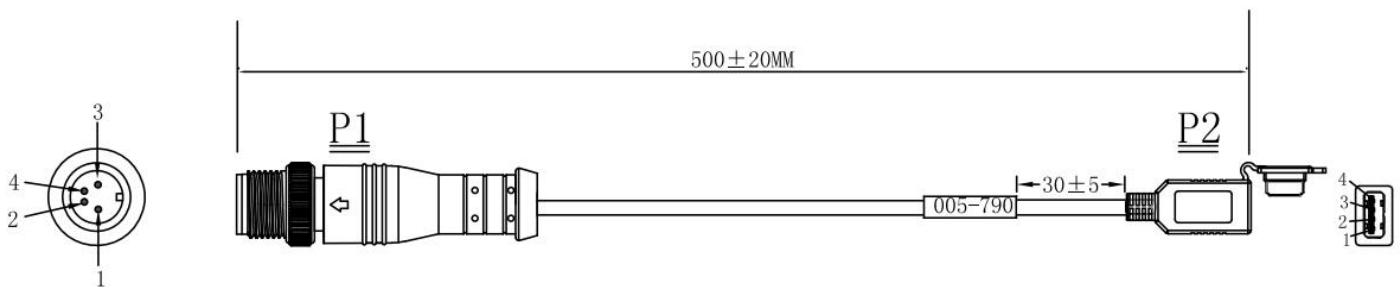
1.4.2.1. AHD Cable



NO.	Item	Definition						
P1-P4	AHD1 to AHD4	Pin		Definition				
		1		12VDC OUTPUT				
		2		GND				
		3		NC				
		4		VIDEO IN				
P5	GPIO	1	2	3	4	5	6	7
		V_GPI1	V_GPI2	V_GPI3	V_GPI 4	V_GPI 5	V_GPI 6	GND

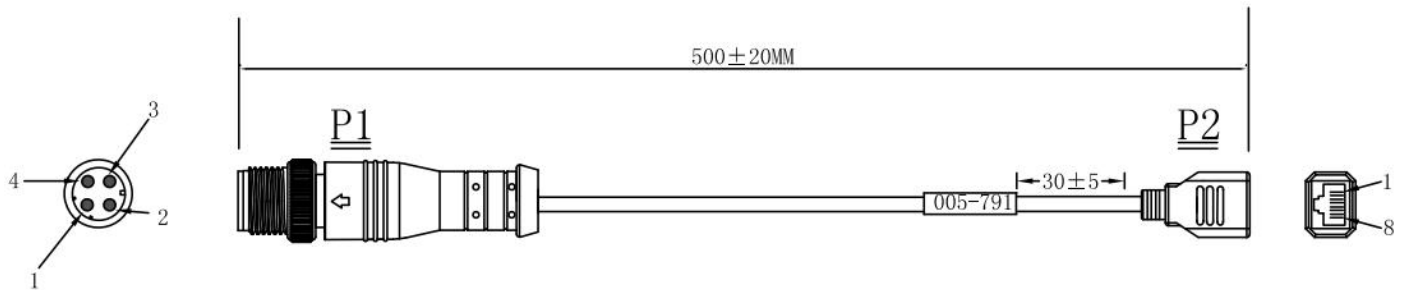
1.4.2.2. M8 Cable

1. USB



NO.	Item	Definition	
P1	M8-A	Pin	Define
		1	GND
		2	Data-
		3	VBUS
		4	Data+
P2	USB	USB2.0 Type-A (Can not be used with USB Type-C simultaneously)	
		Pin	Define
		1	VBUS
		2	Data-
		3	Data+
		4	GND

2. RJ45



NO.	Item	Definition				
P1	M8-D	Pin	Define			
		1	TXP			
		2	TXN			
		3	RXP			
		4	RXN			
P2	RJ45	Pin	Define	Pin	Define	
		1	TXP	5	NC	
		2	TXN	6	RXN	
		3	RXP	7	NC	
		4	NC	8	NC	

1.5. Specifications

System	CPU	Qualcomm ARM Kryo™ 260 64-bit Octa-core Processor 2.0 GHz			
	OS	Android 13			
	GPU	Adreno™ 610			
Storage	RAM	LPDDR4 4GB (standard) / 8GB (optional)			
	ROM	eMMC 64GB (standard) /128GB (optional)			
Display	LCD	7 Inch Digital IPS Panel, 1280 × 800, 1000 nits			
	Screen	Multi-point Capacitive Touch Screen			
Audio	Integrated microphone				
	Integrated speaker 8Ω/2W				
Communication	GNSS ¹	GPS/GLONASS/Galileo/QZSS/BDS; Positioning accuracy 2.5m			
		Paramete	Description	Typ.	Unit
		Sensitivity	Capture	-147	dBm

				Recapture	-158	
				Track	-159	
			TTFF (Time To First Fix)	Cold Start	33	s
				Warm Start	22	
				Hot Start	1.2	
			Positioning Accuracy	CEP-50	2.49	m
	2G/3G /4G ¹	US Version North America	LTE FDD: B2/B4/B5/B7/B12/B13/B14/B17/B25/B26/B66/B71 LTE-TDD: B41			
EM Version Europe/ India/ Korea/ South Asia/ Latin America/ Australia / South Africa		LTE FDD: B1/B2/B3/B4/B5/B7/B8/B20/B28 LTE TDD: B38/B39/B40/B41 WCDMA: B1/B2/B4/B5/B8 GSM: 850/900/1800/1900 MHz				
WIFI ¹		802.11a/b/g/n/ac; 2402~2482 MHz 5180~5825 MHz				
Bluetooth ¹		2.1 + EDR/ 3.0/ 4.1 LE/ 4.2 BLE/ 5.0 LE				
NFC		● ISO/IEC 14443A, ISO/IEC 14443B PICC mode ● ISO/IEC 14443A, ISO/IEC 14443B PCD mode designed according to NFC Forum ● digital protocol T4T platform and ISO-DEP ● FeliCa PCD mode ● MIFARE PCD encryption mechanism (MIFARE 1K/4K) ● NFC Forum tags T1T, T2T, T3T, T4T and T5T NFCIP-1, NFCIP-2 protocol ● NFC Forum certification for P2P, reader and card mode ● FeliCa PICC mode ● ISO/IEC 15693/ICODE VCD mode ● NFC Forum-compliant embedded T4T for NDEF short record				
Sensor	Acceleration, Gyro sensor, Compass, Ambient light sensor					
Button	1× Power button; 2× Customizable buttons					
Interface	USB Type-C	TYPE-C3.1 (USB TYPE-A and USB TYPE-C cannot be used simultaneously), USB Type-C does not support to				

		charge the built-in battery
	Micro SD Slot	1 × Micro SD card slot, support up to 1TB
	SIM Slot	1 × Nano SIM card slot (default), eSIM card (optional)
	Earphone Jack	3.5mm headphone jack compliant with CTIA standard
	Connectors	PORTA-26PIN PORTB-26PIN ² 1× M8-A-4PIN ² 1× M8-D-4PIN ²
Camera²	Front: 5.0 megapixel camera (optional)	
Power Supply	Power	DC 8-36V
	Battery	3.7V, 2800mAH removable battery, can be fully charged in 3 hours, the device can be used for 2-3 hours when fully charged (the usage time varies depending on the device usage status), the maximum charging current of the battery is 1A
Physical dimensions	210.2×140.2×42.3mm (L×W×H)	
Weight	Approximately 885g	
Environmental Reliability	Drop Test	1.2m drop-resistance
	IP Rating	IP67
	Operating Temperature	-20°C ~ 65°C (-4°F ~ 149°F)
	Storage Temperature	-30°C ~ 75°C (-22°F ~ 167°F)
Extended Interface		
Serial Port	COM2(ttyHSL2)	1× RS232_2 (Optional with RTS and CTS) If choose CAN BUS_2, the RS232_2 will be occupied
	COM1(ttyHSL0)	1× RS232_1
	RS485(ttyHSL3)	× 1
CANBUS	CAN Bus_1	
	CAN Bus_2 ³	
RJ45 ²	× 1 (100Mbps)	
USB Type-A	1× USB2.0 (USB TYPE-A and USB TYPE-C cannot be used simultaneously)	
GPIO	3× GPI, 3× GPO (standard)	
	2× GPI, 2× GPO; COM2 with RTS&CTS (Optional)	
ACC	× 1 (0-36V)	

