



MT7010

User's Manual

v1.1



Contents

CONTENTS	2
SAFETY PRECAUTIONS	4
REGULATORY AND CERTIFICATION	6
FCC.....	6
CE MARKING.....	7
RADIO EQUIPMENT DIRECTIVE (2014/53/EU).....	7
LITHIUM BATTERY SAFETY STATEMENT	7
CHAPTER 1. PRODUCT INTRODUCTION.....	8
HARDWARE SPECIFICATIONS.....	8
OPERATING SYSTEM SUPPORT	錯誤! 尚未定義書籤。
ENVIRONMENT.....	9
I/O PORTS.....	10
DIMENSION AND WEIGHT.....	11
MT7010 STANDARD	11
PACKAGE LIST	12
CHAPTER 2. HARDWARE INSTALLATION.....	13
INSTALLING/REMOVING THE SIM CARD	13
INTERNAL SIM SLOT (SIM2).....	13
EXTERNAL SIM SLOT (SIM1)	15
CHAPTER 3. HARDWARE MOUNTING	17
CHAPTER 4. START UP	18
POWERING THE SYSTEM	18
CONNECTOR POWER	18
POWERING DOWN THE SYSTEM	20
LED STATUS.....	21
ADJUST THE SPEAKER VOLUME	22
AUTO-BRIGHTNESS ADJUSTMENT	22
INTERNAL MICROPHONE	23
PROGRAMMABLE BUTTONS.....	23

POWER MANAGEMENT	23
CHAPTER 5. JUMPERS AND CONNECTORS	24
BOTTOM VIEW	24
EXTERNAL CONNECTORS PIN ASSIGNMENTS	25
POWER CONNECTOR	25
RS-232 PORT (COM1).....	26
USB AND RS-232/422/485 PORT (COM2).....	27
DIO AND CAN BUS PORT.....	28
CHAPTER 6. DASHON SETTING.....	29
DEVICE INFORMATION.....	30
VEHICLE STATUS	31
COMMUNICATION SETTING	32
ENABLE/ DISABLE MODULE.....	32
WWAN SETTING	33
SYSTEM STATUS & SETTING	34
POWER MANAGEMENT SETUP.....	34
I/O CONFIGURATION	41
BRIGHTNESS SETTING.....	42
WATCHDOG TIMER	42
PROGRAMMABLE BUTTON.....	45
LOCATION AND SENSOR.....	47
ENABLE/DISABLE GPS RECEIVER.....	48

Safety Precautions

1. Read these safety instructions carefully.
2. Keep this user's manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a stable surface during installation. Dropping it or letting it fall may cause damage.
7. Do not leave this equipment in either an unconditioned environment or in an above 40°C storage temperature as this may damage the equipment.
8. The openings on the enclosure are for air convection to protect the equipment from overheating. **DO NOT COVER THE OPENINGS.**
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Place the power cord in a way so that people will not step on it. Do not place anything on top of the power cord. Use a power cord that has been approved for use with the product and that it matches the voltage and current marked on the product's electrical range label. The voltage and current rating of the cord must be greater than the voltage and current rating marked on the product.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never pour any liquid into an opening. This may cause fire or electrical shock.
14. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
15. If one of the following situations arise, 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 and damaged.
- f. The equipment has obvious signs of breakage.

16. Do not place heavy objects on the equipment.
17. The unit uses a three-wire ground cable which is equipped with a third pin to ground the unit and prevent electric shock. Do not defeat the purpose of this pin. If your outlet does not support this kind of plug, contact your electrician to replace your obsolete outlet.
18. **CAUTION:** DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY RE- PLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE REC- OMMENDED BY THE MANUFACTURER. DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
19. Continuously displaying a fixed pattern may induce image sticking. It's recommended to use screen saver or shuffle contents periodically when a fixed pattern is displayed on the screen.

Regulatory and Certification

RF exposure warning



This equipment must be installed and operated in accordance with provided instructions, and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

FCC

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.
2. This device must accept any interference received, including interference that may cause undesired operation.

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 the 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.

Shielded interconnect cables and shielded AC power cable must be employed with this

equipment to insure compliance with the pertinent RF emission limits governing this device. Changes or modifications not expressly approved by the system's manufacturer could void the user's authority to operate the equipment.



Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device is operable in 5.15 – 5.25GHz frequency range, then restricted in indoor use only, Outdoor operations in the 5.15 – 5.25GHz is prohibitive.

CE Marking

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. Please contact your local representative for ordering information.

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

Radio Equipment Directive (2014/53/EU)

This device complies with the essential requirements of the Radio Equipment Directive (2014/53/EU).

Lithium Battery Safety Statement

Lithium battery inside. Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by battery manufacturer.



THIS PRODUCT CONTAINS LITHIUM-ION BATTERY PACKS. IT MUST BE DISPOSED OF PROPERLY. CONTACT LOCAL ENVIRONMENTAL AGENCIES FOR INFORMATION ON RECYCLING AND DISPOSAL PLANS IN YOUR AREA.

Chapter 1. Product Introduction

MT7010 is an in-vehicle terminal with 7" high resolution display and 500nits brightness, and is flexible to support a wide range of wireless connection capability. The device is well-suited for fleet management, asset management, EOBR and ELDs application.

It is compliant to ISO 7637-2, SAE J1455 and SAE J1113 and its optimized power system is designed for cold cranking, load dump, transient voltage and ESD.

The device is engineered with IP65 protection rating, a wide temperature design, wide input range, and rich expanding interfaces that support in-vehicle connectivity.

Hardware Specifications

Item	Description
Processor	Qualcomm MSM8909 (Quad-Core Cortex-A7 1.1/1.3 GHz)
Memory	LPDDR2 RAM 1GB/2GB
Storage	eMMC 8GB/16GB One MicroSD slot
Display	<ul style="list-style-type: none">● 7 inch TFT LCD● 500 nits● Viewing angel: 145(H)/ 160(V) (CR>10)
Touch Panel	<ul style="list-style-type: none">● Projected Capacitive Touch Screen
Wireless Connectivity	<ul style="list-style-type: none">● 802.11 a/b/g/n 2x2● Bluetooth V4.1● GPS / GLONASS● 4G LTE / HSPA+ / GPRS
Item	Description
Power Input	9-36VDC,3.5A
Battery	1950mAh, 3.6V
Housing (Mechanical)	PC+ABS, fanless design
Certification	CE, FCC, CB

Environment

- Operating temperature:
 - -20°C (-4°F) to 60°C (140°F)
 - In accordance with MIL-STD-810G CHANGE1 Method 501.6 High Temperature Procedure II - Operation
 - In accordance with MIL-STD-810G CHANGE1 Method 502.6 Low Temperature Procedure II – Operation
- Storage temperature:
 - -30°C (-22°F) to 70 °C (158°F)
 - In accordance with MIL-STD-810G CHANGE1 Method 501.6 High Temperature Procedure I – Storage
 - In accordance with MIL-STD-810G CHANGE1 Method 502.6 Low Temperature Procedure I - Storage
- Relative humidity: 5% to 95% @ 30°C (86°F) to 60°C (140°F) non-condensing in accordance with MIL-STD-810G CHANGE1 Method 507.6 Humidity Procedure II Aggravated Cycles (Fig 507.6-7)
- Vibration Test:
 - Operating: MIL-STD-810G CHANGE1 Method 514.7 Category 4,
Fig 514.7C-2 Common carrier (US highway truck vibration exposure);
Fig 514.7C-3 Composite two-wheeled trailer;
Fig 514.7C-4 Composite wheeled vehicle
 - Non-Operating: MIL-STD-810G CHANGE1 Method 514.7 Category 24, Fig 514.7E-1 (General minimum integrity exposure)
- Shock Test:
 - Operation: MIL-STD-810G CHANGE1 Method 516.7 Procedure 1 Functional Shock
 - Non-Operation: MIL-STD-810G CHANGE1 Method 516.7 Procedure V Crash Hazard Shock

I/O Ports

Item	Description
Serial	1 x RS-232 (COM1), with 5V/600mA (max.) or 12V/300mA (max.) 1 x RS-232/422/485, non-isolation (COM2)
USB*	1 x USB 2.0 for host A-type connector (500mA) 1 x USB 2.0 via DB15 connector *only one USB storage is functional simultaneously
Ethernet	10/100Base-T (RJ45) x 1
Digital I/O	2 x DI ; 2 x DO Digital Input: DI 0~30V Digital Output: (1) circuit design reserved for 2 x DO 5V (2) default setting 2 x DO: OC output, High level depends on external pull up resistor, Up to 30 VDC maximum sink 50 mA per channel
CAN	CAN bus (SAE J1939)
Audio	1 x Headset for Mic-in/ Audio out 2 x Internal Mic-in
Speaker	Built-in dual 2W speaker

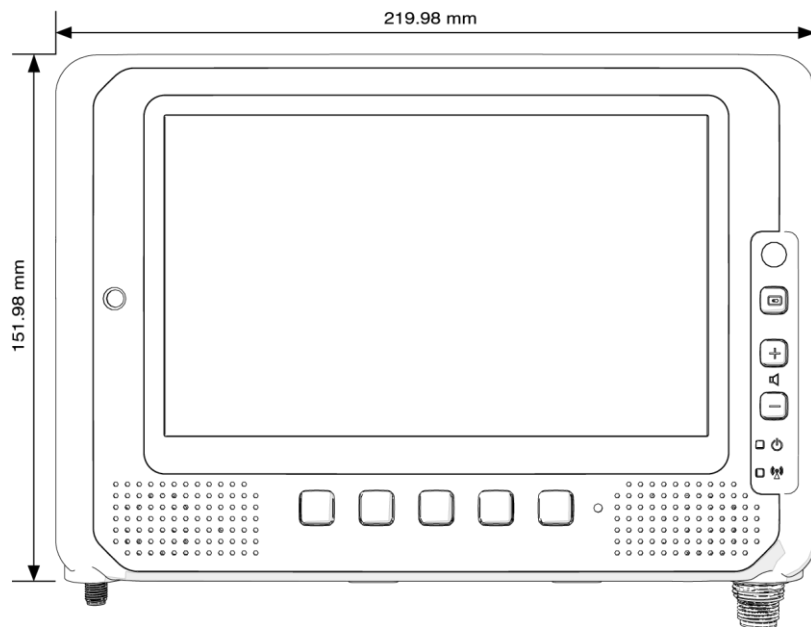
Dimension and Weight

MT7010 Standard

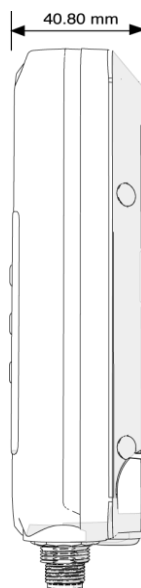
Dimension: 219.98 x 151.98 x 40.8mm / 8.66 x 5.98 x 1.60in. (W x H x D)

Weight: 1.25 kg/ 2.76 lbs.

Front View Dimension



Side View Dimension



Package List

Before you begin the installation or configuration process, make sure to inspect all the components and accessories. Contact your representative if there are any missing or damaged items.

