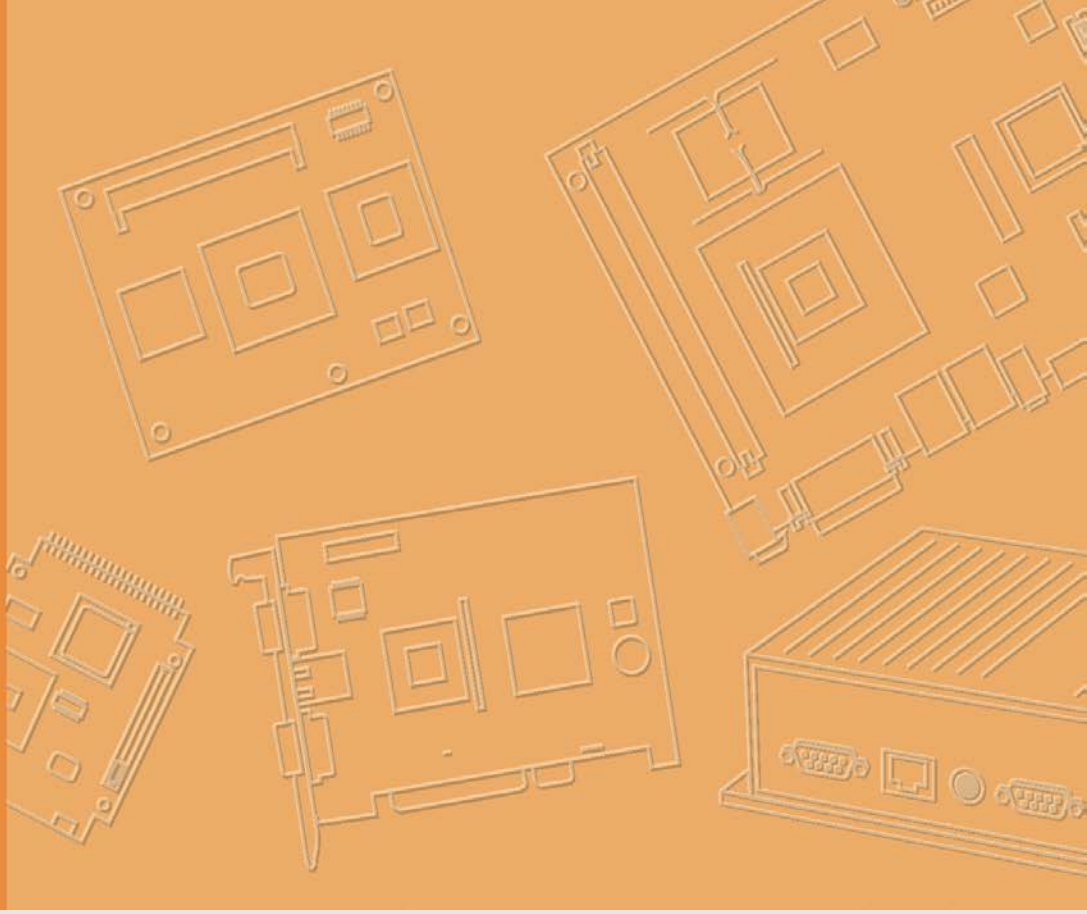

User Manual

TREK-530

Computer

ADVANTECH

Enabling an Intelligent Planet

Copyright

Acknowledgements

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Android is registered trademarks of Google LLC.

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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 1

Apr 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.

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.

Description	Q`ty
TREK-530 Computer	1
Power cable (2M)	1
LAN adaptor cable	1

Ordering Information

Part Number	Description
TREK-530-GWBADA20	TREK-530 Barebone w/ slot
TREK-530-LWBADA20	TREK-530 EU full config. w/ WLAN,BT,LTE,GNSS
TREK-530-LWBADB20	TREK-530 US full config. w/WLAN,BT,LTE,GNSS

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 equip- ment 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 -40° C (-40° F) or above 85° C (185° F), it may damage the equipment. Operating temperature: -20°C~65°C without battery.
8. Do not operate this equipment in an environment temperature may over 65°C(149° 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 cir- cuit. 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, 2A maximum and Tma 65 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.*

1. *Tension d'entrée nominale: 9 - 32 Vdc.*
2. *Transport: portez l'appareil avec les deux mains et manipulez-le avec précaution.*
3. *Entretien: pour bien entretenir et nettoyer les surfaces, n'utilisez que des produits approuvés ou nettoyez-les avec un applicateur sec.*
4. *Carte SD / SIM: Mettez l'appareil hors tension avant de l'insérer ou de le retirerles cartes de stockage.*

Chapter 1

General Information

This chapter gives background information on the TREK-530 Computer

Sections include:

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

1.1 Introduction

TREK-530 is a compact RISC-based in-vehicle computing box equipped with a Qualcomm® Snapdragon™ 212 quad-core ARM® Cortex™-A7 SoC, isolated DI/O, and two extension slots for optional expansion. Built-in WLAN, Bluetooth, and GNSS modules offer enhanced connectivity, while periodic, digital input and WWAN suspend/resume functionality

Supports remote monitoring, making TREK-530 ideal for logistics and fleet management. Moreover, the system's wide operating temperature range (-20 ~ 65 °C), support for 9-32Vdc power input, and compliance with MIL-STD-810G and 5M3 shock/vibration standards ensures TREK-530 can withstand operation in harsh environments.

1.2 General Specifications

Features

- Qualcomm® Snapdragon™ 212 quad-core ARM® Cortex™-A7 SoC with Android 6.0 Marshmallow
- Built-in WLAN, Bluetooth, and GNSS (including BeiDou) modules with external antenna via FAKRA connector.
- Modularized design with two extension slots for optional expansion (such as LTE 4G module or battery) according to application requirements.
- Multiple isolated DI/O; DI supports dry/wet contact and speed sensor inputs for measuring distance.
- Compliant with MIL-STD-810G and 5M3 standards for shock/vibration tolerance.
- Equipped with Advantech's industrial Mobile Android Remote General Utilities for remote management.

Specifications

System	Processor	Qualcomm® Snapdragon™ 212 APQ8009 quad-core ARM® Cortex™-A7 (1.3 GHz) SoC
	Memory	2 GB
	Storage	16 GB eMCP 1 x Externally accessible MicroSD (push-push type) with cover
	Watchdog	Yes
	RTC	Yes
	O.S	Android 6.0 Marshmallow
RF	WiFi	IEEE 802.11 a/b/g/n dual band (2.4/5 GHz) (with external antenna via FAKRA connector)
	Bluetooth	Bluetooth V4.1 Class 1 (with external antenna via FAKRA connector)
	GNSS	GPS, GLONASS, and AGPS (BeiDou upon request) support (with external antenna via FAKRA connector)
	WWAN	Sierra Wireless MC7304 via extension module (EU) LTE: B1, B3, B7, B8, B20 Sierra Wireless MC7354 via extension module (US) LTE: B2, B4, B5, B13, B17, B25 (external antenna via FAKRA connector) WCDMA Band II, Band V, Band IV. GPRS 850,1900,EGPRS 850,1900
	Voice call	N/A
	Wake-on-WWAN	N/A
	SIM	1 SIM slot
	External Antenna	1 x WLAN, 1 x WWAN Main, 1 x WWAN AUX & GPS (FAKRA connector)
Sensor	G-Sensor	Triple-axis accelerometer (±2g/4g/8g)
I/O	Generic I/O Port (via automotive connector)	1 x Mic-In, 1 x Line-Out 4 x Isolated DI (dry/wet contact) 2 x Isolated DO (open-collector output with relay driver) 1 x CAN bus (supports raw CAN, J1939, OBD-II/ISO 15765; firmware configurable) 1 x J1708 (J1587) 1 x USB 2.0 Host 1 x 4-wire RS-232 1 x 4-wire RS-232/RS-485 (software configurable)
	Standard I/O Port	1 x Micro USB OTG (Mini USB) with cover (for debugging) 1 x MicroSD slot with cover
	Indicator	1x LED (Power)
	Button	1x reset button with cover
Power	Reset	Yes
	Input Voltage	9-32V DC
	Backup Battery (Optional)	3.6 V 2100 mAh
Mechanical	Dimensions (W x H x D)	140 x 110 x 50 mm (5.51 x 4.33 x 1.96 in)
	Weight	410 g
	IP Rating	IP54 with I/O cover
Environment	Regulation	E-Mark, ISO 7637-2, SAE J1455, PTCRB
	EMC	CE,FCC
	Safety	UL/cUL, CB, CCC
	Operating Temperature	-20° C ~ 65 °C (-4 ~ 149 °F) -10° C ~ 60° C (with battery discharge) 0° C ~ 45° C (with battery charge)
	Storage Temperature	-40~85C (-40~185F) (without battery)
	Shock/Vibration	MIL-STD-810G, SAE J1455

1.3 Dimensions

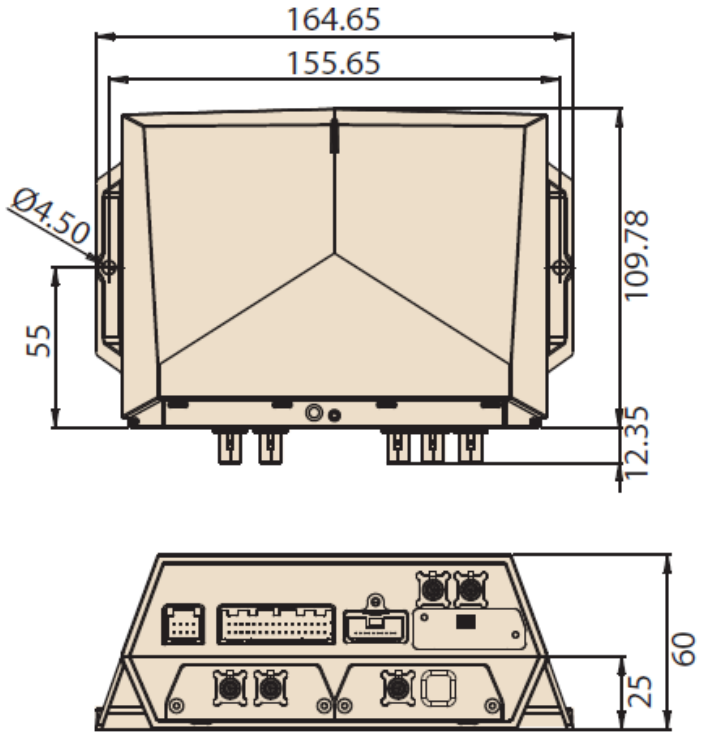


Figure 1.1 TREK-530 dimensions

Warning! *Use suitable mounting apparatus to avoid risk of injury.ÚTTENTION: Veuillez utiliser un système de montage approprié afin d'éviter tout risque de blessure.Đ*Fixed VESA screw specification: M4 ; Screws depth: 10 mm. (Min)_

Chapter 2

System Setup

This chapter details system setup on TREK-530

Sections include:

- A Quick Tour of the Computer Box
- Installation Procedures
- Quick Start to access TREK-530

2.1 A Quick Tour of the TREK-530 Computer

Before starting to set up TREK-530, take a moment to become familiar with the locations and functions of the connectors and ports, which are illustrated in the figures below.

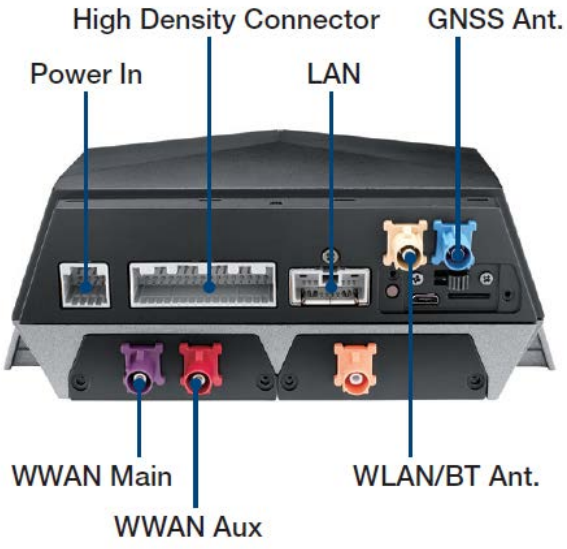


Figure 2.1 Rear view of TREK-530

2.2 Installation Procedures

2.2.1 Installing SIM card

Remove WWAN extension module enclosed I/O door screw then open the rubber door on left side. Then can install SIM Card directly.

Figure 2.3 Installing SIM card

2.2.2 Connecting Power

Connect the 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-530 supports an ignition on/off function so that you can power on/off the TREK-530 via the ignition signal/voltage and connect the TREK-530 ignition switch.*

Table 2.1: Pin Definition of Power Cord

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

2.2.3 Quick Start to access TREK-530

There are 2 method to access TREK-530, one is through USB cable, the other one is through WiFi or Ethernet.

2.2.3.1 USB driver installation

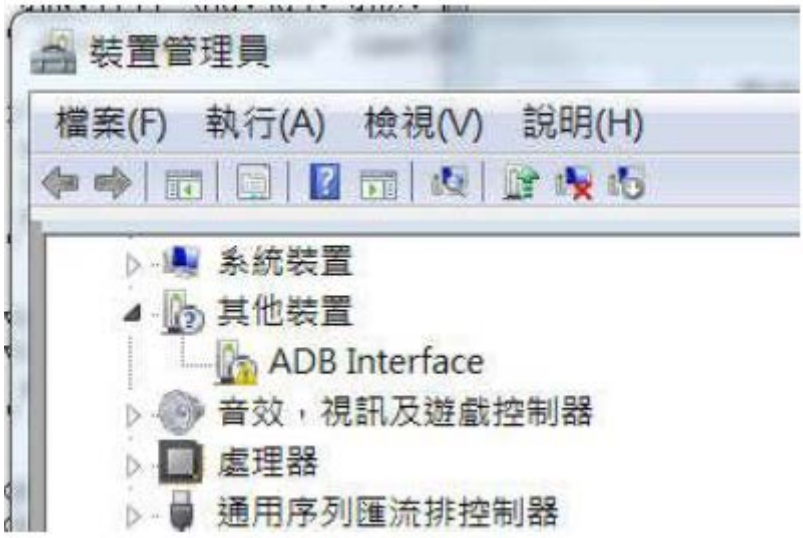
Before access TREK-530, you need to install ADB driver on your PC for ADB connection to TREK-530.