Power	Power Input	× 1 (8-36V) support system to read the power input voltage of the device
	Power Output	× 1 (8-36V) Power Input loops out Power Output, maximum current 1A, system software can control the output switch
Video Input ²	×4/6, AHD 720P/1080P, PAL/NTSC, with 12V 500mA output, for AHD camera power supply	
GPIO Input ²	× 6, be used with the 4/6-CH AHD function, it can realize functions such as zooming in the camera preview interface after triggering IO	

¹ Default internal antenna, optional external Fraka antenna

² Optional function

³ Optional, and occupies COM2 function

2. Getting Started

2.1. Device Common Operations

	Start	Restart	Shutdown	Sleep	Wake
Power Button	Press and hold the power button for more than 2 seconds, it will take about 35 seconds to start the system. When ST-7 starts normally, the power indicator light stays on.	1. Press and hold the power button for 3 seconds, and select "Restart" in the pop-up box. 2. Press and hold the power button for 8 seconds to force restart the device	Press and hold the power button for more than 2 seconds until the shutdown prompt pops up, and then click the "Shut Down" option.	Short press the power button to enter sleep mode	Short press the power button to wake up the tablet
ACC Wire	Connect ACC when DC input on PORT A cable is connected		ACC for tablet shutdown, - see "3.2.3 Using ACC" for more details	ACC for tablet sleep, see "3.2.3 Using ACC" for more details	ACC for tablet wake up, see "3.2.3 Using ACC" for more details

- Typical power consumption (15W): brightness 80%, volume 100%, map simulation navigation, (4Gping Baidu, 1024KB sending packet), dual cards working at the same time, AHD four-way camera input and recording.
- Maximum power consumption (20W): brightness 100%, volume 100%, map simulation navigation, 4G download, CPU and DDR100%, dual card works at the same time, AHD four-way camera input and recording.
- Hibernation power consumption (3W): Short press the power button to rest screen, the serial port software continuously sends and receives data, and the dual cards work at the same time.
- Standby power consumption (10W): serial port software continuously sends and receives data, dual cards work at the same time, and AHD four cameras input.

- ST-7 shutdown state:
 Battery full state: 0W
 Average power consumption in battery not fully charged state: 4.1W

2.2. Power Indicator Definition

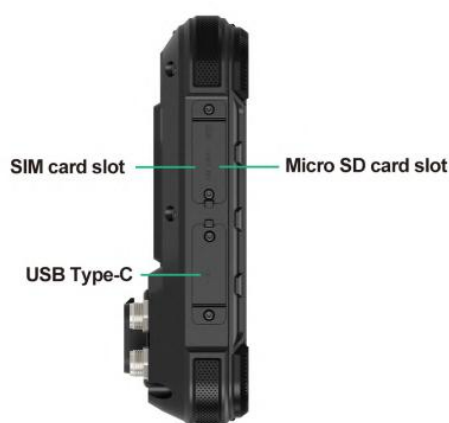
Proper operation of power on/off the device will be beneficial to ensure the stability of the system. The device status indicated by the indicator color as described in the following table for the standard ST-7.

Table 2.1.1 ST-7 Indicator color and device status table

LED State Power State	Device Status			
	Start	Shutdown	Burning Mode	Low Power Mode
DC Input	Fully charged: Green Not fully charged: Red	Fully charged: Off Not fully charged: Red	Red and green lights flash alternately	After entering low power mode, the power indicator changes from green to red.
No DC Input	Green	Light off		Not meet the condition of low power mode
No Internal Battery	Green	Light off		After entering low power mode, the power indicator changes from green to red.

When the red or green light flashes, the device is abnormal. Please cut off the external power supply immediately and contact the factory.

2.3. Installation of Micro SD Card and Nano SIM Card

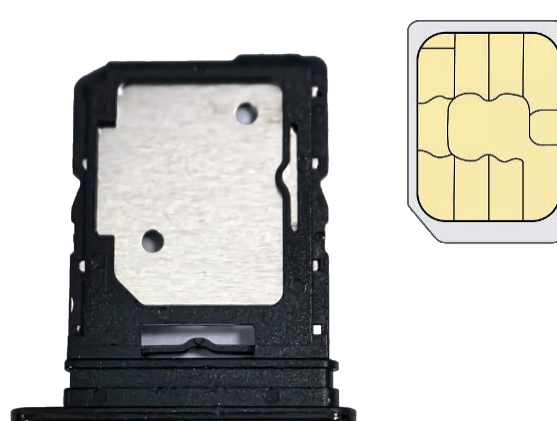


When install the micro SD card or Nano SIM card:

- a. Find the installation location of Nano SIM card slot or Micro SD card slot on the device.
- b. Use the removal tool to remove the Nano SIM card tray.
- c. To install Nano SIM card or Micro SD card, please put the card into the card tray in the correct direction, and then push the card tray horizontally into the card slot in the correct direction.



Micro SD Card Installation Direction



Nano Sim Card Installation Direction

- d. If you want to take out the Nano SIM card or Micro SD card, please use the tweezers.
- e. After installation, lock the interface cover with screws.



2.4. Charging the Battery

The battery was partially drained during shipping. When charging the battery for the first time, be sure to fully charge it.

Tips:

When the tablet is working, please keep it powered by external DC power supply. To ensure the battery life and performance, if the tablet is stored in the warehouse for more than 3 months, it is recommended to charge the

battery every 3 months.

2.4.1. Charging with the Power Adapter

To charge the battery with the provided power adapter:

- a. The DC power supply voltage input range is 8-36V. When powering a tablet, please ensure the adapter with corresponding specifications.

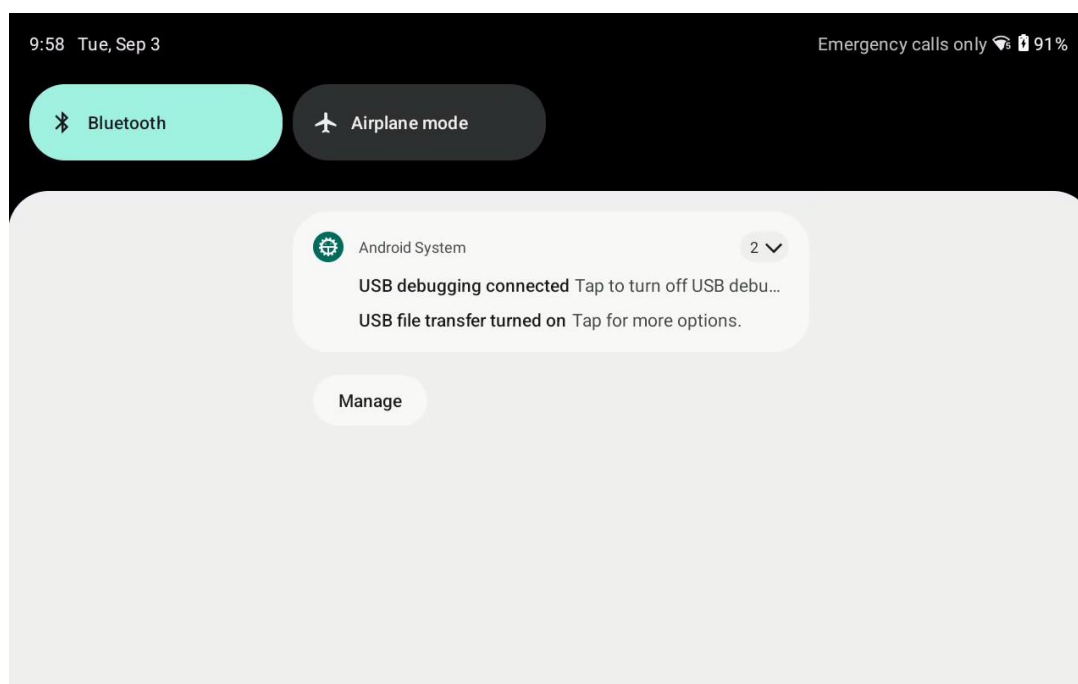


Note:

The Type-C interface does not support charging function

2.4.2. Checking the Battery Level

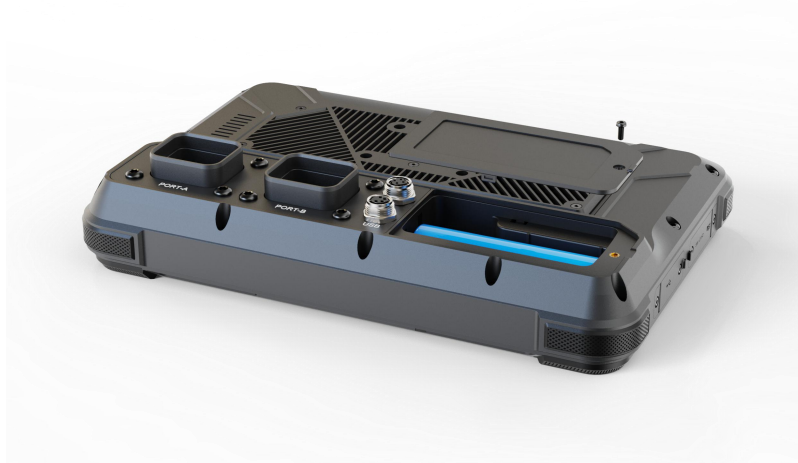
- a. During charging, the battery indicator will appear in the status bar to show the charging percentage. To view the charging percentage, swipe down on the Status Bar and you will see the charging percentage.



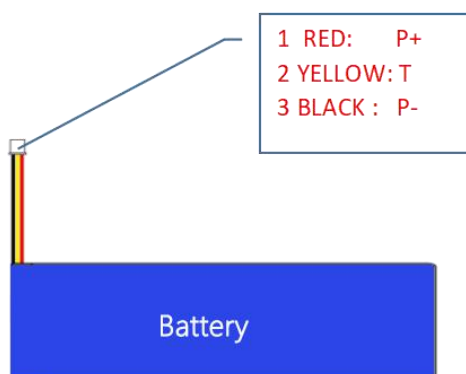
2.4.3. Installing/Replacing the Battery

In case you need to install or replace the battery, follow the steps below to access the battery chamber and replace the battery.

1. Put the device on a flat surface, with the rear side facing up. Use a T6 Torx wrench to loosen the fixing screws on the back cover.



2. Before re-install or replace a battery, PIN definition and direction of the battery connector must be checked, to make sure the contact PINs are aligned correctly.



3. Assemble the battery cover, and use a T6 Torx wrench to fix the screws.

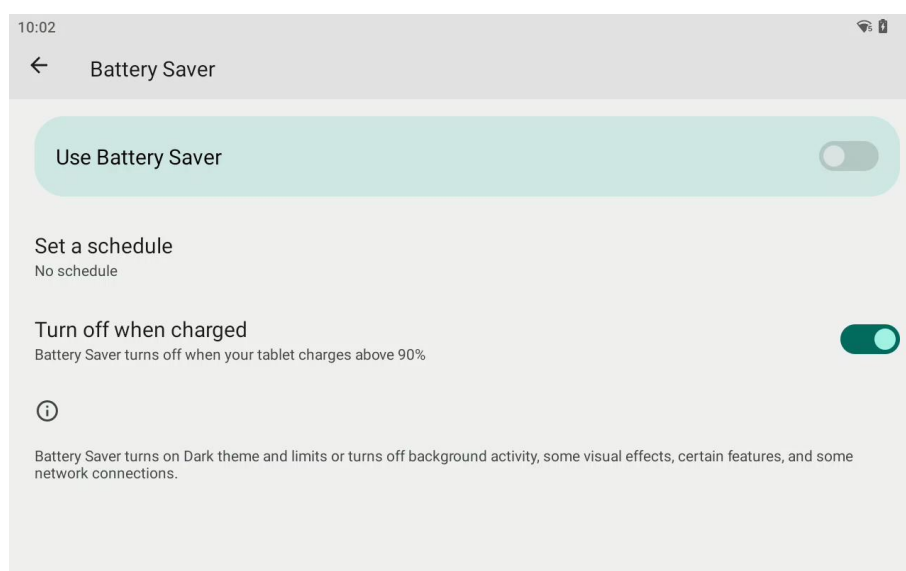


2.4.4. Optimizing Battery

If the ST-7 does not continue to charge via DC power, to optimize the operating time of the battery, it is

recommended to do the following:

1. Decrease the LCD display brightness
2. Set a shorter timeout of inactivity to allow the screen enter sleep mode.
3. Turn off the display if you are not using it.
4. Turn off Wi-Fi, Bluetooth or GPS function if you are not using it
5. Set a battery protection plan to automatically turn on battery protection when the battery is below the set threshold.



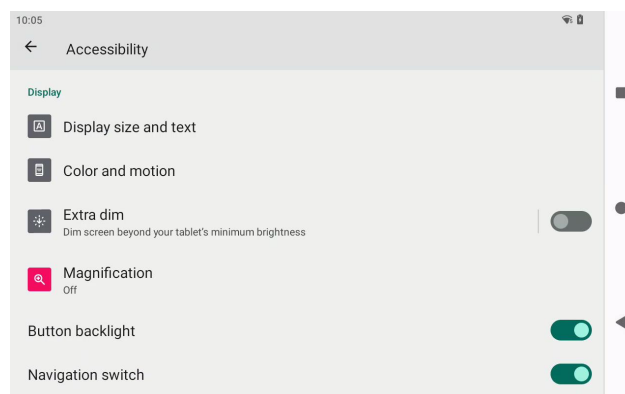
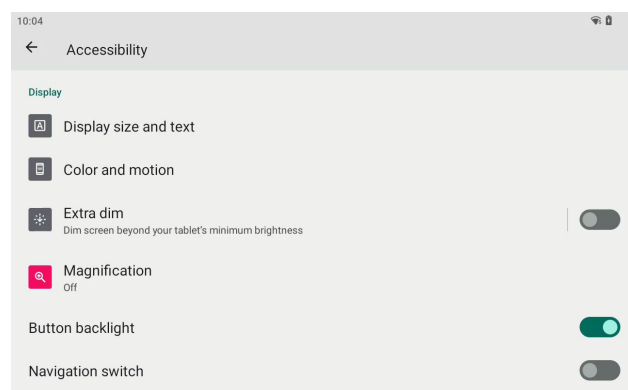
3. Using ST-7 Function

3.1. Software Function

3.1.1. Virtual Button

Find the “Navigation switch” (System Navigation) button in the “Settings→Accessibility→ Navigation switch” to control the display or hide the virtual buttons of the screen.

You can use three virtual buttons to return, return to the main interface, and switch APP operations in the background.