Please verify the delivery of the contents upon receipt

- MT7010 in-vehicle terminal
- Bare wire power cable with circular power connector
- 2-feet DB15 male connector cable with multiple end
- 2-feed DB15 male connector cable (no termination)
- 5-meter external GPS antenna

NOTE: The packaging material has been selected to optimally protect your device. After unpacking, store the original packaging material in the event that you need to return for shipment.

Chapter 2. Hardware Installation

This chapter provides information for the installation and removal of SIM card.

Installing/Removing the SIM card

The device provides dual micro SIM slots for cellular and wireless connection. One is inside (SIM2) and the other is accessible from external SIM cover (SIM1).

You can either Install SIM card in internal or external SIM slot and this selection can be done via SIM slot assignment in DashON. The factory default is the external SIM slot (SIM1).

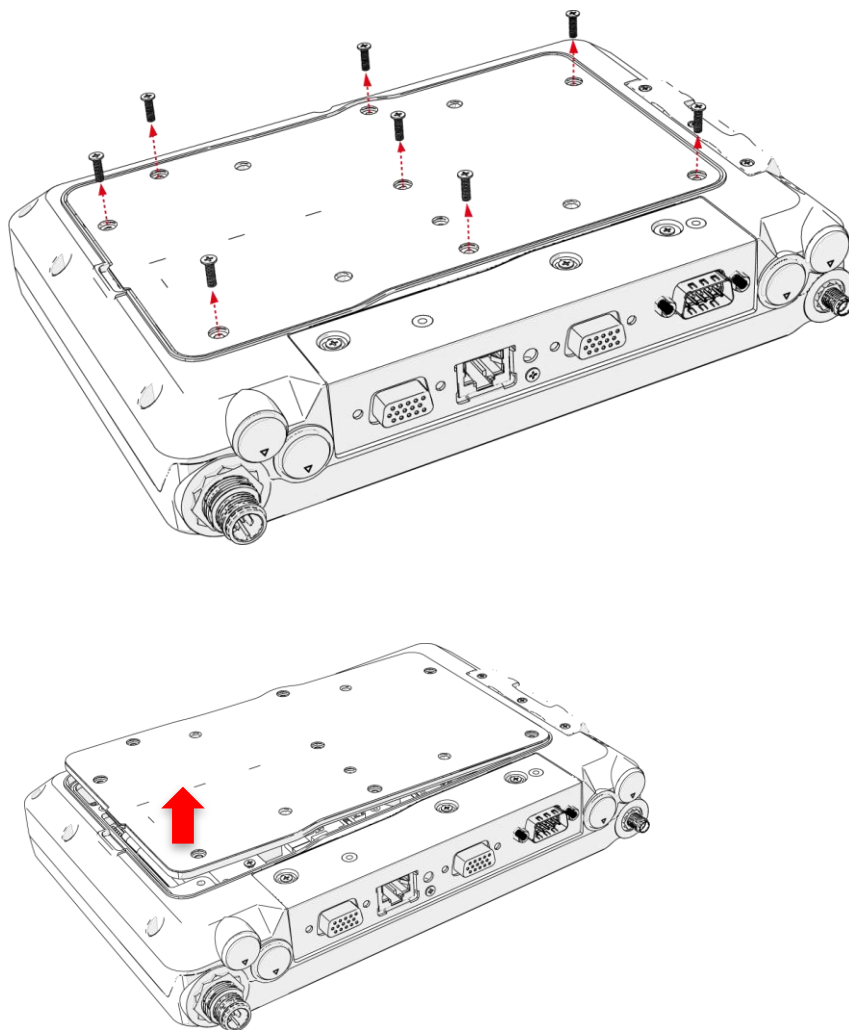
Please see the following guidelines to install or remove the SIM card.



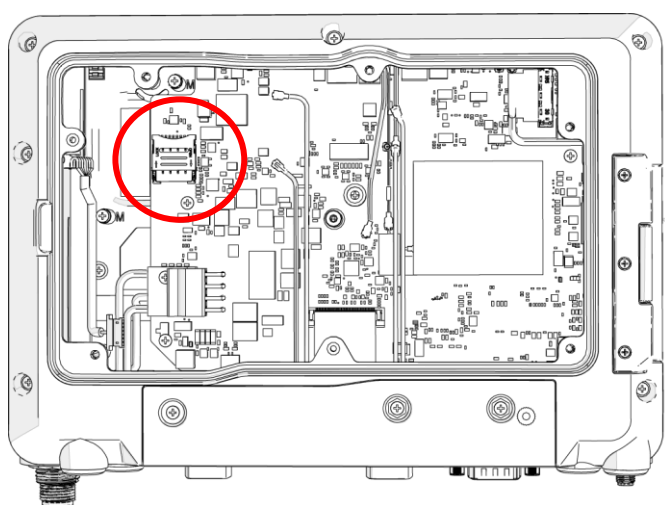
Please make sure that the device is completely powered off and make sure the power status LED light is off when installing/removing the internal SIM card.

Internal SIM slot (SIM2)

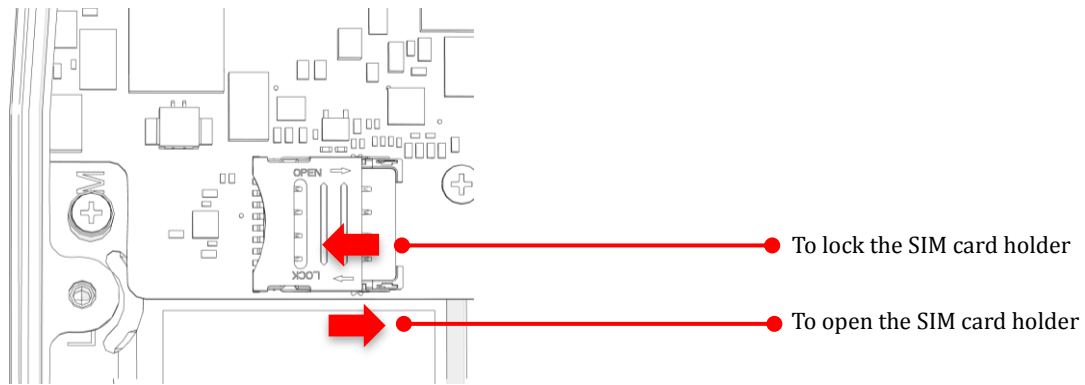
1. Shut down the system properly and disconnect the device from all power sources.
2. Un-mount the device from the mounting apparatus; make sure that the display surface is protected.
3. Remove the screws securing the cover and remove it.



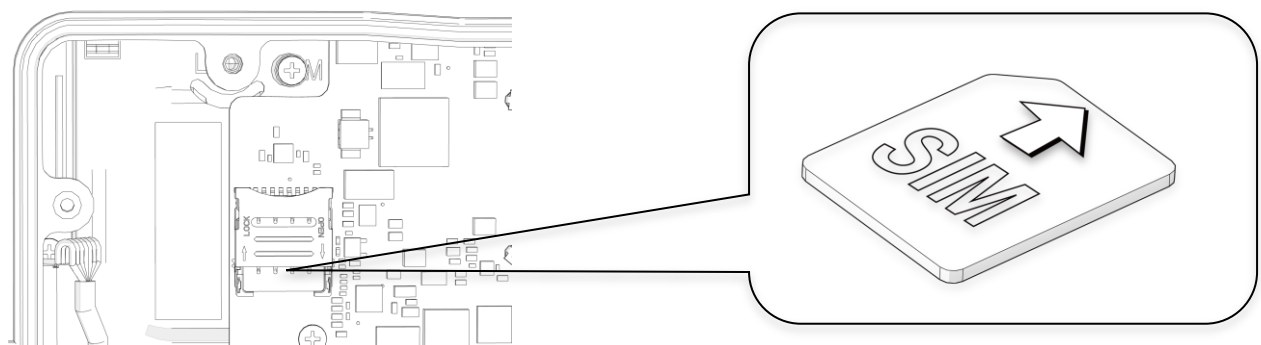
4. Once the service cover is removed, you can see the Micro SIM card slot.



5. To release the SIM card holder, slightly lift the front edge of the cover on the card holder and slide it backwards. Open the cover.



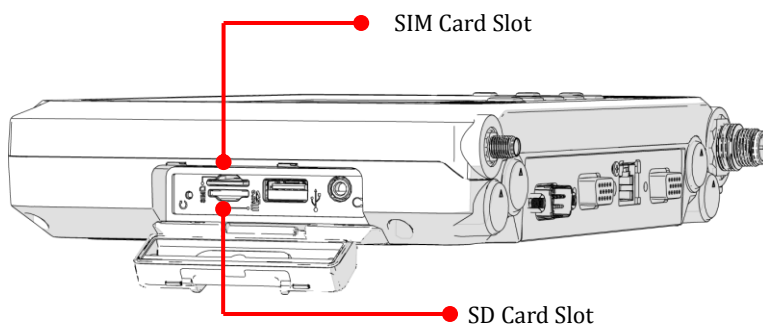
6. Turn your SIM card to the angled corner of your SIM card to match the angled corner of the SIM card holder.



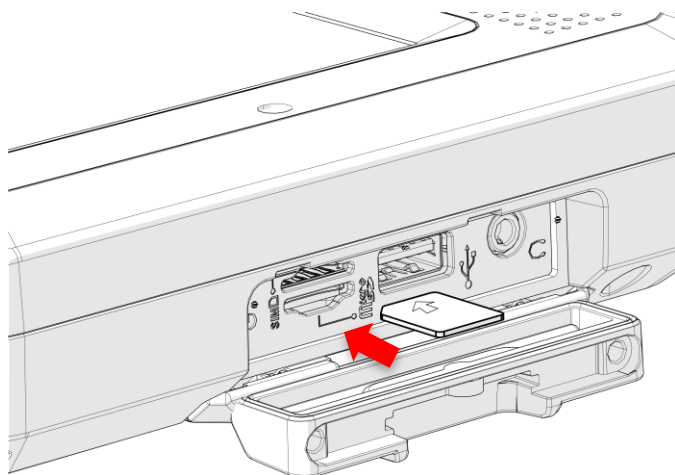
7. Insert the SIM card into the SIM card holder.
8. Close the cover of the SIM card holder.

External SIM slot (SIM1)

1. Shut down the system properly and disconnect the device from all power sources.
2. Open the side cover; you can see the Micro SIM card and SD card slot.

