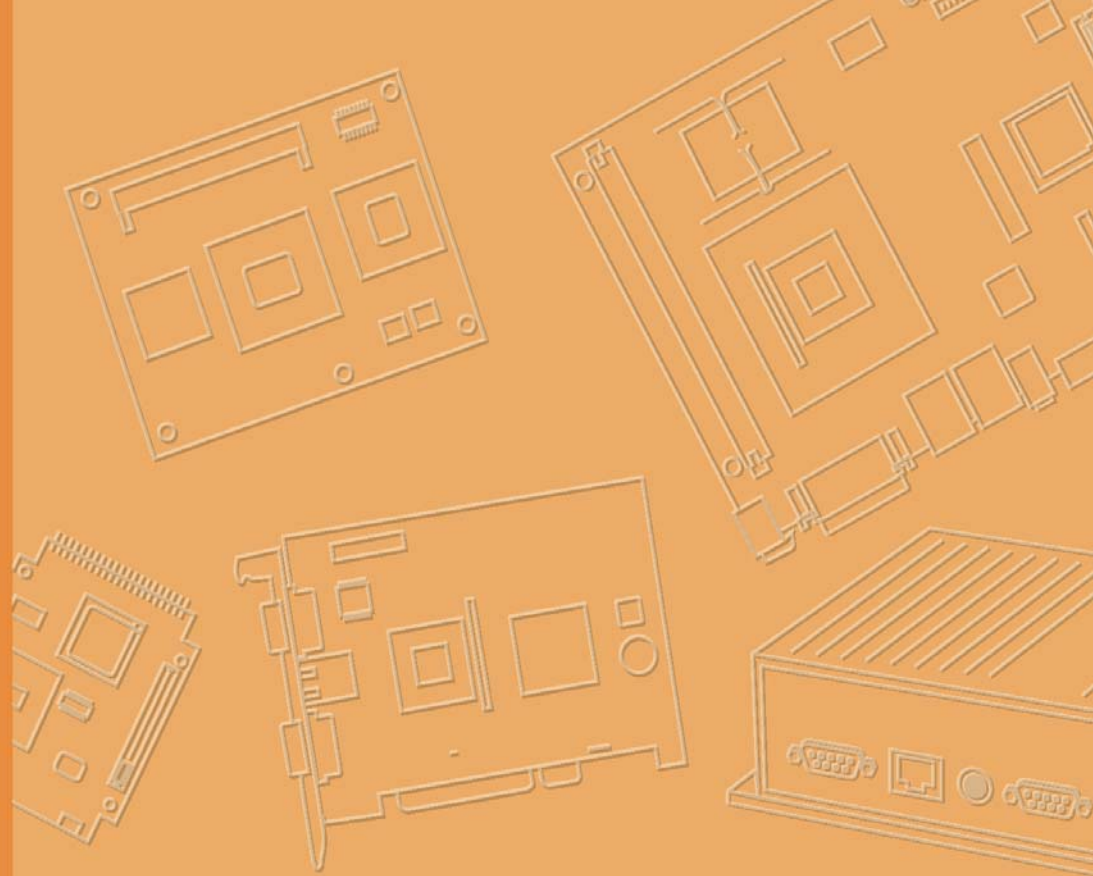# User Manual

TREK-570

Computer

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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 1
Printed in Taiwan	November 2014

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

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 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.

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:

1. This Transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This equipment complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the radiator and your body.

According to FCC 15.407(e), the device is intended to operate in the frequency band of 5.15GHz to 5.25GHz under all conditions of normal operation. Normal operation of this device is restricted to indoor used only to reduce any potential for harmful interference to co-channel MSS operations.

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.

- „   TREK-570 series In-Vehicle Computing Box
- „   USB/Audio cable clip
- „   Power cable
- „   Video in/CAN cable
- „   GIO Cable
- „   Antenna (base on order configuration request)

Ordering Information

P/N	Description
TREK-570-HWB7A0E	TREK-570 w/LTE(EU)/GPS/WLAN/BT/WES7
TREK-570-HWB7B0E	TREK-570 w/LTE(USA)/GPS/WLAN/BT/WES7

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 70° C (158° F), it may damage the equipment. Operating temperature: 50° C
8. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. 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. THE COMPUTER IS PROVIDED WITH CD DRIVES COMPLY WITH APPRO-PRIATE SAFETY STANDARDS INCLUDING IEC 60825.

```
CLASS 1 LASER PRODUCT
KLASSE 1 LASER PRODUKT
```
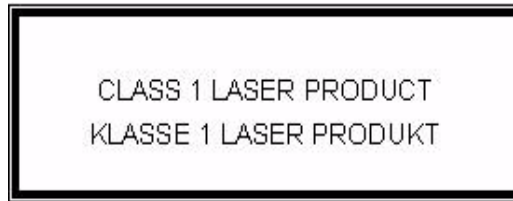
18. This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:

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

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

19. 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.