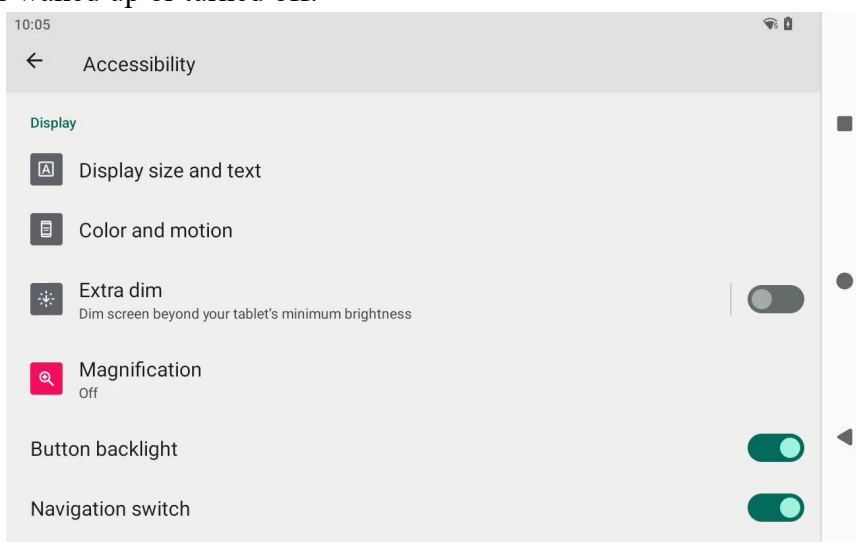


Navigation switch-OFF

Navigation switch-ON

3.1.2. Button Backlight

Find the Button Lights switch in “Settings→Accessibility”. If the switch is turned on, the screen wakes up/off and the button backlight is on/off at the same time; if the switch is turned off, the button backlight is off whenever the screen is waked up or turned off.

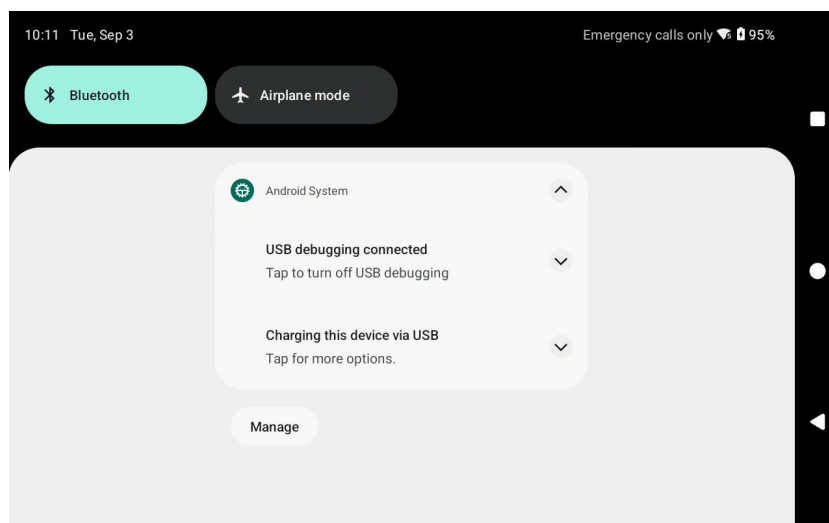


3.1.3. Using USB Function

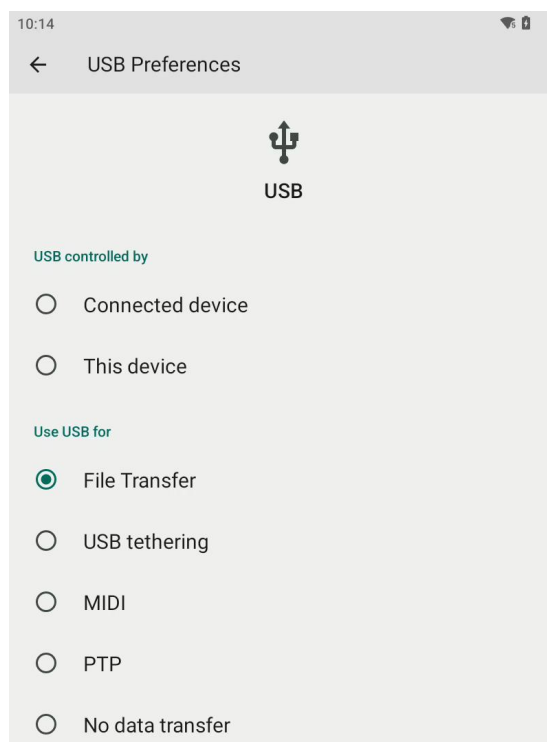
You can transfer files between your computer and the device via USB cable provided, such as pictures or audio files.

3.1.3.1. USB Type-C File Transfer

① Connect the device to the computer by using the Type-C cable to enter the USB debugging mode of the tablet, and it will show open the prompt message on the status bar. Refer to the following figure, click “charging this device via USB⁴” to expand other options.



② Then select “File Transfer”.



⁴ The system displays the USB charging function by default, but the actual hardware does not support USB charging function

③ Find “Device” in “This PC” on the computer.



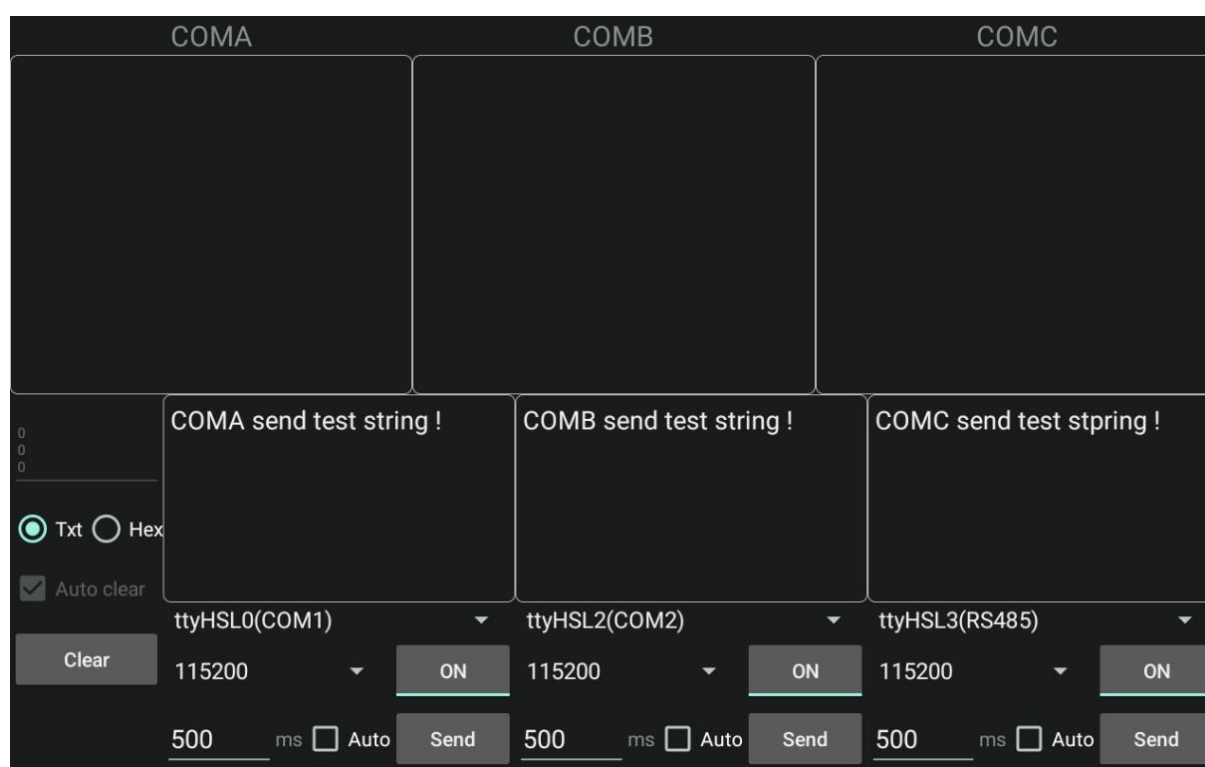
3.1.3.2. USB TYPE-A Instructions

If you want to use the USB TYPE-A function, it needs to ensure that the tablet was disconnect the Type-C cable and connected the M8-A extended cable.