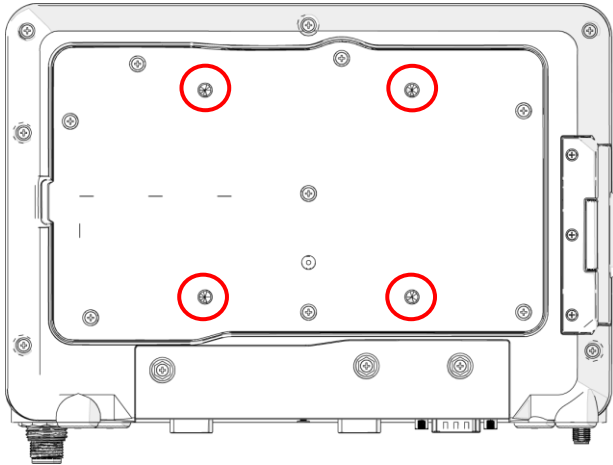


3. Insert your SIM card. Make sure the angled corner of the card is positioned correctly.



Chapter 3. Hardware Mounting

The MT7010 supports a standard VESA version MIS-D, 75, C (75mm distance quadrate order, M5 thread, deepness 6mm) through the four drill holes on the back side of the device.



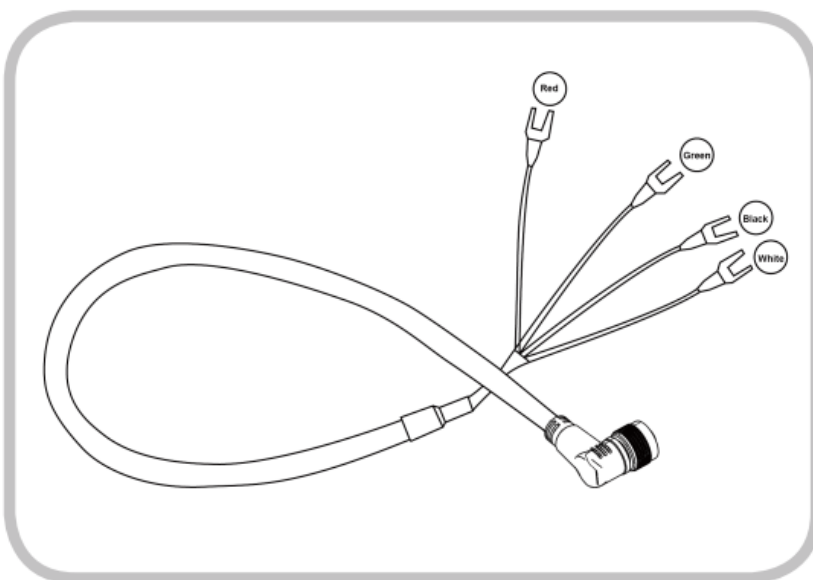
Notes: *To prevent any damage or injury, make sure the mounting bracket is securely attached.*

Chapter 4. Start up

Powering the System

Connector Power

MT7010 allows a wide range of DC power input from 9~36V via a 5-pin M12 A-code power cord. There are two options to start up the MT7010 via car power cable or external power adapter.

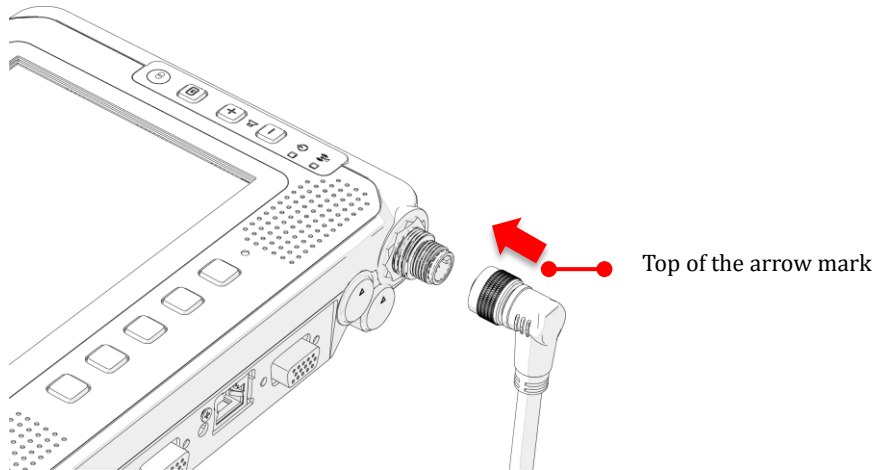


The wire definition.

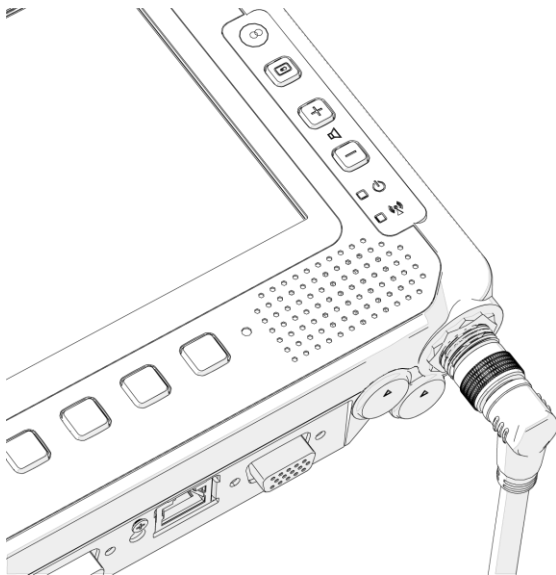
Wire Color	Description
RED	V+
BLACK	V-
GREEN	Chassis Ground
WHITE	ACC/ Ignition

Power source from car power cable

1. The bare wire lead cable allows you to directly wire 12 V or 24 V car power supply. Please follow the wire definition to connect to your power source.
2. Plug the power code into the power connector on the top of the arrow mark.



3. Twist the nut to lock the power connector to the device.



4. MT7010 will turn on automatically when the power supply is connected to the device.

Power source from external power adapter

If your power source is from external power adapter, it means the power source isn't controlled by AAC/Ignition signal. Please short red (V+) and white (ACC/ Ignition) wires.



Make sure that all the power supplies are disconnected when you plug the power cord into the power connector.

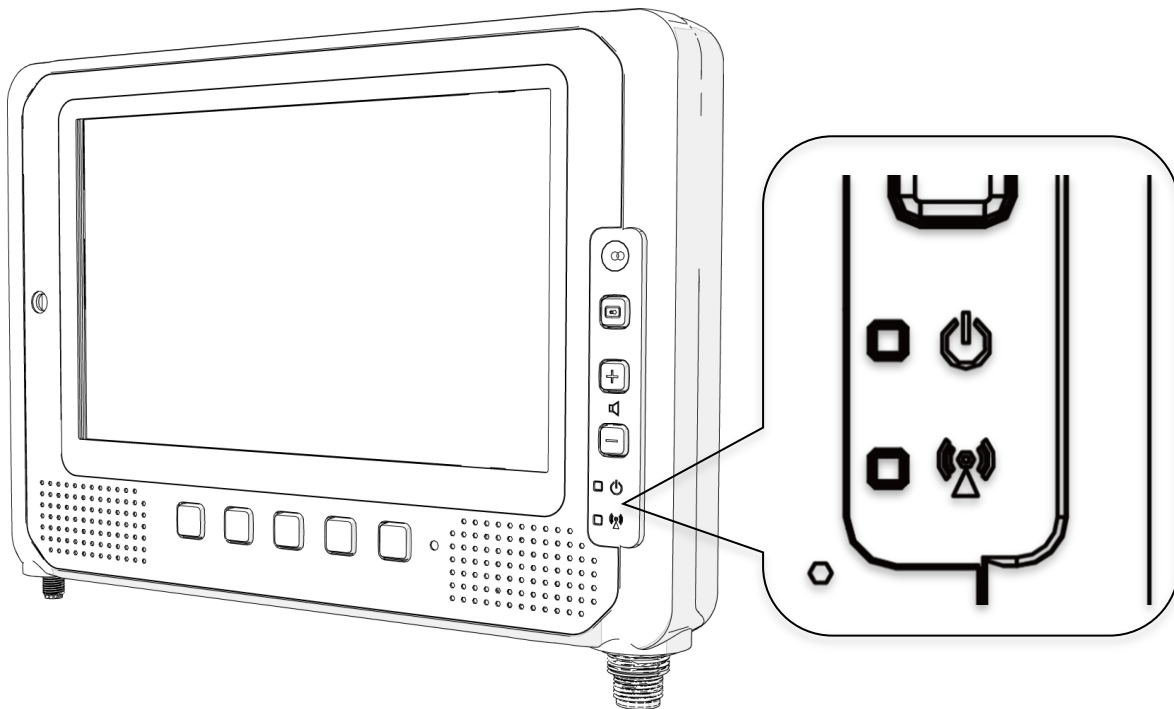
Powering Down the System

MT7010 will be auto power off in one minute when the power supply is removed.

LED Status



The LEDs on MT7010 are status indicators that show the operating status of your system. The status indicators can help pinpoint possible failed hardware components causing specific symptoms. There are two status indicators in the front panel. Refer to the description below.

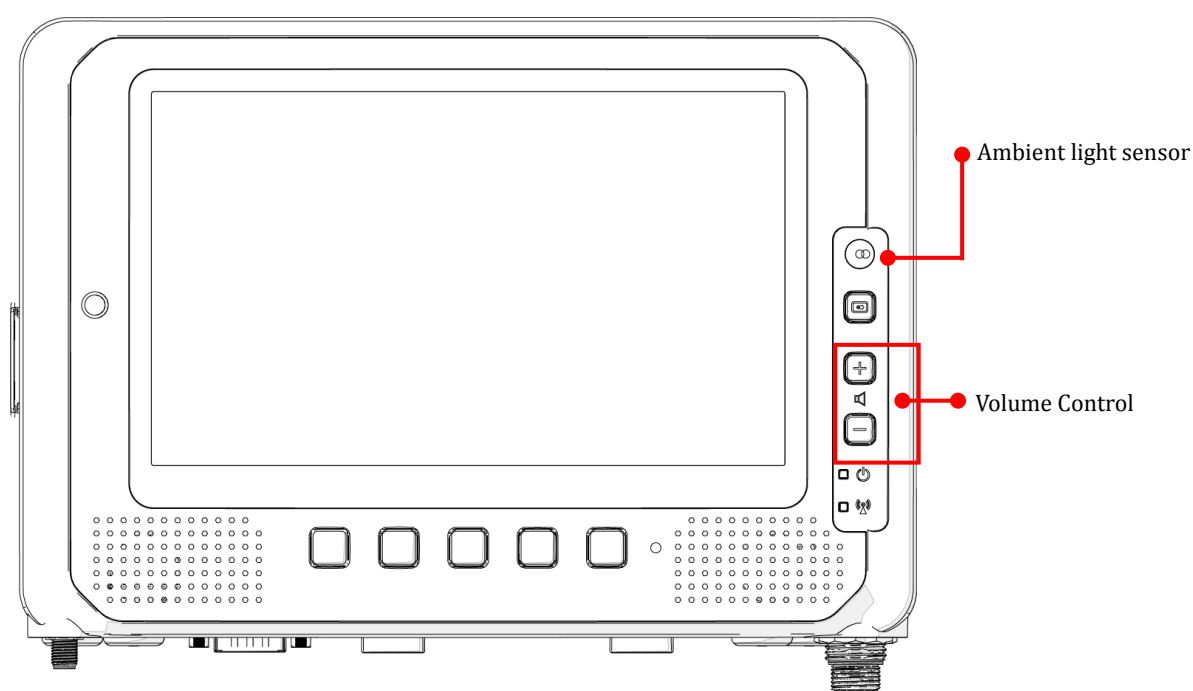
LED	Status	Description
PWR	Blink Green	Power up
PWR.	Blink Yellow	Load BIOS/ boot loader
PWR	Solid Green	System ready for use
PWR	Blink Red	Abnormal vehicle battery
Comm.	Solid Green	WWAN enabled



Adjust the Speaker Volume

MT7010 provides the volume control buttons to adjust the speakers' volume; you can also control the overall level of sound using Windows. When you press the top part of the volume button, it makes the volume louder; pressing the bottom part makes the volume lower

- Press the  button to increase the volume.
- Press the  button to decrease the volume.