20. 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.

21. 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.

22. Caution text concerning lithium batteries:

```
ADVARSEL!
Lithiumbatteri - Eksplosionsfare ved fejlagtig
håndtering.

Udskiftning må kun ske med batteri af samme
```

23. "Rack Mount Instructions - The following or similar rack-mount instructions are included with the installation instructions:

    A) Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

    B) Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

    C) Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

    D) Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on over current protection and supply wiring. Appropriate consid-

eration of equipment nameplate ratings should be used when addressing this concern.

E) Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips)."

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 CPU card or other cards while the PC 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.

Warning!   1.   *Input voltage rated: 6 ~ 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.   *CompactFlash: Turn off the power before inserting or removing CompactFlash storage cards.*

European Contact Information:

Advantech Europe GmbH Kolberger Straße 7
D-40599 Düsseldorf, Germany
Tel: 49-211-97477350
Fax: 49-211-97477300

Contents

Chapter 1

General Information

This chapter gives background information on the TREK-570 In-Vehicle Computing Box.

Sections include:

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

1.1 Introduction

TREK-570 is a compact and economical vehicle-grade, Intel Atom E3826 SOC empowered computing box mainly designed for fleet management market. It can work in extreme environments with features like the wide working temperature range (-30-70℃) and anti-shock/vibration to pass MIL-STD-810G and 5M3 standard. Its special power protection surges from impacting the system. guarding against damage from transient card power.

TREK-570 combined with variety of I/O connectors can be connected to devices like TPMS (Tire Pressure Monitoring System), Rear view Camera (for parking monitoring) and CAN Bus devices. It has dual CAN BUS ports and support several kind of vehicle protocols (e.g. J1939.OBD-II/ISO 15765) for vehicle diagnostics and ion (WWAN, WLAN,BT) /cargo information back l dual display/dual audio ent applications to other to passenger to IVI
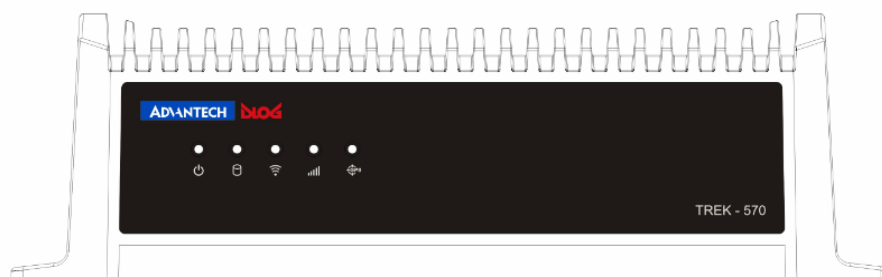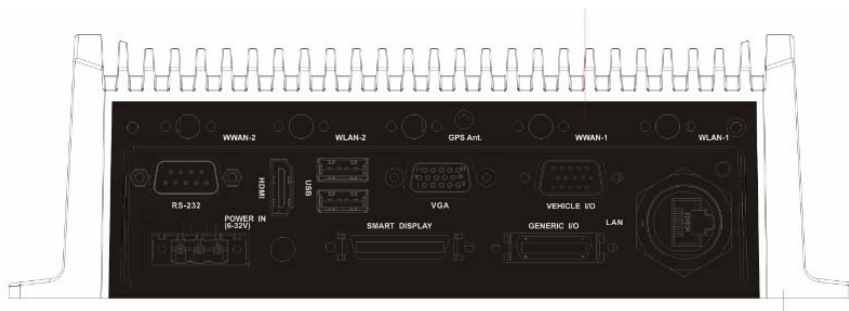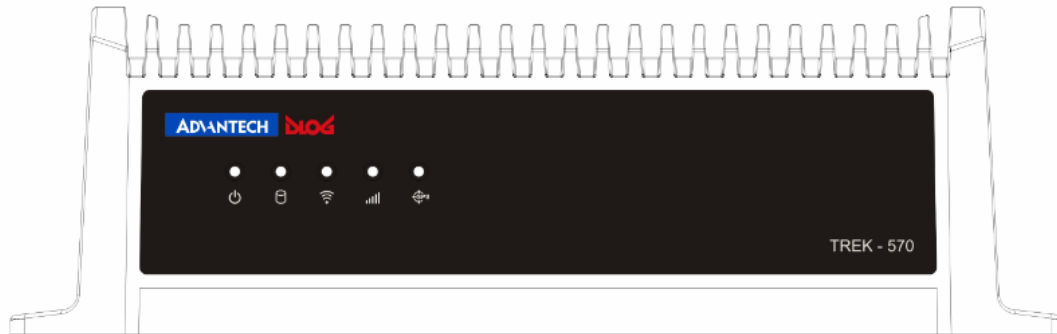
1.2 General Specifications