3.2. Hardware Function

3.2.1. Using Serial Port

3.2.1.1. Serial Port Self-test



Com Assistant DEMO Main Interface

RS232:

Select the Auto checkbox in the test software interface, click the “SEND” button, connect Pin2 and Pin3 of the COM2 (or COM1) interface through a wire, and the receiving window will display the Received data of the port. The received data is consistent with the sent data, indicating that the serial port can communicate normally.

RS485:

Select RS485 as the serial port, check the Auto checkbox in the test software interface, click the “SEND” button, connect the positive pole of the RS485 cable to the positive pole of the RS485 cable of other devices (RS485+/RS485_A), and the negative pole to the negative pole (RS485-/RS485_B). Then, the receiving window of the test software interface will display the received RS485 data. The data received by this device is

the same as the data sent by other RS485 devices, indicating that the RS485 port can communicate normally.

Note:

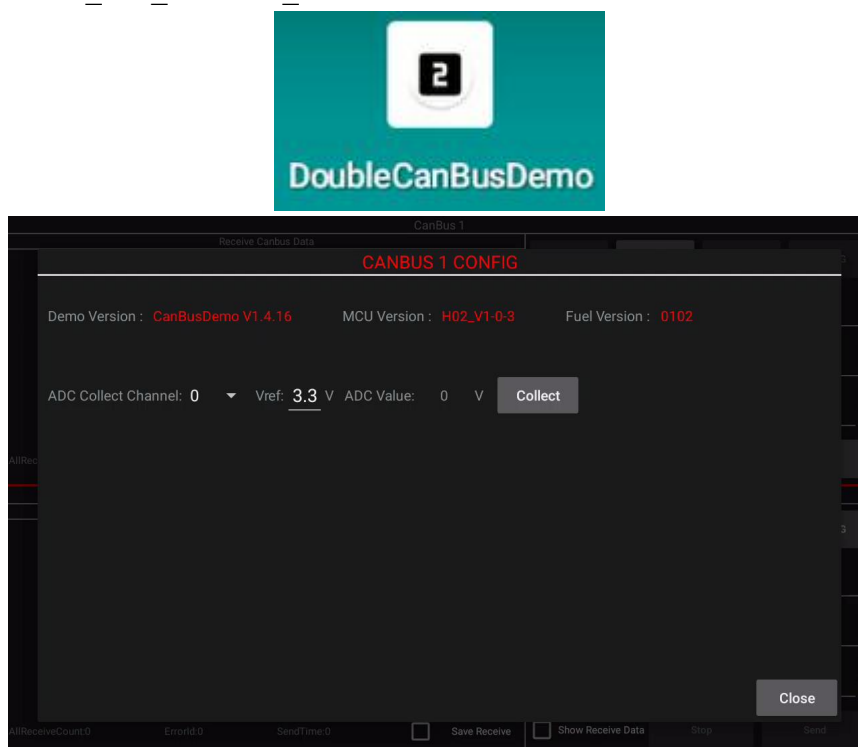
1. When the serial port printing function is enabled on COM1, the port cannot be used as a serial port.
2. When the RS485 connected device is far away, or the RS485 port of the tablet is at the farthest end of the RS232 wire, or the communication baud rate exceeds 115200, it is recommended to connect a 120ohm metal film resistor between RS485_A and RS485_B of the RS485 port.

3.2.2. Using ADC

3.2.2.1. Using ADC DEMO

1. ADC_0 (The input voltage range is 0-90V, and the recognition accuracy is 0.1V) and GPIO input3 function are alternative, ADC_0 is disabled by default
2. ADC_1 is not an external interface, supports to read the DC power voltage connected to the tablet by default.

This software is only used as a reference software for developing ST-7 ADC functions. For specific usage, please refer to “DoubleCAN_Bus_Software_Manual”.

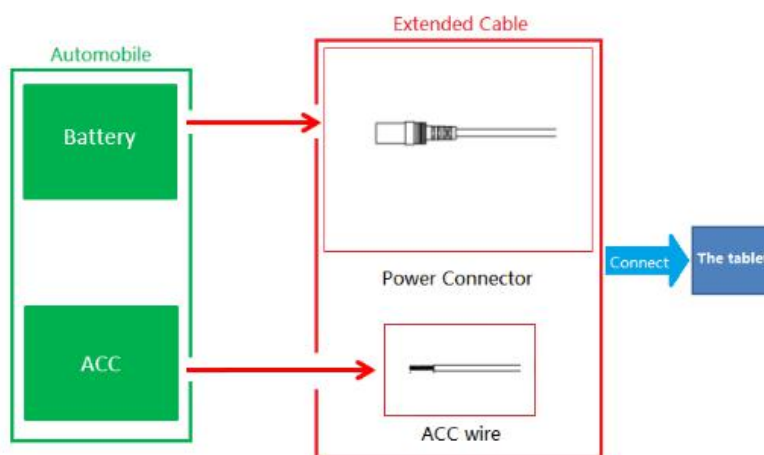


ADC_CONFIG Main Interface

3.2.3. Using ACC

3.2.3.1. ACC Connection Instruction

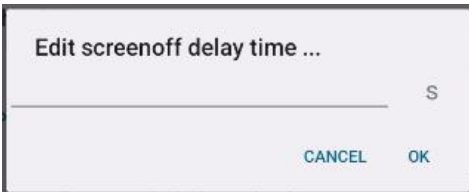
Connecting the tablet with vehicle power supply through extended cable, and connecting ACC wire on extended cable of the tablet with ACC of vehicle.

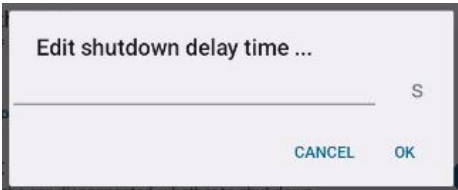


3.2.3.2. ACC Function

Find the ACC function settings in the system settings, path: Settings -> ACC Settings.

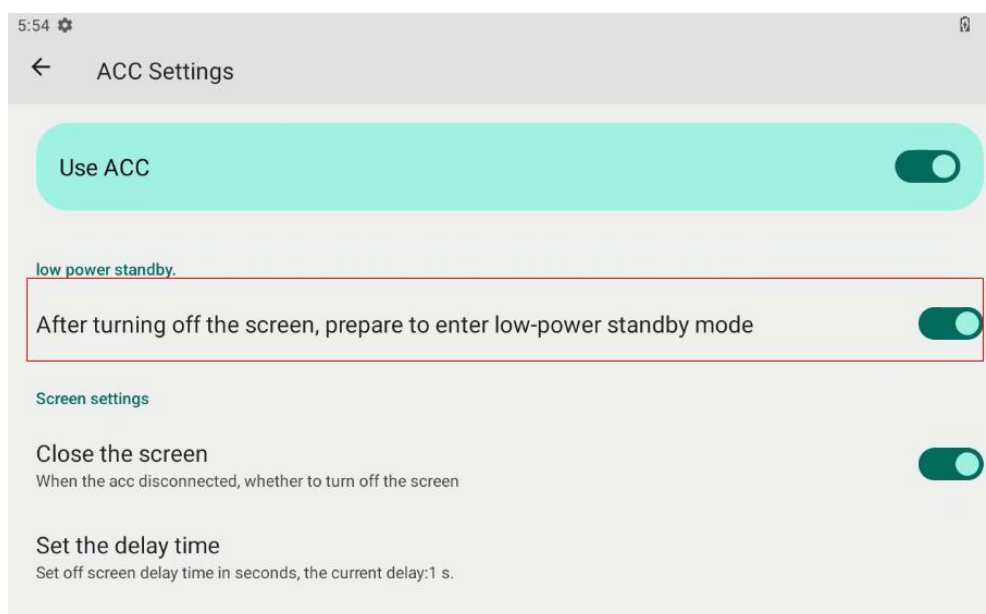


No.	Function
1	ACC switch to control functions of system sleep and device shutdown.
2	Low power mode switch, see “3.2.4 Using low power mode” for details. *Note: After turning on the low power mode switch, the shutdown function by ACC will be forced to turn off.
3	ACC switch to control function of screen sleep.
4	Click the text to display a pop-up window and edit the screen off delay time after ACC is disconnected. The delay time is set to 1s by default. 
5	The switch of screen sleep function to prevent the screen from being accidentally awakened when unattended (for example, when the external power is disconnected), the system can control the screen to sleep again after 30 seconds. 1. Click the “Hide the prompt” button or other blank space to ignore the prompt this time, but the prompt will pop up again after 30 seconds. 2. Click the “Don’t turn off” button to cancel the system-controlled screen sleep function after waking up. 3. Auxiliary use in low power usage scenarios, the screen can re-enter low power mode after being accidentally woken up, see "3.2.4 Using low power mode" for details.

