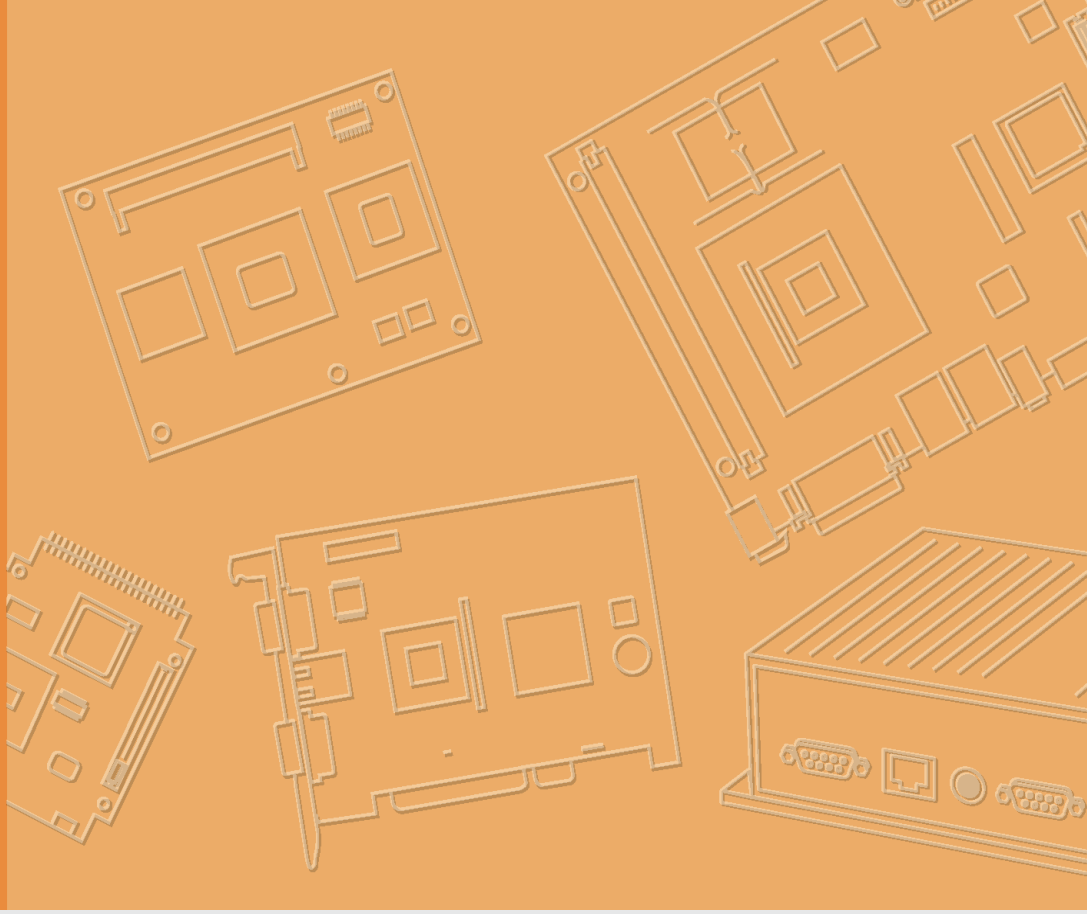

User Manual

TREK-734

RISC All-in-One Heavy duty Mobile Data Terminal

ADVANTECH

Enabling an Intelligent Planet

Copyright

Acknowledgements

i.MX6 is trademarks of Freescale NXP.

Android is registered trademarks of Google LLC.

All other product names or trademarks are properties of their respective owners.

Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Part No. Edition 2

Jan. 2018

Declaration of Conformity

CE

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.

FCC Class B

Note: 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.

This device complies with Part 15 FCC Rules.

Operation is subject to the following two conditions.

(1) This device may not cause harmful interference , and

(2) The device must accept any interference received, including interference may cause undesired operation.

FCC Caution:

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

FCC RF Radiation Exposure Statement :

This device meets the government`s requirements for exposure to radio waves. This device is designed and manufactured not to exceed the emission limits for exposure to radio frequency(RF) energy set by the Federal Communications Commission of the U.S. Government.

This device complies with FCC radiation exposure limits set forth for an uncontrolled environment. In order to avoid the possibility of exceeding the FCC radio frequency exposure limits, human proximity to the antenna shall not be less than 20cm (8 inches) during normal operation.

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

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Technical Support and Assistance

1. Visit the Advantech web site at http://support.advantech.com where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Note! *Notes provide optional additional information.*

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

Part number	Description	Q`ty
TREK-734C	TREK-734 Computer	1
1700019031	Power cable (2M)	1

Ordering Information

P/N	Description
TREK-734C-WBADA0E	TREK-734 I. MX6 1GB,4GB , Android5.1 WiFi only
TREK-734C-LWBADA1E	TREK-734 IMX6,2GB,8GB And.5.1 LTE EU EC-25E Int.
TREK-734C-LWBADB1E	TREK-734 IMX6,2GB,8GB And.5.1, LTE NA EC-25A Ext.
TREK-734C-LWBADC0E	TREK-734 I. MX6 1GB,4GB , Android5.1, Huawei 909s

Optional Accessories

P/N	Description
1760002560-01	Backup Battery pack 7.2V 2450mAh 2S1P
TREK-734-IP000	IP54-rated I/O Cover
1700026766-01	High Density Connector Cable
1750008571-01	WLAN/BT external antenna (TNC)
1750008570-01	WWAN/GPS external antenna (TNC)

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User 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 reliable surface during installation. Dropping it or letting it fall may cause damage.
7. Do not leave this equipment in an environment unconditioned where the storage temperature under -30° C (-22° F) or above 80° C (176° F), it may damage the equipment. Operating temperature: -20°C~70°C without battery.
8. Do not operate this equipment in an environment temperature may over 70°C(158° F). The surface temperature of plastic chassis may be hot.
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Position the power cord so that people cannot step on it. Do not place anything over the power cord. The voltage and current rating of the cord should 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 arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.

- Liquid has penetrated into the equipment.
- The equipment has been exposed to moisture.
- The equipment does not work well, or you cannot get it to work according to the user's manual.
- The equipment has been dropped and damaged.
- The equipment has obvious signs of breakage.

16. CAUTION: The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace

only with same or equivalent type recommended by the manufacture. Discard used batteries according to the manufacturers instructions.

17. 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.
18. CAUTION: Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges.
19. CAUTION: Always ground yourself to remove any static charge before touching the motherboard, backplane, or add-on cards. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.
20. CAUTION: Any unverified component could cause unexpected damage. To ensure the correct installation, please always use the components (ex. screws) provided with the accessory box.

Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the mainboard or other cards while the system is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

This product is intended to be supplied by a Listed DC power source, rated 9~32Vdc, 10A maximum and Tma 55 degree C, if need further assistance with purchasing the DC power source, please contact Advantech for further information.

Warning!

1. *Input voltage rated: 9 ~ 32 Vdc.*
2. *Transport: carry the unit with both hands and handle with care.*
3. *Maintenance: to properly maintain and clean the surfaces, use only approved products or clean with a dry applicator.*
4. *SD/SIM card: Turn off the power before inserting or removing the storage cards.*

Contents

Chapter 1

General Information

This chapter gives background information on the TREK-734 Computer

Sections include:

- **Introduction**
- **General Specifications**
- **Dimensions**

1.1 Introduction

TREK-734 is a RISC-based open platform all-in-one light-duty mobile data terminal equipped with an 8” display, Freescale ARM® Cortex™-A9 i.MX 6 Dual lite processor, Android 5.1 OS , 2GB memory and LTE networking capabilities to enable high performance computing for fleet management applications. LTE capabilities transform the terminal into a wireless network hub that supports WiFi , BT, and GPS communication to facilitate location tracking and route optimization. The built-in backup battery ensures an uninterruptable power supply by providing up to 30 minutes of emergency power in the event of a power failure. Certified to MIL-STD-810G standards for vibration tolerance. Moreover, three external antenna ports are provided for enhanced network communication in order to effectively support critical outdoor applications.

1.2 General Specifications

Features

- Freescale ARM® Cortex™-A9 i.MX 6 Dual lite processor with Android 5.1.
- Rich I/O connectors designed on top of rear side for easy system integration.
- 2 front side speakers make volume louder in real application environment.
- Built-in LTE/GNSS/WiFi/BT for data communication.
- Advanced Shock & anti-vibration certified by MIL-STD-810G.
- Advanced Android SDK , test utility for customer evaluating.

Specifications

System	Processor	Freescale ARM® Cortex™-A9 i.MX 6DualLite (1 GHz)
	Memory	1 GB DDR3 (supports up to 2 GB)
	Storage	4 GB onboard eMMC (supports up to 8 GB) 1 x Micro SD slot (externally accessible)
	Watchdog	Yes
	RTC	Yes
	O.S	Android 5.1.1
RF	WiFi	IEEE 802.11 b/g/n
	Bluetooth	Bluetooth V4.0
	GNSS	u-blox MAX-M8Q (GPS, BD, GLONASS, Galileo)
	WWAN	LTE, HSPA+, GSM/GPRS/EDGE, WCDMA
	Voice call	N/A
	Wake-on-WWAN	N/A
	SIM	1 SIM slot
	External Antenna	1 x WLAN, 1 x WWAN, 1 x GPS (TNC type)
Display	Size/Type	8" (16:10) TFT LCD
	Max. Resolution	1024 x 600
	Brightness (cd/m2)	750 nits
	Viewing Angle (R/L/B/T)	70/80/80/80
	Backlight Life	20,000 hrs
Touchscreen		Capacitive (multi-touch)
Brightness Control		Light sensor for automatic dimming
Function Key		5 x programmable function keys with green LED backlight
I/O	I/O Port (via high-density connector)	1 x CAN bus (supports raw CAN, J1939, OBD-II/ISO 15765) (via high-density connector)
	Generic I/O Port (via high-density connector)	4 x Isolated DI/2 x DO 1 x 4-wire RS-232, 1 x 2-wire RS-232 1 x CVBS-In 1 x Mic-In 1 x Line-In (R & L) 1 x Line-Out (R & L) 1 x USB2.0 Type A host
	Standard I/O Port	1 x USB 2.0 host @ R; mini USB debugging (5 pin) 1 x USB 2.0 client @ R; USB type A host (4 pin)
	Indicator	1x LED (Power)
Power	Power Button	Yes
	Reset	Yes
	Input Voltage	9-32V DC
	Backup Battery (Optional)	7.2 V 2450 mAh 2S1P
Mechanical	Dimensions (W x H x D)	250 x 175 x 95 mm (9.84 x 6.88 x 3.74") with IP-rated I/O cover 250 x 175 x 47 mm (9.84 x 6.88 x 1.85")
	Weight	1.3 kg (2.86 lb)
Environment	IP Rating	IP54
	Regulation	E-Mark, ISO 7637-2, SAE J1455, SAE J1113
	EMC	CE,FCC
	Safety	UL/cUL, CB, CCC
	Operating Temperature	-20° C ~ 70° C (-4° F ~ 158° F) without backup battery
	Storage Temperature	-30° C ~ 80° C (-22° F ~ 176° F) without battery
	Shock/Vibration	MIL-STD-810G, SAE J1455

1.3 Dimensions

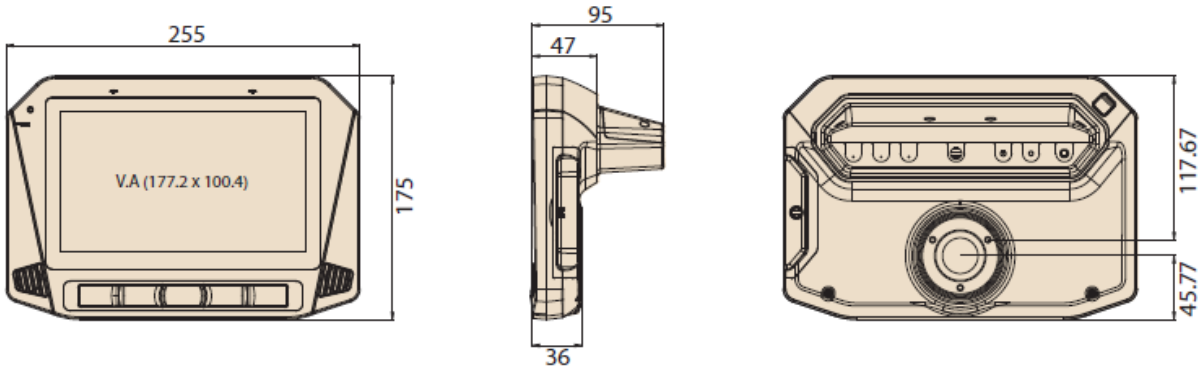


Figure 1.1 TREK-734 dimensions

Chapter 2

System Setup

This chapter details system setup on TREK-734

Sections include:

- A Quick Tour of the Computer Box
- Installation Procedures

2.1 A Quick Tour of the TREK-734 Computer

Before starting to set up TREK-734, take a moment to become familiar with the locations and functions of the connectors and ports, which are illustrated in the figures below.

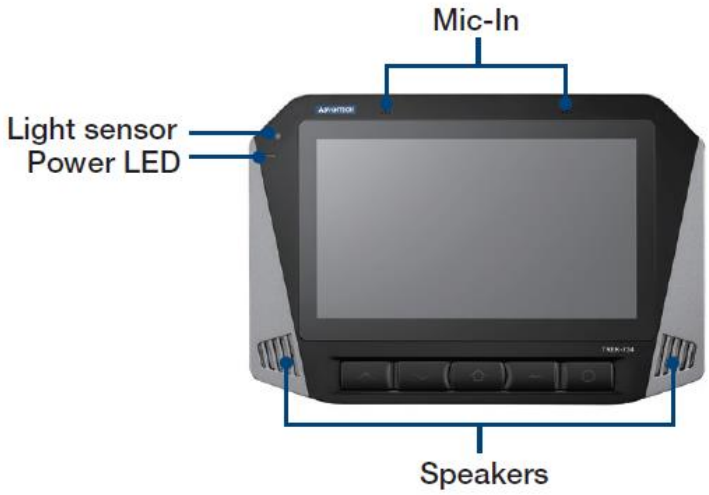


Figure 2.1 Front view of TREK-734

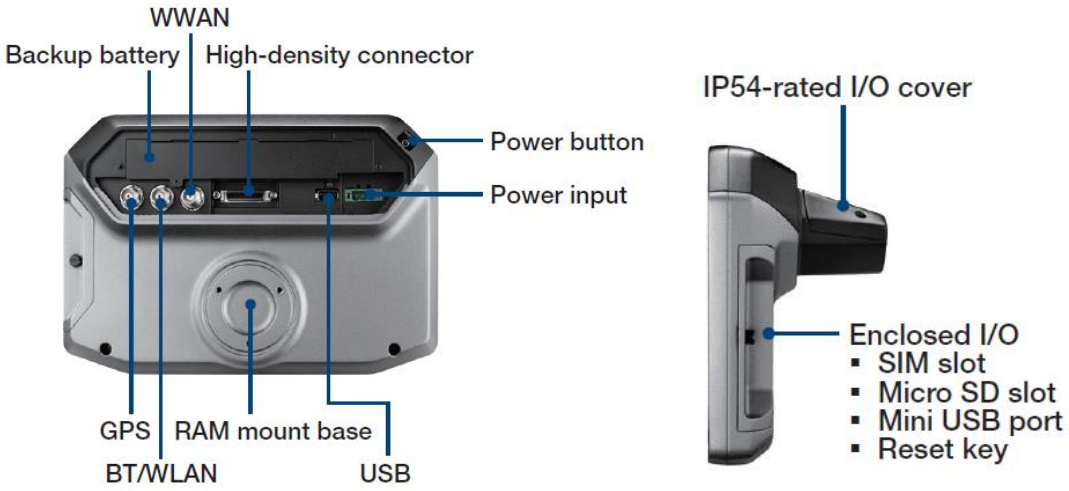


Figure 2.2 Rear view of TREK-734

2.2 Installation Procedures

2.2.1 Installing SIM car & Storage card

Remove enclosed I/O door screw and can install SIM Card & Micro SD card directly.

1. Remove side I/O door

2. Install SIM card or Micro SD card

Figure 2.3 Installing SIM card & Storage card

2.2.2 Connecting Power

Connect the three pin waterproof power cord to the DC inlet of the Computing Box. On the open-wire end, one pin is reserved for positive voltage and is marked, "+"; one pin is reserved for ground and is marked, "-"; and, one pin is reserved for the ignition signal with an “ignition” mark.

Note! *Ignition on/off setting: The TREK-734 supports an ignition on/off function so that you can power on/off the TREK-734 via the ignition signal/voltage and connect the TREK-734 ignition switch.*

Table 2.1: Pin Definition of Power Cord

Pin	Definition	Color
1	-	Black
2	+	Red
3	Ignition	Orange

2.2.2 Power Connector

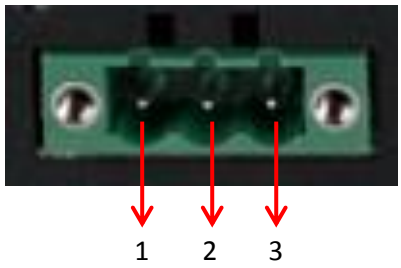


Figure 2.6 Power connector outlook

Table 2.2: Power connector

Pin	Signal	Pin	Signal
1	Ground	2	Power input (9~32VDC)
3	Acc ignition input		

Chapter 3

I/O Connectors

This chapter explains how to set up the Computing Box hardware, including instructions on setting.