Before TREK-530 power on, unplug USB cable, make sure USB switch are switch to “debug mode”, by removing the plate cover and switch to right

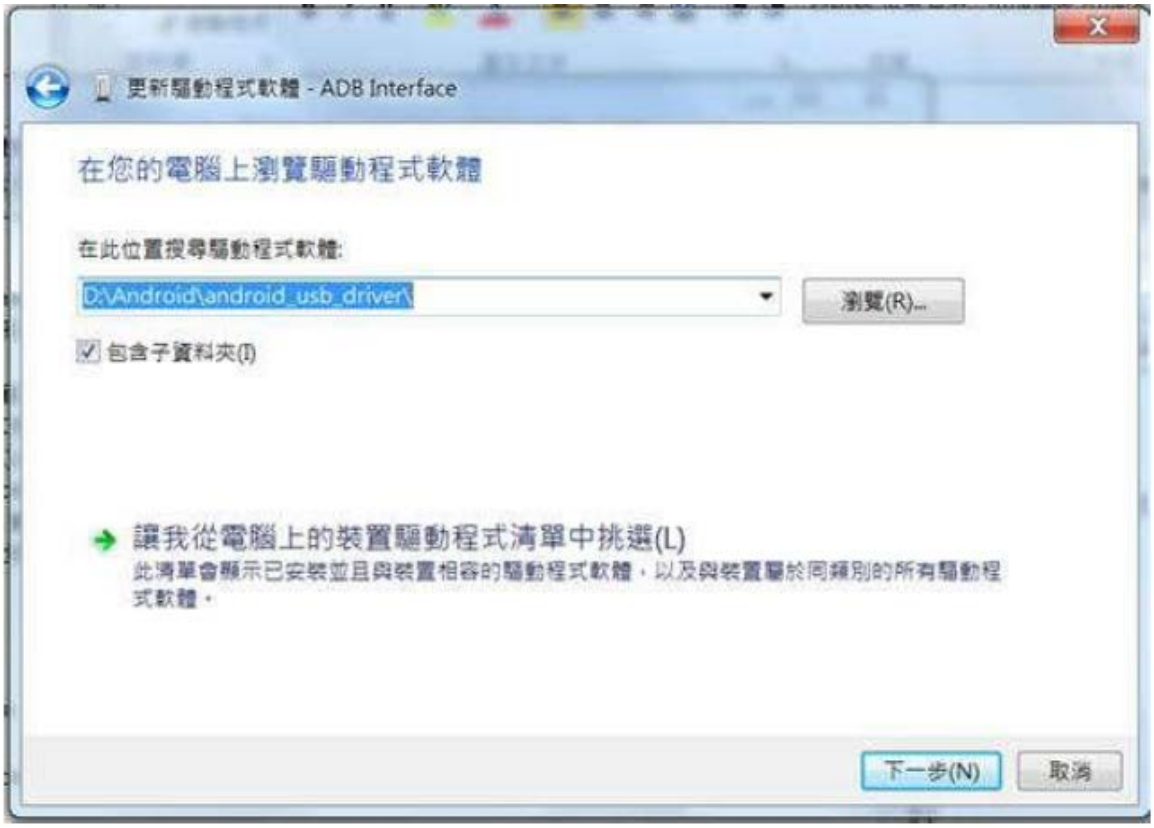
Qualcomm ADB driver install

Environment setup

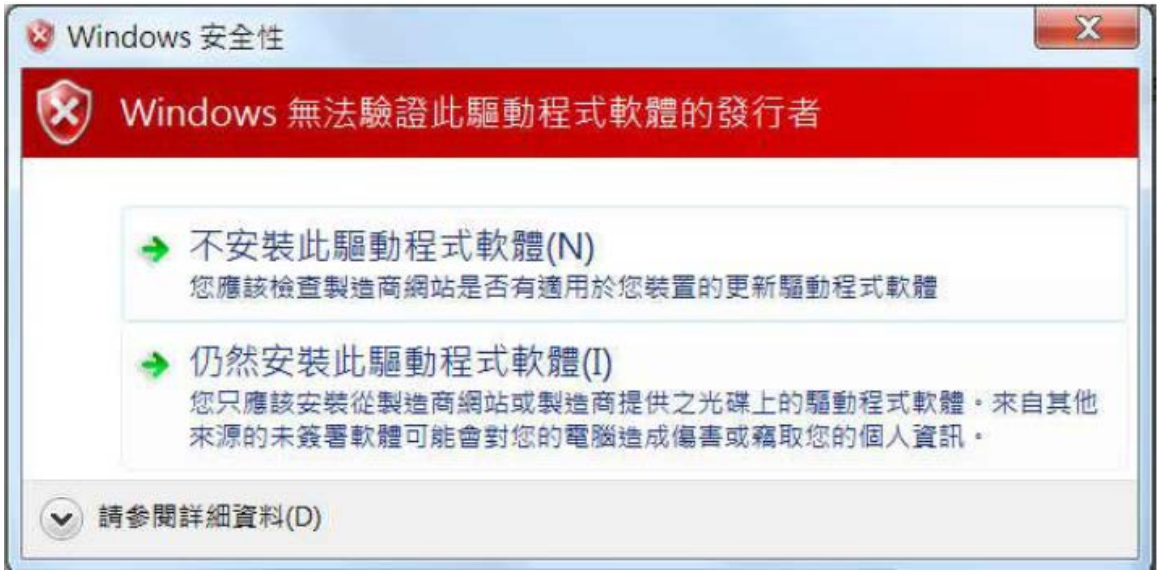
- Windows 7/8 32 / 64bit
- Android_USB_Driver.7z
- Unzip Android_USB_Driver.7z
- [TREK-530] Make sure device is off.
- [TREK-530] Switch USB switch to USB debug side
- Power on device
- After 10 sec, plug-in USB cable
- Check DeviceManager in your PC, found a un-known device as following pic.



Right click it and select “Updated driver” than select “Browse my computer…”
Browse to driver folder and click “Next”

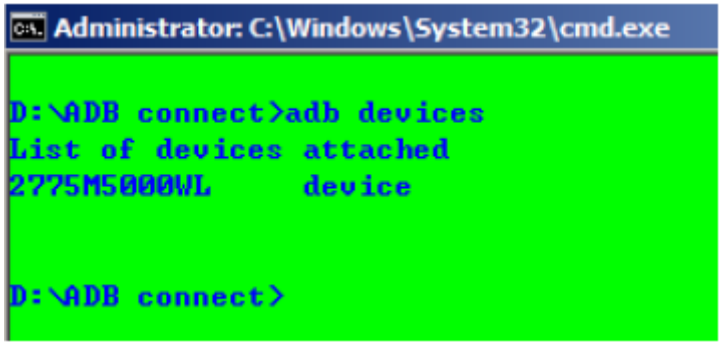


Select “Install” and driver will be installed.



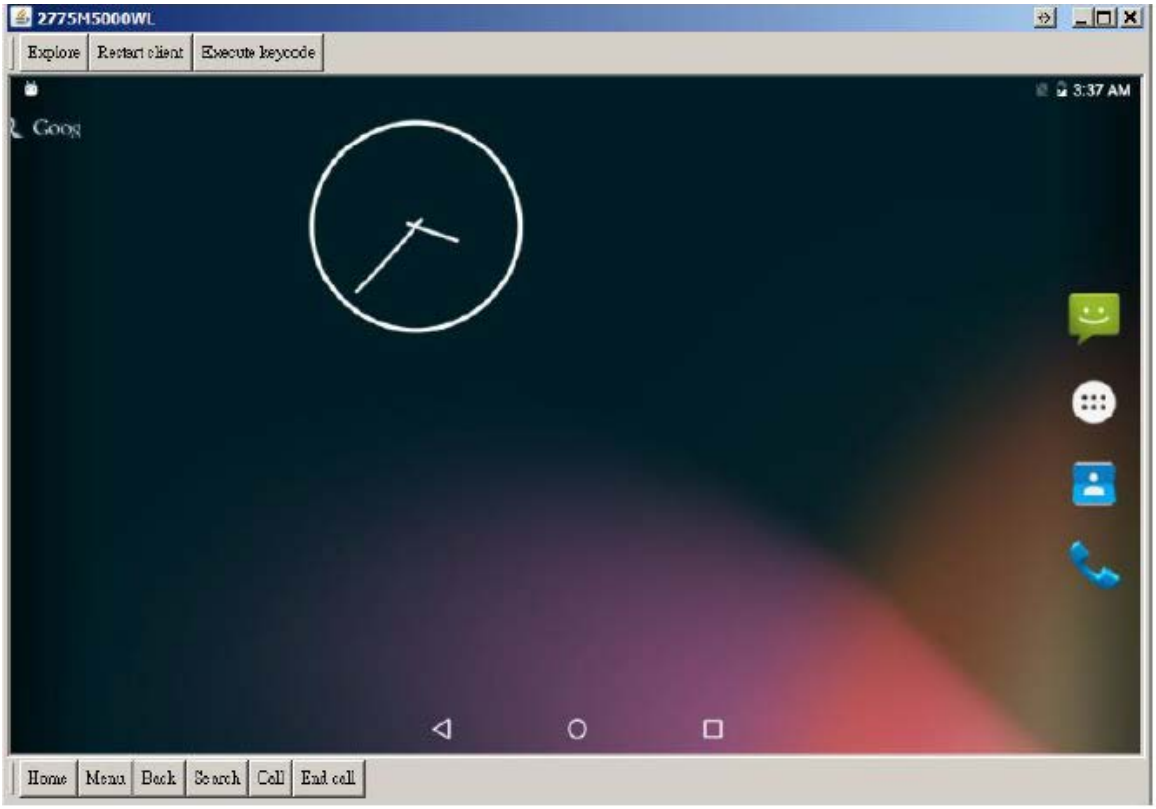
Check Device Manager

Open a window console and type “adb device” to confirm TREK-530 recognized.



Establish screencast connection to TREK-530

Run androidscreencast.bat on PC to launch Android screencast. Then you can look the desktop of TREK-530 remotely.



2.2.3.2 WiFi & Ethernet auto configure

Download a file "trek530_adv.cfg" from Advantech support website.

Change file setting in trek530_adv.cfg

Save trek530_adv.cfg in USB or SDCard storage

Plug storage into TREK530

WiFi Setting

- [WIFI] => Setting for WiFi
- SSID: => SSID name
- WTYPE: => Security Mode

☐ OPEN

WEP

☐ WPAPSK (Include WPA/WPA2 - AES/TKIP)

- PW: => Password (No Need if type is "OPEN")

☐ Ex:

```
# == OPEN ==
[WIFI]
SSID:AIM
WTYPE:OPEN
```

```
# == WEP ==
[WIFI]
SSID:AIM
WTYPE:WEP
PW:abc1234567
```

```
# == WPA/WPA2 - TKIP/AES ==
[WIFI]
SSID:AIM
WTYPE:WPAPSK
PW:abc1234567
```

Ethernet Setting

- [ETH] => Setting for Ethernet
- ETYPE: => Type of Ethernet

☐ STATIC

☐ DHCP (below setting can be ignore)

- IP: => STATIC IP
- NM: => NetMask
- GW: => GateWay
- DNS1: => DNS1(Option for static)
- DNS2: => DNS2(Option for static)

☐ Ex:

```
# == STATIC ==
[ETH]
ETYPE:STATIC
IP:192.168.1.88
NM:255.255.255.0
GW:192.168.1.1
DNS1:8.8.8.8
DNS2:8.8.4.4
```

```
# == DHCP ==
[ETH]
ETYPE:DHCP
```

Note :

Line ignore with “#” mark at first character

☐ If there are same setting in file, value of last line will be used.

- Ex: Same SSID

☐ [WIFI]
SSID:ABCD
SSID:5678 <- 5678 will be used
WTYPE:WEP

☐ Setting also will be applied when boot up if storage is put in device before power on.

☐ WiFi will be triggered to create connection with dedicated AP, but can’t guarantee the connection will be successful. Connection can be created or not is depends on the signal strength in current environment.

Chapter 3

I/O Connector

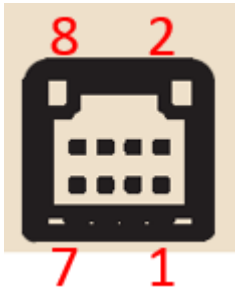
This chapter explains how to set up the Computing Box hardware, including instructions on setting.

Sections include:

- **I/O connectors pin assignment**

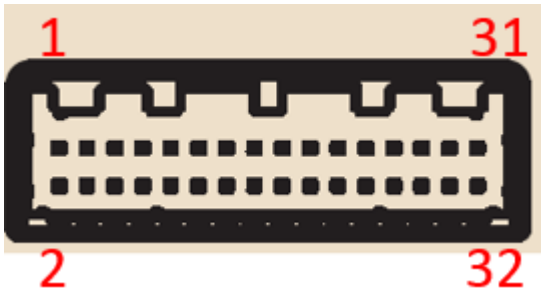
3.1 I/O Connectors Pin Assignment

3.3.1 Power connector



Pin	Function
1	GND
2	GND
3	GND
4	GND
5	9~32V
6	9~32V
7	9~32V
8	IGNITION

3.3.2 High Density Connector



Pin	Function	Pin	Function
1	ISO Digital Input 1	17	USB D-
2	ISO Digital Input 2	18	GND
3	ISO Digital Input 3	19	RS-232_2 RXD RS-485 Data +
4	ISO Digital Input 4	20	RS-232_2 DCD RS-485 Data -
5	GNDof ISO DI/O	21	RS-232_2 CTS
6	ISO Digital Output 1	22	RS-232_2 RTS
7	ISO Digital Output 2	23	RS-232_2 TXD
8	J1708+(J+)	24	GND
9	GND(G)	25	RS-232_1 RTS

10	J1708-(J-)	26	RS-232_1 CTS
11	CAN H	27	RS-232_1 TXD
12	GND(G)	28	RS-232_1 RXD
13	CAN L	29	GND of Audio
14	USB VBUS	30	Line Out
15	GND	31	Line In
16	USB D+	32	MIC Input

3.3.3 LAN Connector

Pin	Function
1	LAN_TX+
2	LAN_TX-
3	LAN_RX+
4	(Pair C+)
5	(Pair C-)
6	LAN_RX-
7	(Pair D+)
8	(Pair D-)

Chapter 4

Software Demo Utility Setup

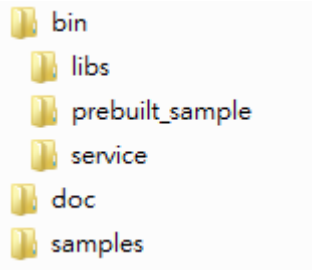
This chapter explains the software demo utility for TREK-530

Sections include:

- Introduction
- How to Set up Demo Utility

1 MRM SDK Package Contents

The MRM SDK package contains the following contents:



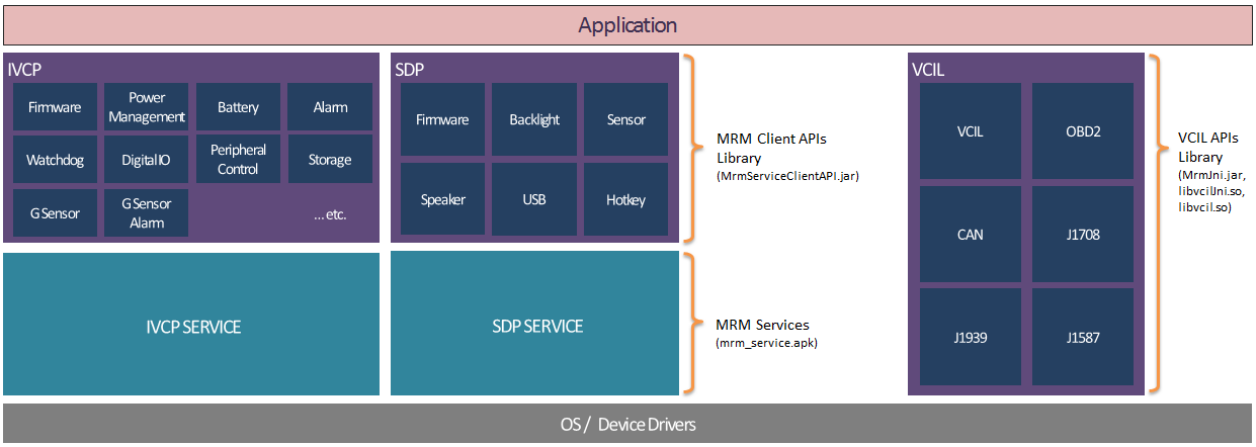
The description of each of the folder at the top level is listed below:

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.