	ACC signal status is OFF The screen will turn off again 30 seconds after the prompt pops up Hide the prompt Don't turn off
6	ACC switch to control function of device shutdown.
7	Click the text to display a pop-up window and edit the shutdown delay time after ACC is disconnected. The delay time is set to 300s by default. 

3.2.4. Using Low Power Mode

ST-7 supports low power mode, which can reduce the power consumption of the device as much as possible, to extend the battery life of the device or reduce the drain of the car battery. In low power mode, the device will adjust its performance and functions to minimize power consumption, including turning on airplane mode, turning off NFC function, etc. By using low power mode, users can use ACC to quickly wake up ST-7 to enter the system and enter the actual working state faster, effectively avoiding problems such as data loss caused by waiting for the device to start up for too long. After entering low power, the power consumption of the whole device can be as low as 0.15W.



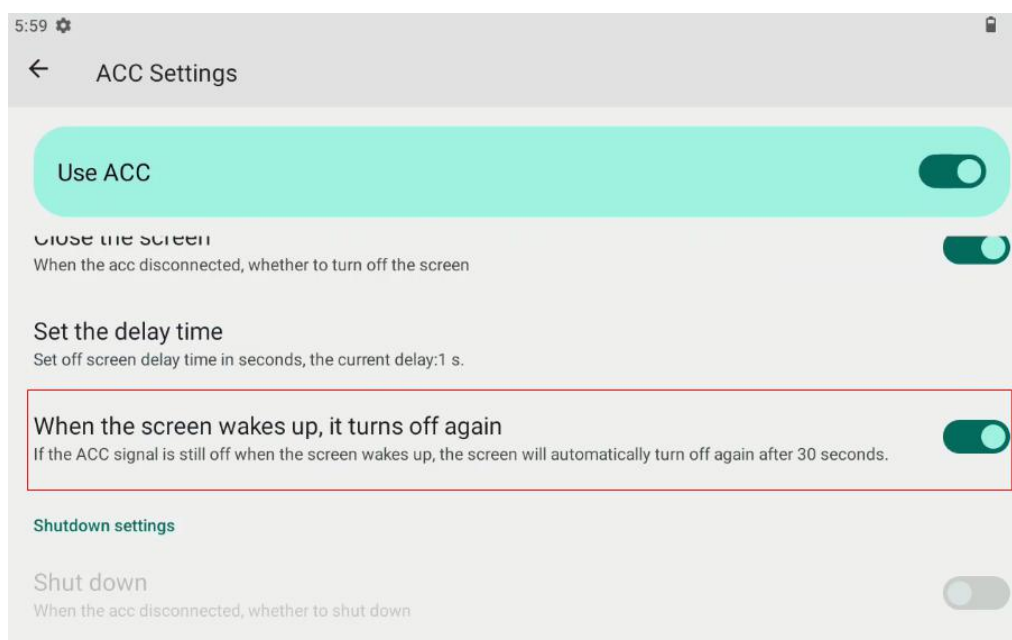
A. Following are the five necessary conditions for entering low power mode:

1. The DC port of the PORT A cable needs to be powered
2. If the ST-7 equipped with built-in battery, the battery must be fully charged with power level of 100%.
3. The screen enters sleep mode:
 - 4-1: Short press the power button to enter screen sleep mode

4-2: Turn on the ACC sleep function. After ACC is disconnected, the screen will sleep after a delay of 1s (default value).

*When successfully enter to the low power mode, the power indicator will turn from green to off.

B. When in low power mode, to prevent the screen from being accidentally woken up when unattended (for example, when the external power supply is disconnected), this function switch can help the device re-enter low power mode.



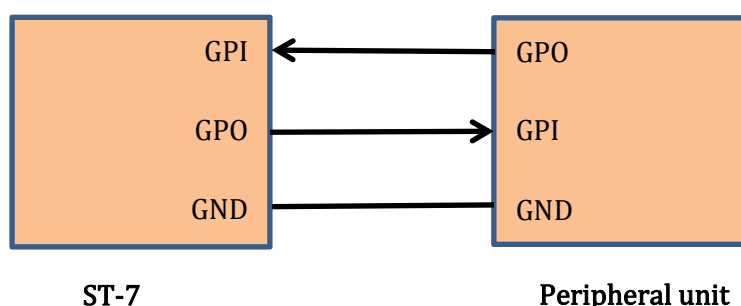
3.2.5. Using GPIO

3.2.5.1. GPIO Wires Instruction

Regarding the definition diagram of GPIO interface, please see the details in Chapter “1.3 Extended Cable Definition”.

3.2.5.2. GPIO Typical Connection

The following figure is a typical connection method of GPIO. In order to ensure communicate normally, please connect the GPIO interface of ST-7A as shown in the following figure.



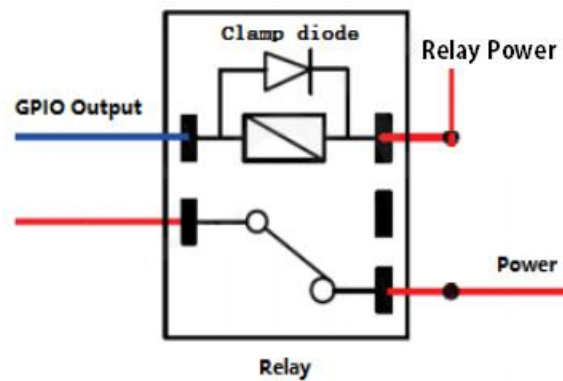
3.2.5.3. GPIO Specification

ST-7 GPIO Specification Descriptions								
PINs	Wire Color	Description	Logic Symbol	Min.	Typ.	Max.	Unit	Note
GPI1	Orange	Digital Input	VIH	1.3	3	30	V	Positive Trigger Input Corresponding to software GPIO3 / system node GPIO123
			VIL	0		0.9	V	
GPI2	Gray	Digital Input	VIH	1.3	3	30	V	Positive Trigger Input Corresponding to software GPIO4 / system node GPIO21
			VIL	0		0.9	V	
GPI3	White	Digital Input	VIH	1.3	3	30	V	Positive Trigger Input Corresponding to software GPIO5 / system node GPIO80
			VIL	0		0.9	V	
GPO 1	Blue	Digital Output ⁵	VOH		-	40	V	Open drain Corresponding to software GPIO0 / system node GPIO82
			VOL	0	-	0.8	V	
GPO 2	Yellow	Digital Output ⁵	VOH		-	40	V	Open drain Corresponding to software GPIO1 / system node GPIO127
			VOL	0	-	0.8	V	
GPO 3	Pink	Digital Output ⁵	VOH		-	40	V	Open drain Corresponding to software GPIO2 / system node GPIO128
			VOL	0	-	0.8	V	
GND	Brown	Ground						
Note: Brown wire (Ground) should be connected to ground of connecting devices.								

⁵ The maximum sink current rating of GPIO output is 500mA.