Sections include:

- **I/O connectors pin assignment**

3.1 I/O Connectors Pin Assignment

3.3.1 Power connector

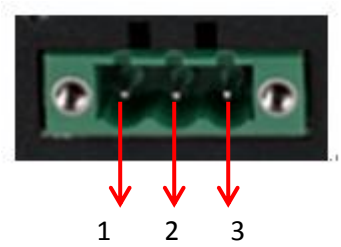
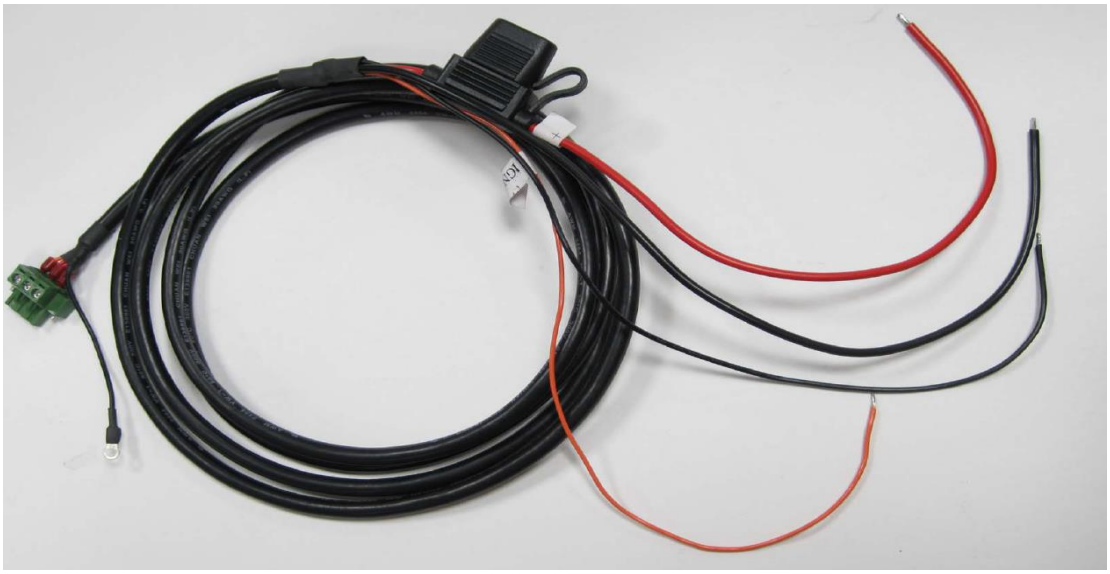


Table 3.1: Power connector

Pin	Signal	Pin	**Signal**
1	Ground	2	Power input (9~32VDC)
3	Acc ignition input		

3.3.1.1 Power in Jack Cable



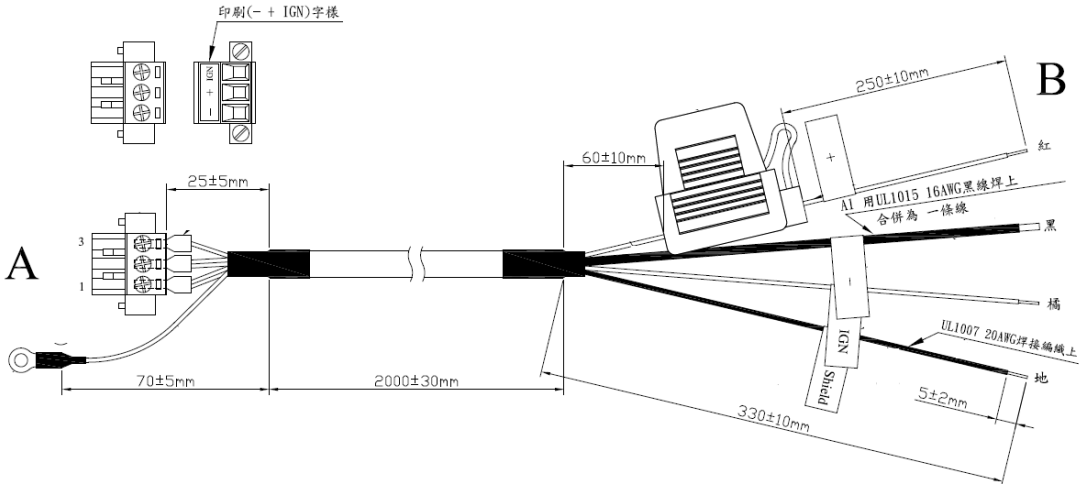


Table 1: Power JACK Cable Pin Depiction		
PIN	**Signal Depiction**	**Cable /Label**
1	Power Ground	■/-
2	Power Input (9 ~ 32 VDC)	■/+
3	Acc Ignition Input	■/IGN
	Shield Ground	■/Shield

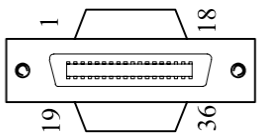
Fuse Spec: 58V/10A*1

3.3.2 High Density Connector

1	GND	19	GND_CODEC
2	RS232_RTS1_HD	20	MIC_IN1
3	RS232_CTS1_HD	21	LINE_IN_P
4	RS232_TX1_HD	22	LINE_IN_N
5	RS232_RX1_HD	23	LINE_OUT_R
6	RS232_TX2_HD	24	LINE_OUT_L
7	RS232_RX2_HD	25	ISO_DO_DRAIN1
8	RS-232_DCD2_HD	26	ISO_DO_DRAIN2
9	CVBS_HD	27	ISO_DI_1
10	GND	28	ISO_DI_2
11	USB_HD_DP_H	29	ISO_DI_3
12	USB_HD_DN_H	30	ISO_DI_4

13	GND	31	ISO_DI_5
14	+V5_HD_USB	32	ISO_DI_6
15	GND	33	ISO_GND
16	GND	34	GND
17	+12V_HD_HD1	35	CAN_H_R
18	+12V_HD_HD1	36	CAN_L_R

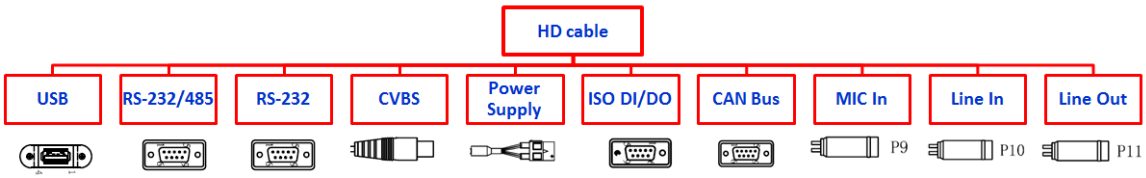
3.3.2.1 High density cable



36Pin connector cable pin define	
Pin number	Pin name
1	GND_RS12
2	RS232_RTS1_HD
3	RS232_CTS1_HD
4	RS232_TX1_HD
5	RS232_RX1_HD

6	RS232_TX2_HD
7	RS232_RX2_HD
8	RS-232_DCD2_HD
9	CVBS_HD
10	GND_CVBS
11	USB_HD_DP_H
12	USB_HD_DN_H
13	GND_USB
14	+V5_HD_USB
15	GND_12V
16	GND_12V
17	+12V_HD_HD1
18	+12V_HD_HD1
19	GND_CODEC
20	MIC_IN1
21	LINE_IN_P
22	LINE_IN_N
23	LINE_OUT_R
24	LINE_OUT_L
25	ISO_DO_DRAIN1
26	ISO_DO_DRAIN2
27	ISO_DI_1
28	ISO_DI_2
29	ISO_DI_3
30	ISO_DI_4
31	ISO_DI_5
32	ISO_DI_6
33	ISO_GND
34	GND_CAN
35	CAN_H_R
36	CAN_L_R

High Density Cable Layout



3.3.3 USB Connector

Connector type: Stack USB A-Type Receptacle DIP UB1112C-8FDE-4F

Table 3. : USB Connector

Pin	Signal Depiction
1	Vcc
2	USB_Data-
3	USB_Data+
4	GND

Chapter 4

Software Demo Utility Setup

This chapter explains the software demo utility for TREK-734

Sections include:

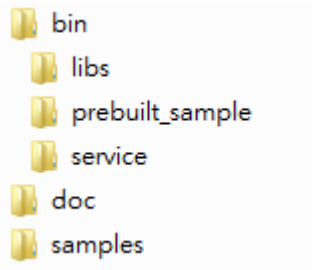
- Introduction
- How to Set up Demo Utility

4.1 MRM SDK Package Contents & Overview

Advantech has developed demo utilities based on Advantech provided SDK APIs to let user test the functions on TREK-734. This document describes the usage of each demo utilities and also provide a basic concept of the application development on TREK-734.

For technical support, contact Advantech application engineers worldwide. For news updates, please visit our website : www.advantech.com and MRM forum : http://mrmforum.advantech.com/index.aspx

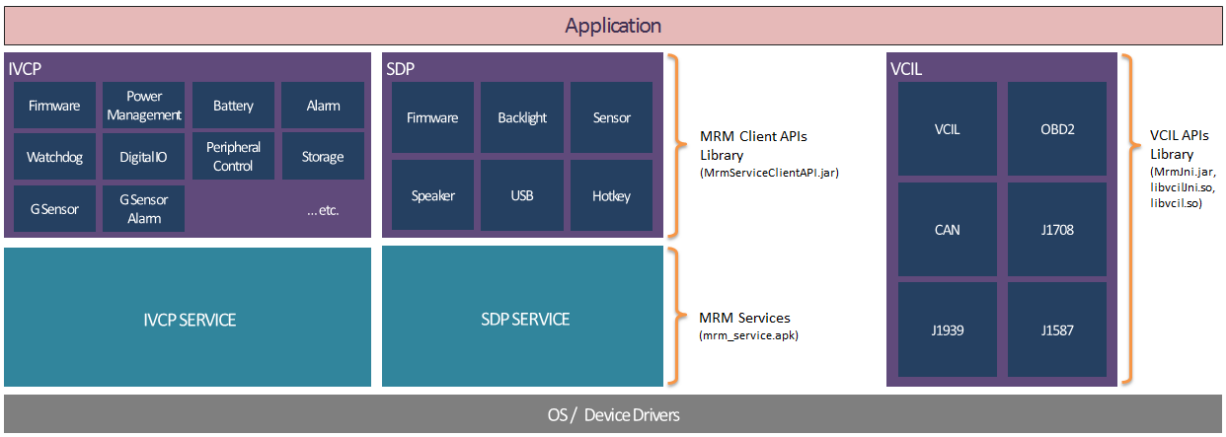
The MRM SDK package contains the following contents:



The description of each of the folder at the top level is listed below:

Files/Directories	Description
bin/library/	The Java library and native library files. These libraries should be imported in to your APP project.
bin/service/	The MRM service APK file. The service APK file must be installed into your device before running your APP or prebuilt sample APPs.
bin/prebuilt_sample/	The prebuilt APK files of sample codes.
doc	The Documents.
samples	The sample code.

The MRM (Mobile Resource Management) SDK is a set of software libraries which provides APIs for controlling various functions of the target device.
The following figure describes the software stack of MRM SDK:



4 MRM SDK is composed of the following function domains:

- **IVCP** (Intelligent Vehicle Co-Processor)
  A VPM(Vehicle Power Management) MCU(Micro Controller Unit) is embedded in the device, which controls the power status of device and peripheral devices such as G-Sensor and P-Sensors.
  The IVCP function domain is designed in client-service architecture. The IVCP Service acts as a proxy to access the VPM MCU and is able to serve multiple APP processes simultaneously. In your APP, you can use the IVCP APIs exported in the MRM Client APIs Library to communicate with the IVCP service.

  IVCP Service Client API Modules:
  - **Firmware APIs** - Get VPM MCU firmware version. Save/Load default settings
  - **Power Management APIs** - VPM related functions. ex: boot control, Ignition control, event delay adjustments, low battery protection and etc.
  - **Battery APIs** - Backup battery related information and functions
  - **Alarm APIs** - Internal RTC time setting and device alarm wakeup related functions.
  - **Watchdog APIs** - Watch dog functions.
  - **Peripheral Control APIs** - Power status management of peripheral devices.
  - **Storage APIs** - Internal EEPROM storage access.
  - **G Sensor APIs** - Access G sensor data. G sensor related settings.
  - **G Sensor Alarm APIs** - G sensor device wakeup functions.
  - **P Sensor APIs** - Access P sensor data.

- **SDP** (Smart Display Panel)
  Depends on the specific device spec, the device may bundle with a smart display panel module. The smart display panel module is embedded with a MCU to control functions of the module. Similar with IVCP function domain, the SDP function domain is also designed in client-service architecture. You can use the SDP APIs exported in the MRM Client APIs Library to communicate with the SDP service.

  SDP Service Client API Modules:
  - **Firmware APIs** - Get SDP MCU firmware version. Save/Load default settings
  - **Backlight APIs -** Configure brightness of smart display.
  - **Sensor APIs** - Access sensor on smart display
  - **Hotkey APIs** - hotkeys related settings.
  - **Speaker API** - Speaker related settings
  - **USB API** - USB port related settings

- **VCIL** (Vehicle Communication Interface Layer)
  A VCIM(**V**ehicle **C**ommunication **I**nterface **M**odule) MCU is embedded in the device for controlling the vehicle communication protocols (e.g. CAN, J1939, OBD2, J1708, J1587). For the performance considerations, the VCIL function domain is designed in form of libraries, You can use the VCIL APIs exported in the VCIL API Library to control the MCU directly. For VCIL does not has service layer, the VCIL API Library does **NOT** support multi-process access.

  VCIL API Modules:
  - **VCIL APIs -** Get VCIL MCU firmware version. Physical port protocol settings.
  - **CAN APIs** - Read / write data with CAN protocol.
  - **J1939 APIs** - Read / write data with J1939 protocol.
  - **OBD2 APIs** - Read / write data with OBD2 protocol.
  - **J1708 APIs** - Read / write data with J1708 protocol.
  - **J1587 APIs** - Read / write data with J1587 protocol.

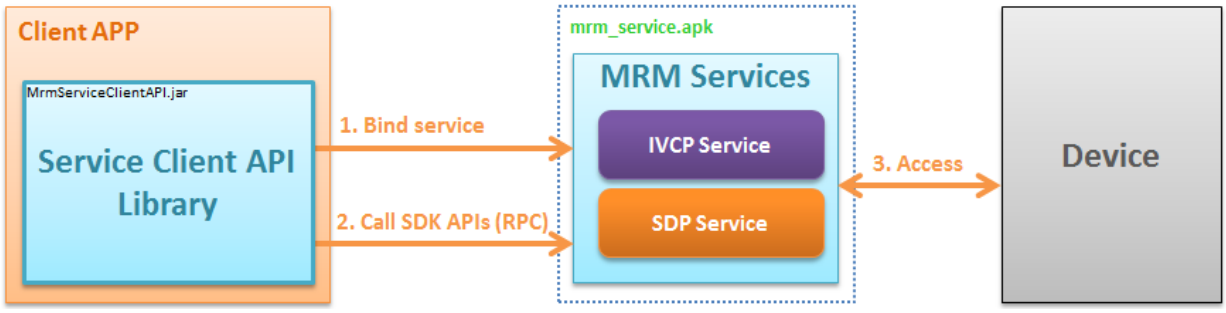
4.2 How MRM SDK Works

IVCP and SDP functions in the MRM SDK for Android is designed in client-service architecture.

To make your APP work with the MRM services to control the device you must first include the Service Client API library into you APP project. Before calling APIs to control the device, you must first "bind" you APP process to the MRM service processes. After binding is done, you can then call the IVCP, SDP APIs to communicate with the services. The MRM services act as

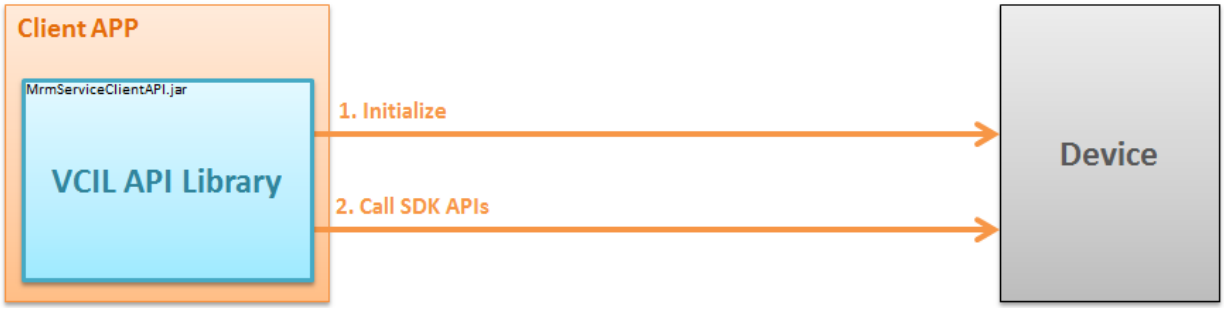
proxies for client APP to access the hardware functions.

Due to the nature of client-service structure, the MRM SDK for Android supports multi-processes access. It is available for the services to serve multiple application processes at the same time. The hardware resources are managed by the services and the client application does not need to worry about hardware resource occupation.



VCIL functions in the MRM SDK for Android is designed in form of libraries.

Before calling APIs to control the device, you must first call the initialization API to make the VCIM MCU ready to work. After initialization is done, you can then call the VCIL APIs to do operations of vehicle protocols.



4.3 Installation of the MRM SDK

You can install SDK(MRM Services) to your device by follow the steps below

1. **Unzip the SDK package**

Extract the SDK package zip file with password.
The password is same as the filename.