Key features

,, Automotive grade working temperature range (-30° C to 70° C)

,, Rich I/O including CAN, LAN, RS-232, RS-485, J1708, isolation 4DI/4DO, Line out, Mic in, USB, and Video-in

,, Built-in GSM/GPRS/LTE (support dual SIM Cards)/GNSS/BT and WLAN

,, Certifications: CE/FCC/e-mark, MIL-SD810F, ISO 7637-2, SAE J1455, SAE J1113 regulations

,, Dual independent display/audio output for both driver and passenger

,, Ignition on/off delay; SW controllable for car power management

Specifications

,, **Dimensions:** (W x H x D): 229.6 x 71 x 117.9 mm

,, **Weight:** 2 kg

,, **Vehicle power feature:**

   – Input voltage: 6 ~ 32 Vdc, support ignition cold crank

   – Supports Ignition on/off

   – Supports low battery shut-down protection threshold (optional)

   – Supports power off event delay

   – Supports power on delay

   – Supports power low delay

   – Supports power low hard delay

   – Supports hard off delay

> *Note!*
>
> *For more detail of function please refer to Chapter 6, Section 6.3 of this manual.*

,,

,, **CPU:** Intel Atom E3826(Dual Core, 1.46GHz)

,, ,, **BIOS:** 4MB Flash BIOS, ACPI Compliant.

,, **System memory:** One SODIMM sockets, accepts up to 4GB DDR3L1066 SDRAM

,, **Storage:** One mSATA slot, support system boot up

,, **Serial ports:** Two CAN Bus
                     Two 4-wire RS232,1 x RS485, 1 x J1708 ports

,, **Universal serial bus (USB) port:** one USB3.0 Type A, one USB 2.0 Type A

,, **LAN port:** 1 x 10/100/1000 Ethernet by RJ45

„

Storage:
1x Mini PCI express bus expansion slot for m-SATA: SATA rev2.0 bus
Video output:
1 X LVDS output by Smart Display port
1 x VGA output by DB-15
1 x HDMI output by HDMI 19pin Receptacle
*note: 2 of 3 video output can be displayed simultaneously in BIOS or OS.

Video in: 1 x composite video input (for rear view
monitor) by BNC connector on Generic IO cable

„ **Mini PCI express bus expansion slot:** Accepts full size mini PCIe bus card.

Mini PCI express bus expansion slot for WWAN: support dual SIM card switch

Watchdog timer: Supports 0-255 sec. time intervals, SW programmable and SW enable/disabled.

„ **RTC Battery:** 3.0 V @ 200 mAH lithium battery.

„ **Power management:** Supports power saving modes including Normal/ sus-
pend-to-disk modes.

„ **Digital I/O:** Isolated 4 digital input and 4 digital output

„ **CAN/J1939 bus:** Support CAN V2.0B up to 1 Mb/s, by DB-9 connector on Vehicle
I/O cable

ODBII bus: up to 500kbps, by DB-9 connector on Vehicle I/O cable

J1708 bus: 9600 bps, by DB-9 connector on Vehicle I/O cable

. **GNSS (Ublox MAX-M8Q/W):** GPS, GLONASS, BEIDOU

„ **Audio:** 2 audio codecs, one is for smart display, one is for TREK-570 line out
and mic in phone jack by Generic I/O cable.