Auto-Brightness Adjustment

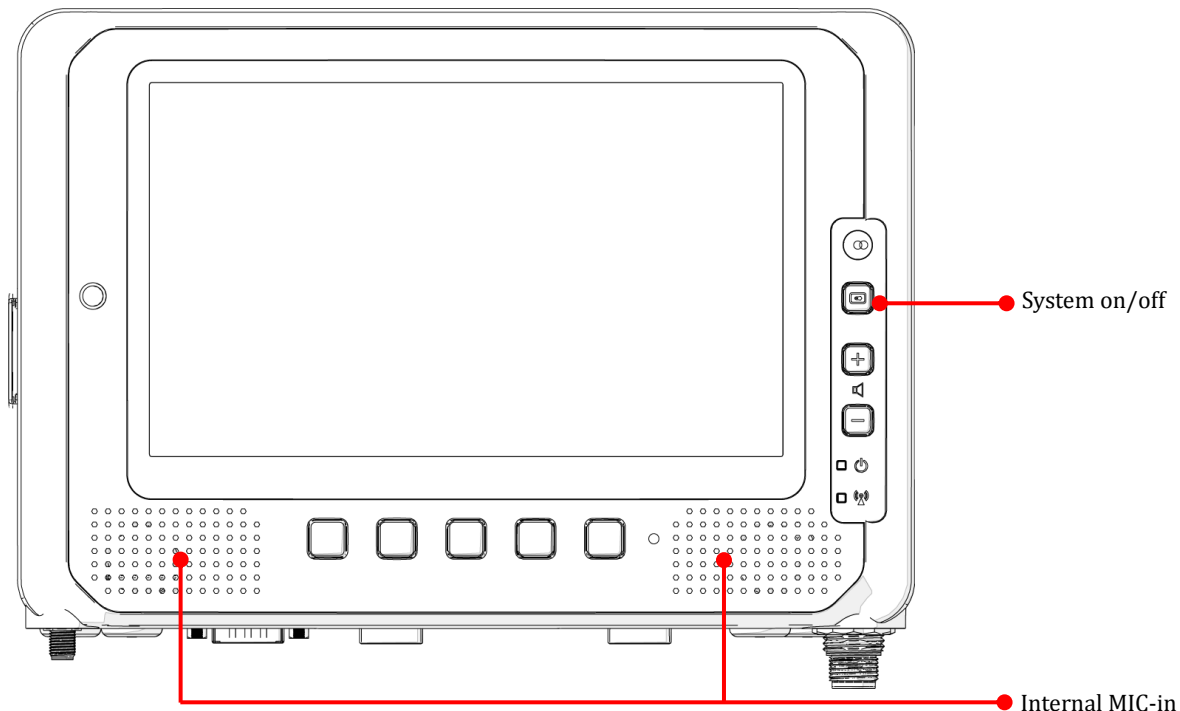
When you use MT7010, you may well encounter different lighting conditions that make it difficult to see the information on screen. MT7010's built-in the ambient light sensor on the front panel supports auto-dimming, which you can also disable to manually adjust the screen's brightness; this setting can be done via DashON.

Internal Microphone

MT7010 is equipped with two internal microphones, so you don't need an external one. In addition to the built-in speaker and microphones, you can plug external headsets in the audio jack.

Programmable Buttons

MT7010 provides default commands for five programmable buttons. You can configure the programmable buttons via DashON to different commands or keyboard shortcuts to better fit your work style.

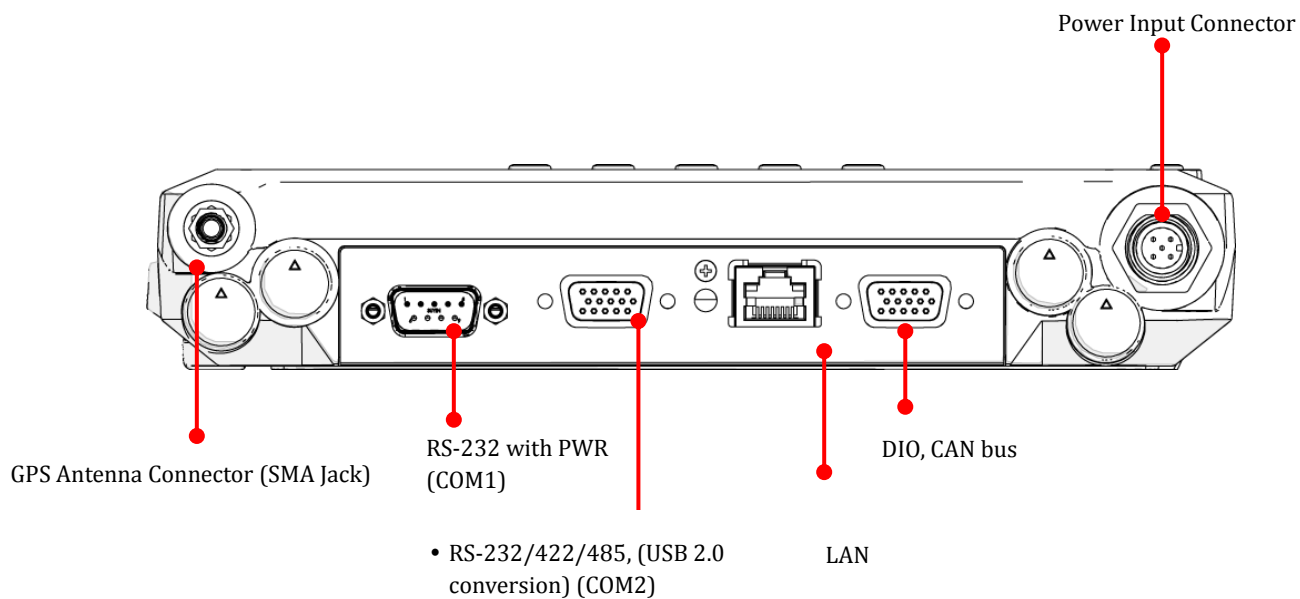


Power Management

In addition to settings in Windows Control Panel, MT7010 also provides DashON for configuration setting which includes power management and system setup. Please refer to Chapter 6 for configuration setting in DashON.

Chapter 5. Jumpers and Connectors

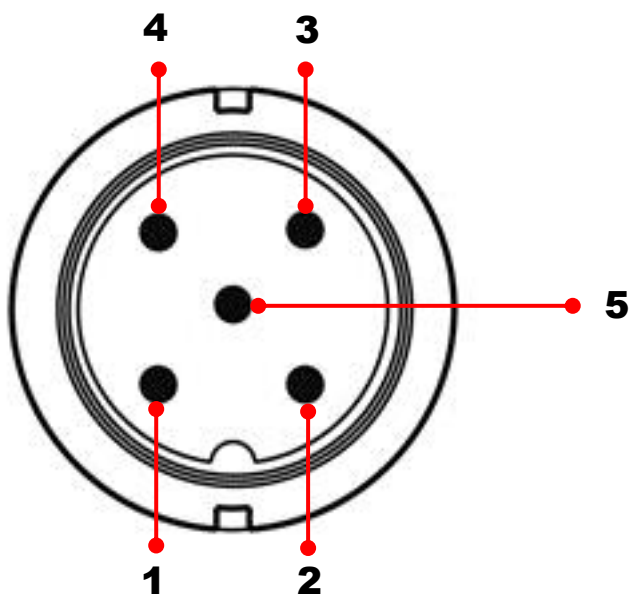
Bottom View



External Connectors Pin Assignments

Use this section as a reference for the pin assignments of the various ports available on the MT7010.

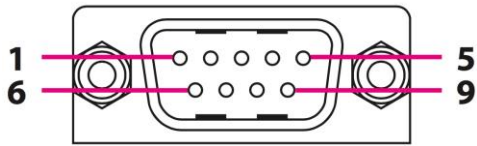
Power Connector



Pin	Signal
1	DC+
2	N/A
3	GND
4	N/A
5	ACC/ Ignition

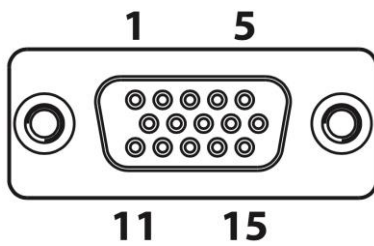
Note: Please refer to section 1 in Chapter 4 for connecting the external power cable to power source.

RS-232 Port (COM1)



Pin	Signal	Description
1	DCD	Data carrier detect (input)
2	RXD	Receive data (input)
3	TXD	Transmit data (output)
4	DTR	Data terminal ready (output)
5	GND	Signal/power ground
6	DSR	Data set ready (input)
7	RTS	Request to send (output)
8	CTS	Clear to send (input)
9	RI / PWR	Bar code scanner power (5V/600mA & 12V/300mA max) or Ring indicator (input)

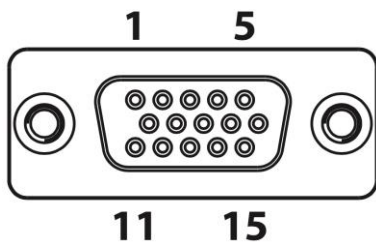
USB and RS-232/422/485 Port (COM2)



Pin	Signal
1	RS-422 TX+
2	RS-422 RX+
3	RS-485 TX+
4	RS-232 TX
5	GND
6	RS-422 TX-
7	RS-422 RX-
8	RS-485 TX-
9	USB 5V
10	RS-232 RX
11	GND
12	USB DP
13	USB DM
14	USB 5V
15	NC

We provide Y-cable with DB15 male connector which is the RS232/422/485 and USB converter. Please contact your local representative for ordering information

DIO and CAN bus Port



Pin	Signal
1	CAN_H
2	N/A
3	N/A
4	FWD
5	WHEELTICK
6	CAN_L
7	N/A
8	N/A
9	CARD POWER
10	GND
11	N/A
12	DIO_OUT1 (5V 10mA)
13	DIO_IN1 (5V 100mA)
14	DIO_IN2 (5V 100mA)
15	DIO_OUT2 (5V 10mA)

We provide the DB15 male connector to multiple pins without termination cable. Please contact your local representative for ordering information

Chapter 6. DashON Setting

You can use DashON to configure the device for your demo or test. We also provide the corresponding SDK for your application development. DashON will auto-run in background while the system turns on. This section is to brief you on what functions are included in DashON and how to set up based on Windows OS.