2. **Install MRM Services (**mrm_service.apk**)**

   (NOTE: This step is only necessary for IVCP and SDP function. You can skip this step if you only need VCIL functions)

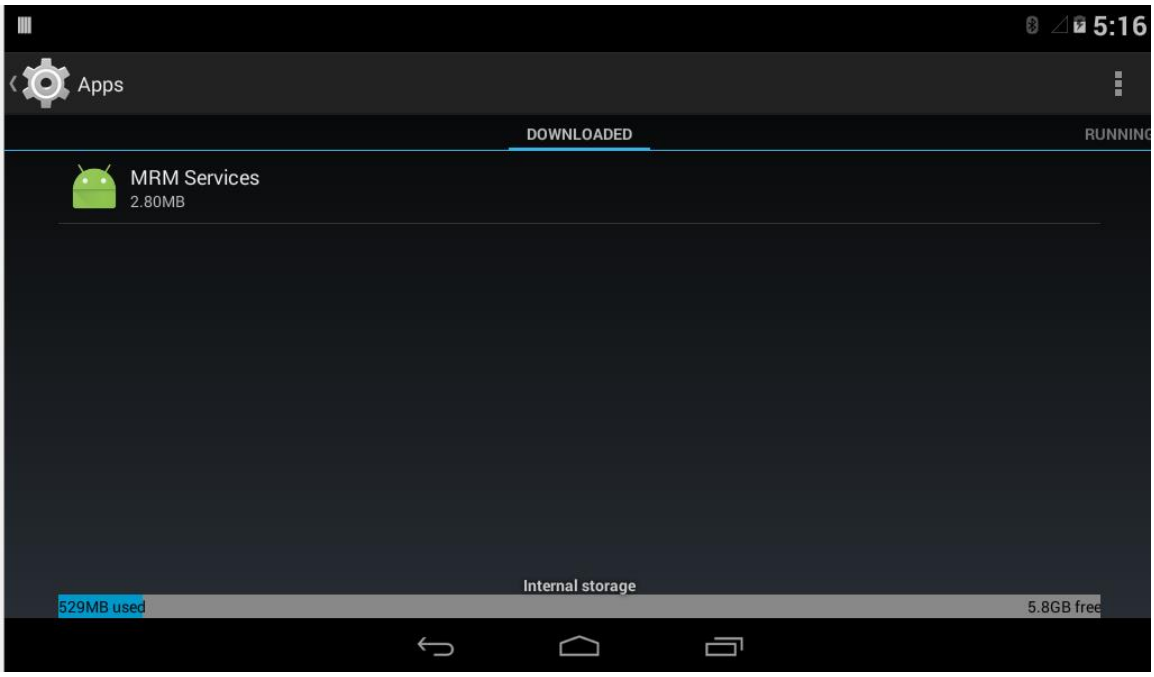
   Connect device to you computer with ADB.

   Execute the script **install_mrm_service.bat** in [SDK_Pacakge]/bin/

The script will execute the following ADB command:

```
adb install -r .\mrm_service.apk
```

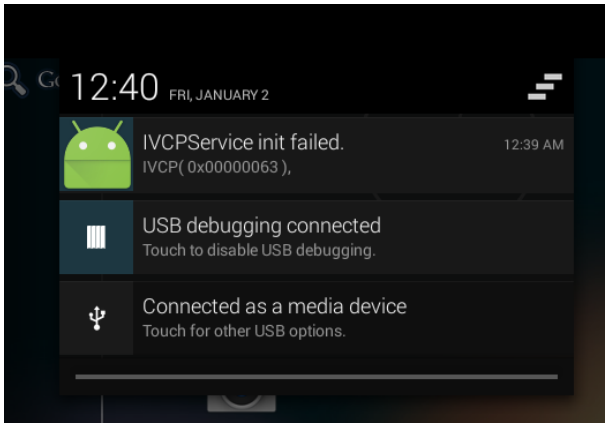
After installed, you will get the following package in your devices



There will also be an MRM Service Console APP named "MRM" in the APP list. This is a utility for testing MRM Services and checking the basic information.

MRM Control Panel	
SDK INFORMATION	
MRM SDK ver.	4.0.1.0
SYSTEM INFORMATION	
OS image ver.	dmsst05_6dq-eng 4.4.2 1.0.0-rc3 eng.root.20150925.152917 dev-keys
VPM FW ver.	000.091
MRM SERVICE STATUS	
IVCP Service	RUNNING (PID = 14889)

When **MRM** is launched, it will try to bind all MRM services. The MRM Services will be started and initialize related hardware resources.
If initialization failed, you can get message with error code in the notification area (drag down from left top of screen).



In the MRM, the service status will should be shown with the service process ID. The status will be one of the followings:

- **RUNNING**
  - Service process is working correctly.

  ex:

- **NOT_INITIALIZED**
  - Service process exists but the hardware resources can not be initialized. In this status, the IVCP APIs can not work properly.
  - You can find the error code message in the notification area.

  ex:

- **UNKNOWN**
  - Service process exists but the initialization status can not be confirmed.
  - The error code will be also shown. (For the definition of error codes, please refer to the IVCP, VCIL, SDP User Manual)

  ex:

- **STOP**
  - Service process does not exist.

  ex:

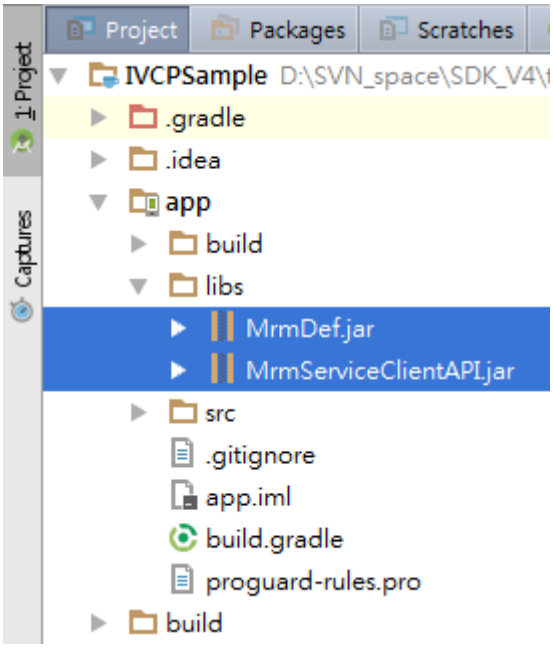
  

3. **Import MRM Service Client APIs Library**

   (NOTE: This step is only necessary for IVCP and SDP function. You can skip this step if you only need VCIL functions)

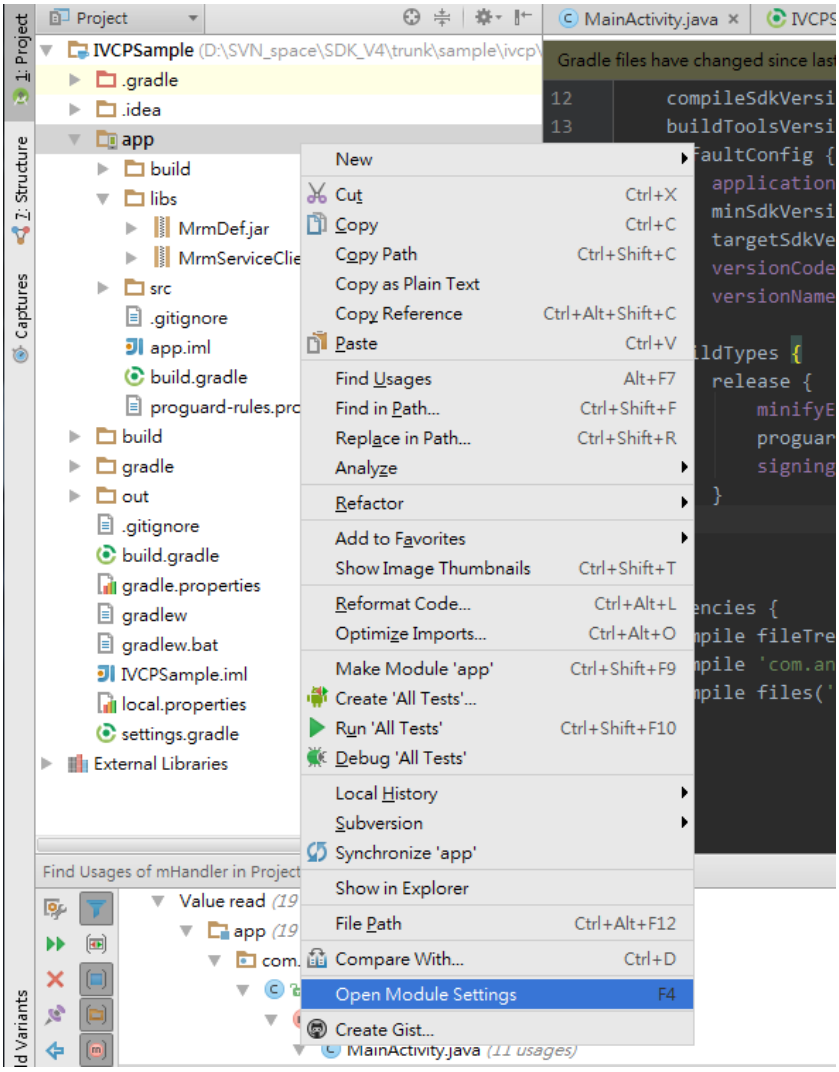
   To access MRM Service from your APP, you must import the MRM Service Client API lib into you project.

   Please find the **MrmServiceClientAPI.jar** and **MrmDef.jar** in the MRM SDK package. Copy the libraries to the directory **/[Module Name]/libs/** in you Android Studio project (the default module name might be "app").

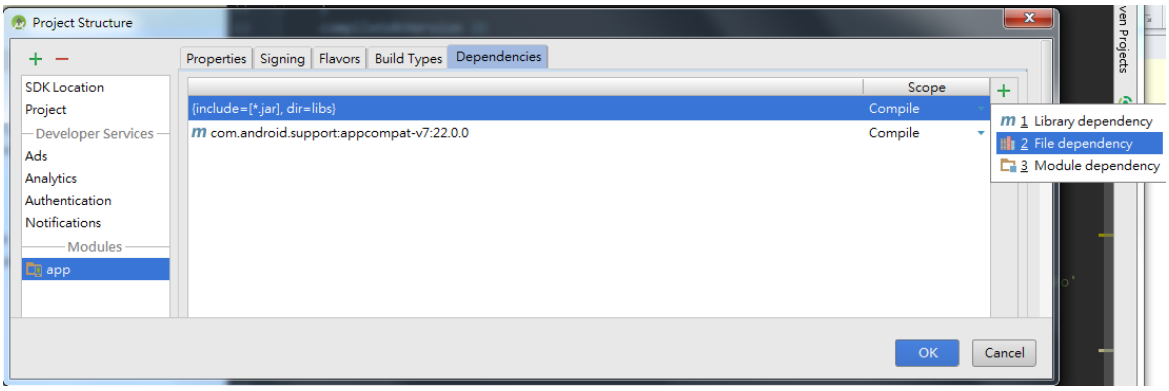


   Then import the libraries by following the steps below:

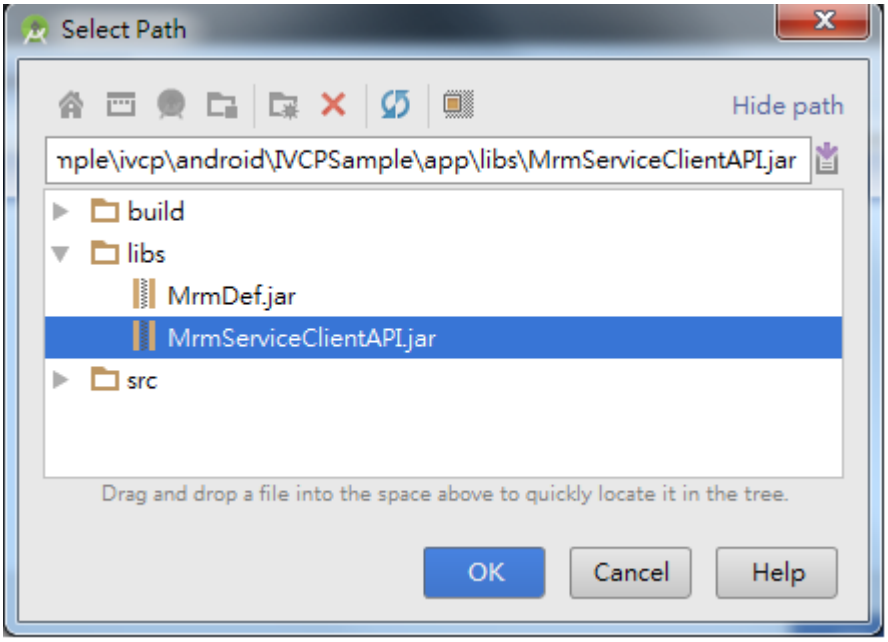
   - Right click on you APP module. Click "**Open module settings**"



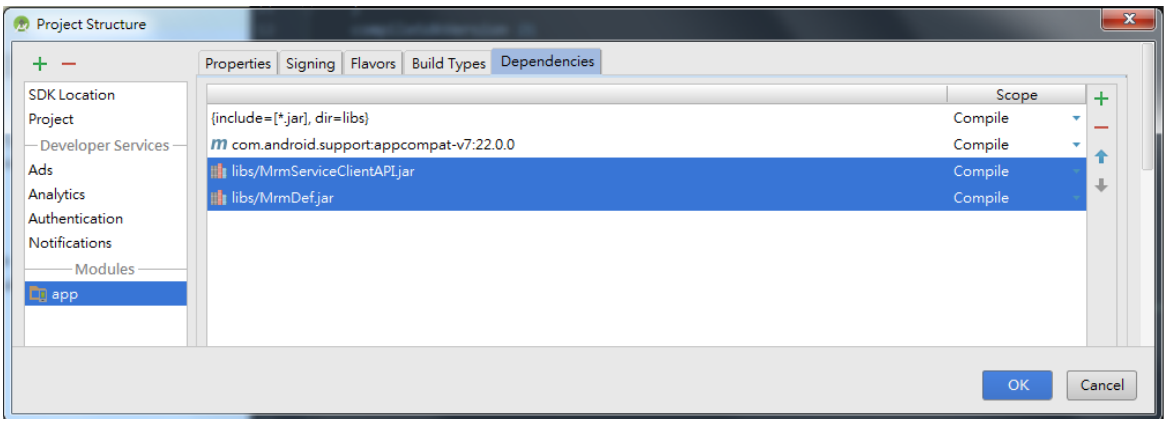
- Click the "**Dependency**" tab. Then click "+" -> "**File dependency**"



- Select the lib file.



- Repeat the above steps to add all libs and you will see all libs are added to the list.



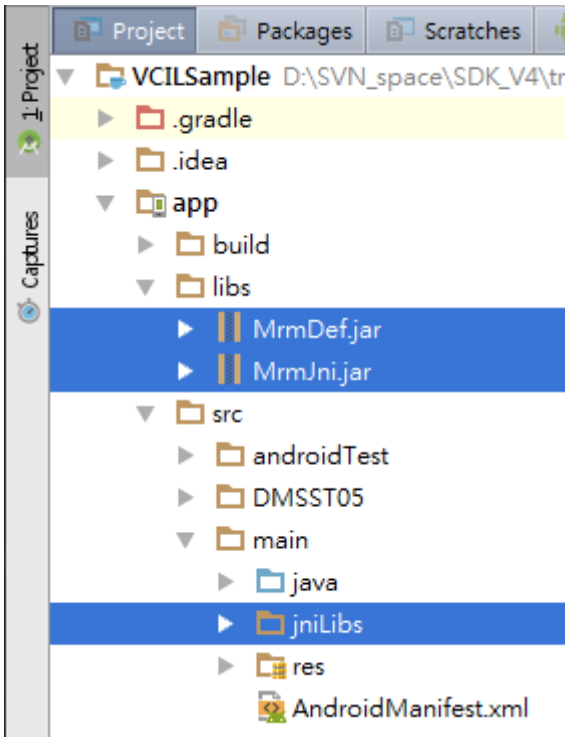
1. **Import VCIL APIs Library**

   (NOTE: This step is only necessary for VCIL functions)

   To access VCIL functions from your APP, you must import the VCIL libraries into you project.

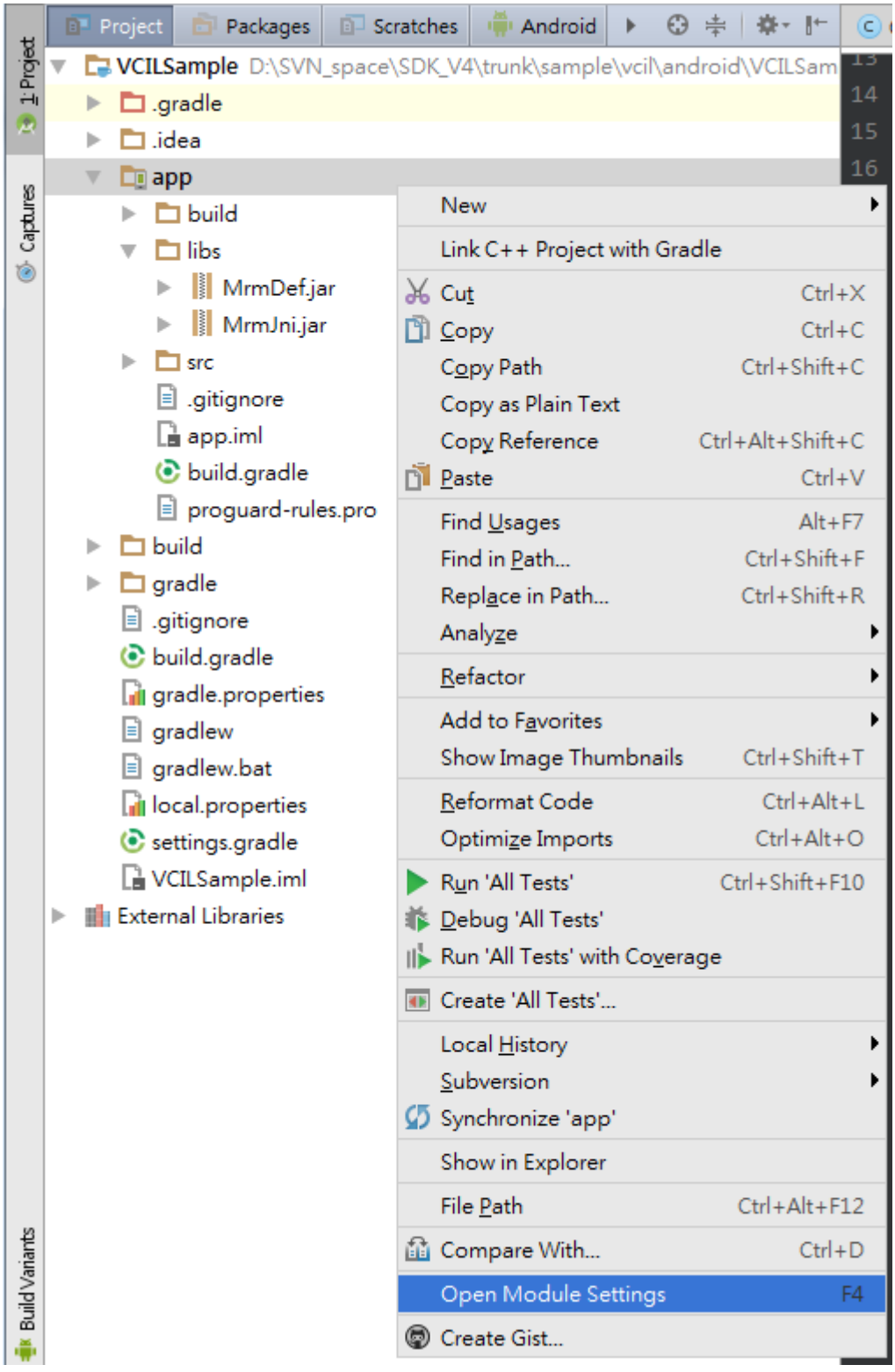
   Please find the **MrmJni.jar, MrmDef.jar** and **jniLibs/** folder in the MRM SDK package.