RS-485: up to 115200 bps by Generic I/O cable.

„ **Optional modules:**
RF:

WLAN+BT (Sparklan WEPA-251N(BT)): IEEE802.11a/b/g/n MIMO +Bluetooth V4.0

WWAN (Sierra Wireless MC7304/54): Quad-band GSM/GPRS, HSDPA+,
CDMA2000, LTE

„ **PCI Express Bus Ethernet Interface:** Ethernet: support 1000/100/10Base-T
auto-sensing capability.

„ **Operating temperature:** -30 ~ 70° C

„ **Relative humidity:** 10 ~ 95% @ 40° C (non-condensing)

„ **Shock:** 30 G peak acceleration (11 msec duration)

„ **Certifications:** CE, FCC, CCC, Emark

„ **Vibration:** 5 ~ 500 Hz SAE J1455 4.9.4.2, MIL-STD-810F 514.5

1.3 Dimensions

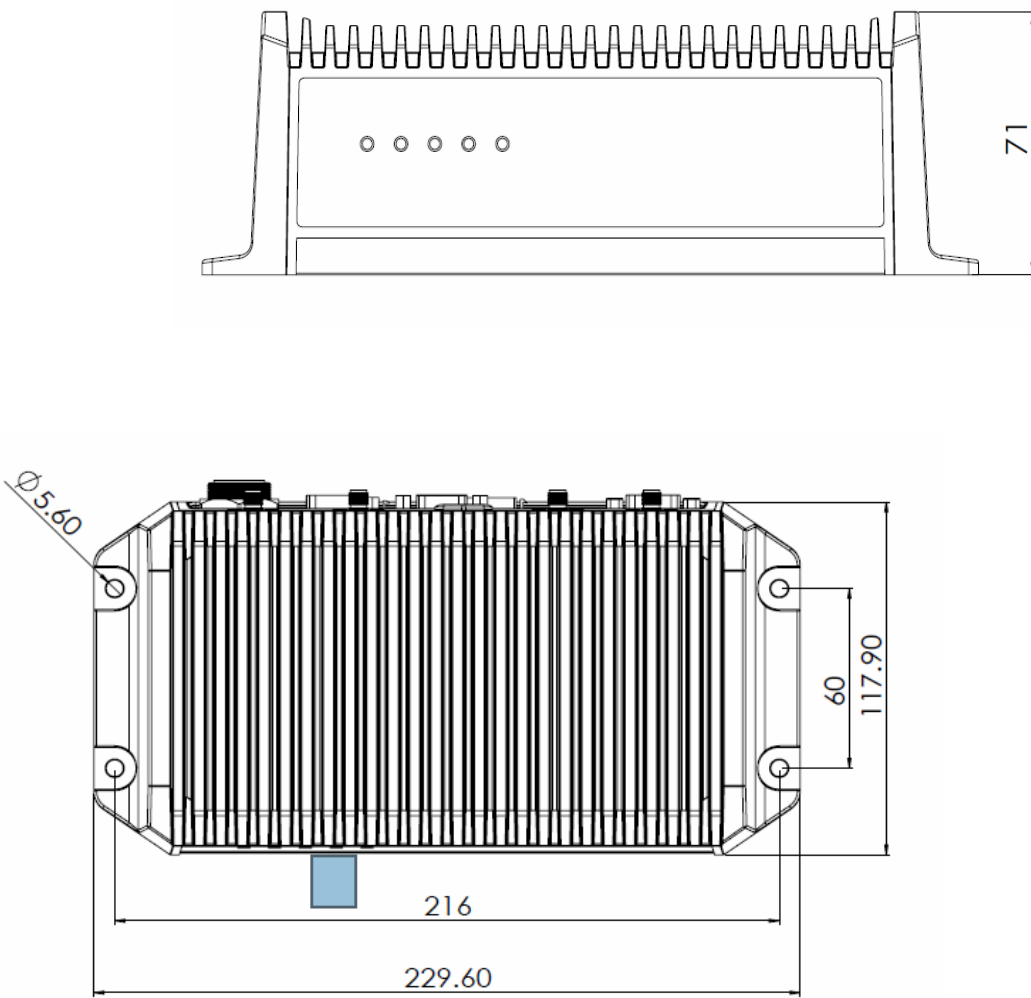**Figure 1.1 TREK-570 dimensions**

Chapter 2

System Setup

This chapter details system setup on TREK-570

Sections include:

- „ A Quick Tour of the Computer Box
- „ Installation Procedures
- „ Running the BIOS Setup Program

a moment to become
, connectors and ports,
er box is placed inside
driver, its front appears

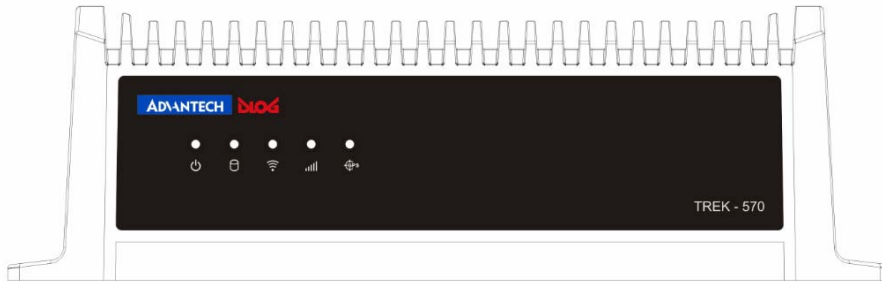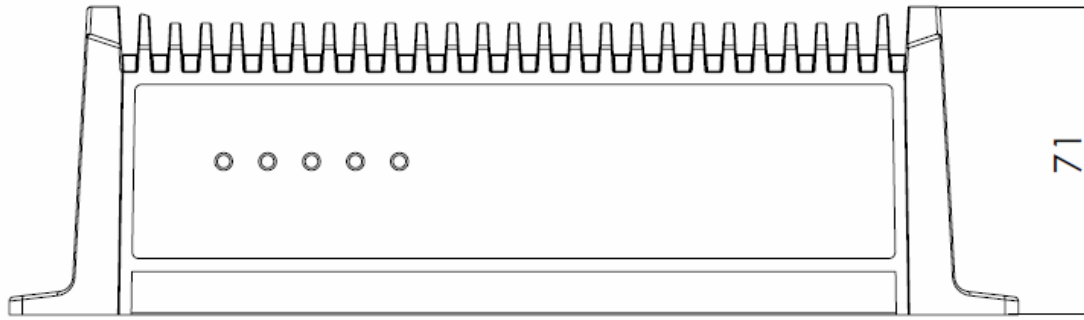**Figure 2.1 Front view of TREK-570**

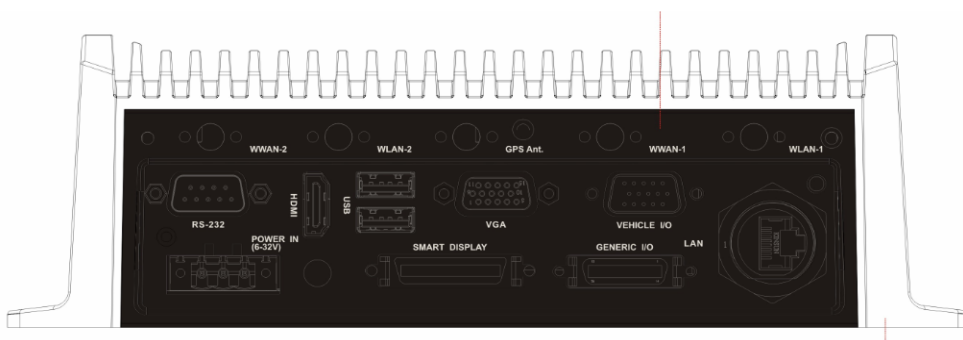**Figure 2.2 Rear view of TREK-570**

2.2 HW Installation Procedures

2.2.1 Connecting the Power Cord

Connect the three pin waterproof power cord to the DC inlet of the In-Vehicle 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-550 A2 supports an ignition on/off function so that you can power on/off the TREK-550 A2 via the ignition signal/volt-*
> *age and connect the TREK-550 A2 vehicle ignition switch.*

Table 2.1: Pin Definition of Power Cord		
Pin	**Definition**	**Color**
1	+	Red
3	-	Black
4	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 (6~36VDC;18~58VDC)
3	Acc Ignition Input		

2.3 Booting up the System

In most cases, the computer will have been properly set up and configured by the dealer or SI prior to delivery. However, it may still be necessary to adjust some of the computer's BIOS (Basic Input-Output System) setup programs to change the system configuration data, like the current date and time, or the specific type of hard drive currently installed.