2 MRM SDK Overview

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:



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:

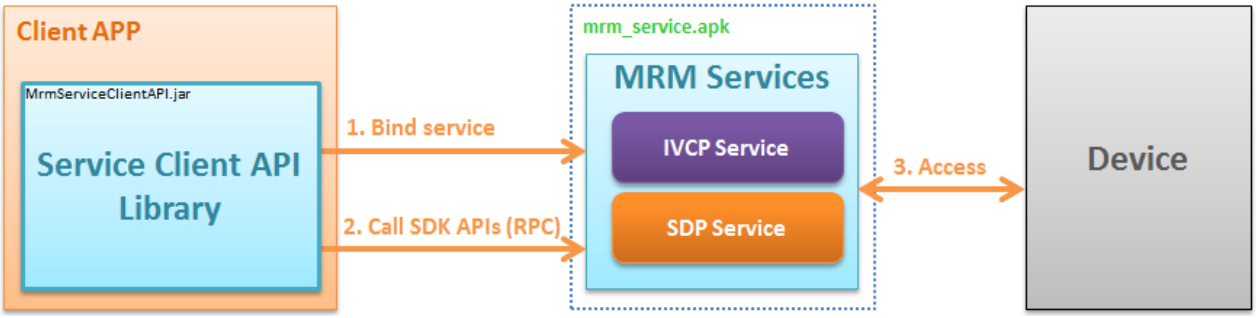
  - **VCIL APIs -** Get VCIL MCU firmware version. Physical port protocol settings.
  - **CAN APIs** - Read / write data with CAN protocol.
  - **J1939 APIs** - Read / write data with J1939 protocol.
  - **OBD2 APIs** - Read / write data with OBD2 protocol.
  - **J1708 APIs** - Read / write data with J1708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

3 How MRM SDK Works

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

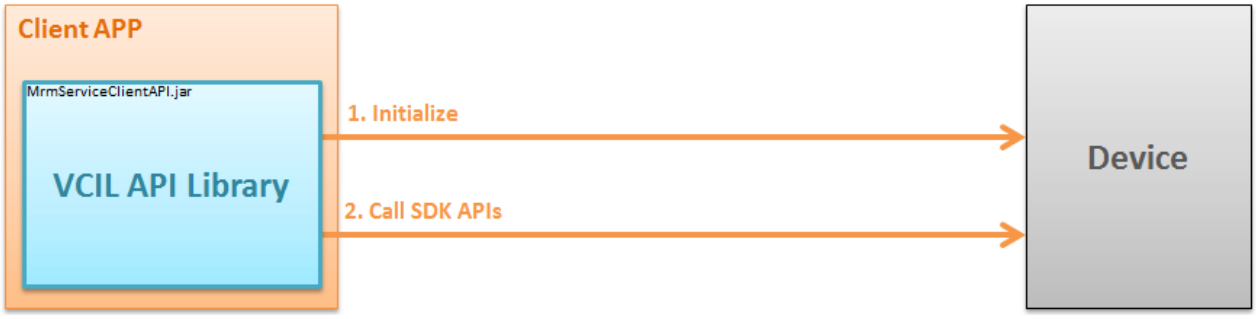
To make your APP work with the MRM services to control the device you must first include the Service Client API library into you APP project. Before calling APIs to control the device, you must first "bind" you APP process to the MRM service processes. After binding is done, you can then call the IVCP,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

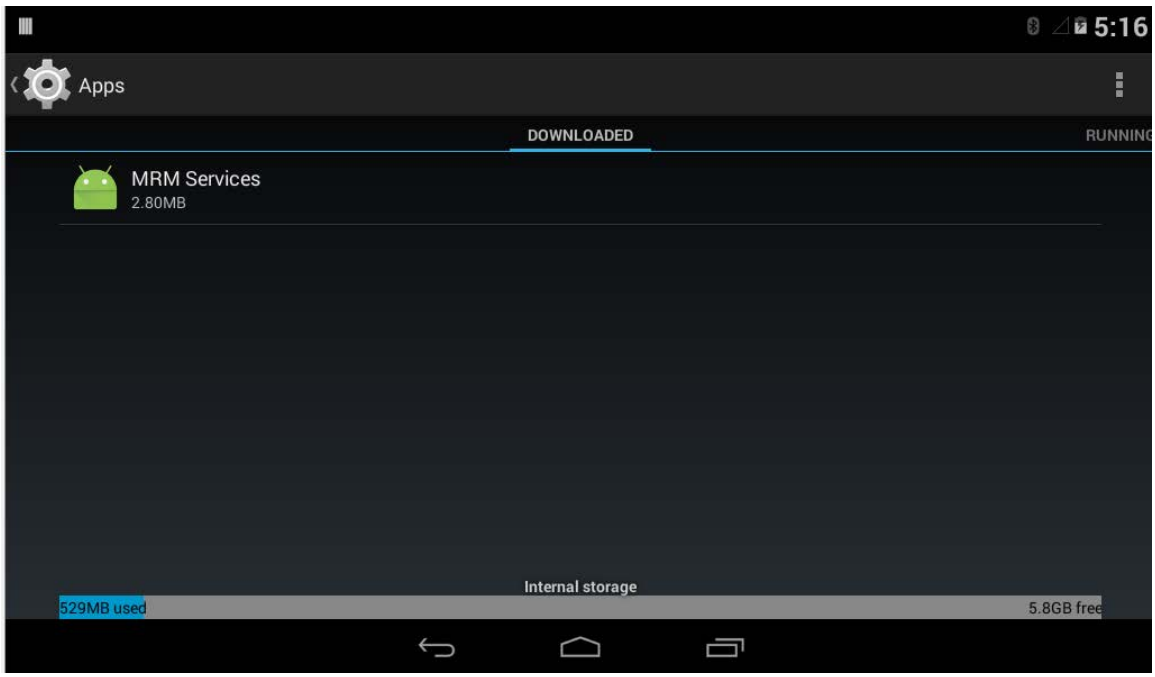
   Connect device to you computer with ADB.

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

   The script will execute the following ADB command:

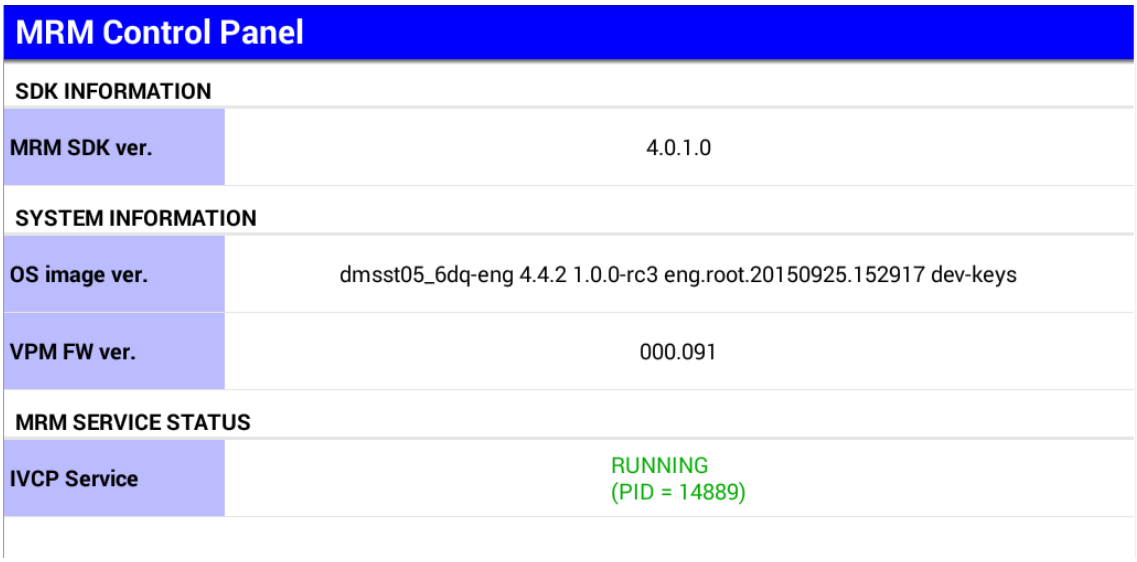
```
adb install -r .\mrm_service.apk
```

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



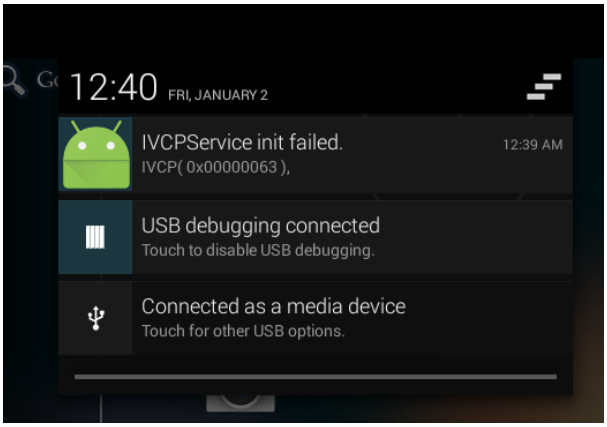
   There will also be an MRM Service Console APP named "**MRM**" in the APP list. This is a utility for

testing MRM Services and checking the basic information.



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:

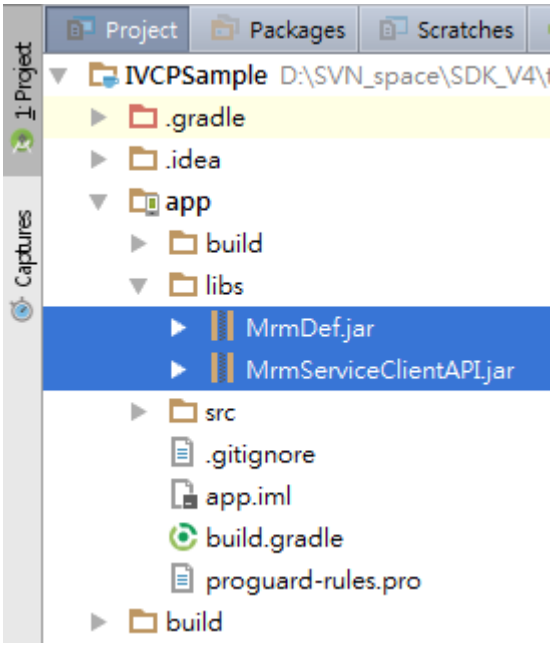
3. **Import MRM Service Client APIs Library**

   (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.

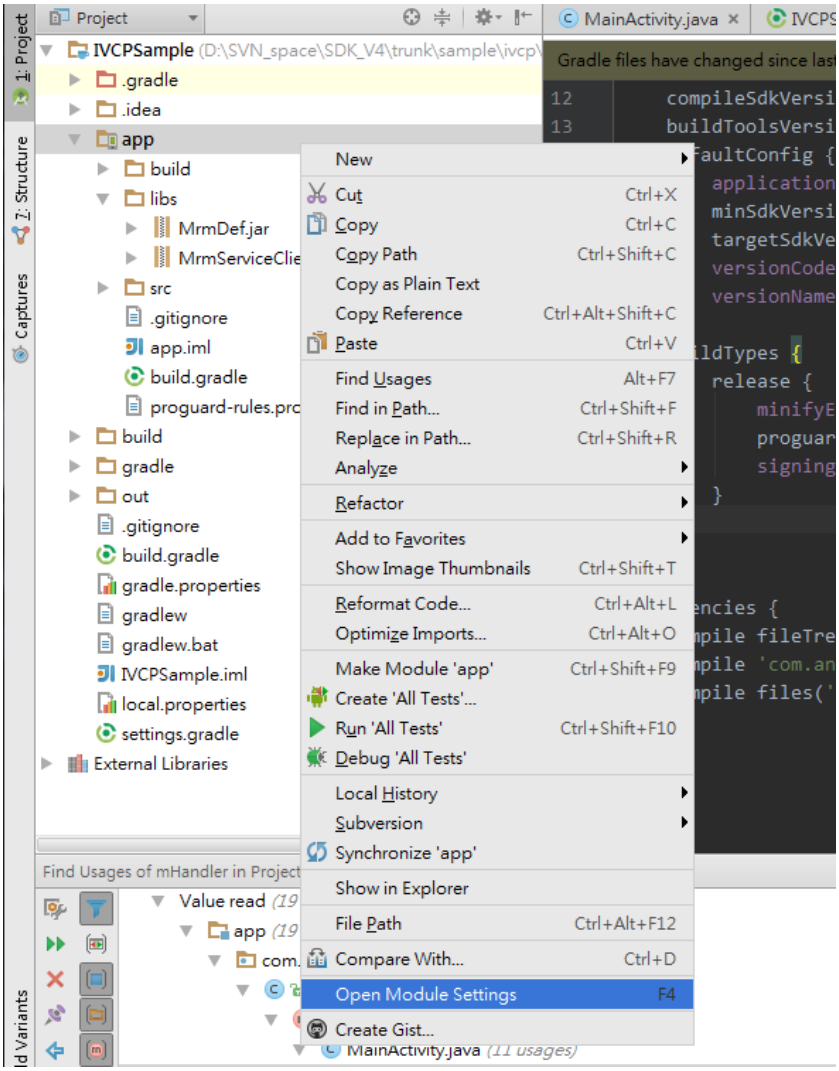
   Please find the **MrmServiceClientAPI.jar** and **MrmDef.jar** in the MRM SDK package. Copy the libraries to the directory **/[Module Name]/libs/** in you Android Studio project (the default

module name might be "app").

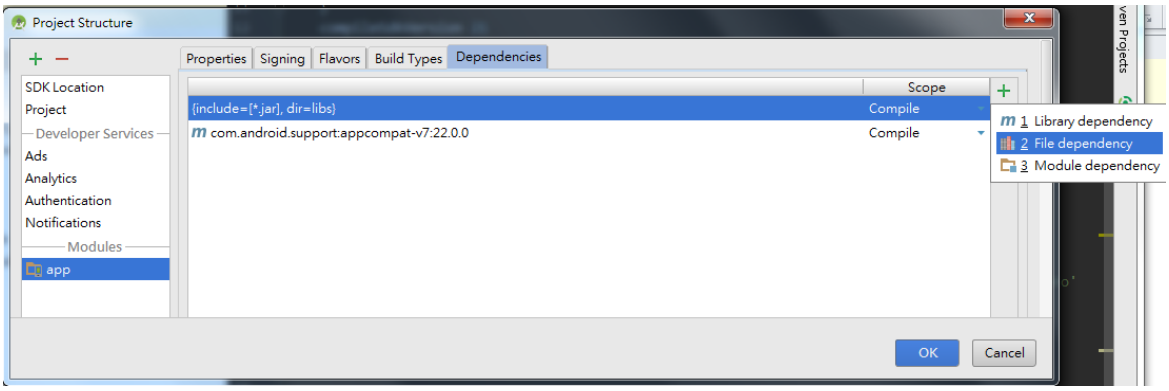


Then import the libraries by following the steps below:

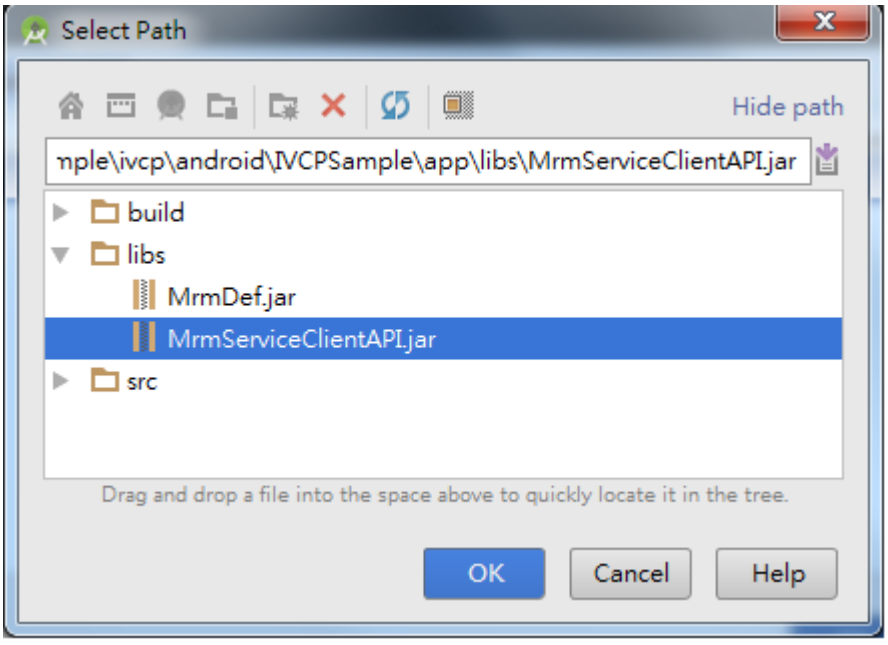
- Right click on you APP module. Click "**Open module settings**"



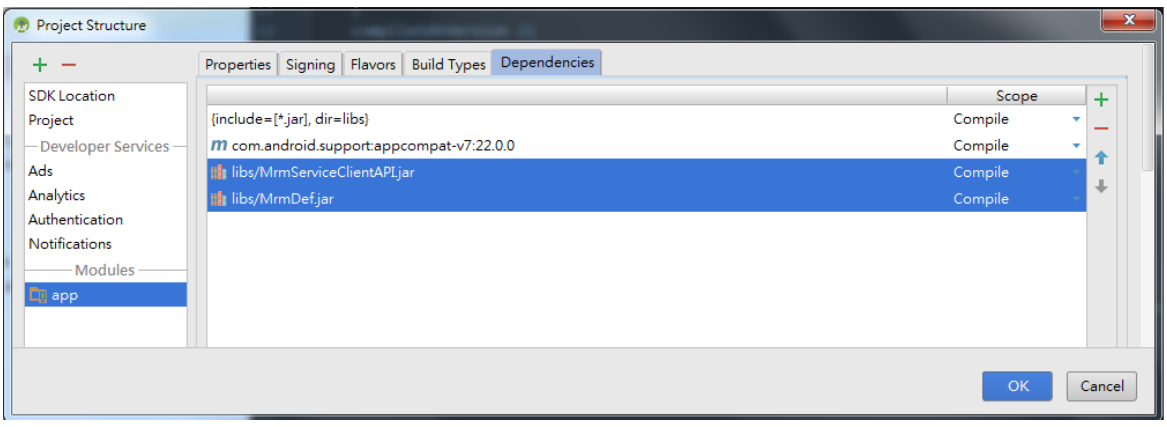
- Click the "**Dependency**" tab. Then click "+" -> "**File dependency**"



- Select the lib file.