   Copy the **MrmJni.jar, MrmDef.jar** to the directory **/[Module Name]/libs/** in your Android Studio project (the default module name might be "app") and copy the **jniLibs/** folder to the directory **/[Module Name]/src/main/** .

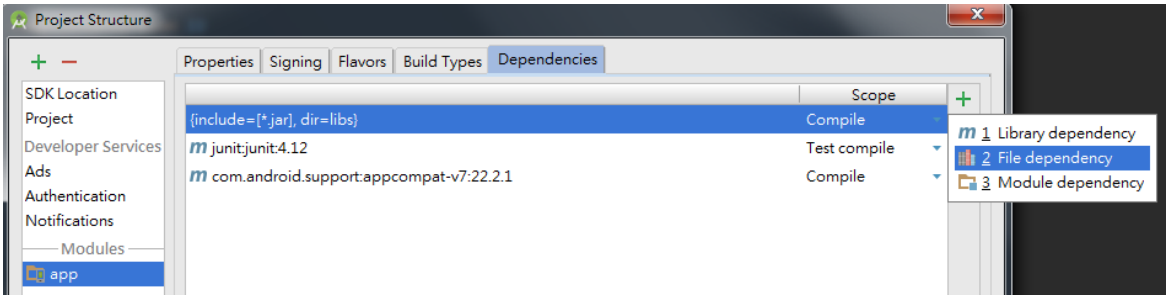


   Then import the Java libraries by following the steps below:

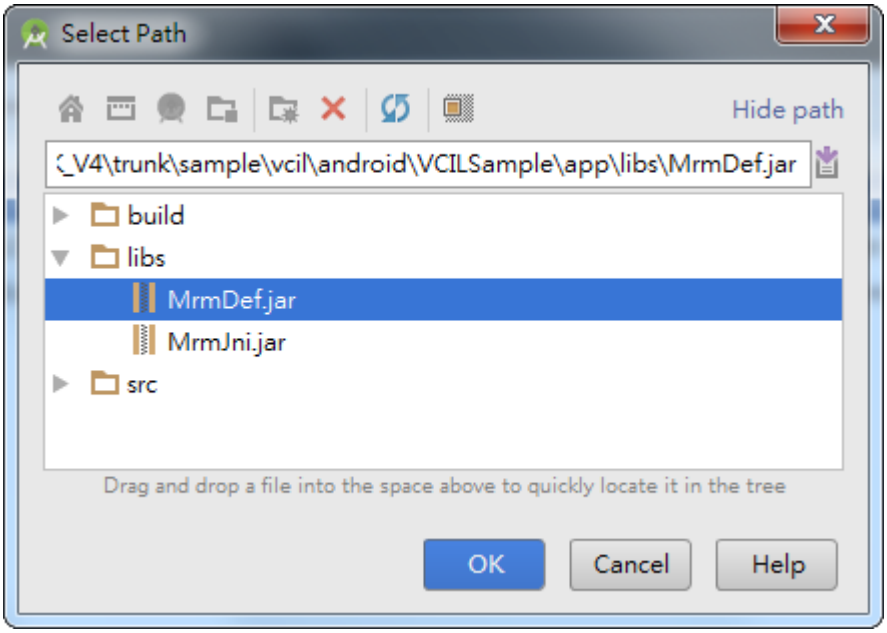
   - Right click on you APP module. Click "**Open module settings**"



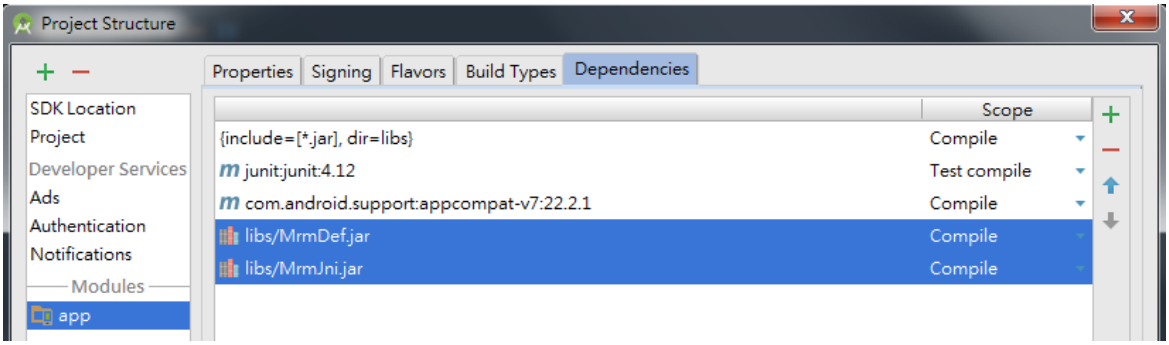
- Click the "**Dependency**" tab. Then click "+" -> "**File dependency**"



- Select the lib file.



- Repeat the above steps to add all libs and you will see all libs are added to the list.



4.4 Install Prebuilt Sample Apps

The prebuilt sample is placed in [SDK_Pacakge]/bin/samples/ .

Execute the script **install_sample_apps.bat** to install to your device.

The script will execute the following ADB command:

```
adb install -r .\IVCPSample.apk
adb install -r .\SDPSample.apk
adb install -r .\VCILSample.apk
```

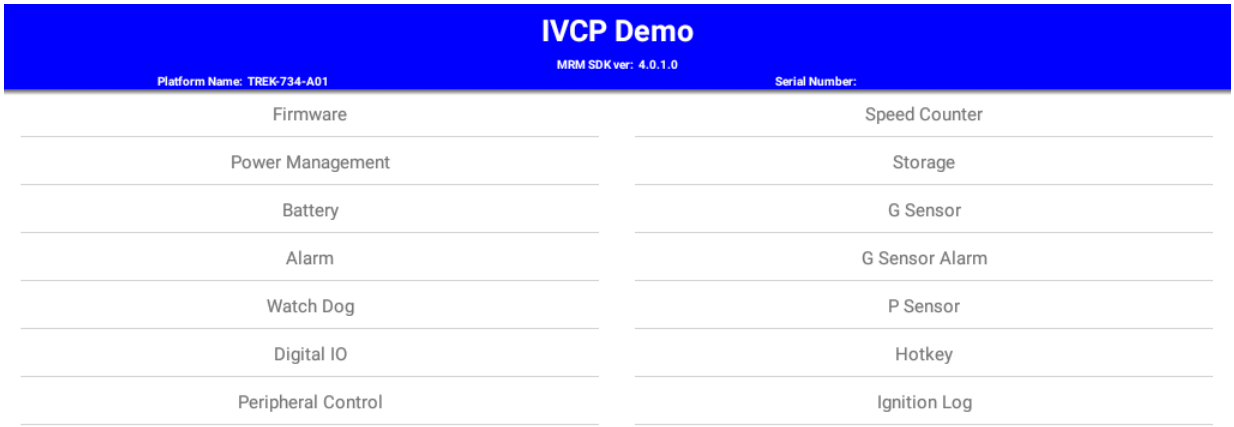
Please note that you must install the MRM Services **(**mrm_service.apk**)** fist or the sample APPs will not work

4.5 IVCP Demonstration

The IVCP demonstration application demonstrate the usage of MRM IVCP API which is a lightweight interface between OS (Operating system) and IVCP (Intelligent Co-Processor) allow user to access the status of machine and change machine behavior such as power management, boot behavior, peripheral control etc.

4.5.1 Information

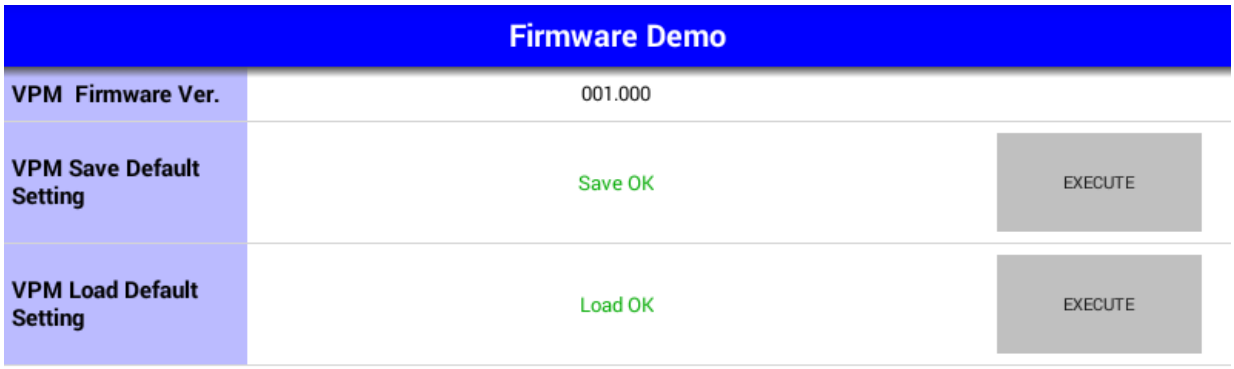
In this page, the demo application shows the current status and basic information.



4.5.1 Firmware

This page demonstrates the Firmware APIs.

To save/load the default settings of VPM firmware, you can press the corresponding "EXECUTE" button.



4.5.2 Power Management

This page demonstrates the Power Management APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.

· Power Control

o VPM trigger power off event

· Power & Battery

o Get/Set power mode and show Power & Battery status

· Ignition

o Show ignition status and Control ignition wakeup.

· Low Voltage Protection

o Control preboot/postboot low voltage protection and get/set preboot or postboot LVP threshold. It also can reset low voltage protection to default value and get default range.

NOTE:

The Postboot LVP Threshold voltage must less than or equal to Preboot LVP Threshold voltage.

· Event Delay

o Low Voltage Event Delay:

The delay time before VPM trigger a power off event (i.e. power button press).

o Low Voltage Event Hard Delay:

The delay time counted down after a power off event is triggered. VPM will force power off the machine if the hard delay time is counted down to zero.

o Ignition Event On Delay:

The delay time before VPM trigger an power on event (power on the machine).

o Ignition Event Off Delay:

The delay time before VPM trigger an power off event (i.e. power button/Ignition off press).

o Ignition Event Hard Off Delay:

The delay time counted after an power off event is triggered. VPM will force power off the machine if the hard delay time is counted down to zero.

· VPM Mode

o Control Keep Alive and AT mode.

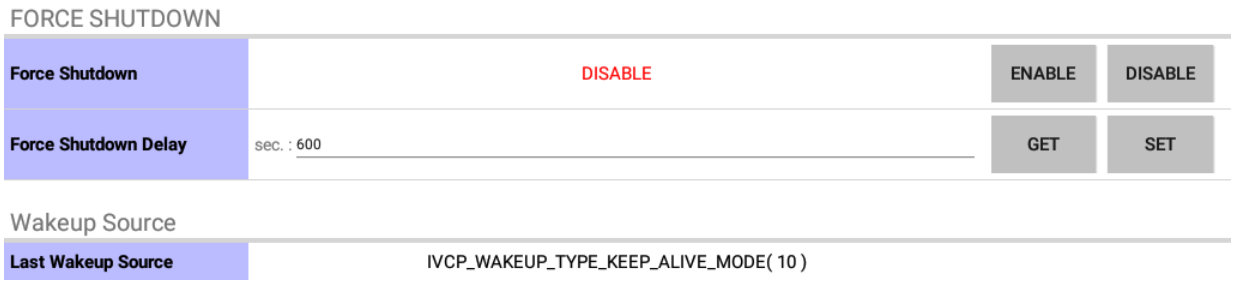
· Force Shutdown

o Control force shutdown and get/set force shutdown delay.

· Wakeup Source

o Show last wakeup source.


Power Management Demo
POWER CONTROL
Power Off
N/A
EXECUTE
POWER & BATTERY
Power Mode
12V
GET
SET 12V
SET 24V
Power Status
ON
Voltage(V)
18.417286
Battery Status
OFF
Voltage(mV)
0
Avg. Curr.(mA)
0
IGNITION
Ignition Status
ON
Ignition Wakeup
ENABLE
ENABLE
DISABLE
LOW VOLTAGE PROTECTION
LVP Range
Min:10.10 , Max:12.25 , Default:11.43
GET
Preboot LVP Status
DISABLE
ENABLE
DISABLE
Preboot LVP Threshold
Voltage : 11.427966
GET
SET
Postboot LVP Status
DISABLE
ENABLE
DISABLE
Postboot LVP Threshold
Voltage : 11.427966
GET
SET
LVP Reset Threshold
N/A
RESET
EVENT DELAY
Event Delay
Type: IGNITION_OFF
sec. : 5
GET
SET
VPM MODE
Keep Alive Mode
ENABLE
ENABLE
DISABLE
AT Mode
DISABLE
ENABLE
DISABLE
SHUTDOWN SOURCE
Ignition
ENABLE
ENABLE
DISABLE
Power Button
UNSUPPORT OPERATION
ENABLE
DISABLE

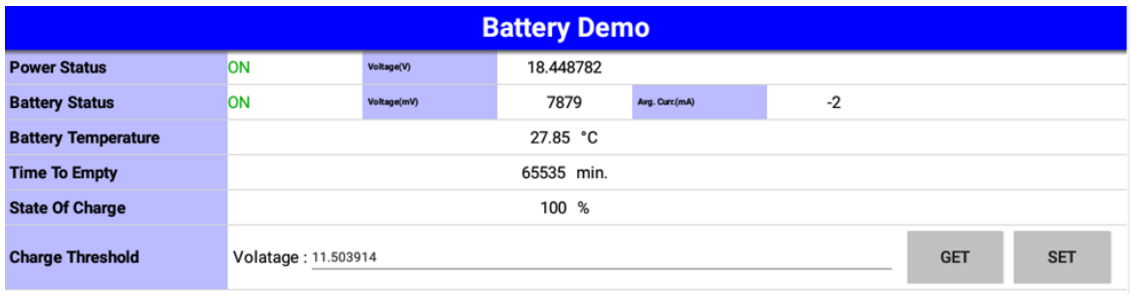


4.5.3 Battery

This page demonstrates the Battery APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.

You can adjust the battery setting of VPM in this page.

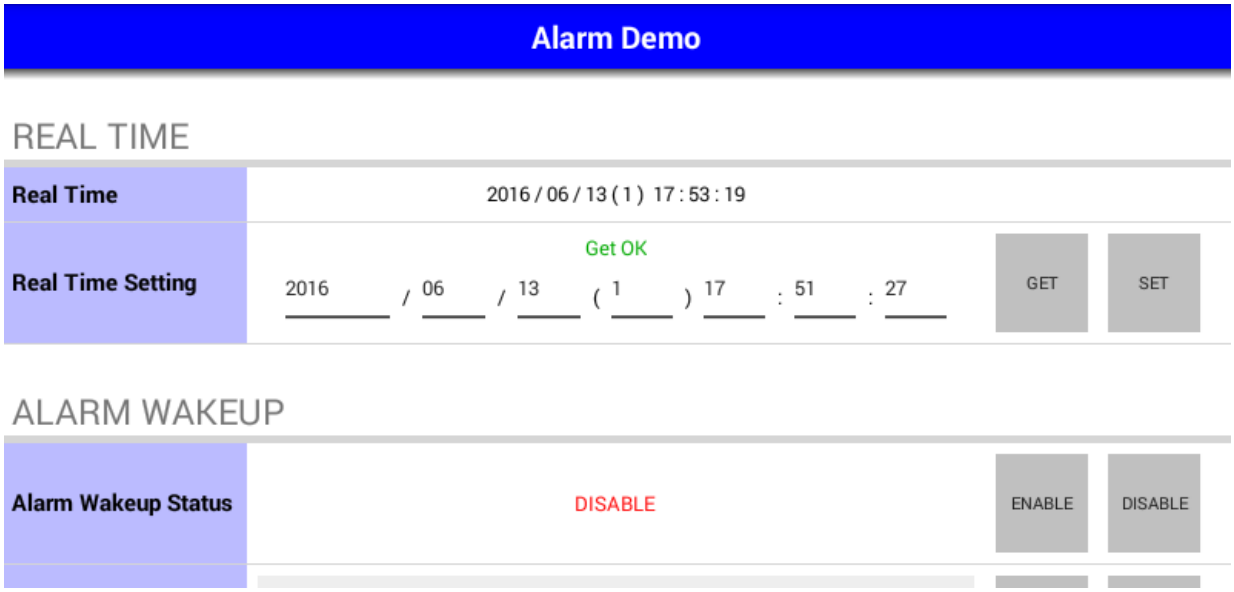


4.5.4 Alarm

This page demonstrates the Alarm APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.

You can adjust the RTC time and device alarm wakeup setting of VPM in this page.



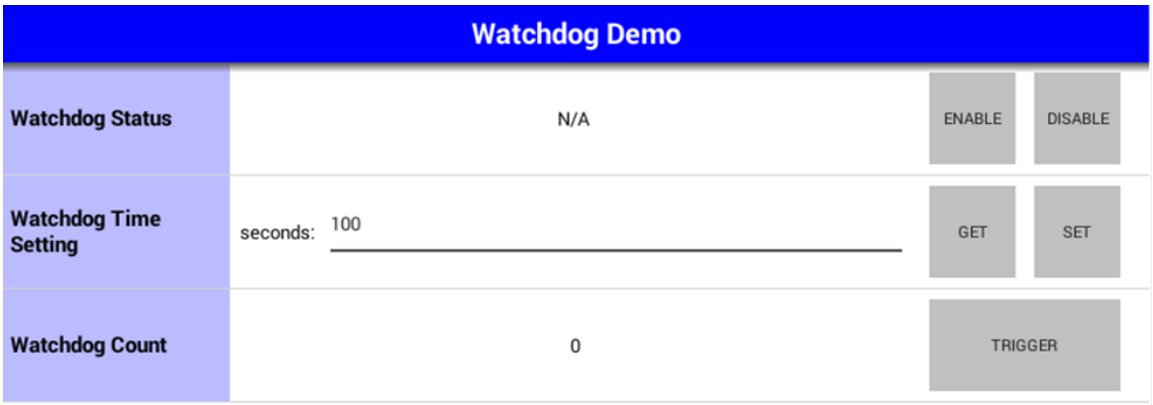
4.5.5 Watchdog

This page demonstrates the Watchdog APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.