1. Device Information

It provides information of system hardware, software, and firmware version.

2. Vehicle Status

This section is to demo how to read the vehicle information such as vehicle battery voltage, fuel, speed and so on while connecting with vehicle SAE J1939. We use the simulator to run the demo.

3. Communication Setting

This is to enable / disable Wi-Fi/BT/WWAN and configure the related setting.

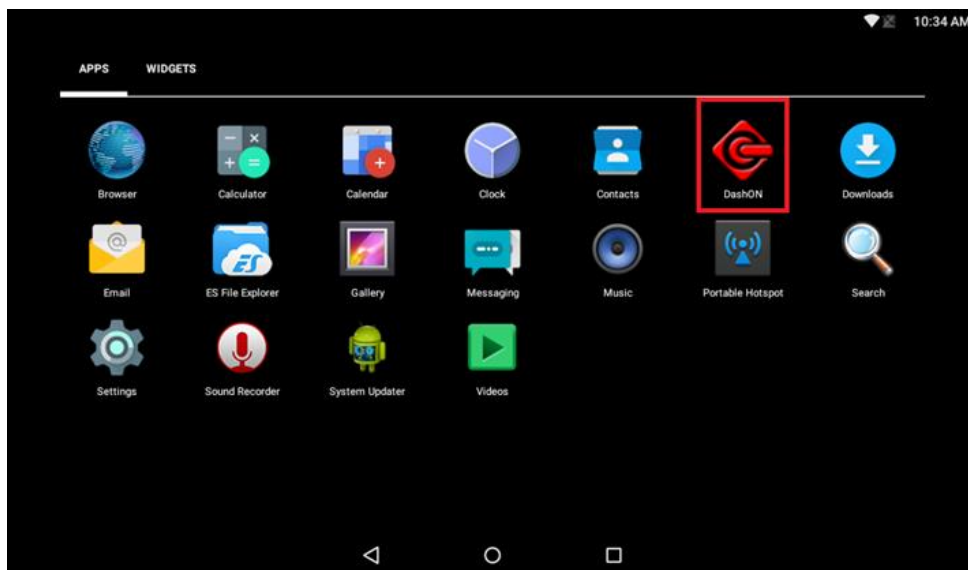
4. System Status & Setting

This section contains the major configuration of the system device. Power management, wake up event, IO configuration, brightness and watchdog timer setting are included.

5. Location & Sensor

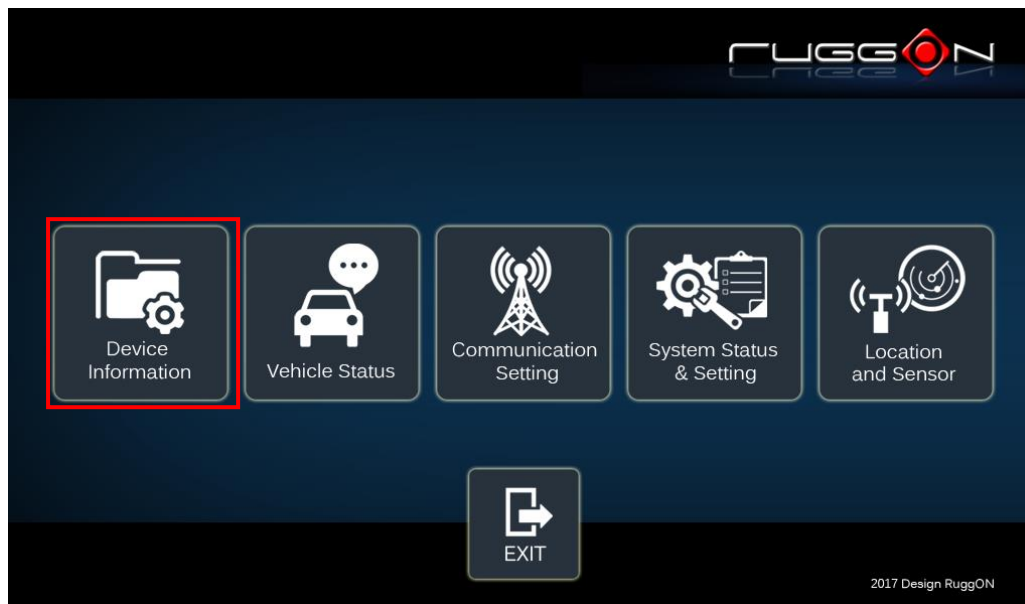
GPS configuration setting and temperature status

Click on the DashON icon if DashON is not running in background



Device Information

Click on the “Device Information” icon

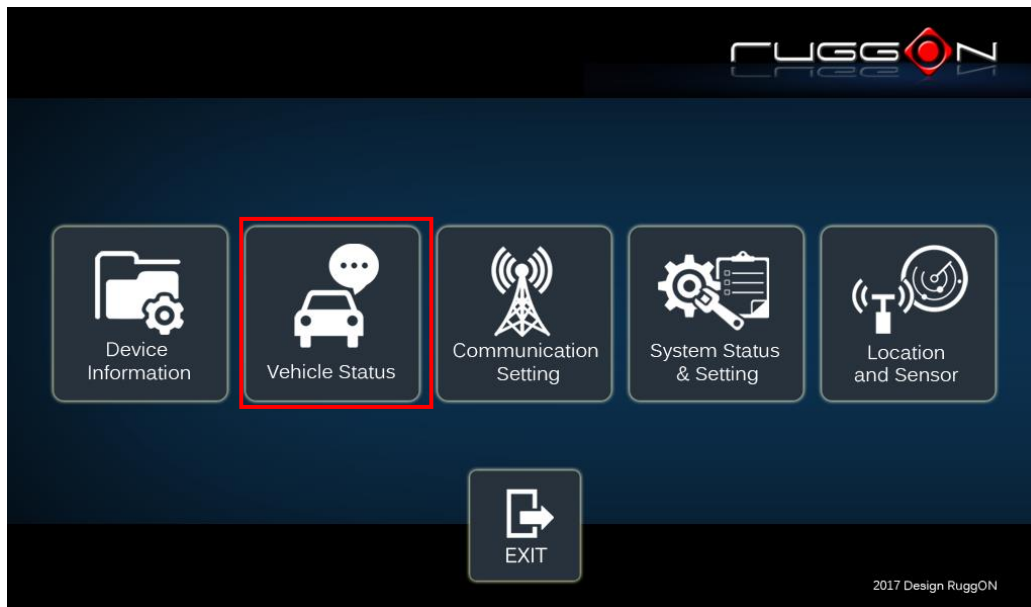


In device information, you can see the PCBA version, DashON utility version and system model name.



Vehicle Status

Vehicle status shows some vehicle information from the simulator.

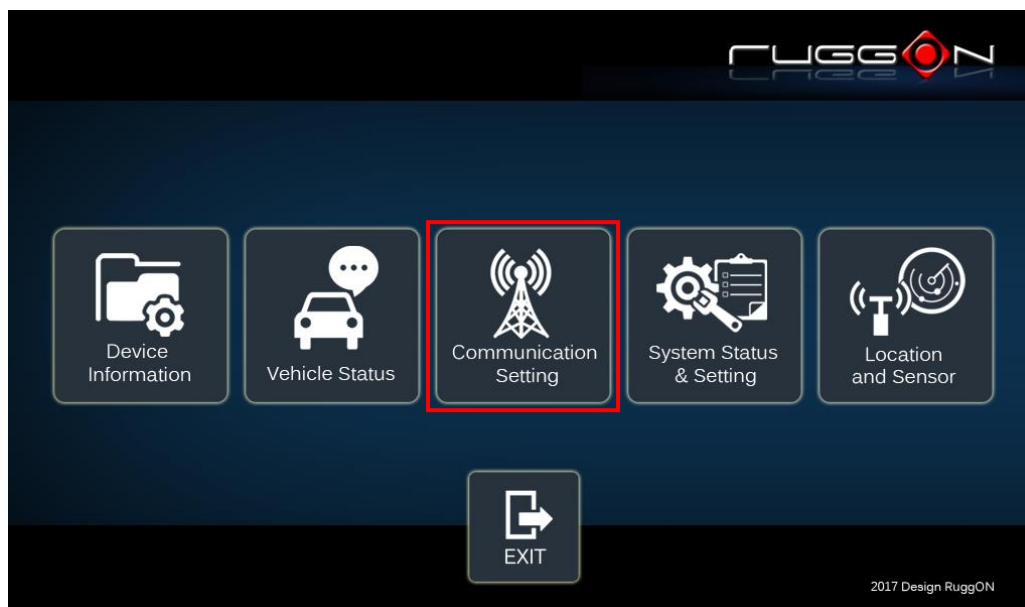


The related AT command is available upon request. Please contact local sales representatives or login to the support website.



Communication Setting

Communication setting allows you to enable/ disable Wi-Fi/WWAN/Bluetooth via DashON utility. Please click on the “Communication Setting”



Enable/ Disable Module

- Item 1. Click on the switch bar to **Enable/ Disable** Wi-Fi function.
- Item 2. Click on the switch bar to **Enable/ Disable** Bluetooth function



WWAN Setting

If WWAN module is present in the device, you can click on “WWAN setting” to get into the detailed setting.



You can set the two major features including WWAN RF on/off and SIM slot selection.

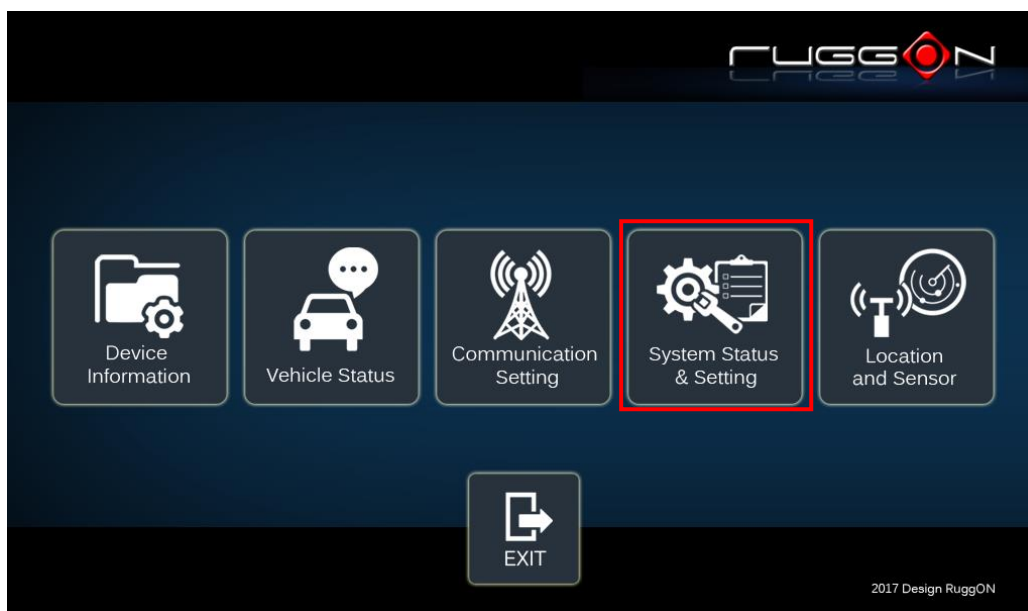
1. Module RF Enable/ Disable: to enable or disable the WWAN RF transmission. A message will then pop up.
2. SIM slot assignment: This feature is only available for the device with multiple SIM slots.