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



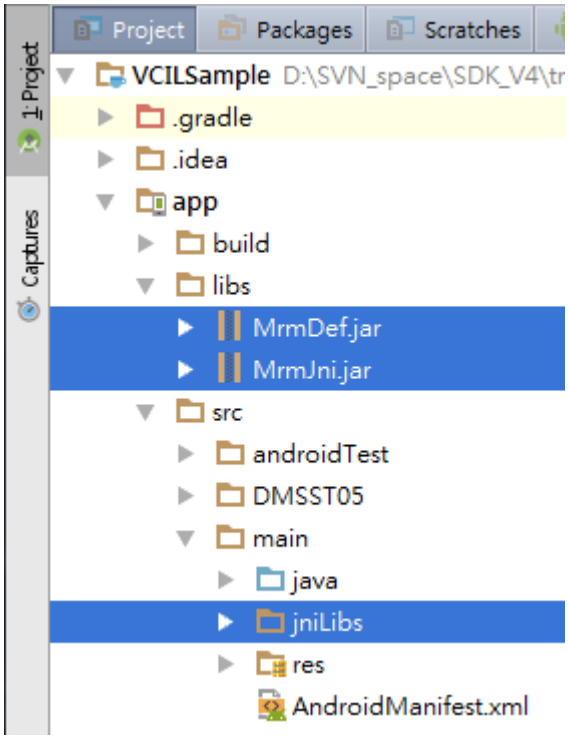
4. **Import VCIL APIs Library**

(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.

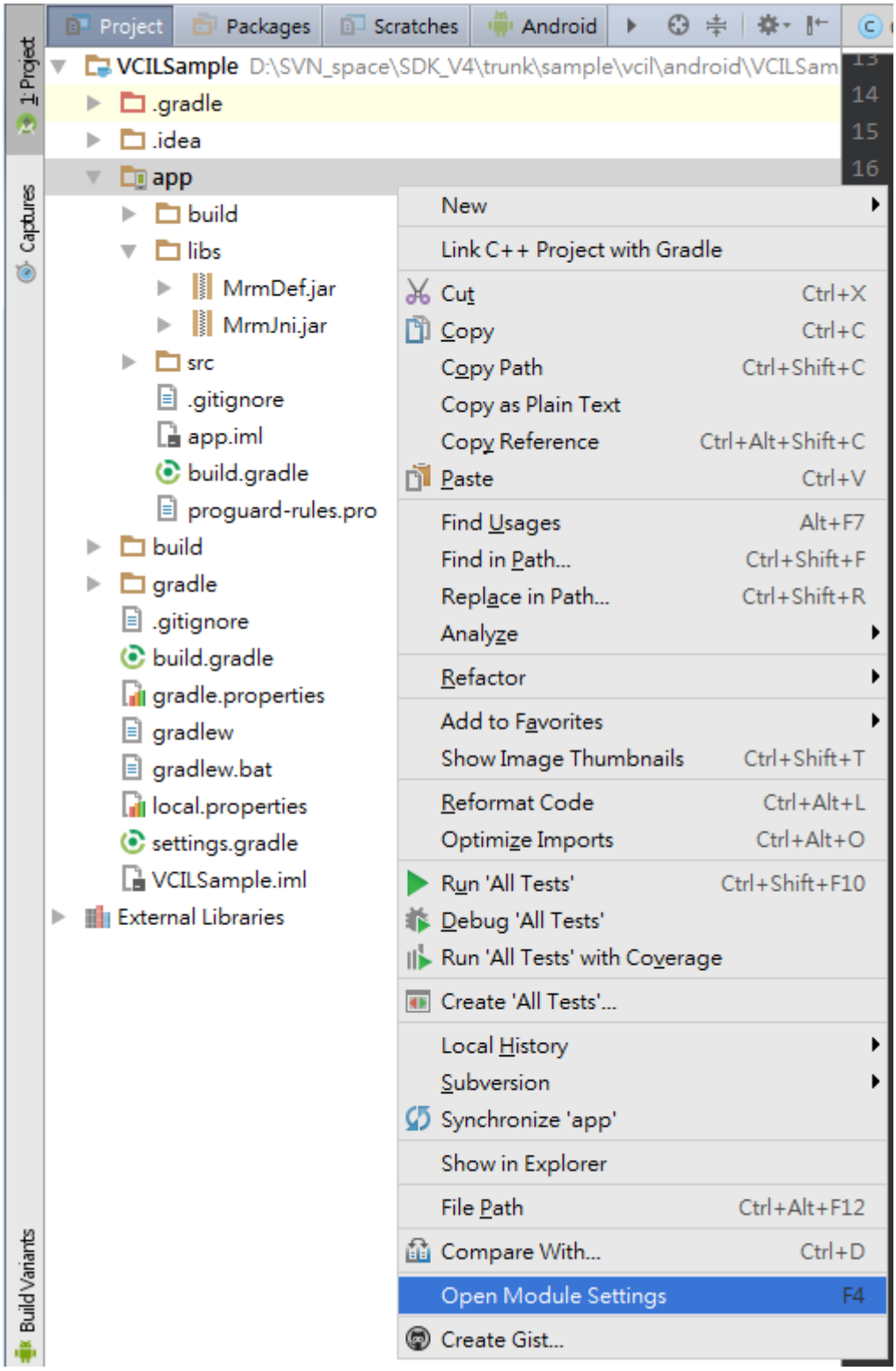
Please find the **MrmJni.jar, MrmDef.jar** and **jniLibs/** folder in the MRM SDK package.

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/** .

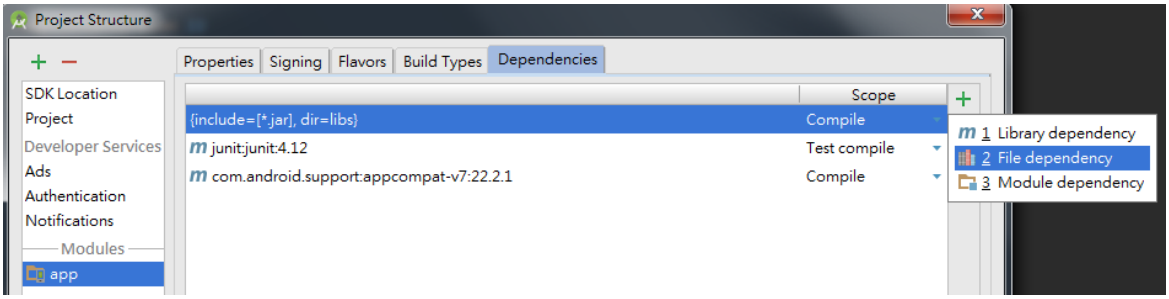


Then import the Java libraries by following the steps below:

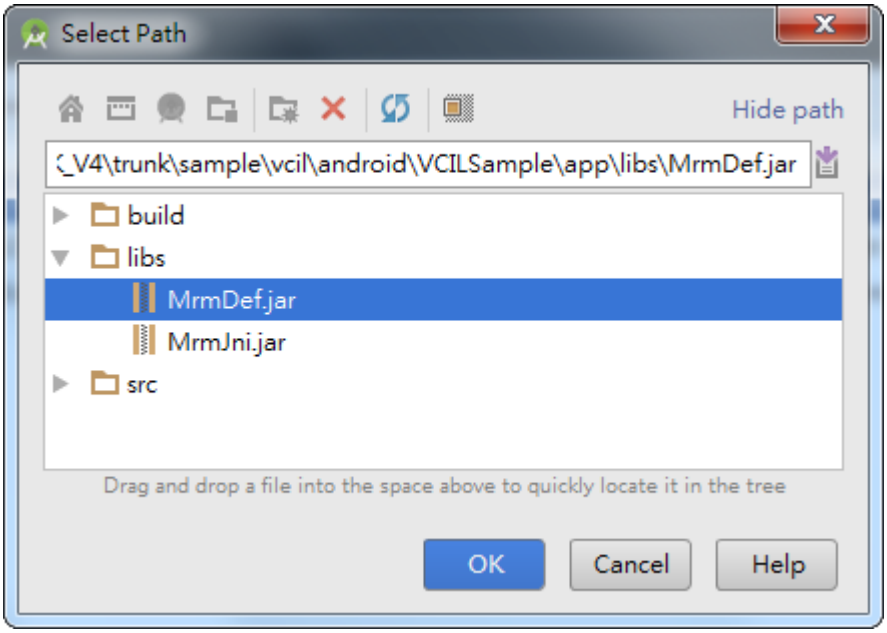
- Right click on you APP module. Click "**Open module settings**"



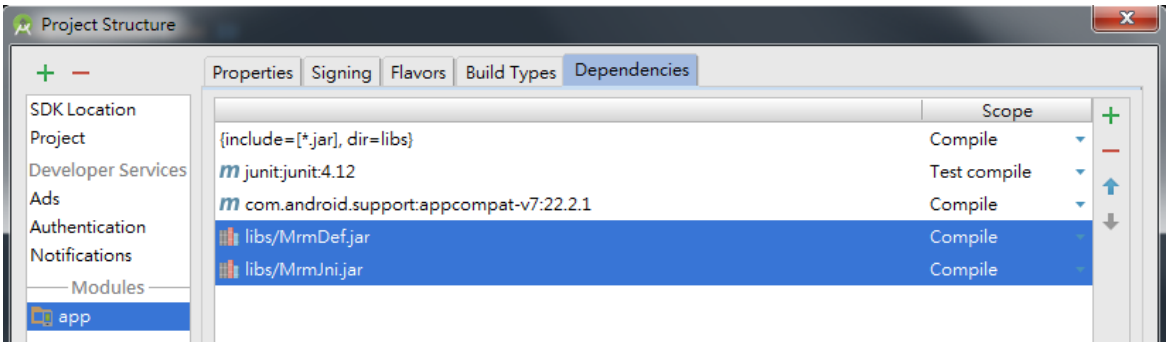
- Click the "**Dependency**" tab. Then click "+" -> "**File dependency**"



o Select the lib file.



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



5 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.

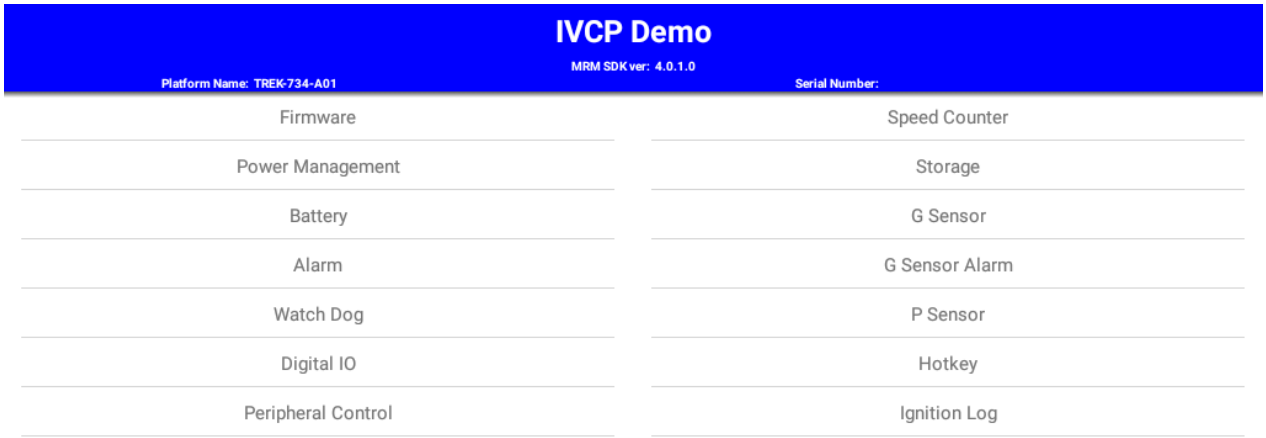
6 IVCP Demonstration

The IVCP sample APP (IVCPSample.apk) demonstrates the usage of IVCP APIs. You can tap on the items in the list to start demo. The following sections show the usage guide line of basic 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.



6.1 Firmware

This page demonstrates the Firmware APIs.

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

Firmware Demo		
VPM Firmware Ver.	001.000	
VPM Save Default Setting	Save OK	EXECUTE
VPM Load Default Setting	Load OK	EXECUTE

6.2 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**
  - VPM trigger power off event
- **Power & Battery**
  - Get/Set power mode and show Power & Battery status
- **Ignition**
  - Show ignition status and Control ignition wakeup.
- **Low Voltage Protection**
  - 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**
  - **Low Voltage Event Delay:**
    The delay time before VPM trigger a power off event (i.e. power button press).
  - **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.
  - **Ignition Event On Delay:**
    The delay time before VPM trigger an power on event (power on the machine).
  - **Ignition Event Off Delay:**
    The delay time before VPM trigger an power off event (i.e. power button/Ignition off press).
  - **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**
  - Control Keep Alive and AT mode.
- **Force Shutdown**
  - Control force shutdown and get/set force shutdown delay.
- **Wakeup Source**
  - 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

FORCE SHUTDOWN

Force Shutdown	DISABLE	ENABLE	DISABLE
Force Shutdown Delay	sec. : 600	GET	SET

Wakeup Source

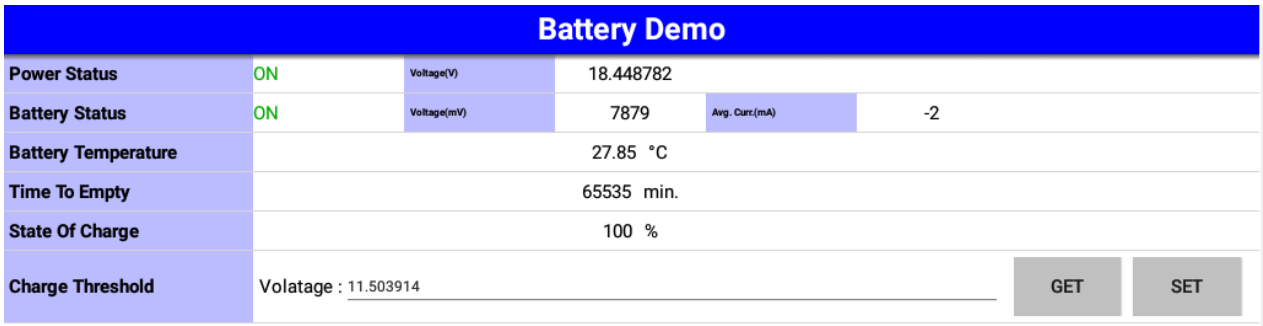
Last Wakeup Source	IVCP_WAKEUP_TYPE_KEEP_ALIVE_MODE(10)

6.3 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.