When the "enable" is pressed, the watch dog will start count down and the count will be updated to the "watchdog count" row.

You can press "trigger" button to reset the count or press "disable" button to stop watch dog.



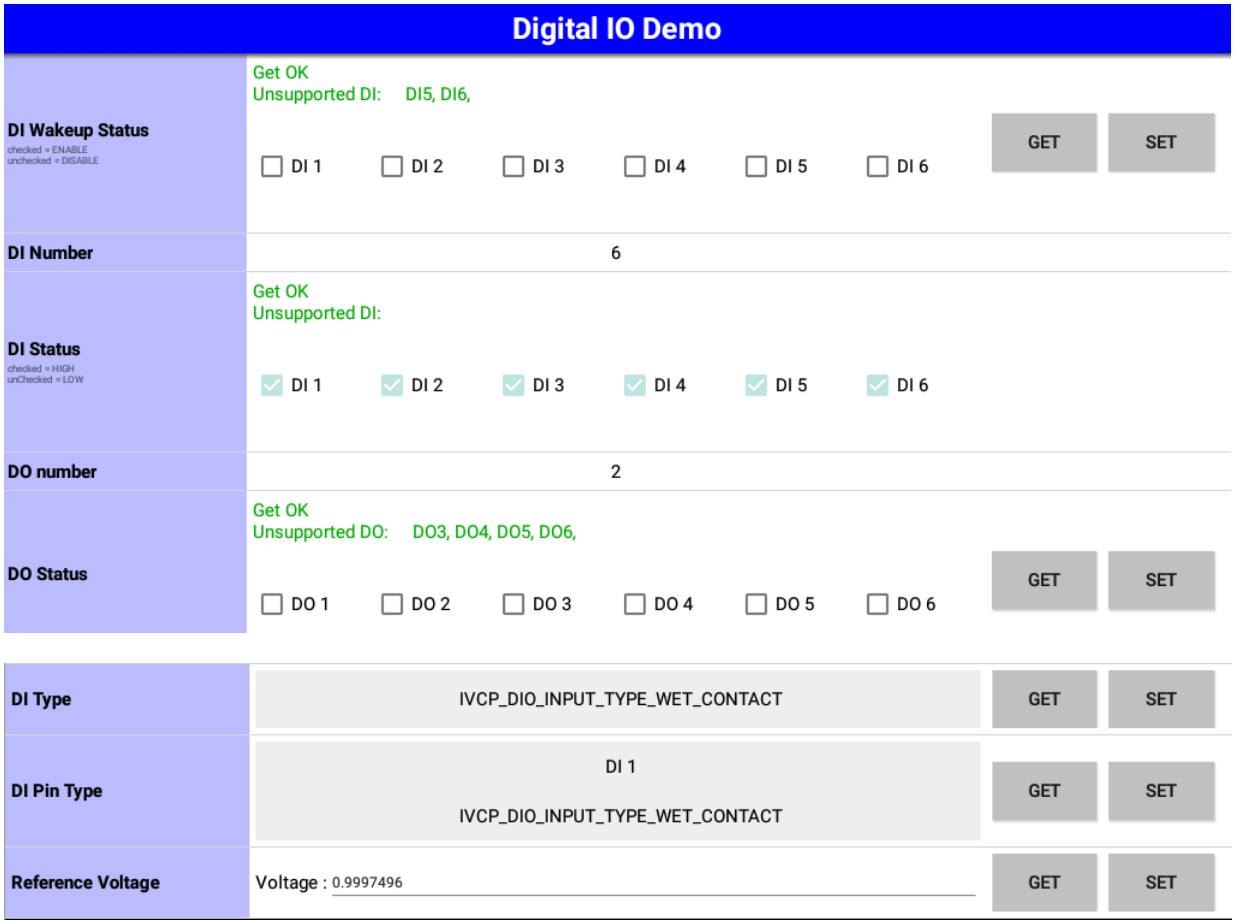
4.5.6 Digital IO

This page demonstrates the Digital IO APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.

In the row of "DI Status", the status of each DI pins will be updated periodically to corresponding check boxes.

In the row of "DI Type", you can adjust the wet/dry contact for all DI pin. In the row of "DI Pin Type", you can adjust the wet/dry contact for specify DI pin.

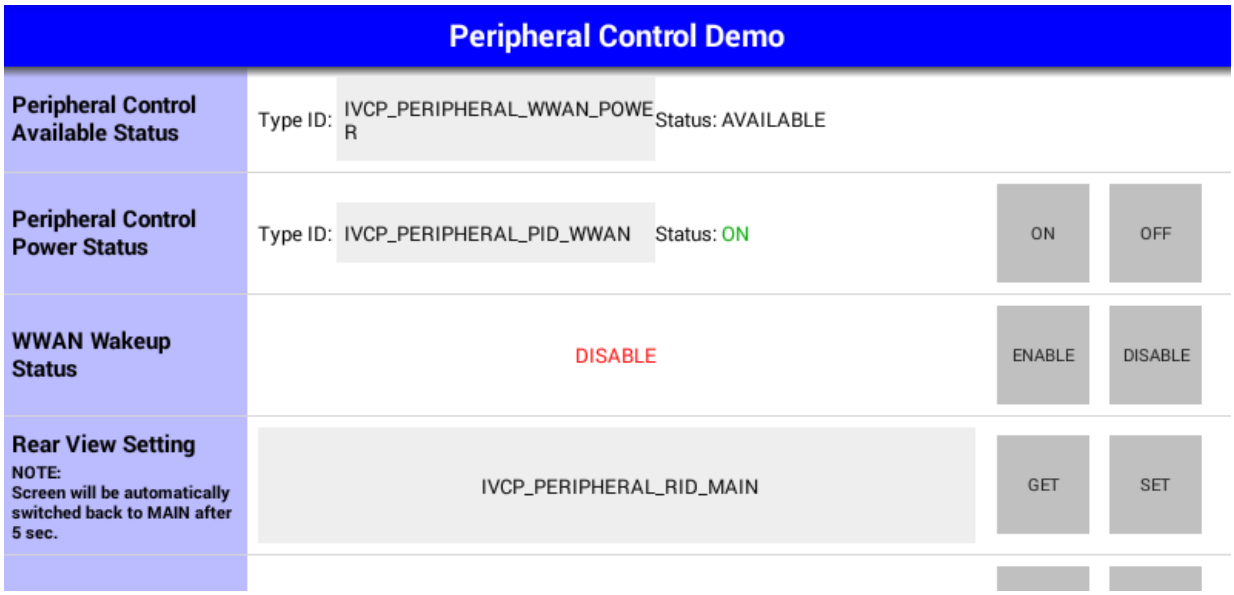


4.5.7 Peripheral Control

This page demonstrates the Peripheral Control APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to

do corresponding demo actions.

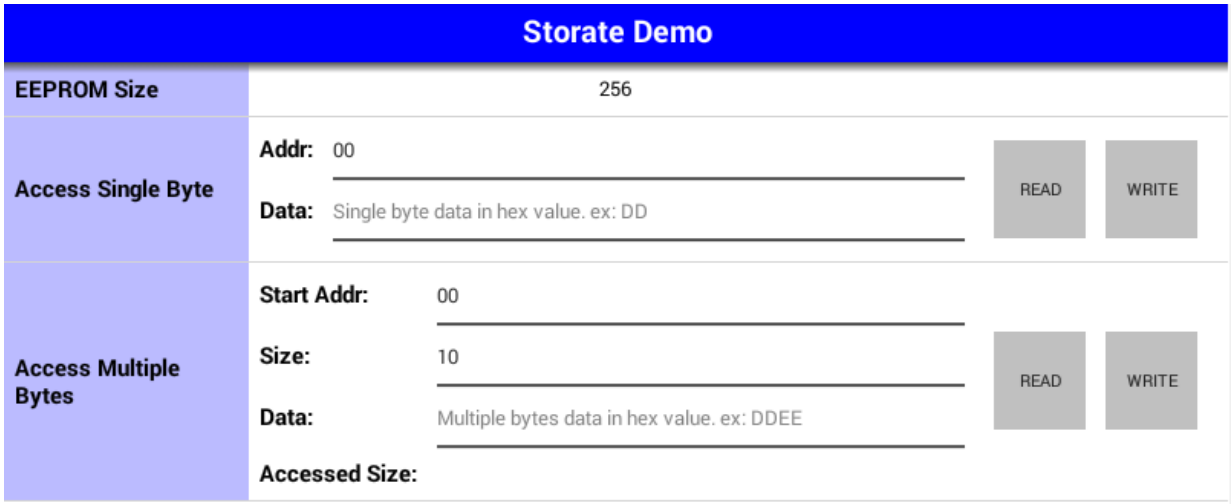


4.5.8 Storage

This page demonstrates the Storage APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.

The "data" column in each row is represented in HEX string. To write data, you should input the data in HEX string format. For example, to write 2 bytes data - "DD" and "EE" - to the storage, you must input "DDEE" to the data column.



4.5.9 G Sensor

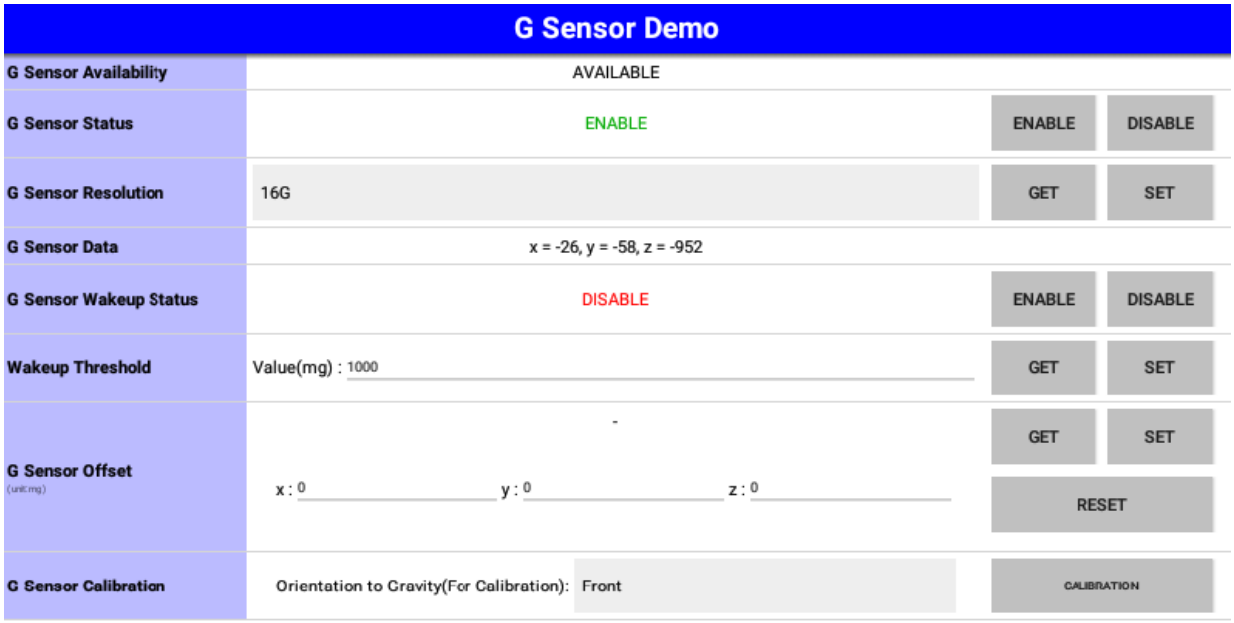
This page demonstrates the G Sensor APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.

The G sensor status is updated periodically in the G sensor data row.

In the row of "G Sensor Offset", you can get/set the G Sensor Offset. Click "Reset" button to reset G Sensor Offset to default (x=0,y=0,z=0).

In the row of "G Sensor Calibration", the G sensor calibration should be decided by orientation to gravity. In the front, G sensor data will be x=0, y=0, z=1000 (mg). In the back, G sensor data will be x=0, y=0 ,z=-1000(mg)

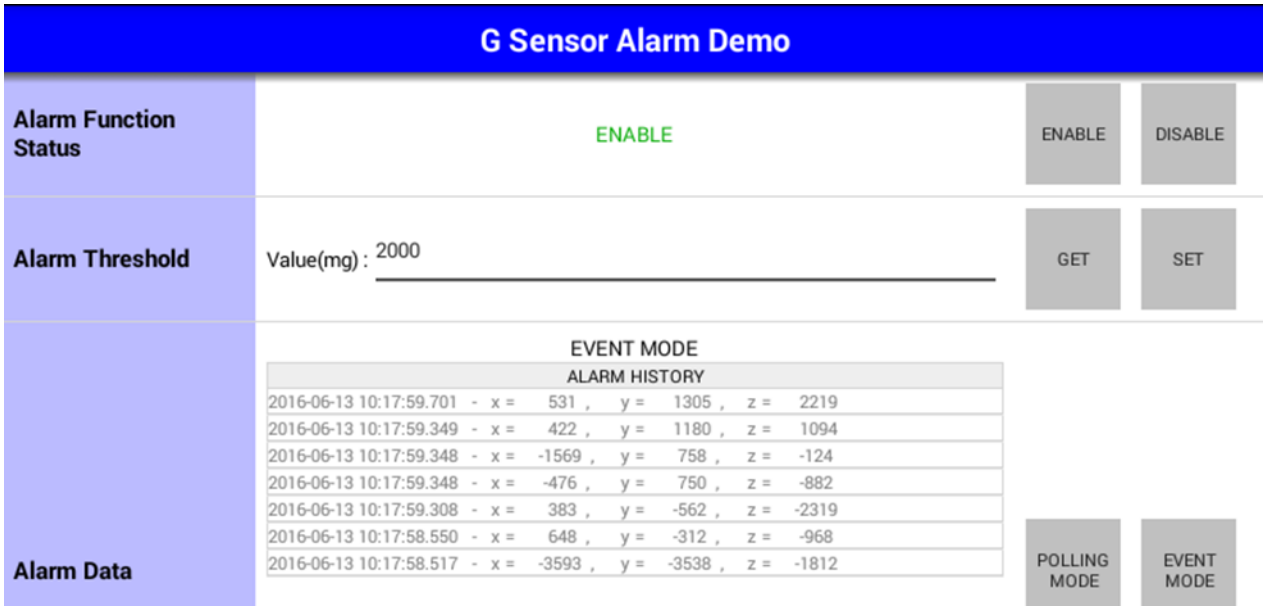


4.5.10 G Sensor Alarm

This page demonstrates the G Sensor Alarm APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.

When G sensor alarm is enabled. The G sensor alarm data will be updated to the row "alarm data"

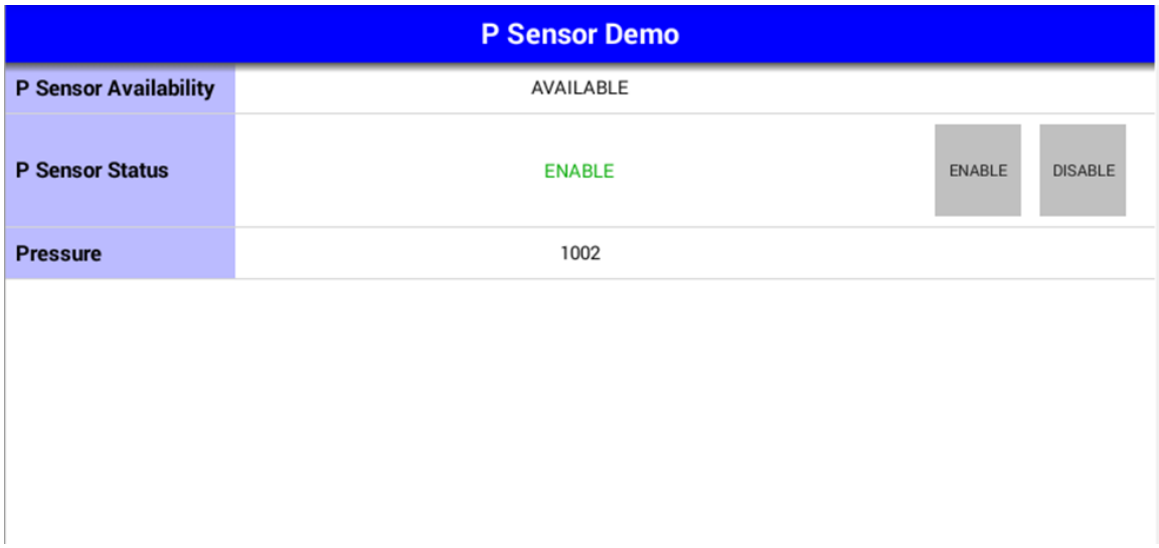


4.5.11 P Sensor

This page demonstrates the P Sensor APIs.

Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.

The P sensor status is updated periodically in the pressure row.

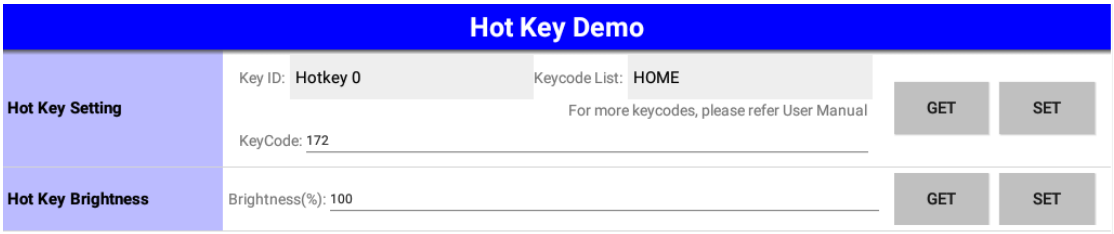


4.5.12 Hot Key

This page demonstrates the Hotkey APIs.