Application Note:

In case of inductive load of motor, relay, and so on, be sure to use a clamp diode in parallel with external coil. Generation of the counter electromotive force that exceeds the output rating is prevented by discharging through the clamp diode. Relay application circuit is shown in the following figure



3.2.5.4. GPIO_DEMO Instruction

This reference software is used for developing GPIO functions of device. Please refer to the “ST-7 GPIO_DEMO Instruction” for specific usage methods.

name	direction	state	operation
GPIO 0	OUT	HIGH	SET_LOW
GPIO 1	OUT	HIGH	SET_LOW
GPIO 2	OUT	HIGH	SET_LOW
GPIO 3	IN	HIGH	READ
GPIO 4	IN	HIGH	READ
GPIO 5	IN	HIGH	READ
READ_ALL		SET_ALL_LOW	

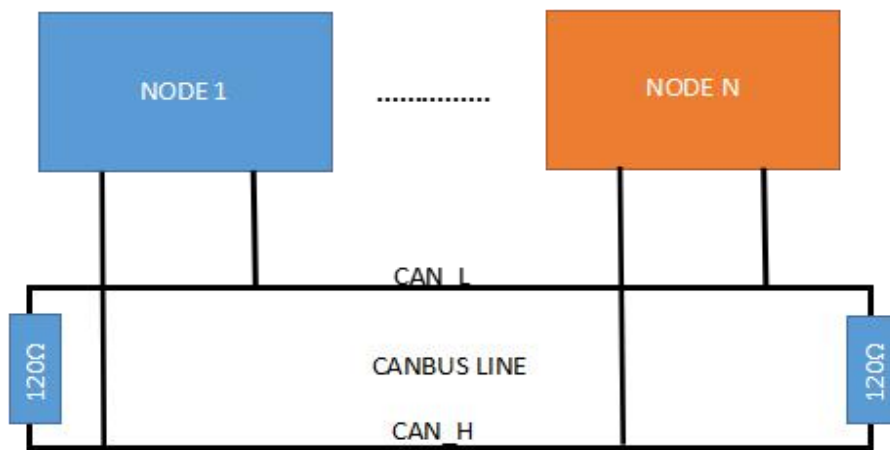
GPIO_DEMO Main Interface

3.2.6. Using CANBUS (Optional)

3.2.6.1. CAN BUS Typical Connection

The CANBUS connection method is shown in the following figure:

When using high-speed transmission (more than 250kbps) on the CAN Bus, in order to ensure the transmission quality of the signal, it is recommended to connect a 120Ω terminal matching resistor at each end of the CAN bus.

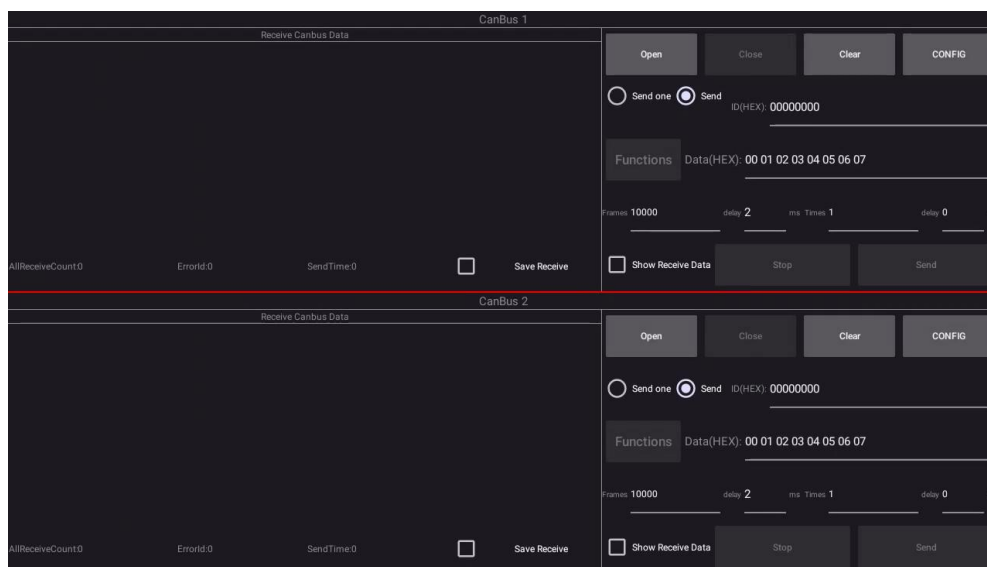


Recommended CANBUS Connection Diagram

3.2.6.2. DoubleCANBUS_DEMO Instruction

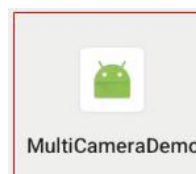
This reference software is only used for developing the ST-7 CANBUS function. Please refer to “DoubleCAN_Bus_Software_Manual” for specific usage methods.

* If the device is single CanBus version, the CanBus 2 interface can be ignored.



DoubleCANBUS_DEMO Main Interface

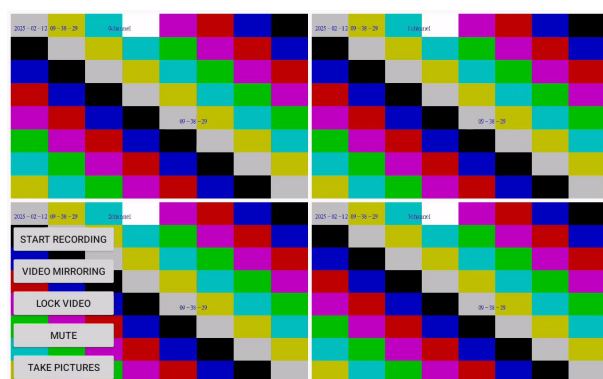
3.2.7. Using AHD Instruction (Optional)



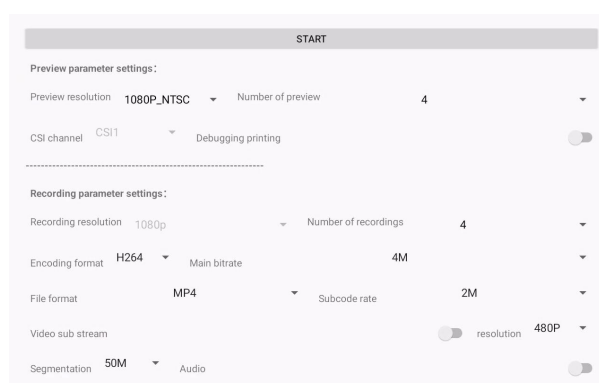
Description of AHD camera's power supply status

Screen State	AHDCamera Software Status	AHD Camera Power Supply Status
--------------	---------------------------	--------------------------------

Sleep	AHDCamera software not started	No power supply
	Enable AHDCamera software	No power supply
Wake up	Start AHDCamera software but it is on the parameter configuration page.	No power supply
	Start AHDCamera software and be in the preview page./AHDCamera software is in the preview page and running in the background.	Have power supply



Preview Page

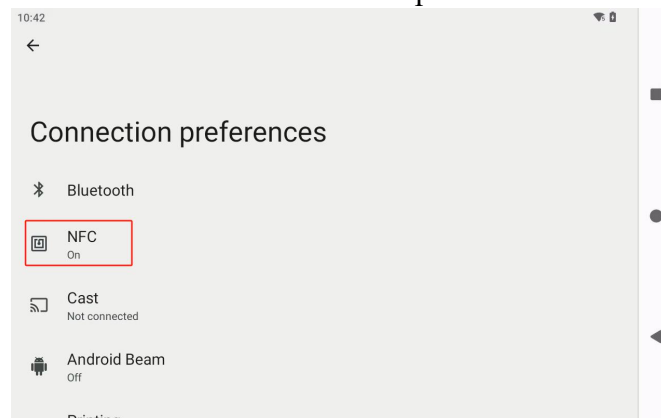


Parameter configuration page

More details, please refer to “AHD Software Instruction”.