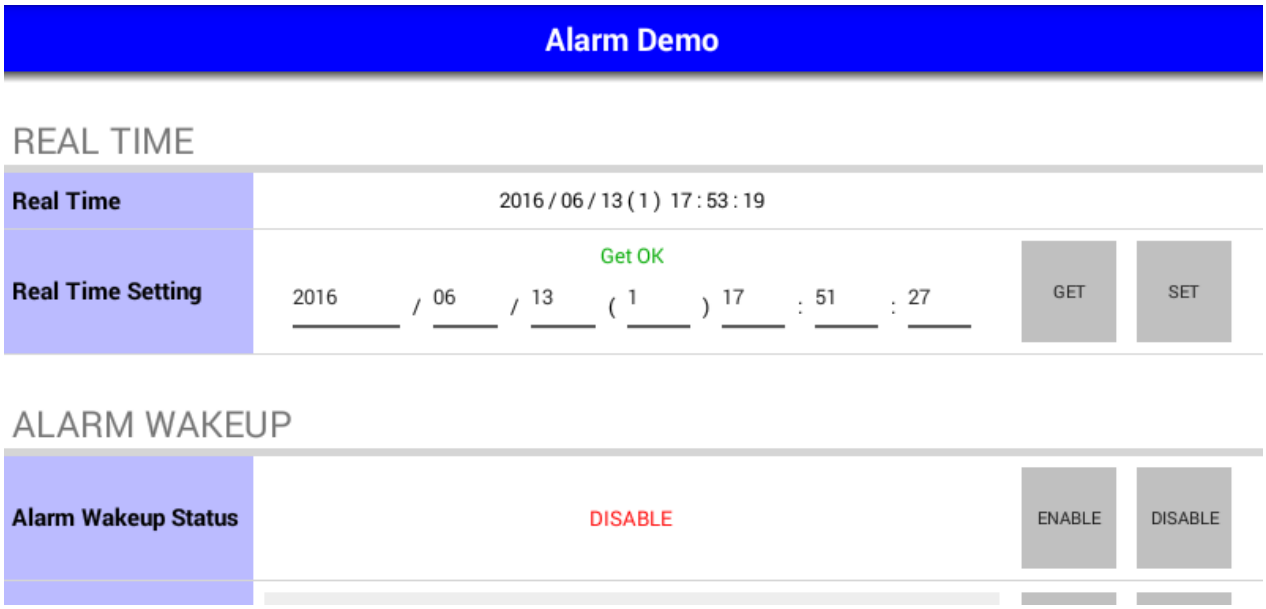


6.4 Alarm

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.



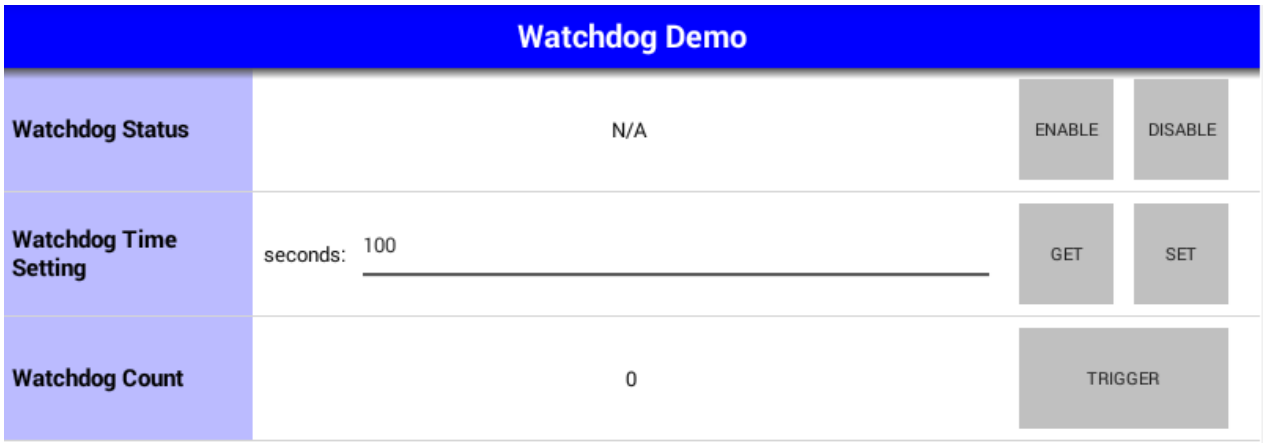
6.5 Watchdog

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.



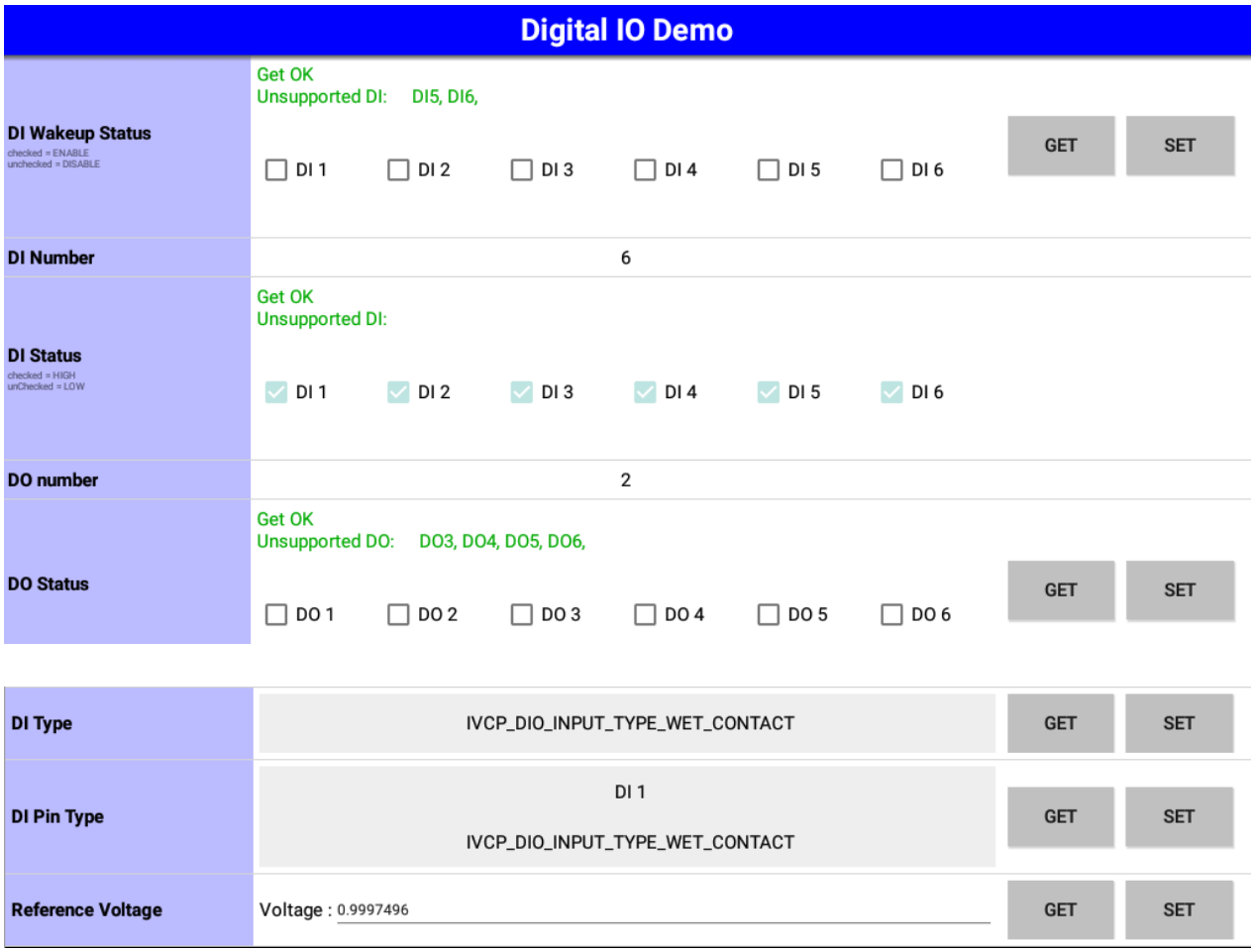
6.6 Digital IO

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.

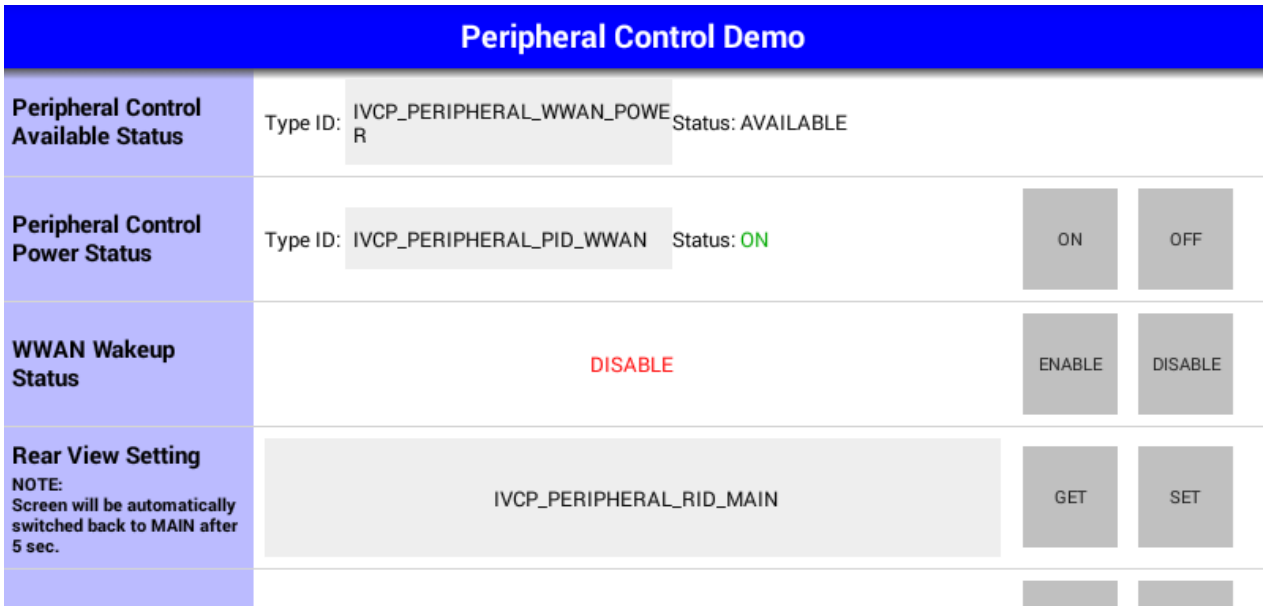
In the row of "DI Type", you can adjust the wet/dry contact for all DI pin. In the row of "DI Pin Type", you can adjust the wet/dry contact for specify DI pin.



6.7 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.

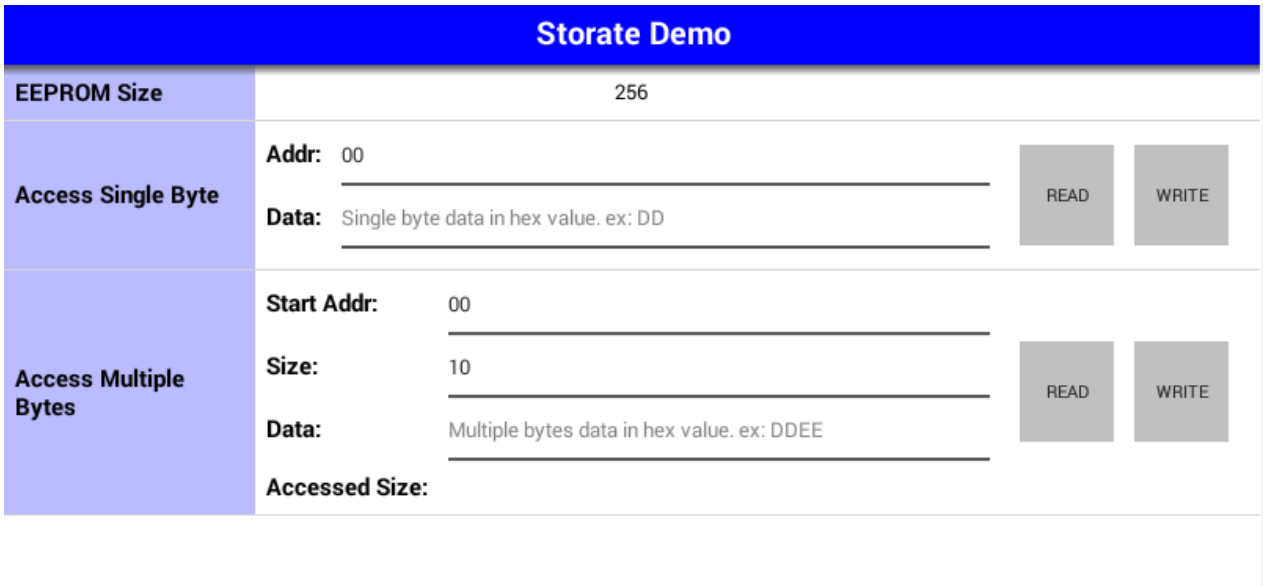


6.8 Storage

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.



6.9 G Sensor

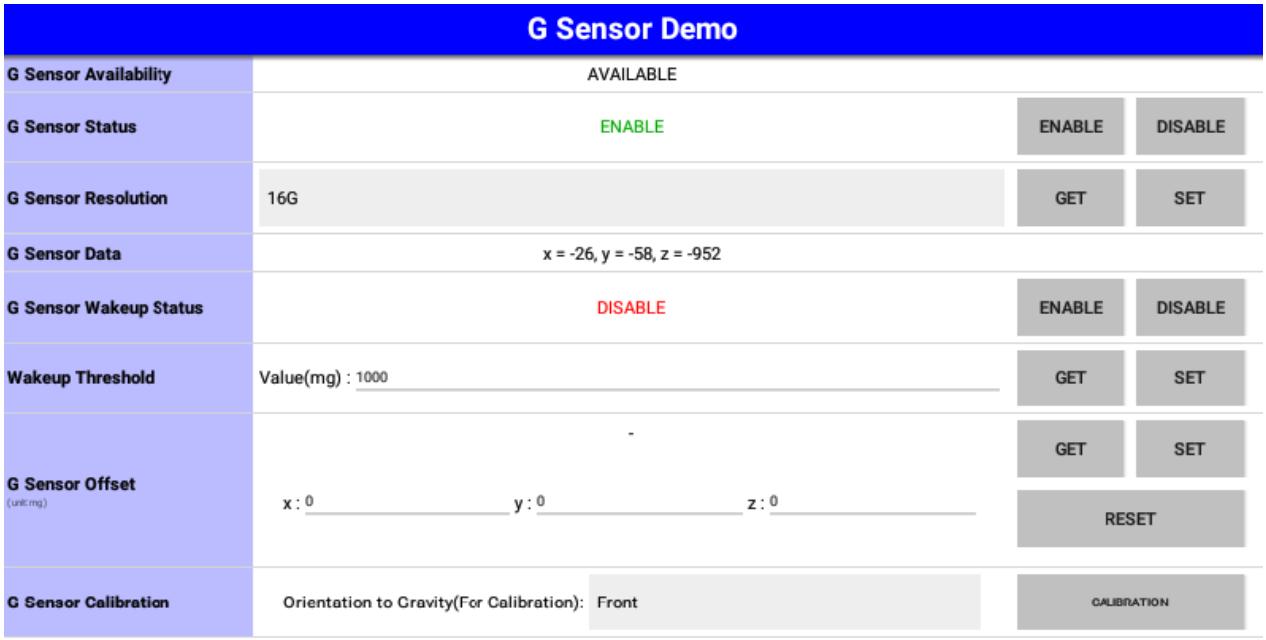
This page demonstrates the G Sensor APIs.