In the "Hoy Key Setting" row, you can set the keycode of corresponding function key on the device. The keycode list will show the common keycode for easy setting.

In the "Hoy Key Brightness" row, you can set the brightness of LED back light of the function keys.



4.6 VCIL Demonstration

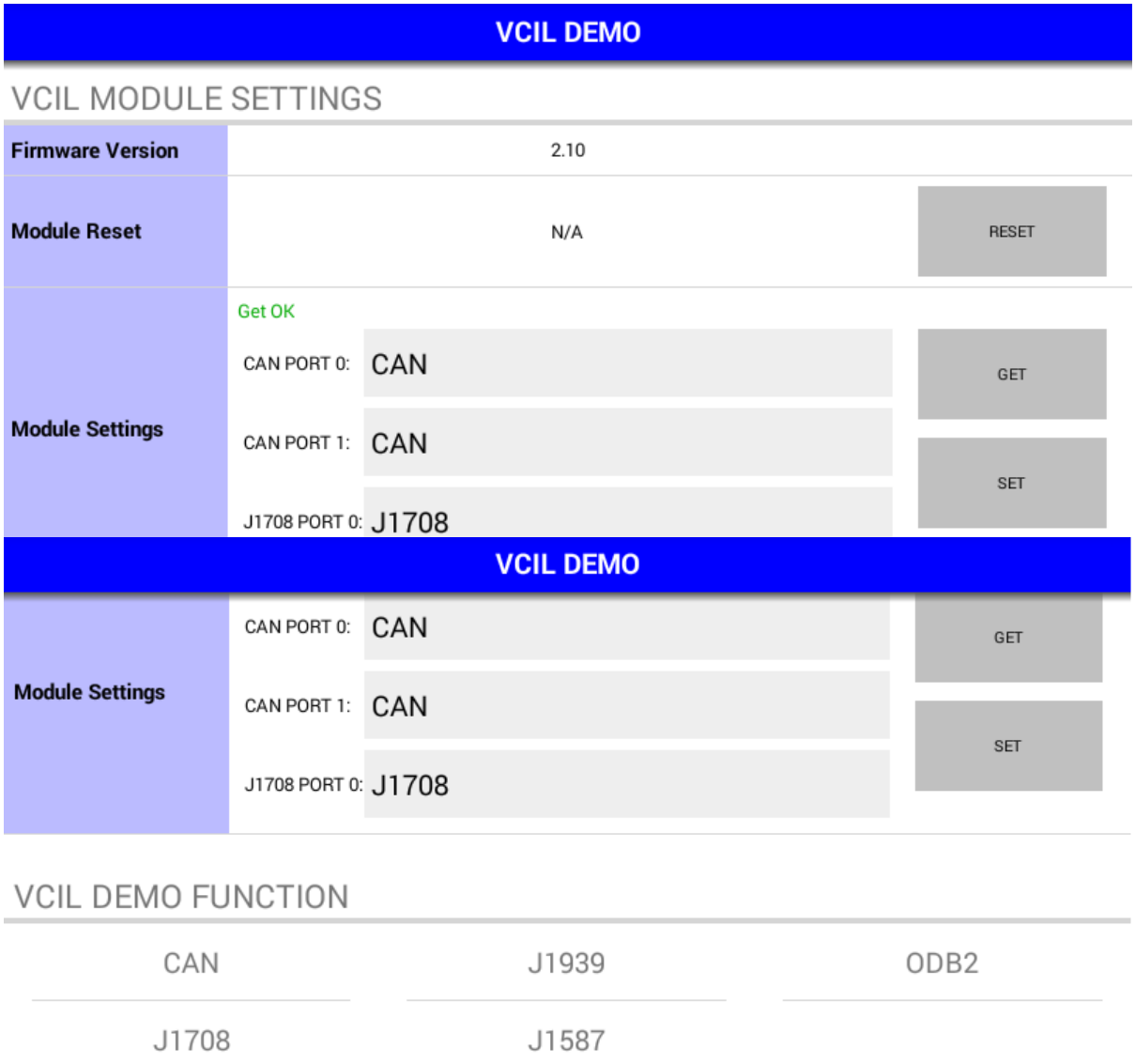
The VCIL sample APP (VCILSample.apk) demonstrates the usage of VCIL APIs.

In the entry page, you should first set the protocol for each physical port properly in the "module settings" before you start other VCIL demo. Then, you can scroll to the bottom of the page and tap on the items in the VCIL demo function list to execute the demos. The following sections show the usage guide line of each items.

NOTE:

There might be some functions which are not supported on your device.

For the details of supported functions, please refer to the hardware spec.



4.6.1 CAN

This page demonstrates the CAN APIs.

There are two scrolling areas in this page. The left side contains the demo of CAN port speed setting, CAN message sending, and CAN port error status getting. The right side contains the demo of CAN message receiving.

- **CAN Port Speed Setting**
  In the "CAN PORT SPEED" area, you can set the bit rate for each CAN port.
  Please note that you should also configure the bit rate for CAN port before you start J1939 and OBD2 demo page.
  The CAN, J1939, OBD2 demo may not be operational.

- **CAN Message Sending**

  In the "SEND" area, you can set the contents of a CAN message and press "SEND" button to send the message to CAN bus.

- **CAN Port Error Status Getting**

  In the "CAN PORT ERROR STATUS" area, you can press "GET" button to get the error status of specific CAN port.

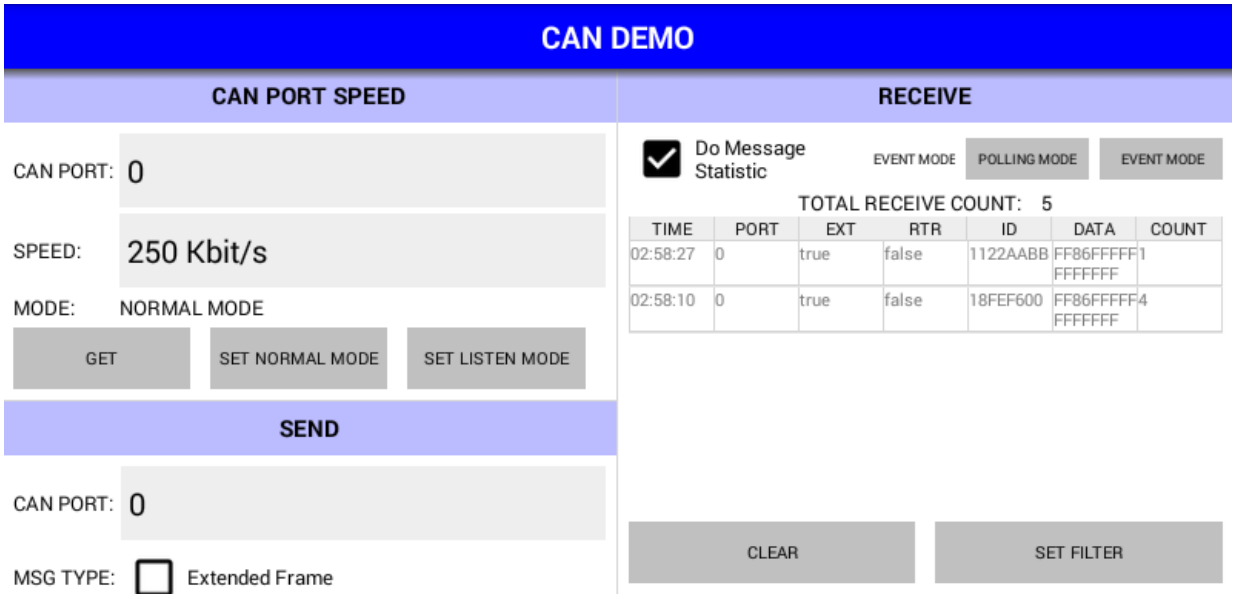
- **CAN Message Receiving**

  In the "RECEIVE" area, all received CAN messages will be categorized and shown in the list view. The messages from the same CAN port with same CAN message ID will be updated to the same row in the list view and the "COUNT" column will increase.

  You can press the "SET FILTER" button to enter the CAN Filter demo page.

NOTE:

1. You must properly set the protocol in the entry page or the demo will not be operational.
2. You must set the CAN port speed properly or the sending and receiving function in CAN, J1939, OBD2 demo page will not be operational.



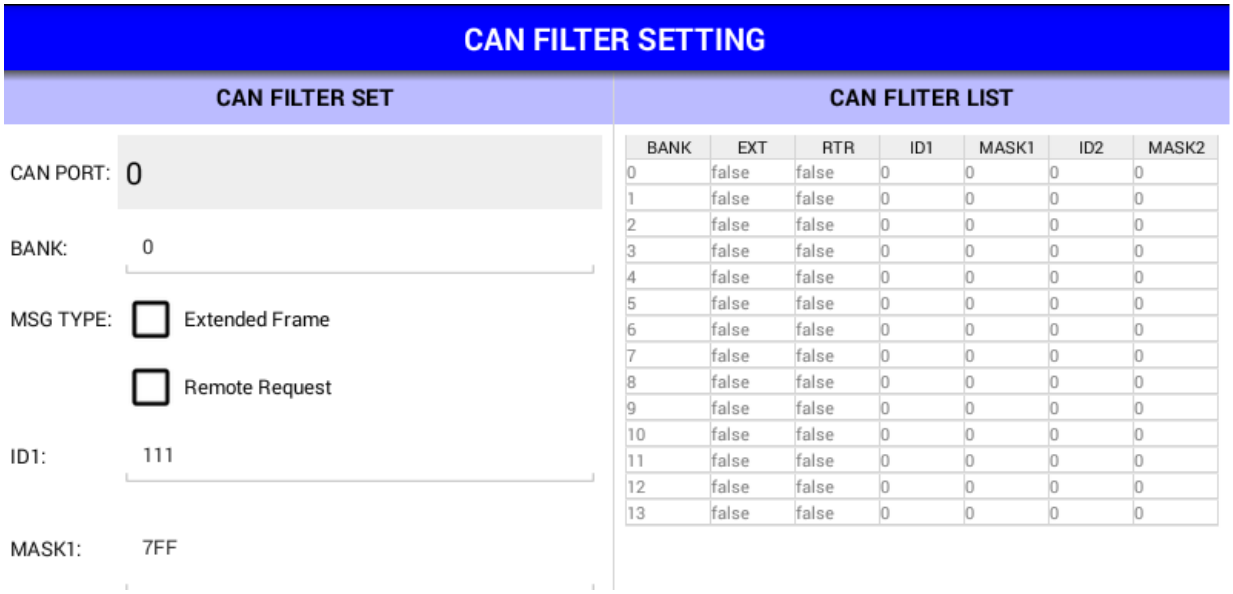
4.6.2 CAN Filter

This page demonstrates the CAN APIs related to CAN message filter.

There are two scrolling areas in this page. The left side contains the demo of CAN message filter settings. The right side shows the filter of specific CAN port.

In the left side you can specify a filter (CAN ID) of specific CAN port and press "SET" button to apply it or "REMOVE" to remove the filter. To show the filters applied on specific CAN port, you can choose the CAN port ID and press the "GET" button and all filters will be shown to the right side.

In the right side, you can tap on the row in the list view to load the filter settings to the columns in left side.



4.6.3 J1939

This page demonstrates the J1939 APIs.

There are two scrolling areas in this page. The left side contains the demo of J1939 config, and J1939 message sending. The right side contains the demo of J1939 message receiving.

- **J1939 Config**
  Press the "CONFIG" button to enter the J1939 config page. You can configure the address and J1939 NAME in the page.

- **J1939 Message Sending**

  In the "SEND" area, you can set the contents of a J1939 message and press "SEND" button to send the message to CAN bus.

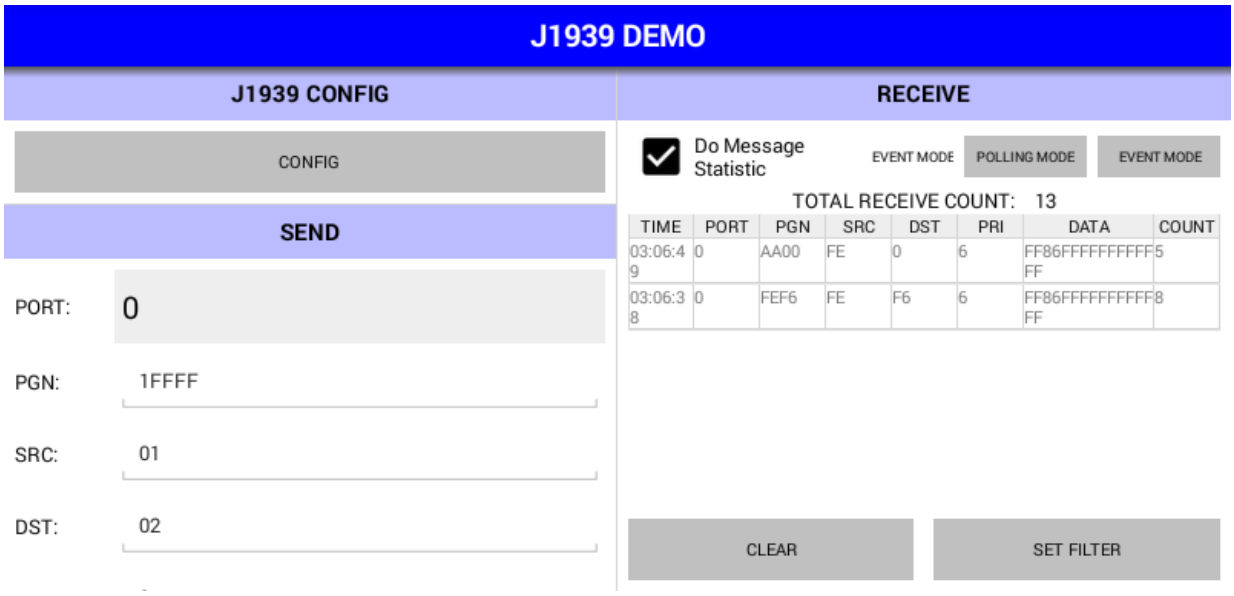
- **J1939 Message Receiving**

  In the "RECEIVE" area, all received J1939 messages will be categorized and shown in the list view. The messages from the same CAN port with same PGN will be updated to the same row in the list view and the "COUNT" column will increase.

  You can press the "SET FILTER" button to enter the J1939 Filter demo page.

NOTE:

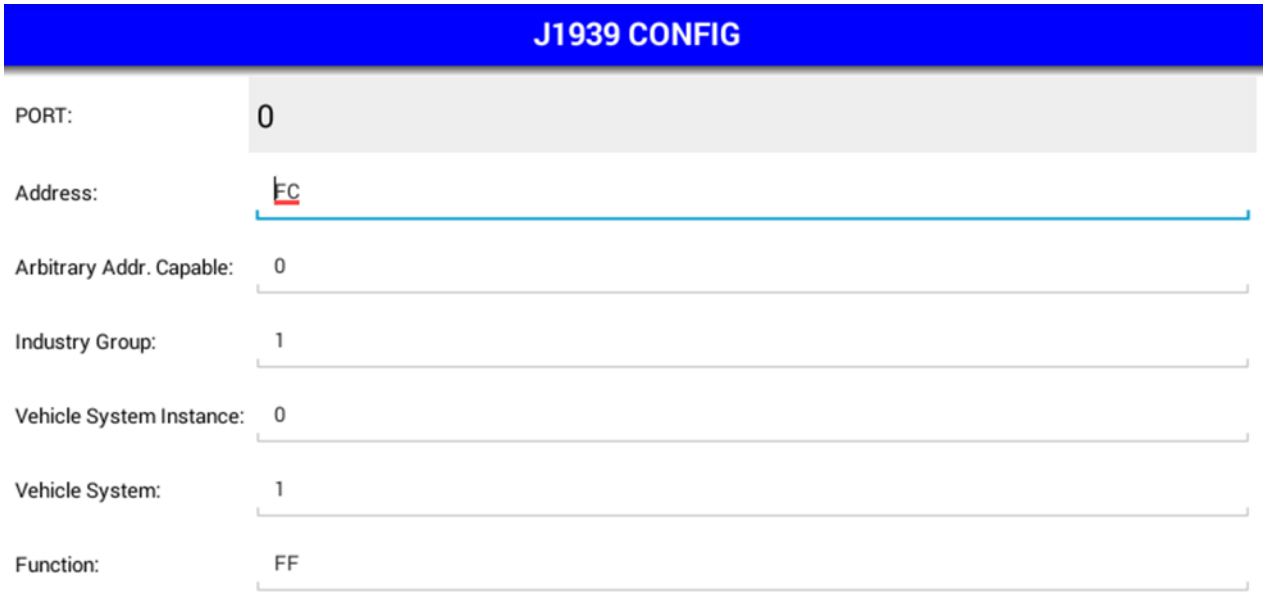
1. You must properly set the protocol in the entry page or the demo will not be operational.
2. You must set the CAN port speed properly or the sending and receiving function in CAN, J1939, OBD2 demo page will not be operational.



4.6.4 J1939 Config

This page demonstrates the J1939 APIs related to J1939 configuration.

You can set/get the address and J1939 NAME in this page. Please refer to SAE J1939-81 for the definitions of J1939 NAME.