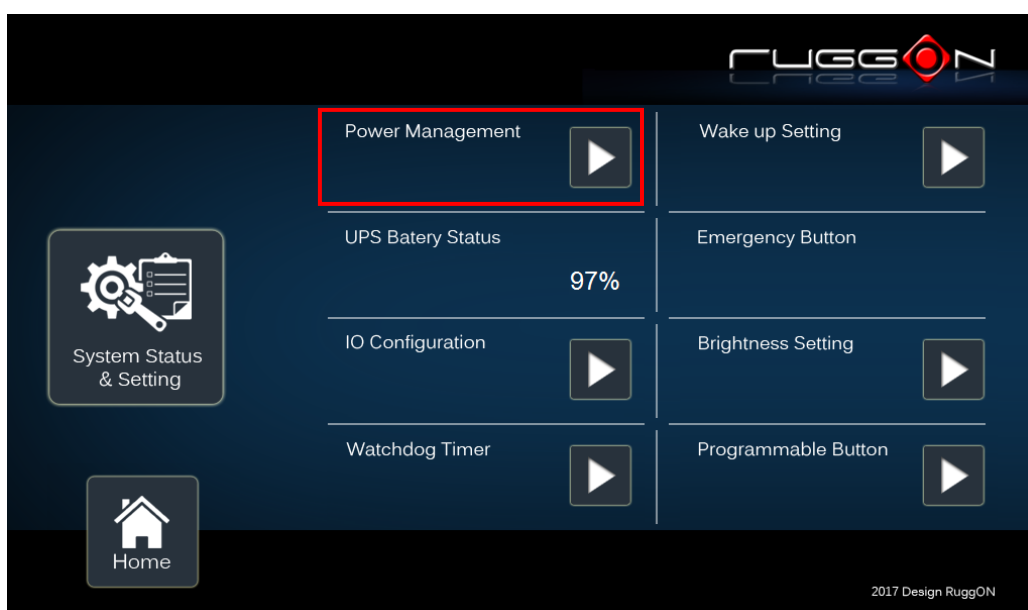
System Status & Setting

This section is to set and read the system status. It covers power management, internal backup battery, IO configuration, wake up event and so on.

Power Management Setup



Please click on the “Power Management”




ACC Detection Setting

In MT7010 design setting, it supports ACC sense. You can check its status from ACC status.

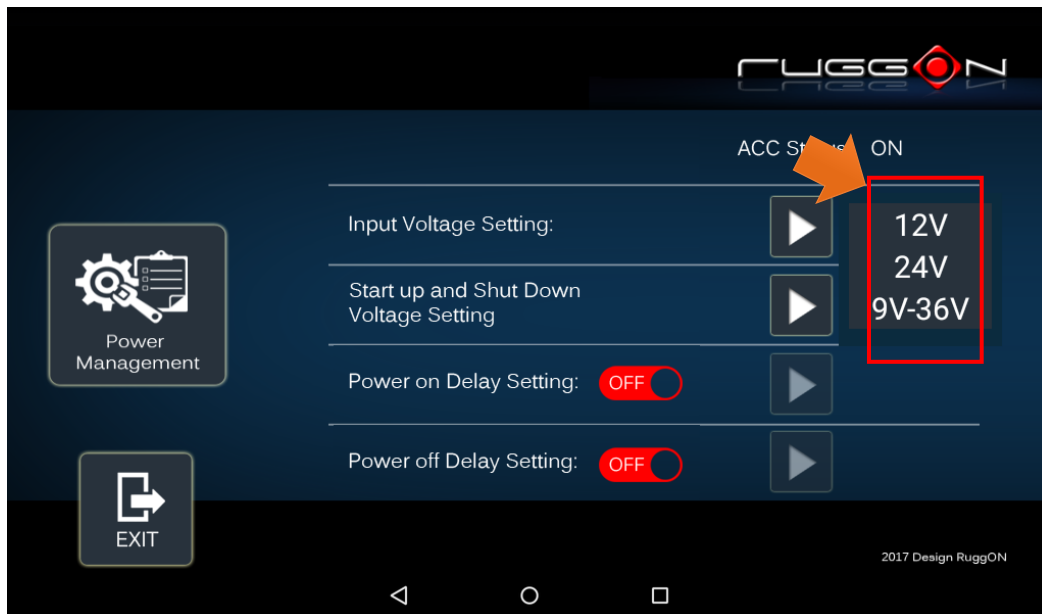


Input Voltage Setting

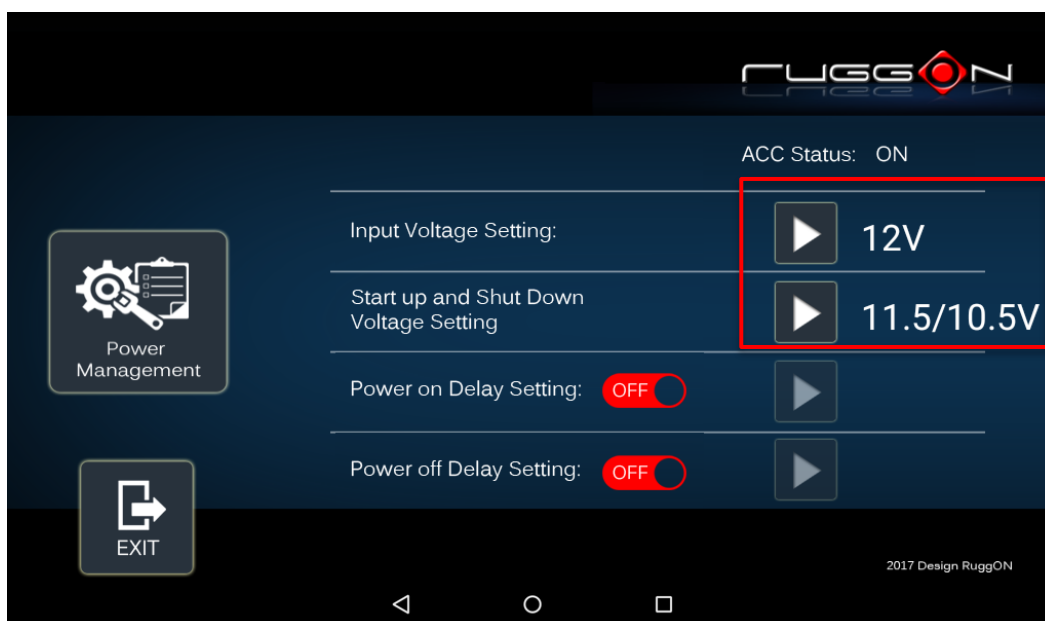
Click on the  to the input voltage selection.

You can select the power input voltage either 9~36V or 12V or 24V. If 9~36V is selected, it means the system can be powered on while the voltage ranges from 9~36V.

Please note if you use a 19V power adapter, the input voltage must be selected to 9~36V.



If 12V or 24V is selected, you can also select the startup and shut down voltage setting.







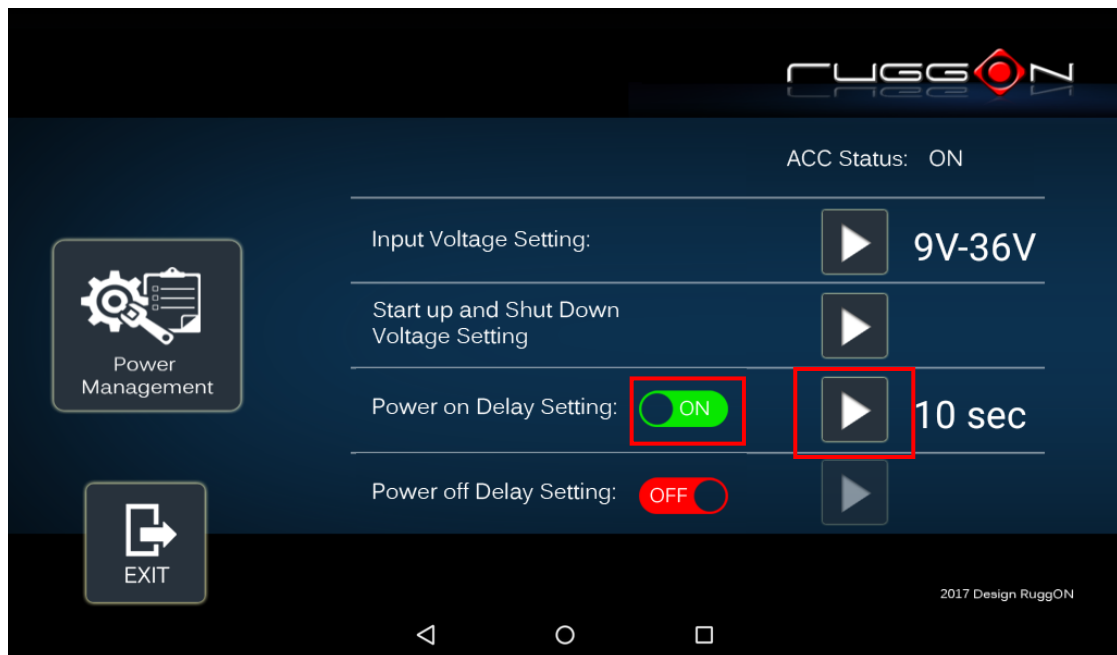
If the above selection items do not meet your demand, please contact local sales representatives.

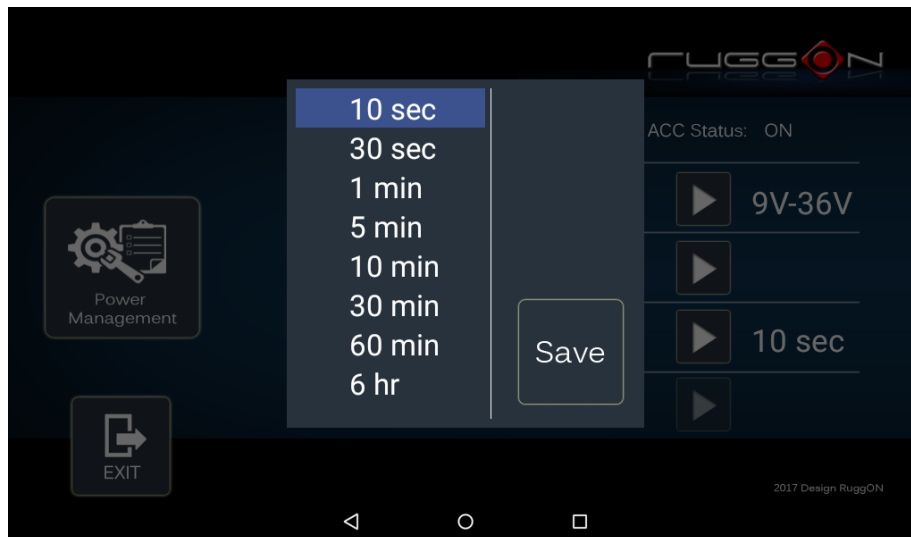
Power On/Off Delay Setting

Power on delay function enables you to power on the device after the ACC is on for a specified period of time. Enabled power off delay function lets the device remain on until the ACC is off for a specified period of time.