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)

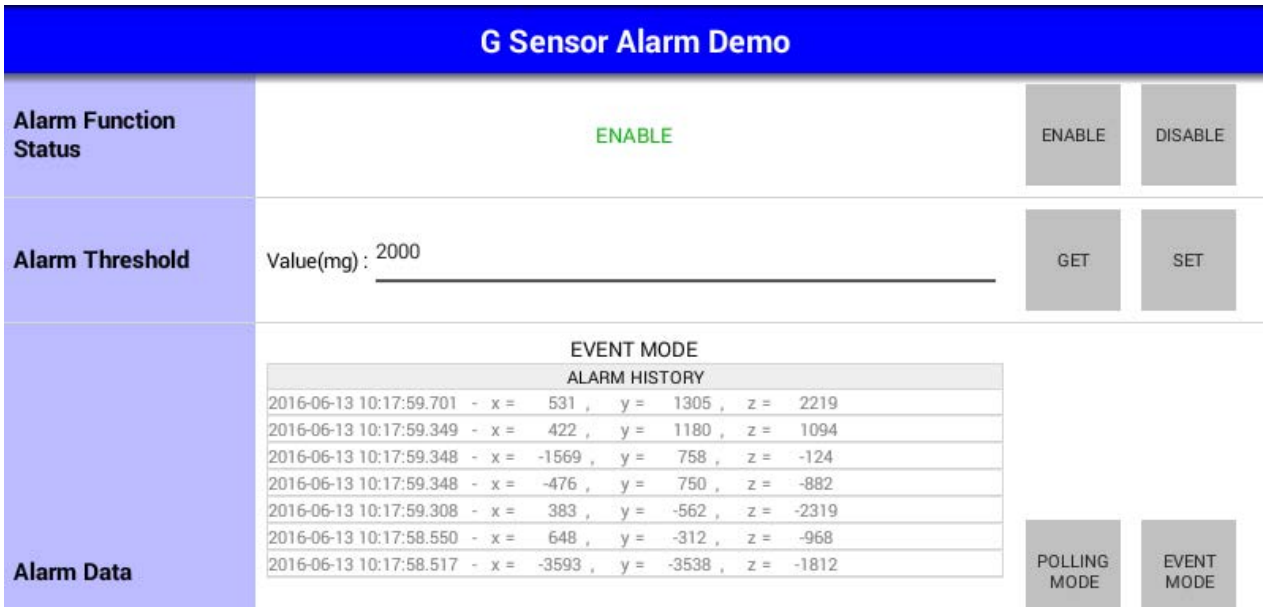


6.10 G Sensor Alarm

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"

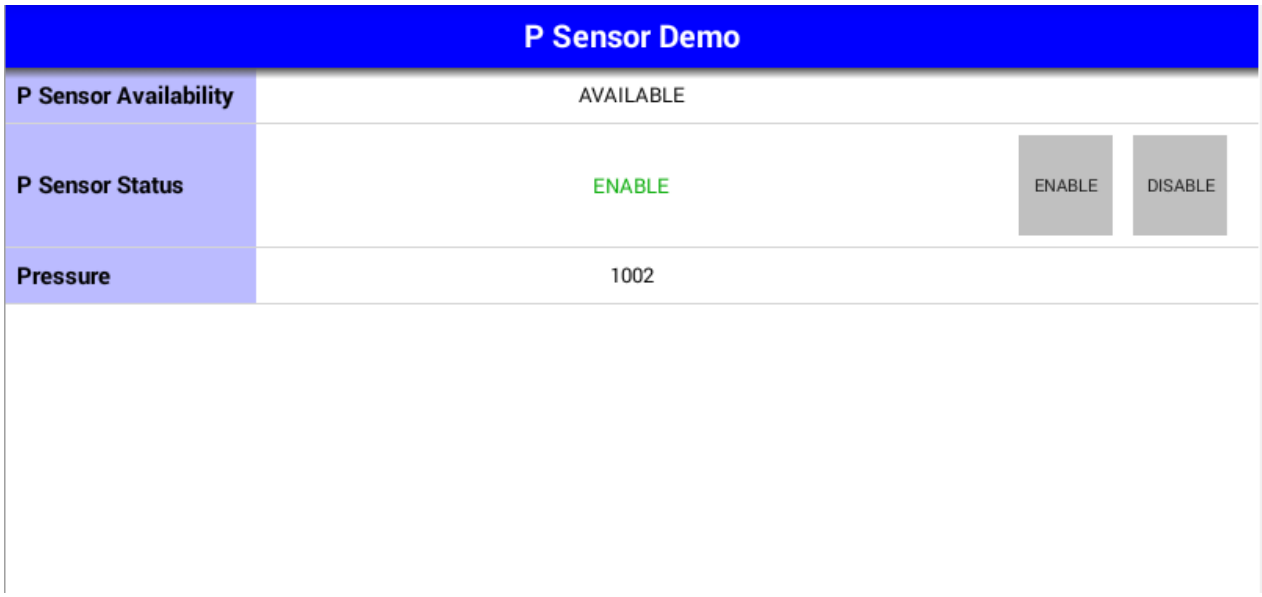


6.11 P Sensor

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.

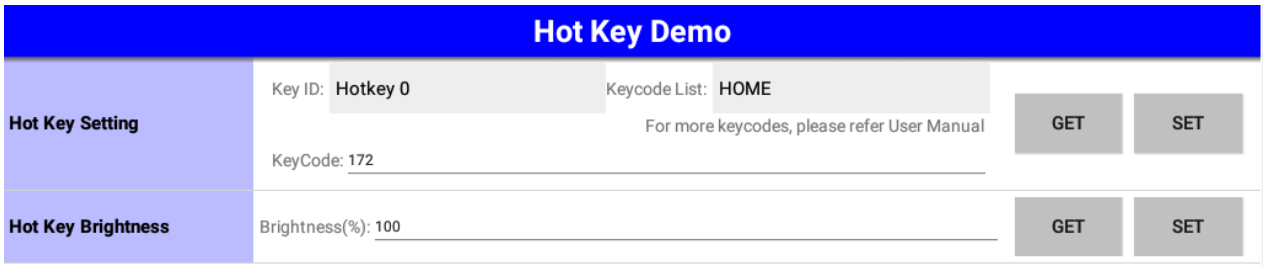


6.12 Hotkey

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.



7 VCIL Demonstration

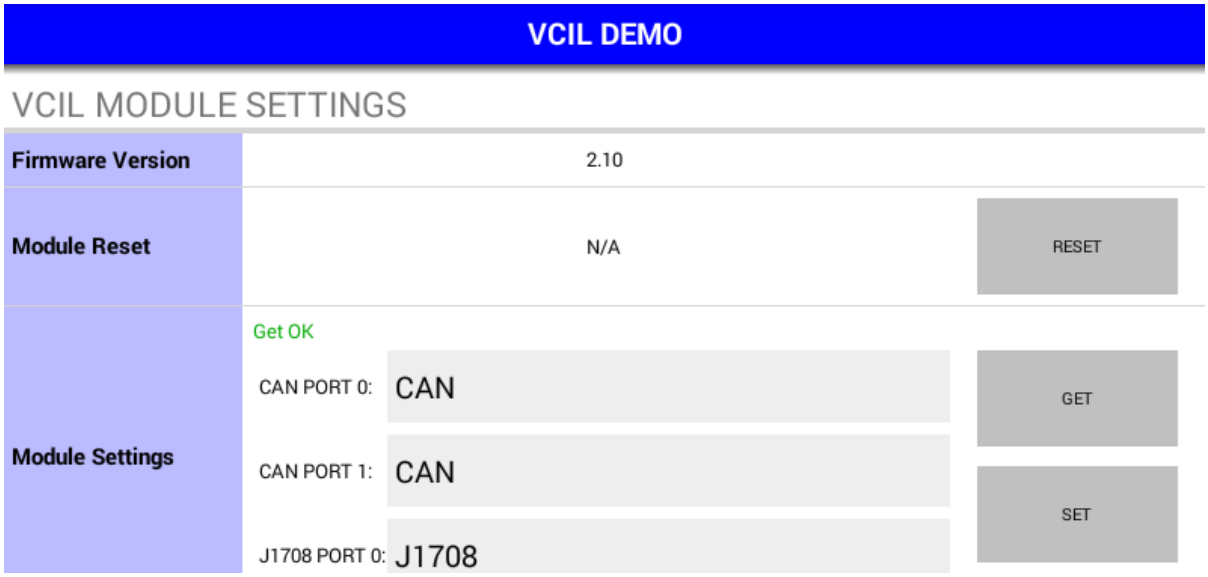
The VCIL sample APP (VCILSample.apk) demonstrates the usage of VCIL APIs.

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.



VCIL DEMO

Module Settings	CAN PORT 0:	CAN	GET
	CAN PORT 1:	CAN	SET
	J1708 PORT 0:	J1708	

VCIL DEMO FUNCTION

CAN	J1939	ODB2
J1708	J1587	

7.1 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**

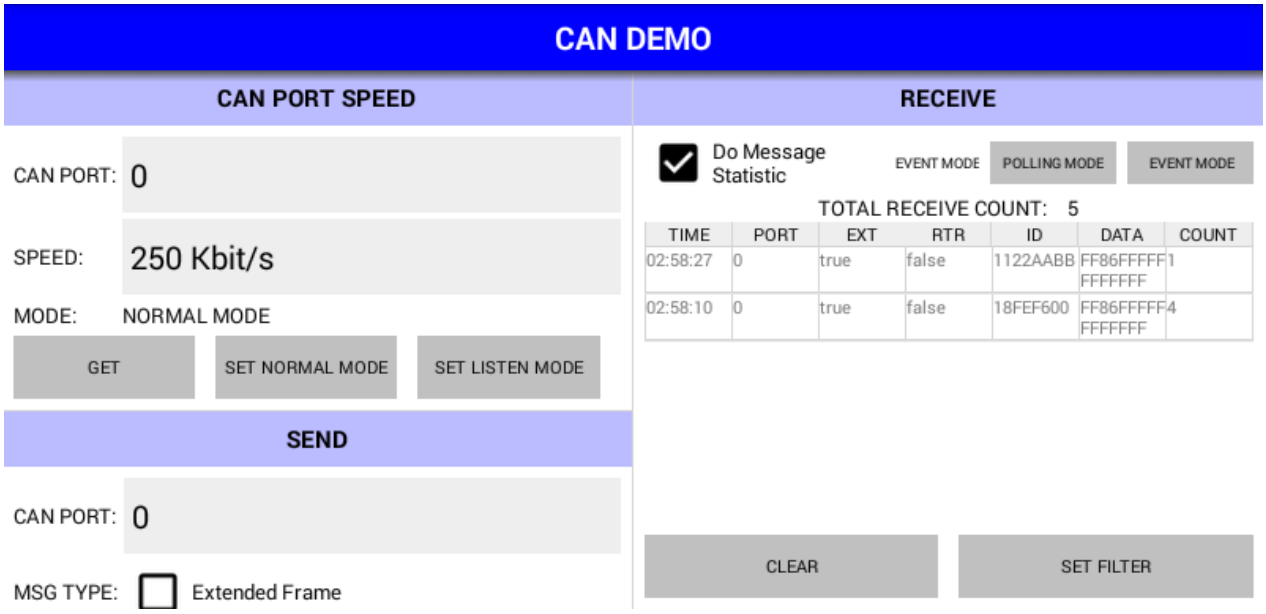
  In the "RECEIVE" area, all received CAN messages will be categorized and shown in the list view. The messages from the same CAN port with same CAN message ID will be updated to the same row in the list view and the "COUNT" column will increase.

  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.


CAN DEMO
CAN PORT SPEED
CAN PORT: 0
SPEED: 250 Kbit/s
MODE: NORMAL MODE
GET
SET NORMAL MODE
SET LISTEN MODE
SEND
CAN PORT: 0
MSG TYPE: Extended Frame
RECEIVE
Do Message Statistic
EVENT MODE
POLLING MODE
EVENT MODE
TOTAL RECEIVE COUNT: 5
TIME PORT EXT RTR ID DATA COUNT
02:58:27 0 true false 1122AABB FF86FFFFFFFFFFFF 1
02:58:10 0 true false 18FEF600 FF86FFFFFFFFFFFF 4
CLEAR
SET FILTER

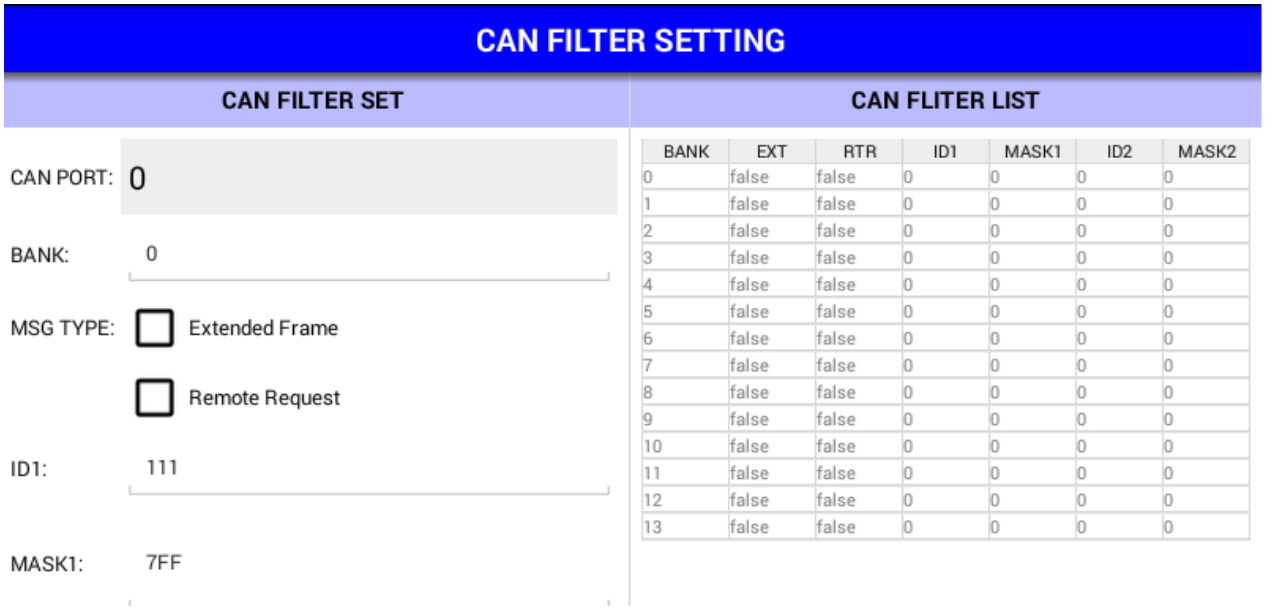
7.2 CAN Filter

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.



7.3 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.