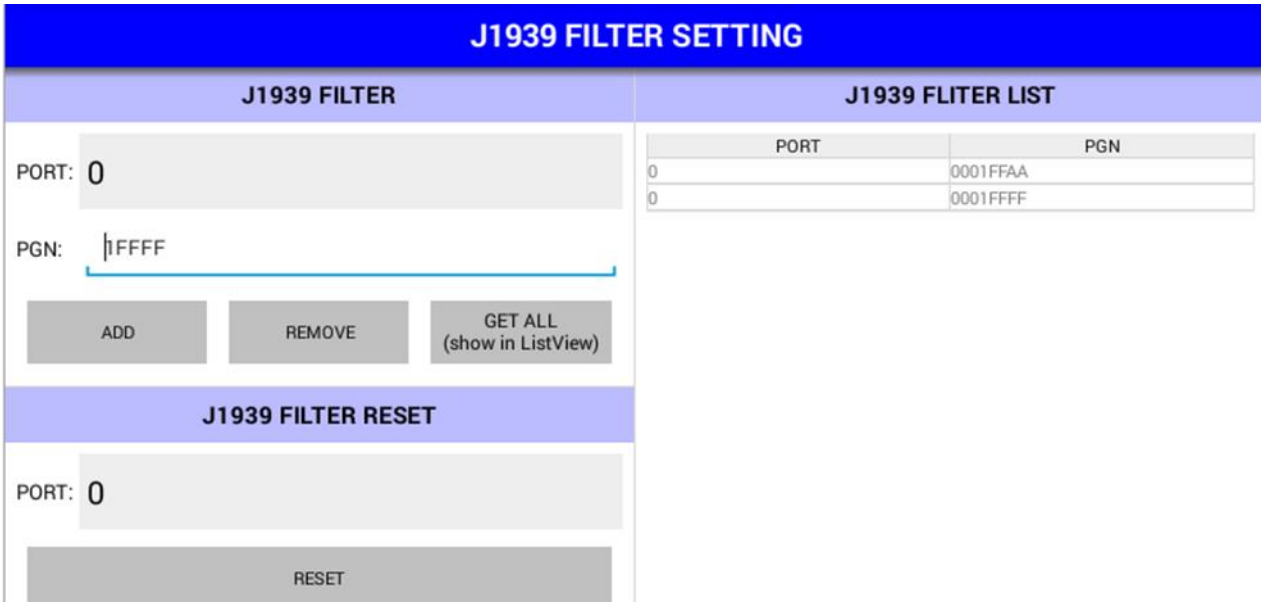
4.6.5 J1939 Filter

This page demonstrates the J1939 APIs related to J1939 message filter.

There are two scrolling areas in this page. The left side contains the demo of J1939 message filter settings. The right side shows the filter of specific J1939 port.

In the left side you can specify a filter (PGN) of specific CAN port and press "SET" button to apply it or "REMOVE" to remove the filter. To show the filters applied on specific CAN port, you can choose the CAN port ID and press the "GET" button and all filters will be shown to the right side.

In the right side, you can tap on the row in the list view to load the filter settings to the columns in left side.



4.6.6 OBD2

This page demonstrates the OBD2 APIs.

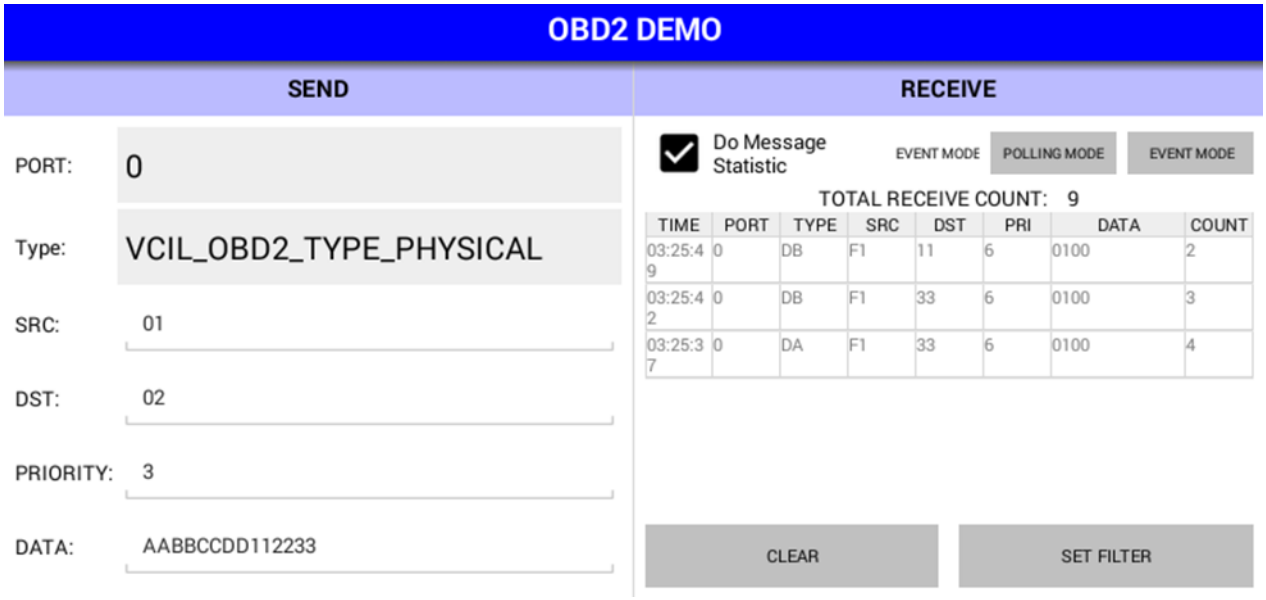
There are two scrolling areas in this page. The left side contains the demo of CAN port speed setting, OBD2 message sending. The right side contains the demo of OBD2 message receiving.

- **OBD2 Message Sending**
  In the "SEND" area, you can set the contents of a OBD2 message and press "SEND" button to send the message to CAN bus.

- **OBD2 Message Receiving**
  In the "RECEIVE" area, all received OBD2 messages will be categorized and shown in the list view. The messages from the same CAN port with same message type, source address and destination address will be updated to the same row in the list view and the "COUNT" column will increase.
  You can press the "SET FILTER" button to enter the OBD2 Filter demo page.

NOTE:

1. You must properly set the protocol in the entry page or the demo will not be operational.
2. You must set the CAN port speed properly or the sending and receiving function in CAN, J1939, OBD2 demo page will not be operational.


OBD2 DEMO
SEND
RECEIVE
PORT:
0
Type:
VCIL_OBD2_TYPE_PHYSICAL
SRC:
01
DST:
02
PRIORITY:
3
DATA:
AABBCCDD112233
Do Message Statistic
EVENT MODE
POLLING MODE
EVENT MODE
TOTAL RECEIVE COUNT: 9
TIME PORT TYPE SRC DST PRI DATA COUNT
03:25:49 0 DB F1 11 6 0100 2
03:25:42 0 DB F1 33 6 0100 3
03:25:37 0 DA F1 33 6 0100 4
CLEAR
SET FILTER

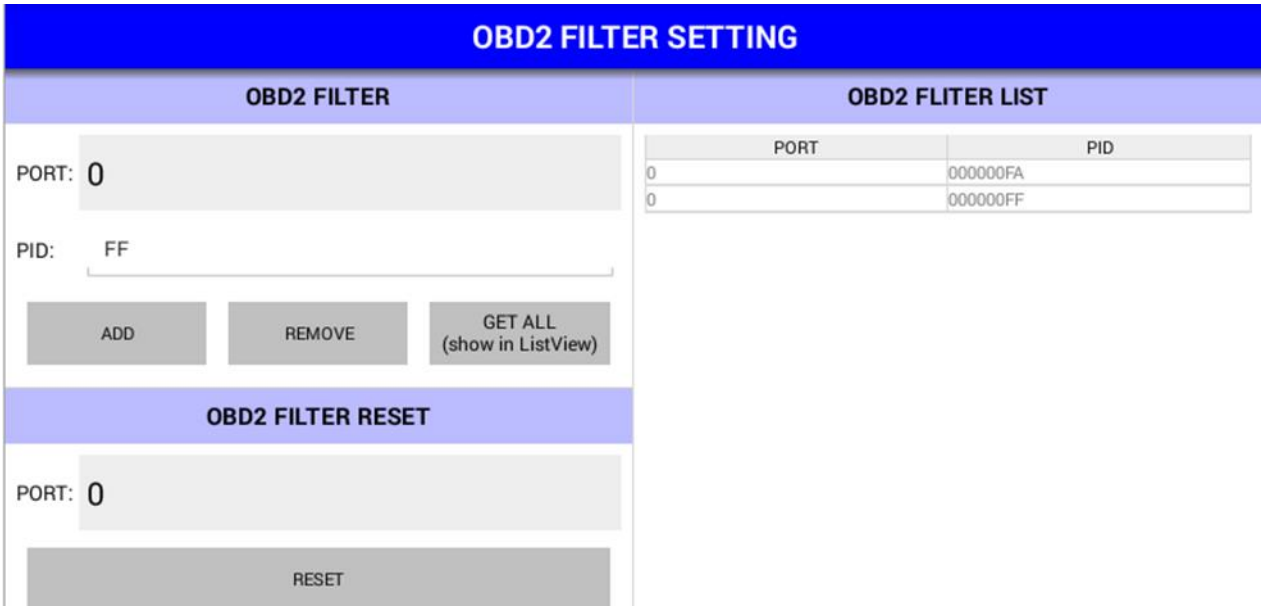
4.6.7 OBD2 Filter

This page demonstrates the OBD2 APIs related to OBD2 message filter.

There are two scrolling areas in this page. The left side contains the demo of OBD2 message filter settings. The right side shows the filter of specific CAN port.

In the left side you can specify a filter (PID, please refer to ISO 15031-5) of specific CAN port and press "SET" button to apply it or "REMOVE" to remove the filter. To show the filters applied on specific CAN port, you can choose the CAN port ID and press the "GET" button and all filters will be shown to the right side.

In the right side, you can tap on the row in the list view to load the filter settings to the columns in left side.



4.6.8 J1708

This page demonstrates the J1708 APIs.

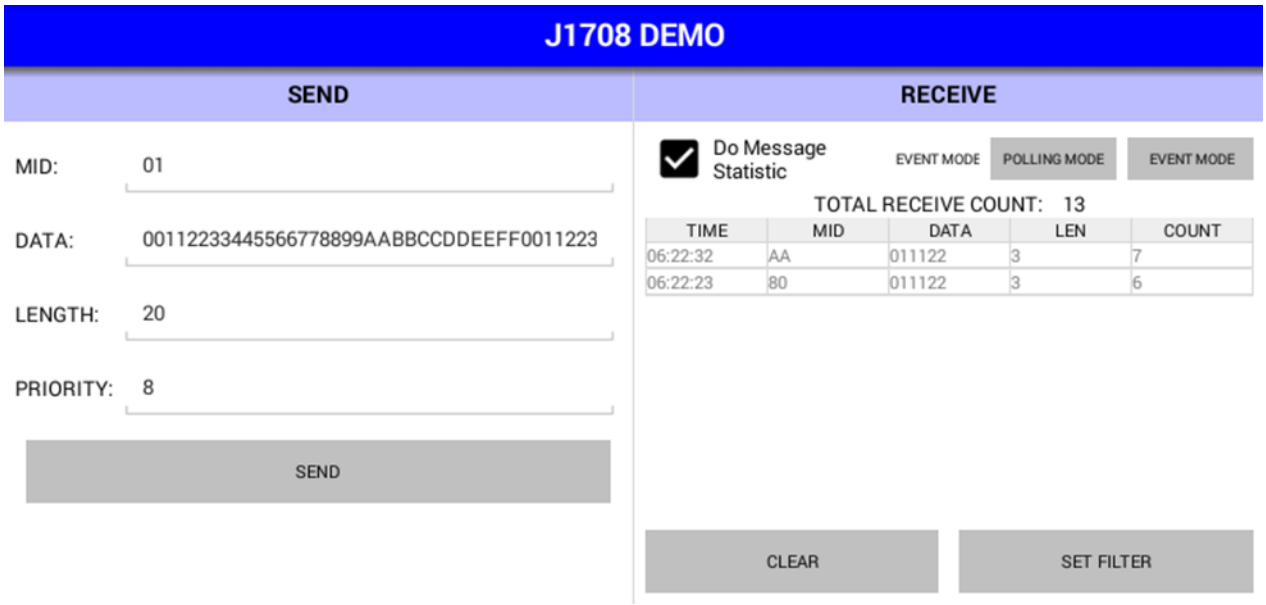
There are two scrolling areas in this page. The left side contains the demo of J1708 message sending. The right side contains the demo of J1708 message receiving.

- **J1708 Message Sending**
  In the "SEND" area, you can set the contents of a J1708 message and press "SEND" button to send the message to J1708 bus.

- **J1708 Message Receiving**
  In the "RECEIVE" area, all received J1708 messages will be categorized and shown in the list view. The messages with same MID will be updated to the same row in the list view and the "COUNT" column will increase.
  You can press the "SET FILTER" button to enter the J1708 Filter demo page.

NOTE:

1. You must properly set the protocol in the entry page or the demo will not be operational.

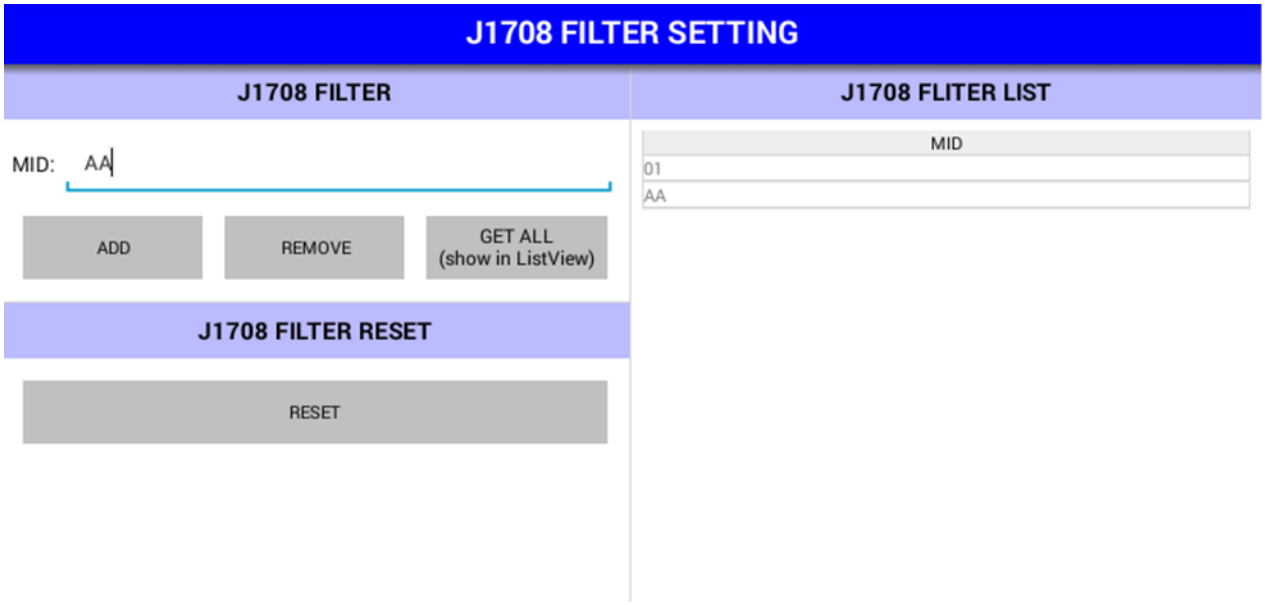


4.6.9 J1708 Filter

This page demonstrates the J1708 APIs related to J1708 message filter.

There are two scrolling areas in this page. The left side contains the demo of J1708 message filter settings. The right side shows the filter of the J1708 port.

In the left side you can specify a filter (MID) and press "SET" button to apply it or "REMOVE" to remove the filter. To show the filters applied on J1708 port, you can press the "GET" button and all filters will be shown to the right side.
In the right side, you can tap on the row in the list view to load the filter settings to the columns in left side.



4.6.10 J1587

This page demonstrates the J1587 APIs.

There are two scrolling areas in this page. The left side contains the demo of J1587 message sending. The right side contains the demo of J1587 message receiving.

- **J1587 Message Sending**
  In the "SEND" area, you can set the contents of a J1587 message and press "SEND" button to send the message to J1587 bus.

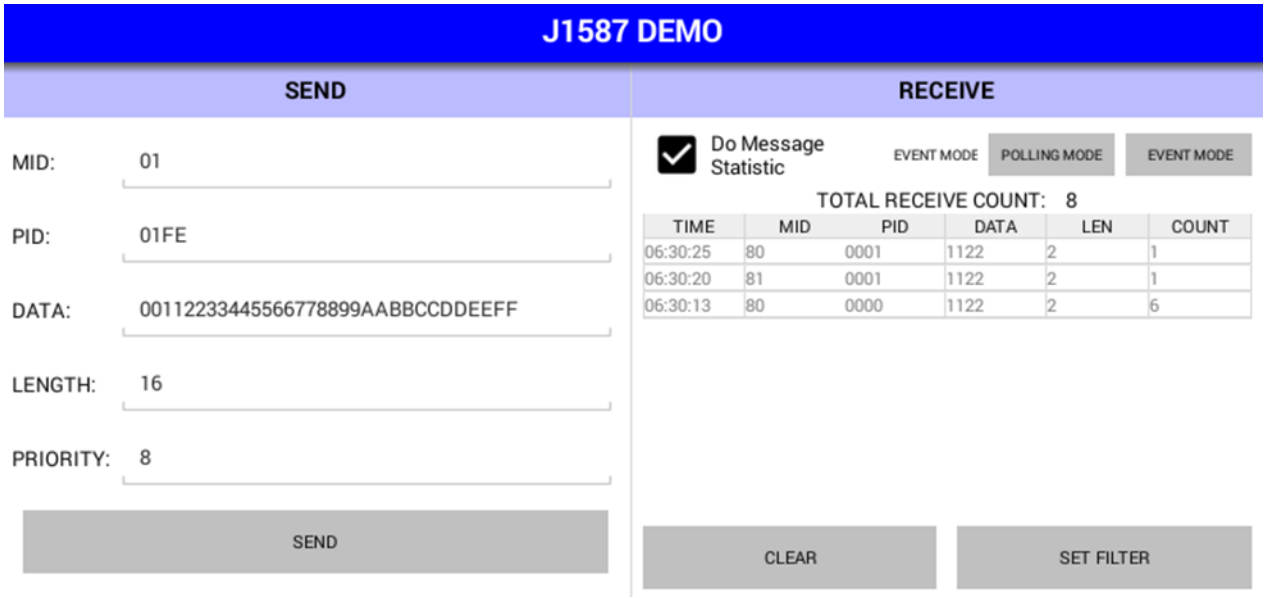
- **J1587 Message Receiving**

  In the "RECEIVE" area, all received J1587 messages will be categorized and shown in the list view. The messages with same MID will be updated to the same row in the list view and the "COUNT" column will increase.