3.2.8. Using NFC (Optional)

NFC setting path: Setting > Connected devices > Connection preferences > NFC



After activating NFC function and open NFC Tools App, place the NFC card close to the induction area (as Figure 1 shows). A prompt tone would be heard if the card is successfully identified. If the card contains some information (such as manufacturer's information), there will be an interface popped up as shown in Figure 2.

Note:

If the card has been identified, it does not always pop up an interface, but there must be a prompt tone.



Figure 1

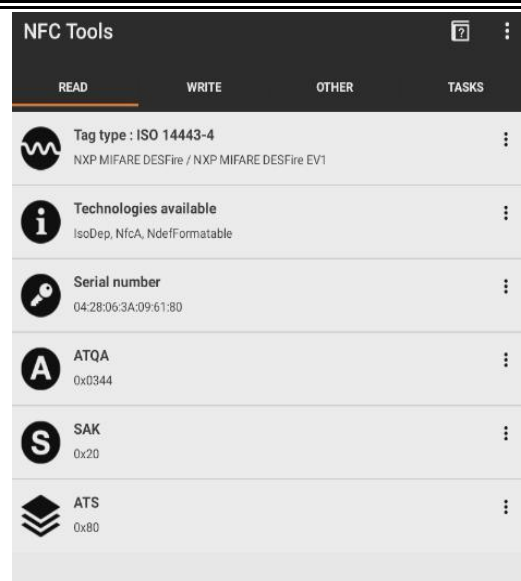


Figure 2

4. Accessories

4.1. Standard Accessories

Torx wrench and screws	Retrieve card pin and tweezers

4.2. Optional Accessories

DC Power Adaptor (12V)	RAM Bracket with 1 inch ball	ST-7 LAN Cable (M8 connector)

ST-7 USB Cable (M8 connector)	USB 3.0 to Type-C Cable	ST-7 Port A Cable
		
ST-7 Port B Cable		

5. Troubleshoot Common Problems

	Problem Description	Troubleshooting
Question 1	The device cannot charge the battery (Provided the device has batteries)	1. Observe whether the panel indicator is red during charging 2. Switch the battery between the normal battery and the abnormal battery to test whether the battery can be charged, or use a multimeter to measure whether the battery voltage is between 2.8V and 4.1V.
Question 2	The device cannot identify the peripheral through the USB-A port	1. Do not use the USB Type-C port on the side of the device when using the USB-A port on the extended cable 2. Check whether the USB port can recognize the USB flash drive or mouse 3. Please provide the specifications of the peripheral device to confirm whether the USB cannot be used due to excessive power of the peripheral device and insufficient output power of the tablet 4. Please confirm whether the extended cable connecting the USB to the peripheral device is too long. Generally, it is recommended to add a USB hub to improve the attenuation of the transmission signal when it exceeds 2m (or inform us to realize long-distance USB signal transmission through hardware customization).
Question 3	GPIO cannot be used	GPIO input: 1. Ensure that the DC port on the extended cable is connected to the power supply 2. Check whether the voltage connected to the GPIO is within the tolerance range of the device 3. Check whether the power supply connecting to the GPIO is in the same ground as that of the device GPIO output: 1. Confirm the typical connection mode of GPIO output in the

		instructions.
Question 4	The tablet always shutdown after N minutes of startup	1. Please disable ACC function (setting -> ACC setting) and observe the phenomenon, if no recurring problem, please check the following points. 2. Ensure that the device has been connected to the ACC 3. Check whether the power supply connected to the ACC is in the same ground as the power supply of the device.
Question 5	The device cannot identify the SIM card	1. Ensure that the SIM card works properly. 2. Check whether the tablet is powered on after the SIM card is inserted. If the card can be recognized and used on other devices, check whether the card slot is damaged.
Question 6	The tablet screen is black and cannot be turned on	1. When the device powered through the DC port, check whether the power indicator is red or green. 2. Press and hold the power button for 10 seconds to force restart the tablet. 3. If the preceding steps do not work, check whether the device has power input, remove PORT A cable, and according to the definition of extended cable, use a multimeter to detect whether the power pin is conductive.
Question 7	The tablet is stuck on the Logo page during startup	Re-write the system package (before burning, ask the Manufacturer engineer whether it can be burned or not, if there is no relevant burning package, please contact the engineer)
Question 8	The USB to LAN converter is unavailable	1. Ensure that the DC port on the PORT A cable is connected to the power supply. 2. Do not use the Type-C interface on the side of the device. 3. Customers are advised to use the USB to LAN converter model we recommend. If the customer wants to use their own converter, they need to provide the converter model for debugging by our engineers, which requires some time and cost.
Question 9	Android is locked, forget the screen lock password	Use the fastboot tool to erase device password data. (Contact engineers for related tools.)
Question 10	RS232 cannot be used	1. Check whether the baud rates of the two devices are the same. 2. Short PIN2(TXD) and PIN3(RXD) of the port to check whether the demo software can send and receive serial port data. 4. Check whether cables are correctly connected to the two communication devices. (RXD -> TXD, TXD -> RXD, GND -> GND)
Question 11	CANBUS cannot be used	1. Ensure that the DC port on the PORT A cable is connected

	to the power supply. 2. Check whether the CAN baud rates of the two devices are the same. 3. Check whether cables are correctly connected to the two communication devices. (CAN_H -> CAN_H , CAN_L -> CAN_L) 4. If the above points are confirmed, try to connect a 120 ohm resistor in parallel between the terminal bus to check whether the communication is normal.
--	--

***If the above problems cannot be repaired after troubleshooting, please contact our engineers!**

FCC Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Caution: Any changes or modifications to this device not explicitly approved by manufacturer could void your authority to operate this equipment.

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

RF Exposure Information

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator and your body.

ISED Statement
English: This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:

- (1) This device may not cause interference.
- (2) This device must accept any interference, including interference that may cause undesired operation of the device.

The digital apparatus complies with Canadian CAN ICES-3 (B)/NMB-3(B).

French: Cet appareil contient des émetteurs/récepteurs exempts de licence qui sont conformes aux RSS exemptés de licence d'Innovation, Sciences et Développement économique Canada.

L'exploitation est soumise aux deux conditions suivantes :

- (1) Cet appareil ne doit pas provoquer d'interférences.
- (2) Cet appareil doit accepter toute interférence, y compris les interférences susceptibles de provoquer un fonctionnement indésirable de l'appareil.

L'appareil numérique du clem conforme canadien peut - 3 (b) / nmb - 3 (b). This device meets the exemption from the routine evaluation limits in section 6.6 of RSS 102 and compliance with RSS 102 RF exposure, users can obtain Canadian information on RF exposure and compliance.

cet appareil est conforme à l'exemption des limites d'évaluation courante dans la section 6.6 du cnr - 102 et conformité avec rss 102 de l'exposition aux rf, les utilisateurs peuvent obtenir des données canadiennes sur l'exposition aux champs rf et la conformité.

This equipment complies with Canada radiation exposure limits set forth for an uncontrolled environment.

Cet équipement est conforme aux limites d'exposition aux rayonnements du Canada établies pour un environnement non contrôlé.

This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

Cet équipement doit être installé et utilisé à une distance minimale de 20 cm entre le radiateur et votre corps.

The device for operation in the band 5150–5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems.

L'appareil destiné à fonctionner dans la bande 5150-5250 MHz est uniquement destiné à une utilisation en intérieur afin de réduire le potentiel d'interférences nuisibles aux systèmes mobiles par satellite cocanaux.

This radio transmitter has been approved by Industry Canada to operate with the antenna types listed with the maximum permissible gain indicated. Antenna types not included in this list, having again greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés ci-dessous et ayant un gain admissible maximal. Les types d'antenne non inclus dans cette liste, et dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

This product is only suitable for installation and fixed use within the vehicle. Maintain a safety distance of at least 20cm