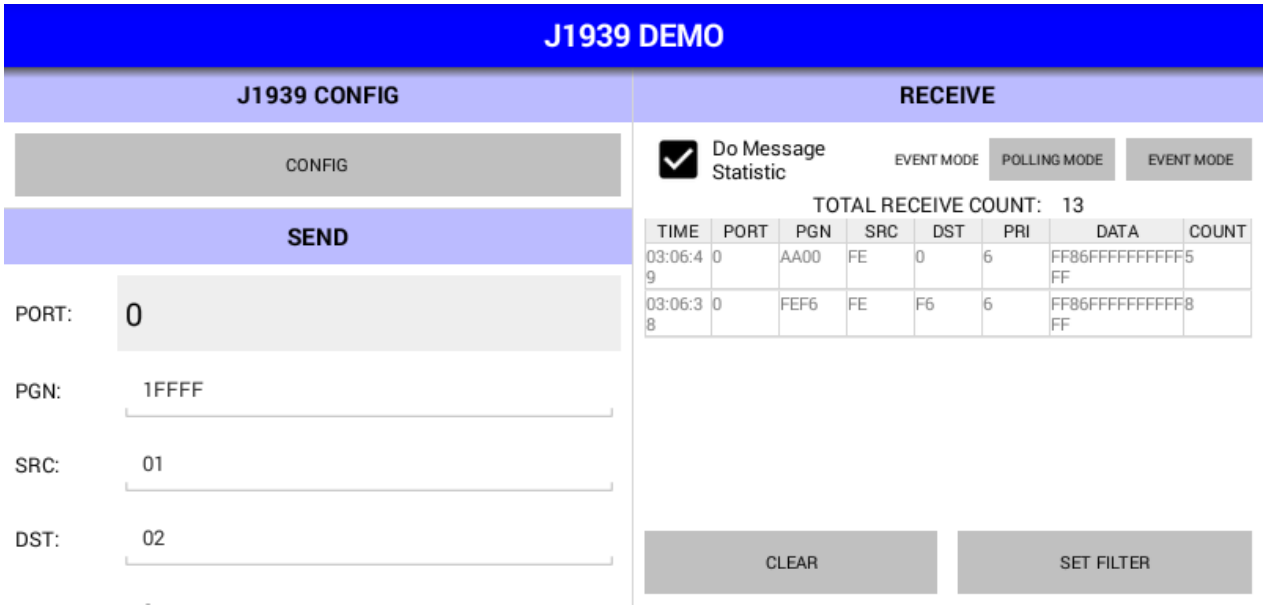
- **J1939 Message Sending**
  In the "SEND" area, you can set the contents of a J1939 message and press "SEND" button to send the message to CAN bus.

- **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.

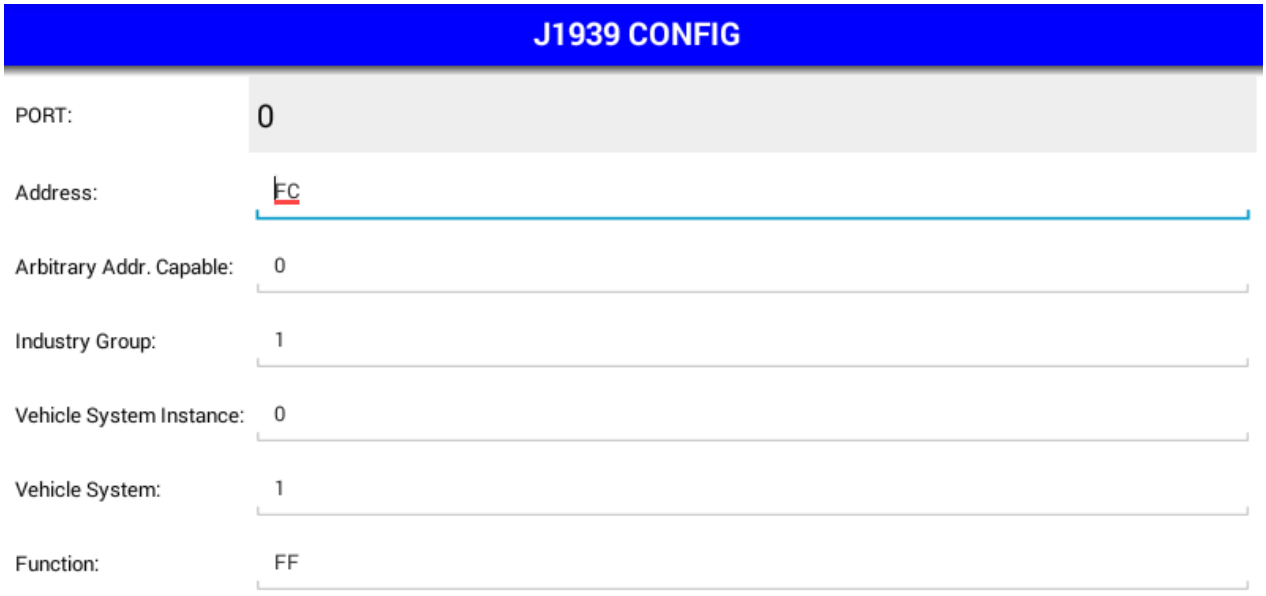
2. You must set the CAN port speed properly or the sending and receiving function in CAN, J1939, OBD2 demo page will not be operational.


J1939 DEMO
J1939 CONFIG
CONFIG
SEND
PORT:
0
PGN:
1FFFF
SRC:
01
DST:
02
RECEIVE
Do Message Statistic
EVENT MODE
POLLING MODE
EVENT MODE
TOTAL RECEIVE COUNT: 13
TIME PORT PGN SRC DST PRI DATA COUNT
03:06:49 0 AA00 FE 0 6 FF86FFFFFFFFFF 5
03:06:38 0 FEF6 FE F6 6 FF86FFFFFFFFFF 8
CLEAR
SET FILTER

7.4 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.



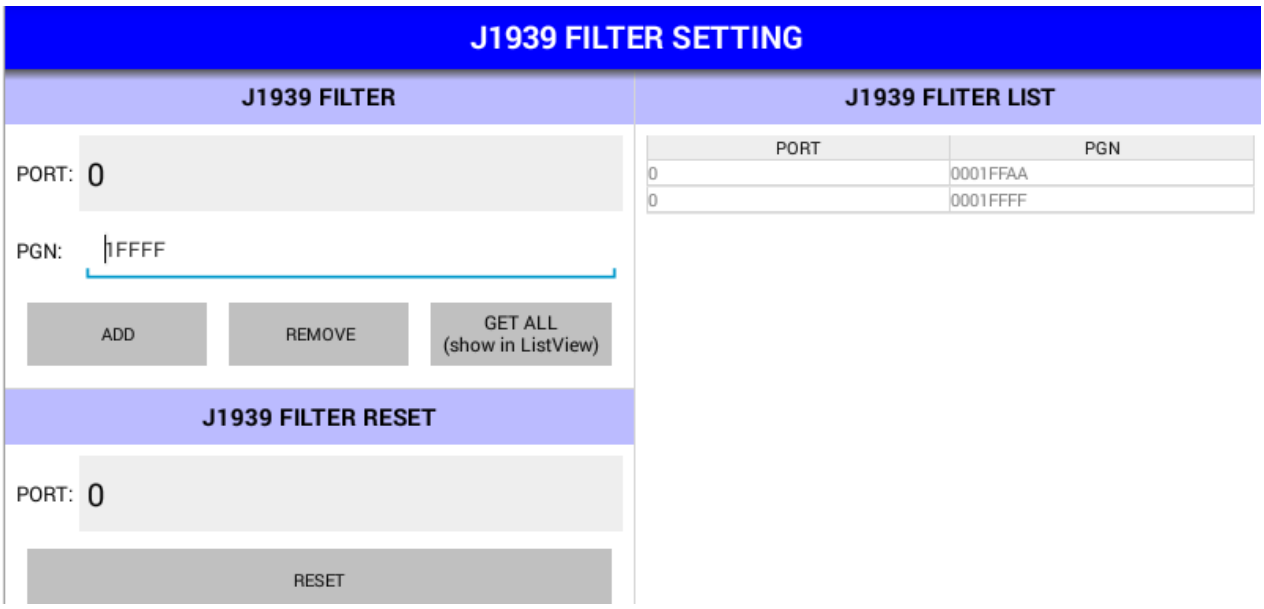
7.5 J1939 Filter

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.



7.6 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.

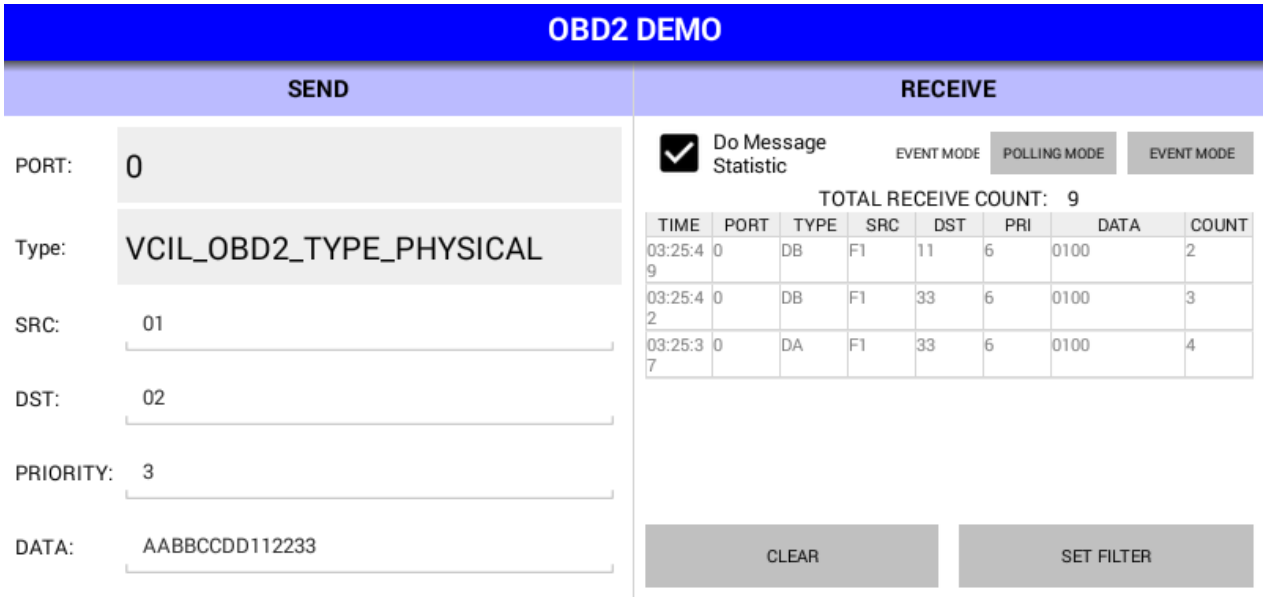
- **OBD2 Message Sending**
  In the "SEND" area, you can set the contents of a OBD2 message and press "SEND" button to send the message to CAN bus.

- **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

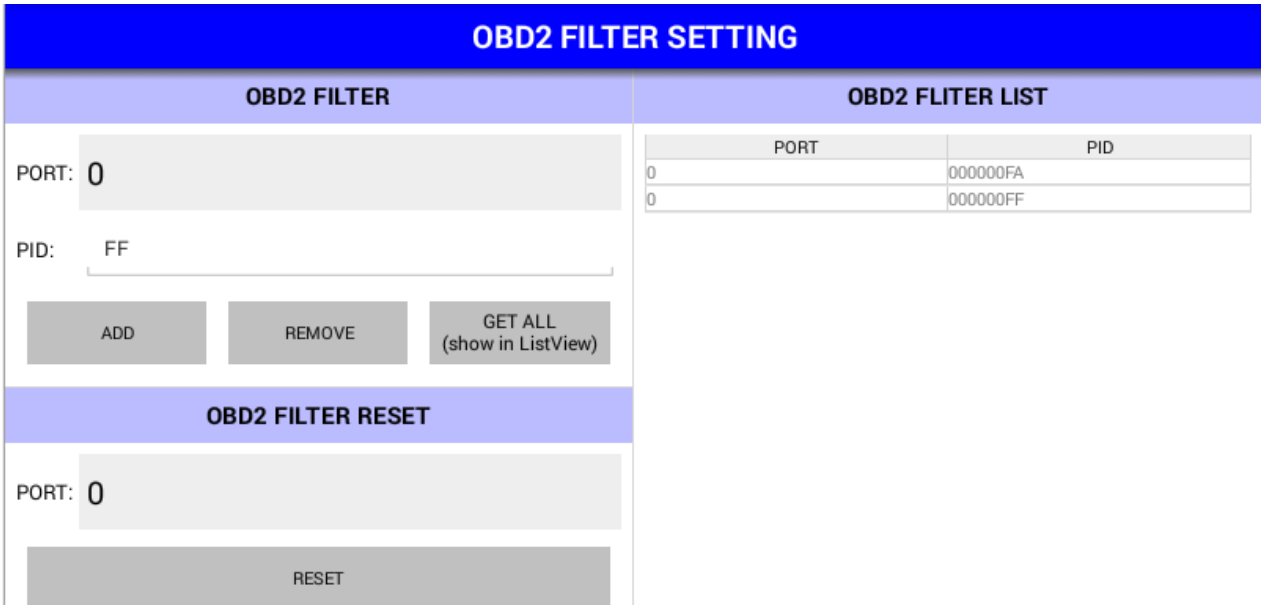
7.7 OBD2 Filter

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.



7.8 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.

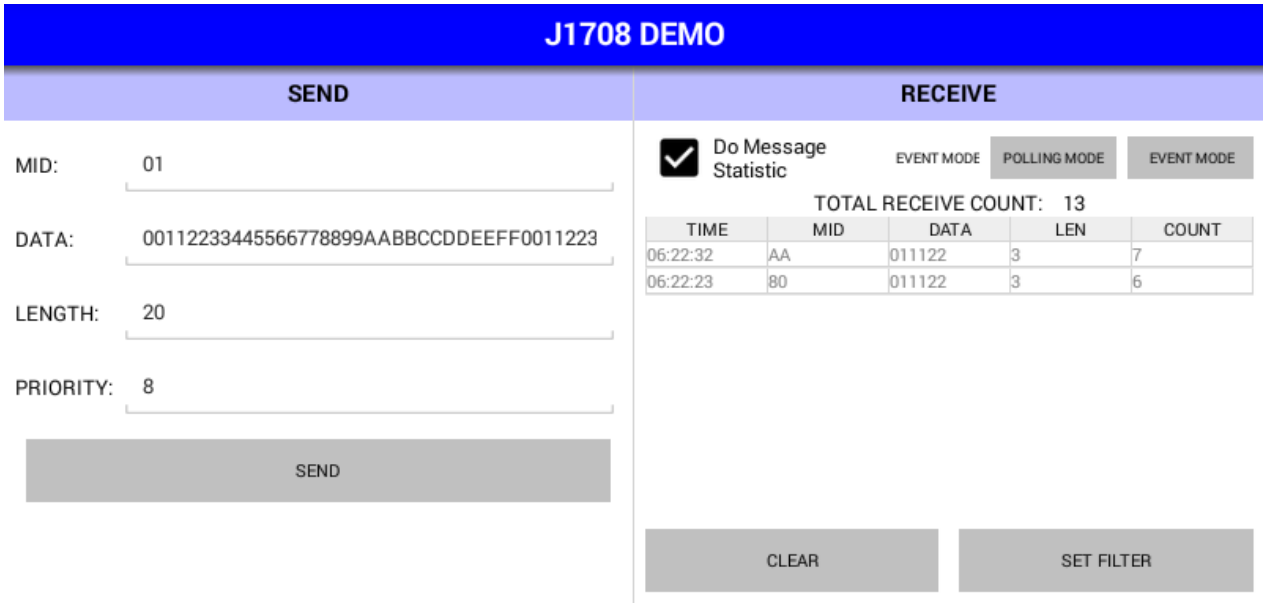
- **J1708 Message Receiving**

  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.