  You can press the "SET FILTER" button to enter the J1708 Filter demo page.

NOTE:

1. You must properly set the protocol in the entry page or the demo will not be operational.



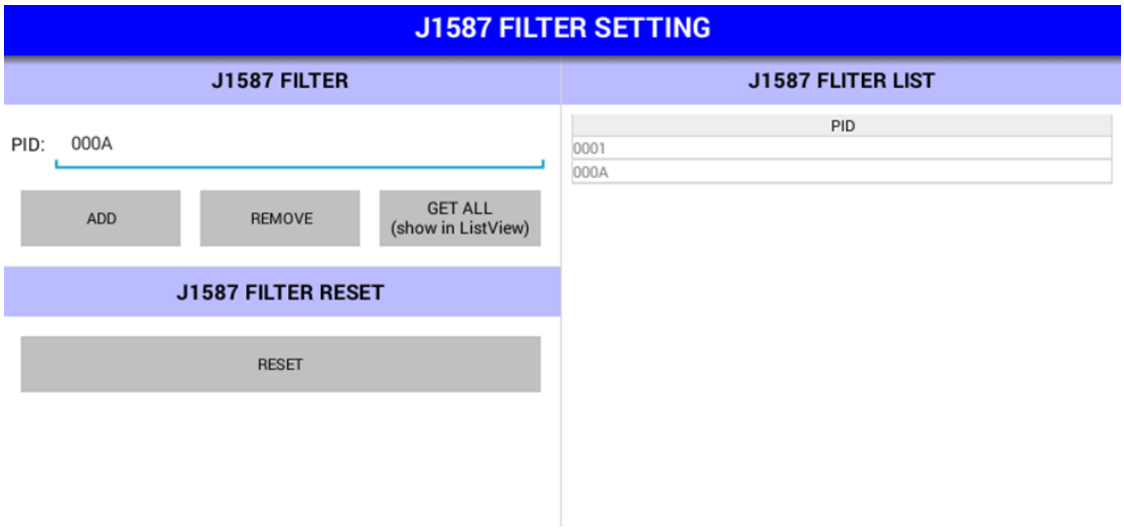
4.6.11 J1587 Filter

This page demonstrates the J1587 APIs related to J1587 message filter.

There are two scrolling areas in this page. The left side contains the demo of J1587 message filter settings. The right side shows the filter of the J1587 port.

In the left side you can specify a filter (PID) and press "SET" button to apply it or "REMOVE" to remove the filter. To show the filters applied on J1708 port, you can press the "GET" button and all filters will be shown to the right side.

In the right side, you can tap on the row in the list view to load the filter settings to the columns in left side.


J1587 FILTER SETTING
J1587 FILTER
J1587 FLITER LIST
PID:
000A
ADD
REMOVE
GET ALL
(show in ListView)
PID
0001
000A
J1587 FILTER RESET
RESET

\

Appendix A

This appendix explains the optional peripherals installation

A-1 Installing Backup Battery

1. **Remove the screws on backup battery cover**

2. **Install the backup battery into the battery slot**

Note: Please install the connector in correct direction (the connector is antiproof)

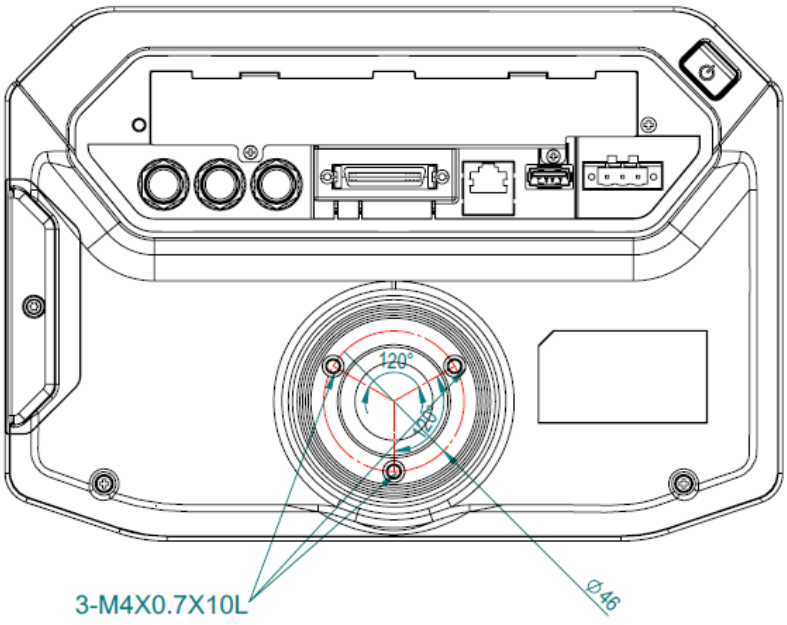
3. **Locked the battery cover.**

A-2 Installing RAM mount kit

TREK-734 designed a RAM mount hole to support ram mount kit. Refer to below dimension. It needs to use 3pcs M4x0.7x10L screws.

TREK-734 using as portrait monitor only.

Note: When adjust angle of RMA mount need to loosen the screws on RMA mount to prevent the TREK-734 damage.



A-3 Installing IP54 I/O Cover

Part A –Water proofing Rubber

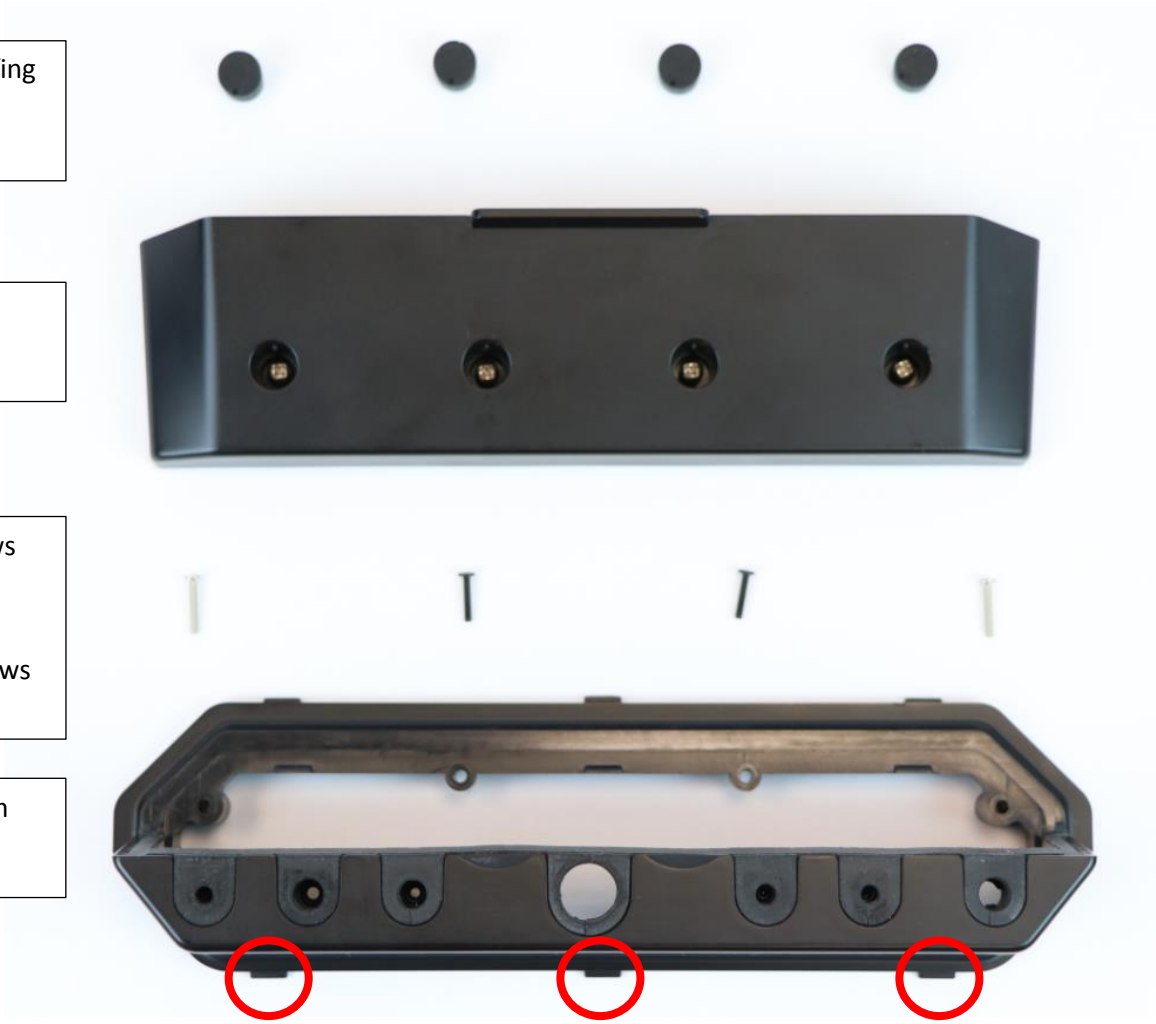
Part B – Cover Top

Part C– Longer Screws

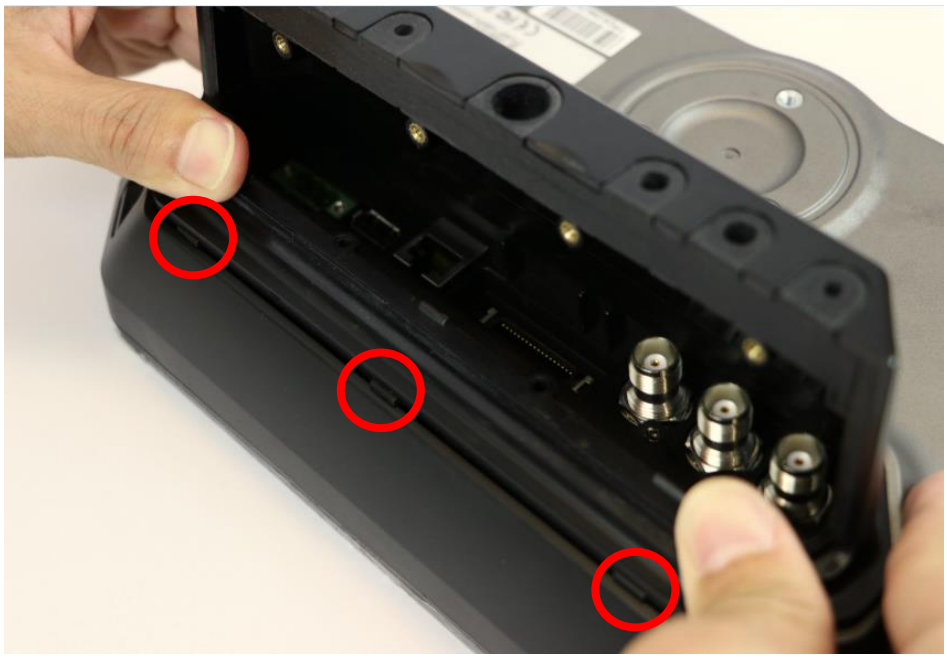
(2 side)

Part D– Shorten Screws (middle)

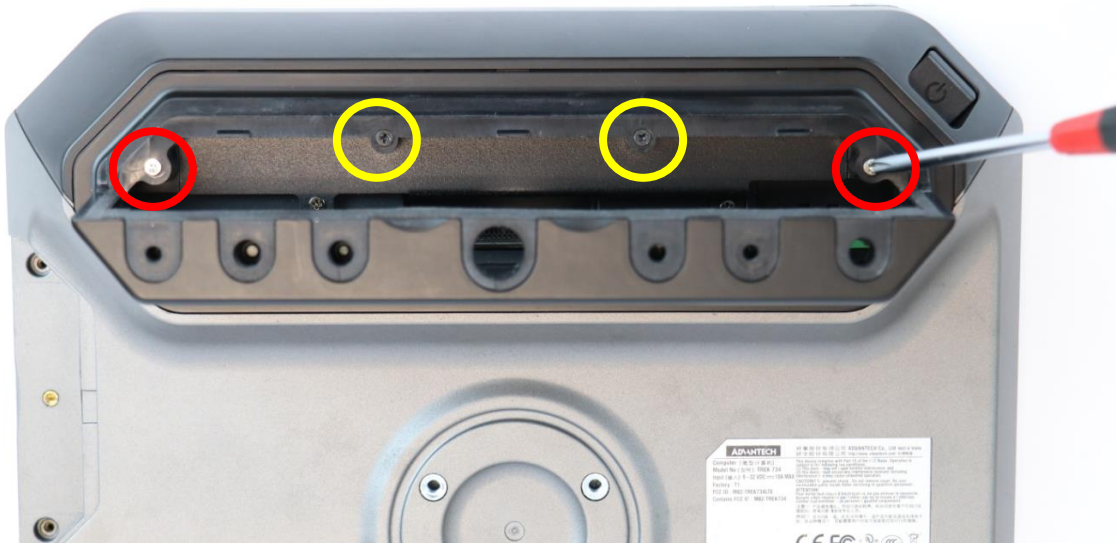
Part E –Cover Bottom



1. **Insert the Part E- Cover Bottom into the chassis clip.**

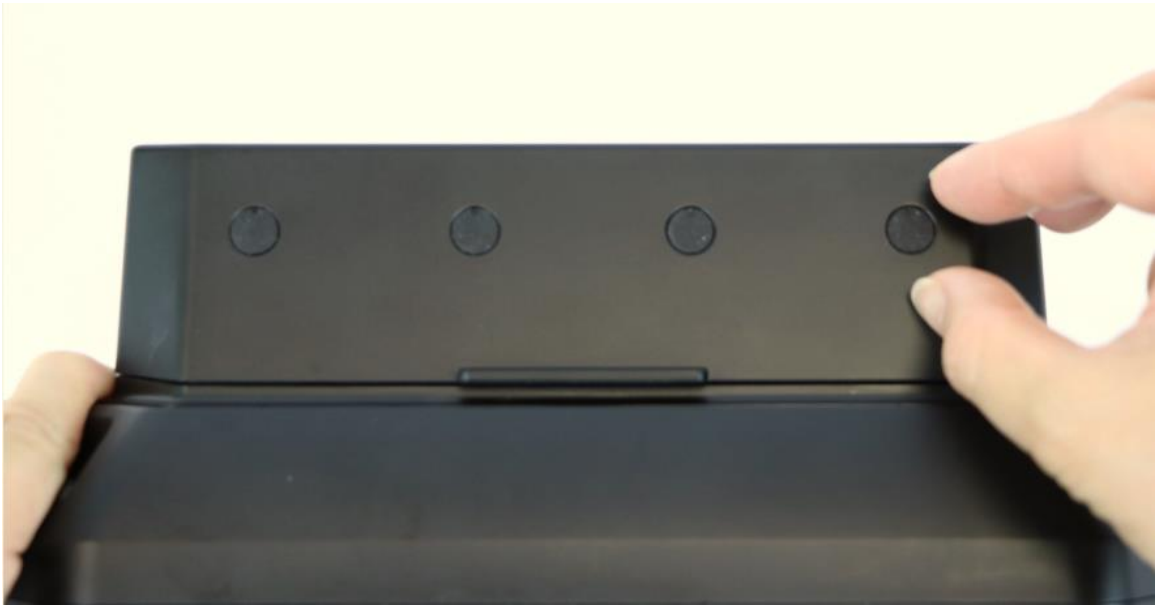


2. **Install the screws and tightening screws. (2 different size screws, the part C – longer screw in 2 side, part D- the shorten screws in the middle)**



3. **Install the Part B cover - Top and tighten the screws of cover top.**

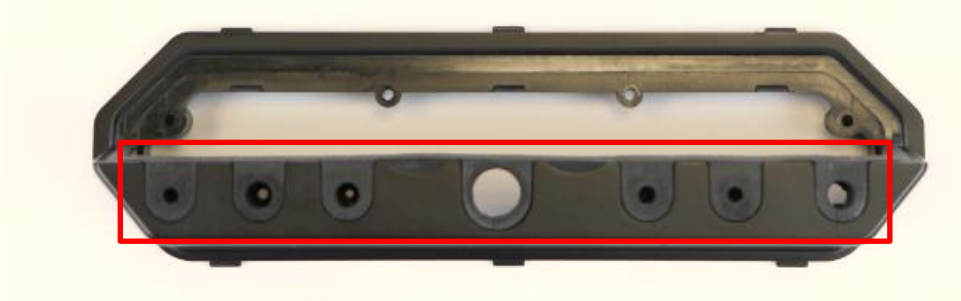
4. **Insert the Part A- Water Proofing Rubber into the screw holes**

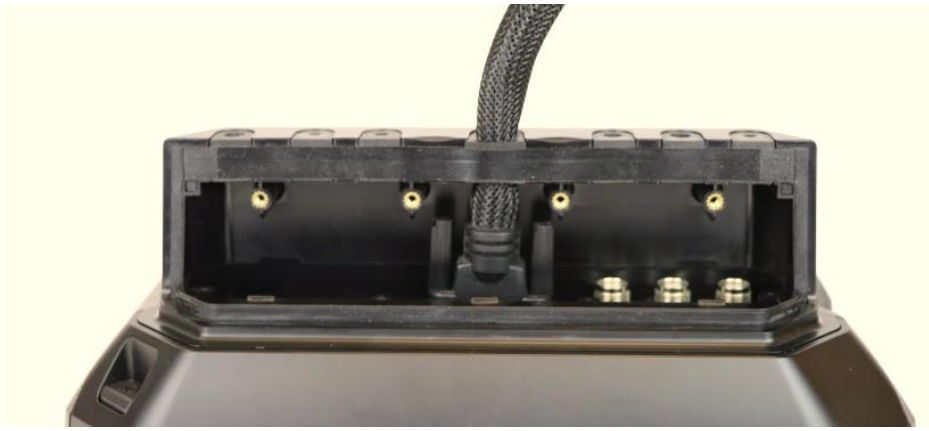


A-4 Installing HDC cable

1. **Insert the HDC cable before install the IP54 cover and tighten the screws on HDC cable.**

2. **Fix the HDC into the rubber of IP54 I/O cover, please remove the rubber in Cover Bottom.**





3. **Install the Part B cover - Top and tighten the screws of cover top.**

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