Power On Delay

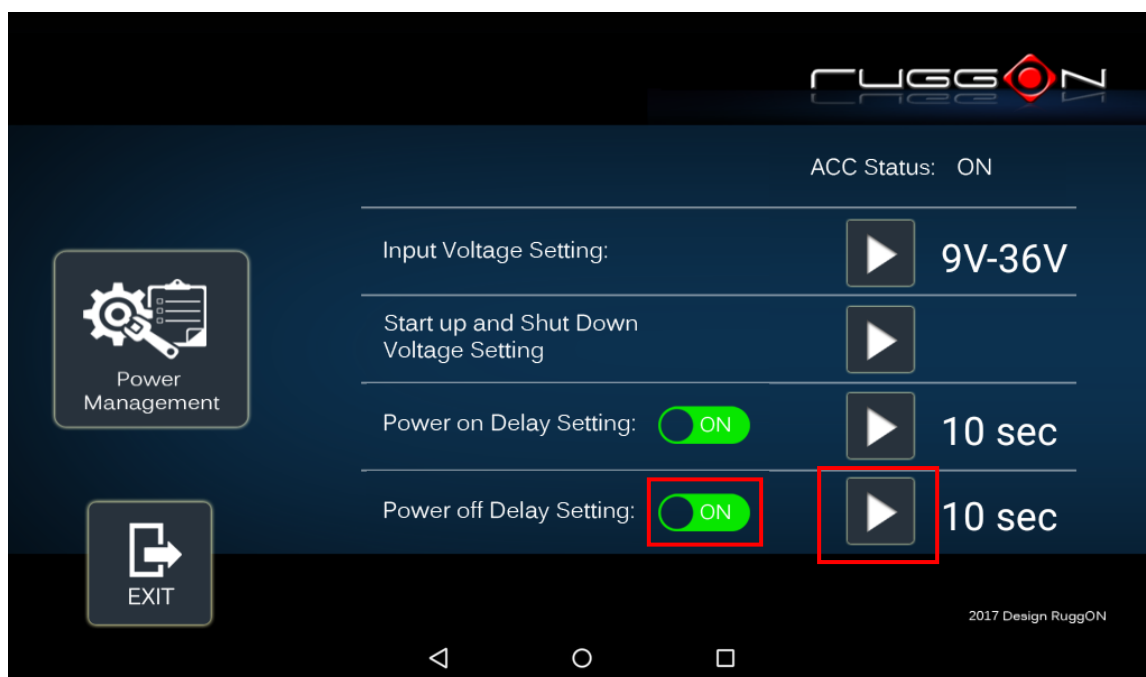
Switch the  to , click on the , and you will see the selection list. Delay time can be set at 10sec/30sec/1min/5min/10min/30min/60min/6hr

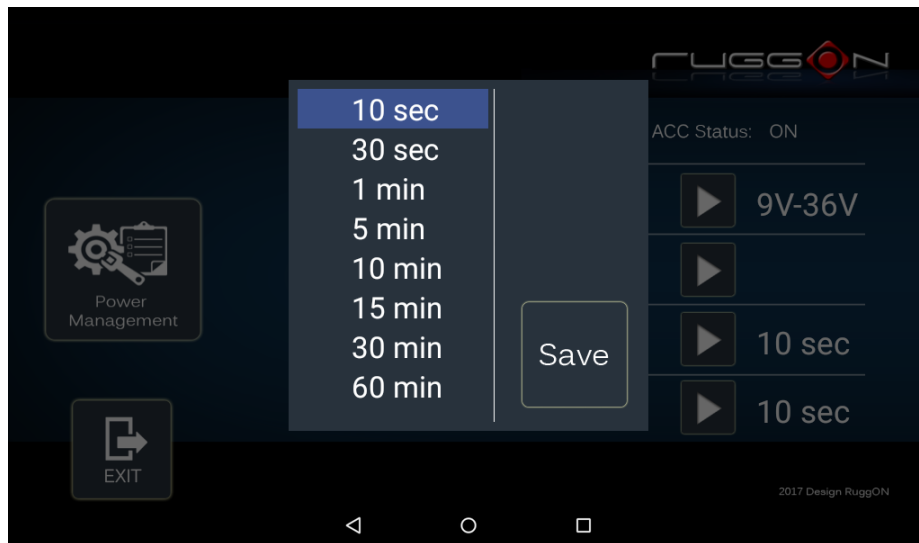




Power Off Delay

Same as power on delay setting process; you can also set the power off delay.
 Delay time can be set at 10sec/30sec/1min/5min/10min/15min/30min/60min/6hr

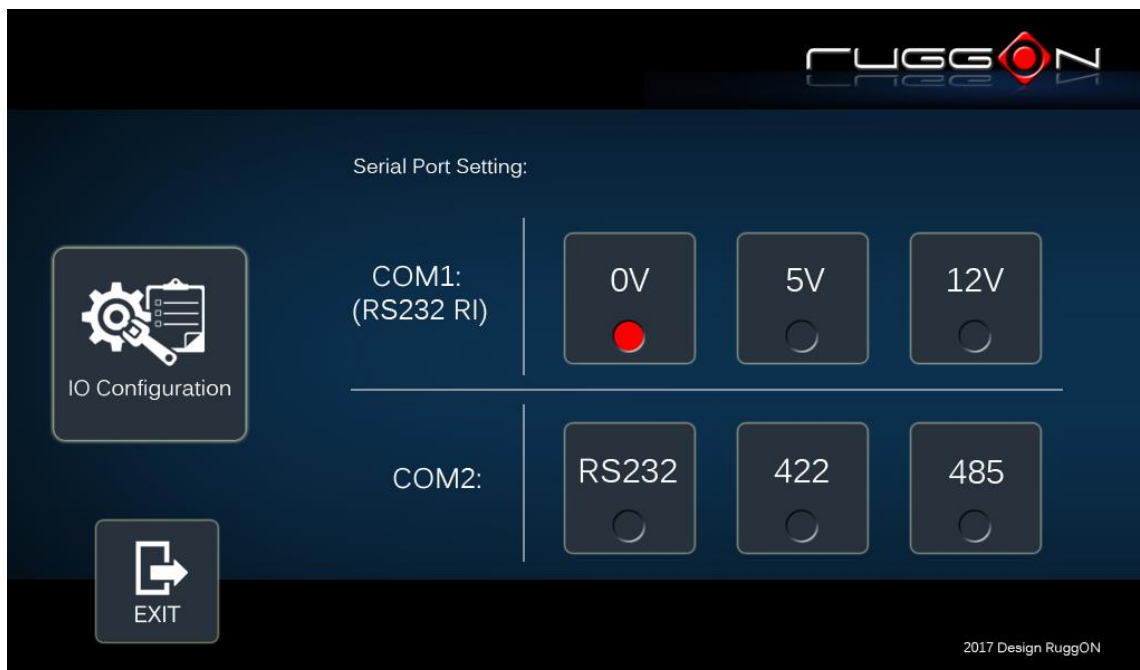




I/O Configuration

COM1 Setting

RS232 (COM1) supports 5V or 12V power output for users to easily connect with barcode scanner or other equipment. The maximum current is up to 5V/600mA & 12V/300mA.



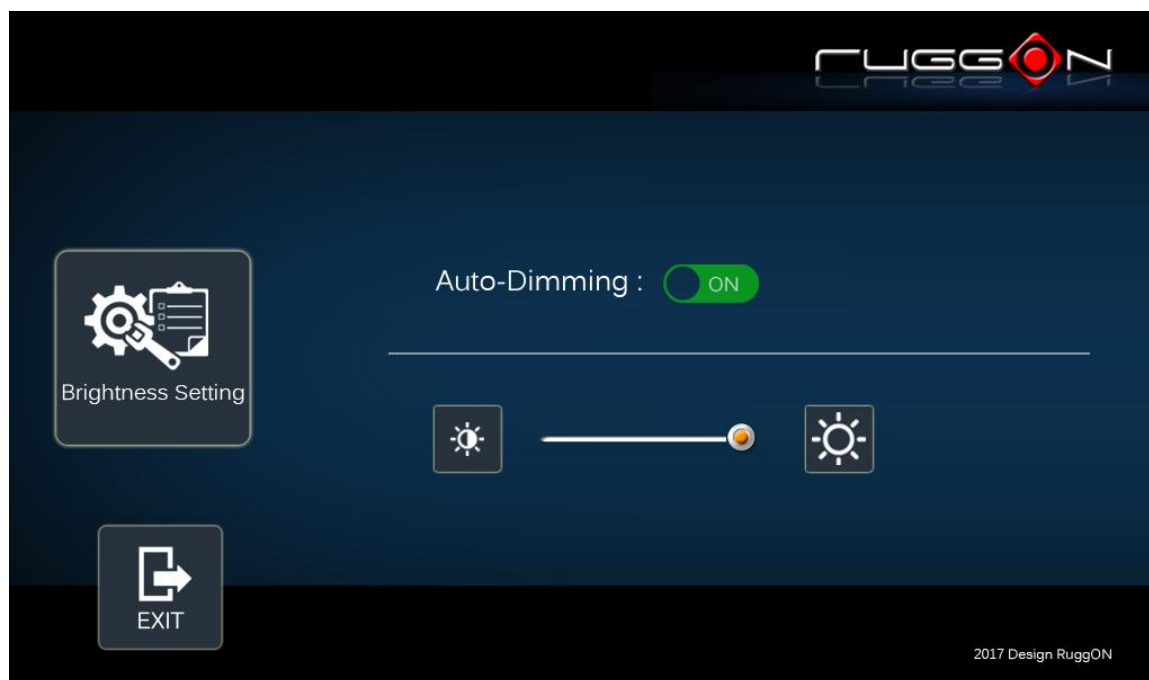
If you don't need the power output, just select 0V output to avoid the equipment damage. Please note if system power source is from backup battery (no DC input available), COM1 will stop supplying the power output.

COM2 Setting

The COM2 includes RS-232, RS-422 and RS-485 signals. Please select your required item and connect the Y-cable converter to the system. Please refer to the pin out description for correct connection.

Brightness Setting

Brightness adjustment is to optimize the operation of the backlight LEDs under a variety of daylight conditions. MT7010 supports auto-dimming and manually adjusts the brightness. If auto-dimming is enabled, the brightness is auto adjusted along with the changes of environmental light. You can also manually change the display brightness via programmable buttons or the bar adjustment in DashON. For programmable button setting, please see “Programmable Button” section. MT7010’s display brightness is set to automatic adjustment. You can also turn off “Auto-Dimming” and drag the scroll bar to adjust display brightness.