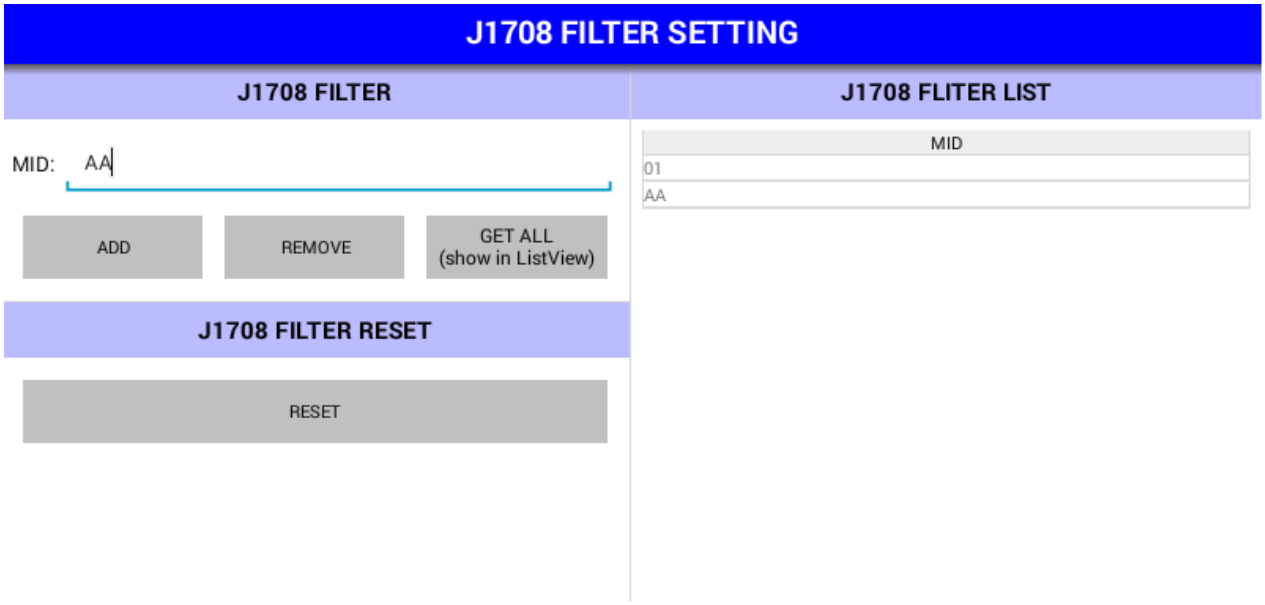
7.9 J1708 Filter

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.



7.10 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.

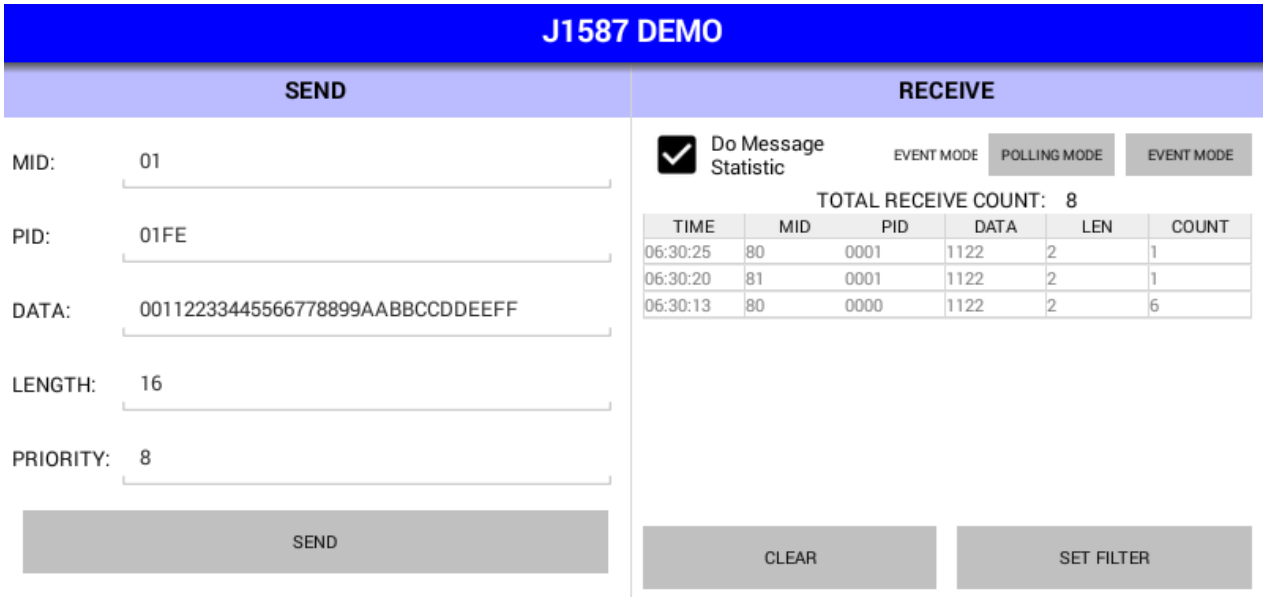
- **J1587 Message Receiving**

  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.



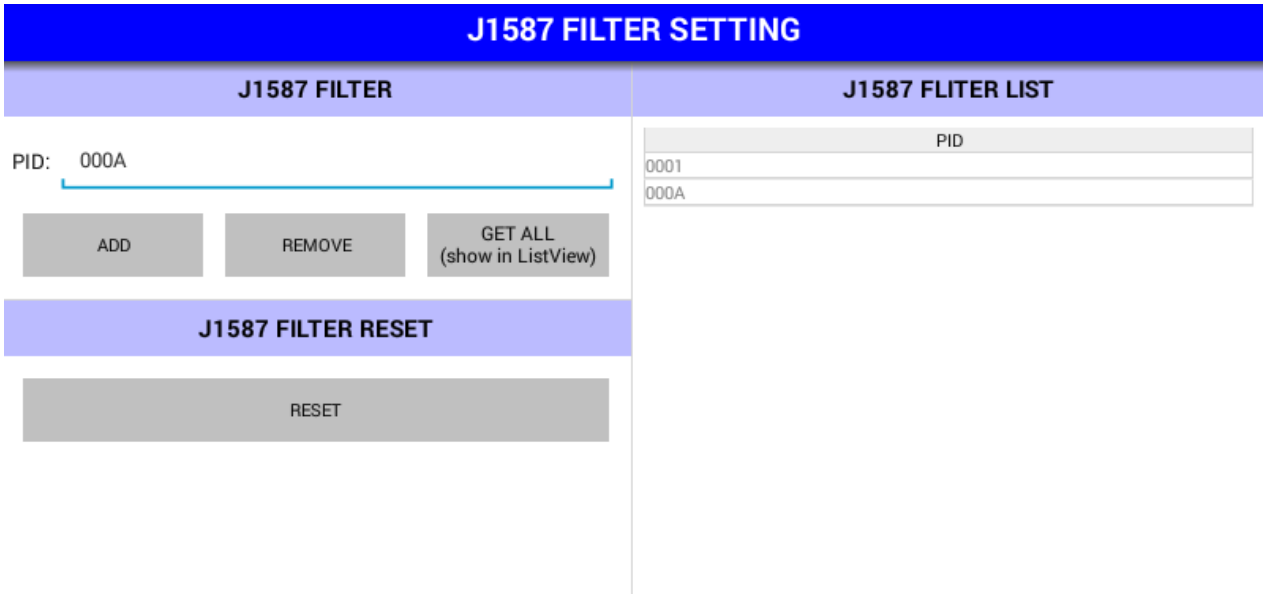
7.11 J1587 Filter

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.



8 SDP Demonstration

The SDP sample APP (SDPSample.apk) demonstrates the usage of SDP APIs. You can tap on the items in the list to start demo. The following sections show the usage guide line of basic 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.

8.1 Firmware

This page demonstrates the Firmware APIs.

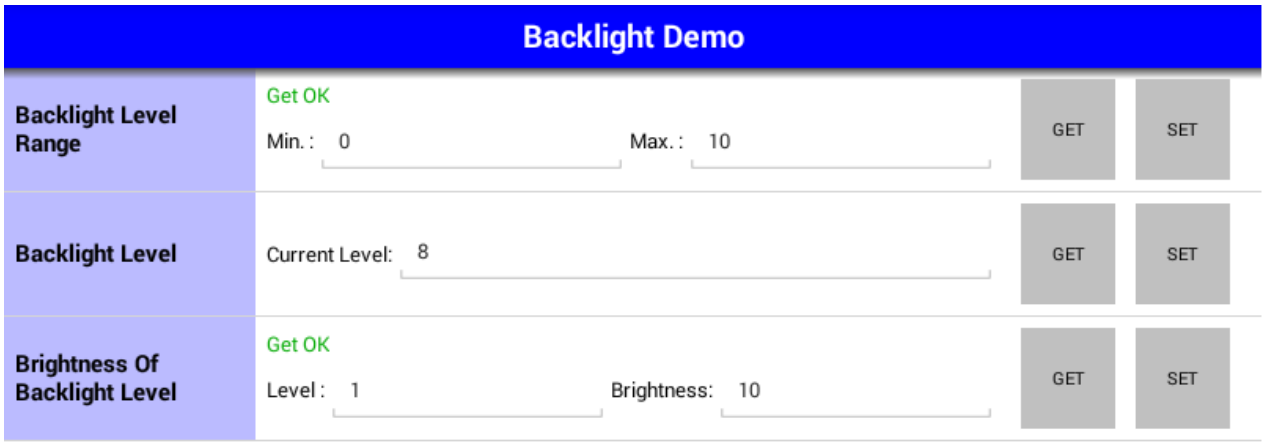
To save/load the default settings of SDP firmware, you can press the corresponding "EXECUTE" button.

Firmware Demo		
Firmware Ver.	000.006	
Firmare Save default Values	Save OK	execute
Firmware Load default Values	Load OK	execute
Firmware Reset	Reset OK	RESET

8.2 Backlight

This page demonstrates the Backlight APIs.

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

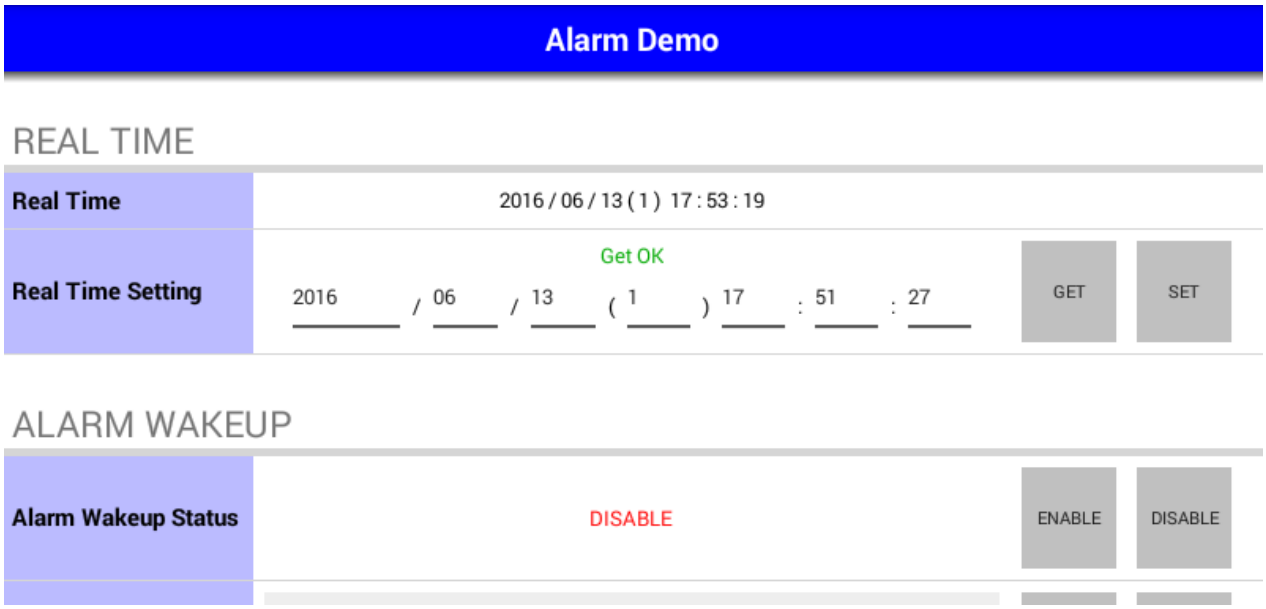


8.3 Alarm

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.



8.4 Sensor

This page demonstrates the Sensor APIs.

The light sensor status is updated periodically.

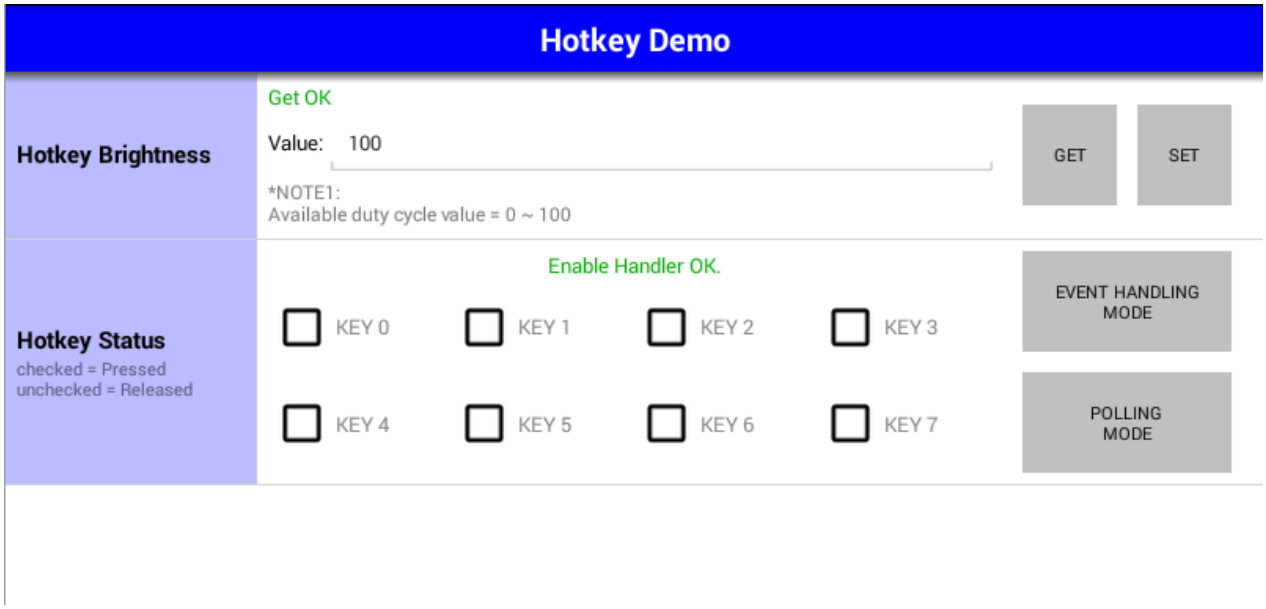
Sensor Demo	
Light Sensor (lux)	99

8.5 Hotkey

This page demonstrates the Hotkey APIs.

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

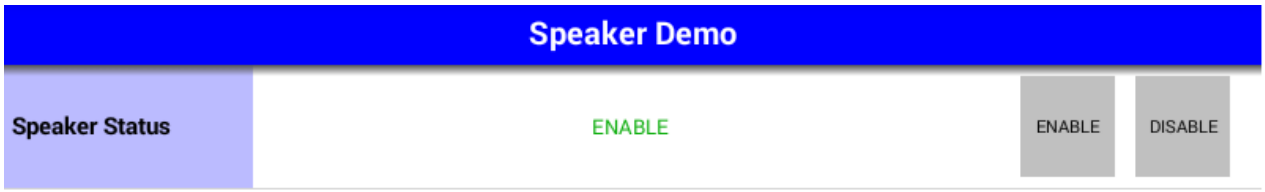
In the row of "Hotkey status", the status of each hotkey will be updated automatically to corresponding check boxes.



8.6 Speaker

This page demonstrates the Speaker APIs.

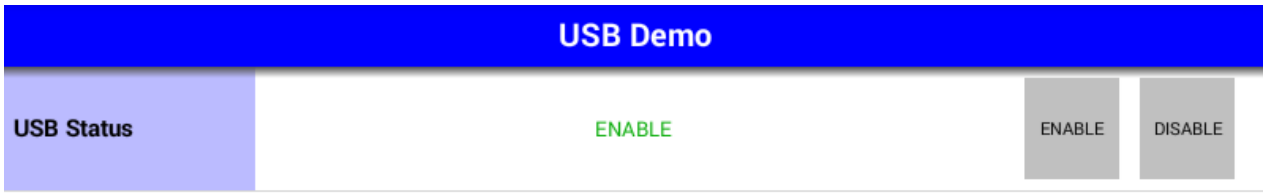
Each row shows demonstration different APIs. You can press the buttons at the right side to do corresponding demo actions.



8.7 USB

This page demonstrates the USB APIs.

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



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