Watchdog Timer

This section is about the timer setting of watchdog and the simulation of watchdog functions. When the system is hanging due to some reasons, you are able to reboot the system automatically after the set time frame.

Double click on the DashON icon, and then click on the 4th icon “System Status & Setting”.



Click on the “Watchdog Timer”



Select the timer setting.



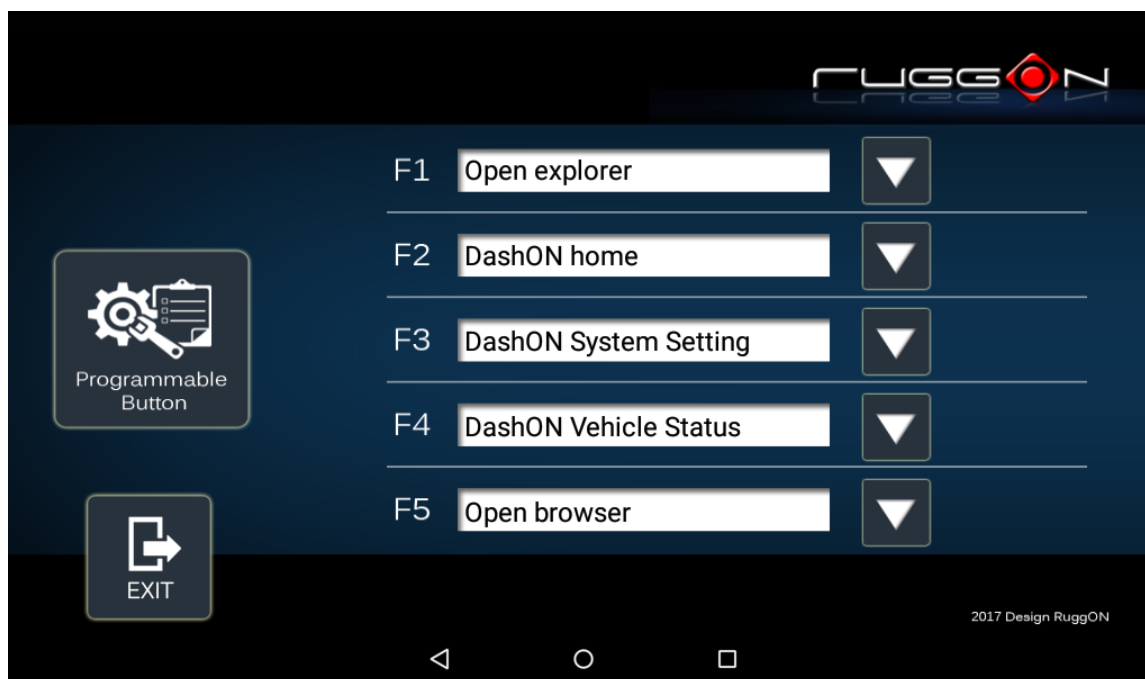
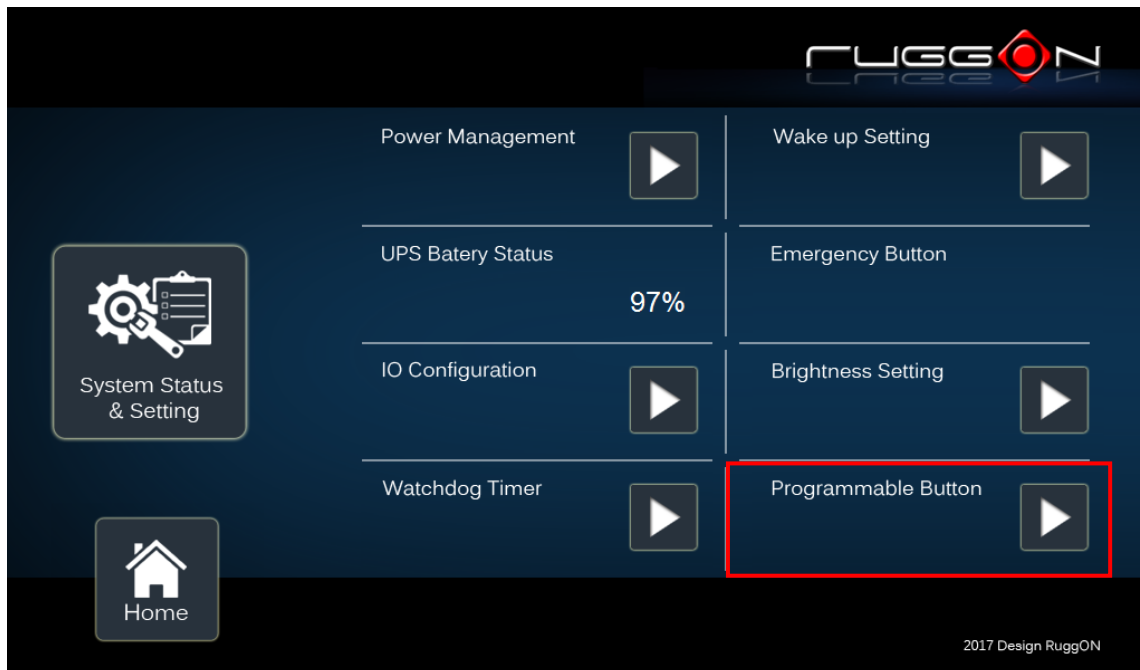
Turn on the watchdog switch.




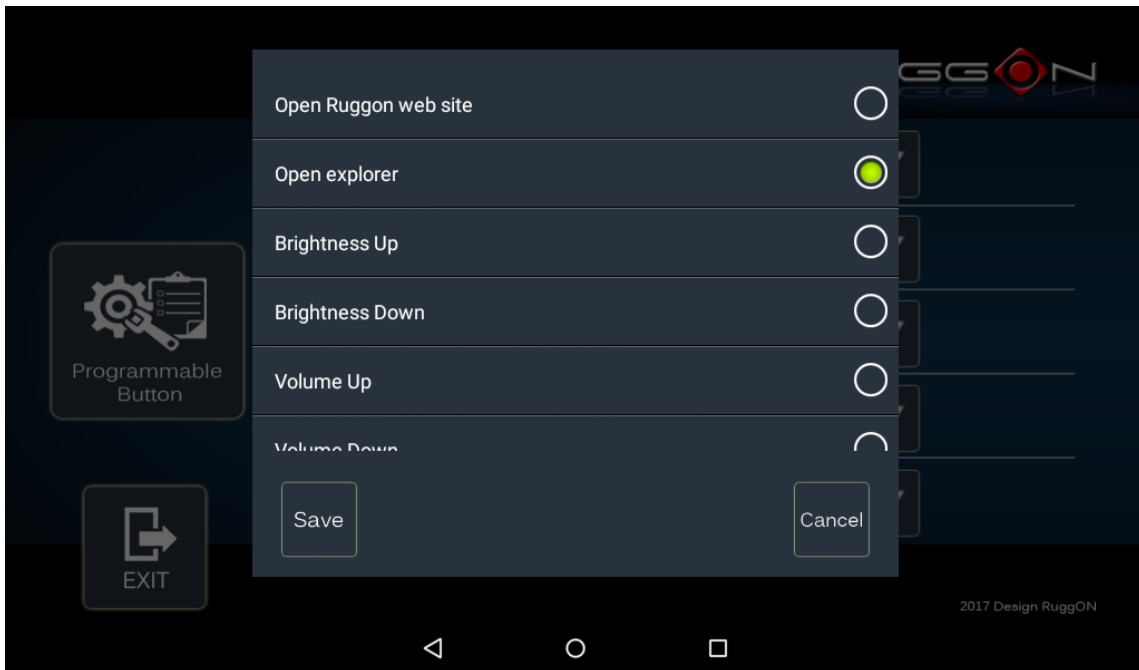
If you'd like to test if watchdog timer is enabled and working, please click on the “simulation” icon. The “simulation” is to simulate the system on hang and reboot it after the set time frame.

Programmable Button

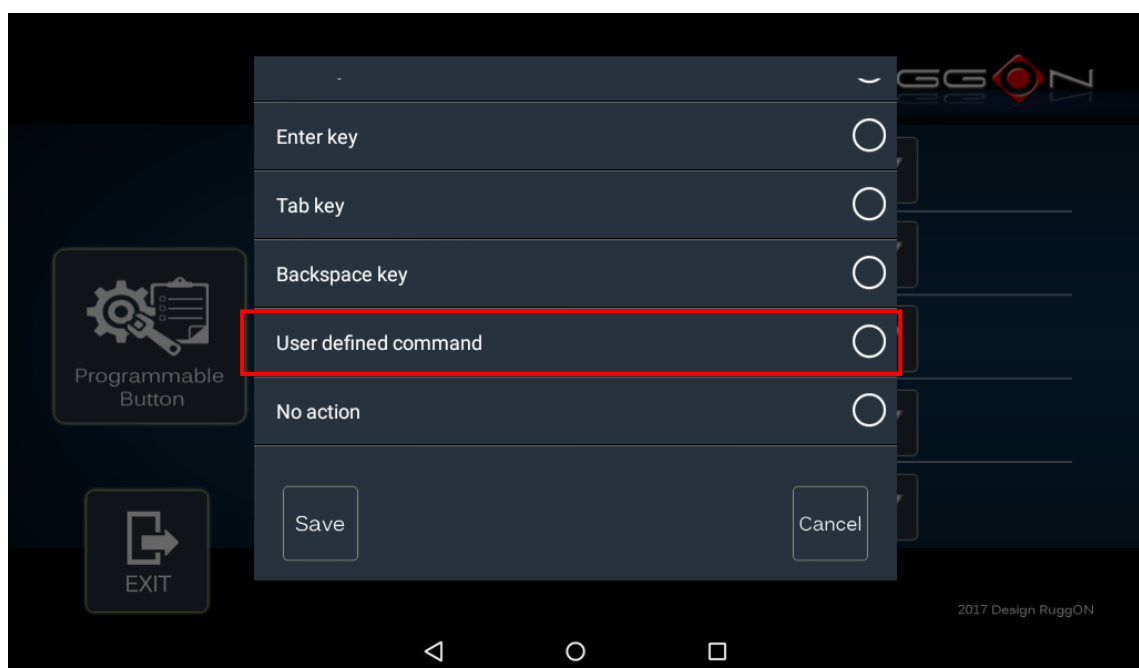
Programmable buttons can be set to different functions per user's definition.



Select which function key button you want to set and then click the  to select the function from the list.



User can also define the keystrokes for function keys by selecting the “User Defined Command” from the list.



Location and Sensor

MT7010 provides the GPS receiver and G-Sensor built-in. DashON provides both setting and information and also links to the Google map locations for demo applications.


You can also use the general freeware GPS viewer to set GPS setting.

Click on the “Location and Sensor”



Module RF: to enable or disable the GPS receiving function.

Enable/ Disable GPS Receiver

The default GPS receiver is enabled in MT7010. If you want to disable the receiver, switch “Module RF” to .