The setup program is stored in read-only memory (ROM). It can be accessed either when turning on or resetting the computer, by pressing the "Del" key on the keyboard immediately after powering up the computer.

The settings that are specified with the setup program are recorded in a special area of the memory called CMOS RAM. This memory is backed up by a battery so that it will not be erased when turning off or resetting the system. Whenever the power is turned on, the system reads the settings stored in CMOS RAM and compares them to the equipment check conducted during the power on self-test (POST). If an error occurs, an error message is displayed on screen, and the user is prompted to run the setup program.

Chapter **3**

Hardware & Peripheral Installation

This chapter details the installation of hardware for TREK-550 A2.

Sections include:

,, Overview of Hardware Installation and Upgrading

,, Installing the Storage Device and Memory

,, Installing Optional Accessories

,, Fuse

3.1 Overview of Hardware Installation & Upgrading

The In-Vehicle Computing Box consists of a PC-based computer that is housed in a ruggedized aluminum enclosure. Any maintenance or hardware upgrades can be completed after removing the bottom cover plate.

Warning! Do not remove the ruggedized aluminum covers until verifying that no power is flowing within the computer. Power must be switched off and the power cord must be unplugged. Take care in order to avoid injury or damage to the equipment.

3.2 Installing the Storage Device and Memory

The In-Vehicle Computing Box can only use a mSATA as a storage device. Put the mSATA into the slot and insert the RAM into the 200-pin SODIMM socket on the main board.

3.3 Installing Optional Accessories

Optional accessories, like RAM mount kits or other functional modules are available for purchase to complement TREK-570. The following are instructions for accessory installation.

3.3.1 Installing TREK-570 Peripheral Modules

There are 6 screws on the bottom of TREK-550 A2, if you want to install the peripherals in TREK-550 A2, please use M2 type screw to open the system.

`

Figure 3.1 Install peripheral in the system

3.3.3 installing the MiniPCI Type WWAN, SIM Card and Coin Battery

The WWAN module is on the Mini PCI slot can be easily installed, just undo the 6 screws from the bottom cover to install WWAN, SIM card, and battery.

3.3.4 GPS Module

The GPS module is not to be installed by the customer with breaking the warranty.

3.4 Paired with TREK-303 Specifications

See Appendix A

TREK-550 A2 provides both VGA function and LCD to connect with TREK-303, it can output different content, clone to VGA output

Chapter 4

Jumper Settings and Connectors

This chapter explains how to set up the In-Vehicle Computing Box hardware, including instructions on setting jumpers and connecting peripherals, and how to set switches and read indicators.

Be sure to read all the safety precautions before beginning the installation procedure.

Sections include:

„ Setting Jumpers and Switches

„ Jumpers Setting

4.1 Setting Jumpers and Switches

It is possible to configure the In-Vehicle Computing Box to match the needs of the application by resetting the jumpers. A jumper is the simplest kind of electrical switch. It consists of two metal pins and a small metal clip, often protected by a plastic cover that slides over the pins to connect them. To "close" a jumper, connect the pins with the clip. To "open" a jumper, remove the clip. Sometimes a jumper has three pins, labeled 1, 2, and 3. In this case, connect either pins 1 and 2, or pins 2 and 3.

JP1: Car Battery Mode

1-2	2-3
12V	24V

default: 1-2

SW1: PCIe mini card(CN22) mode select

ON	WLAN
OFF	WWAN

default: ON

SW2: WWAN voice call setting

1	2	3	4	WWAN
ON	OFF	ON	OFF	MC809x
OFF	ON	OFF	ON	MC73x4

default: ON-OFF-ON-OFF

SW3: CAN1/2 Termination

1	2	CAN1	CAN2
OFF	OFF	no termination	no termination
OFF	ON	no termination	Terminated
ON	OFF	Terminated	no termination
ON	ON	Terminated	Terminated

default: OFF-OFF

J1: CMOS

1-2	Clear CMOS
2-3	Normal

default: 2-3

SW4: WWAN Power Source Setting

1	2	3
3.3V	3.6V	3.8V

default: 2

CN11: COM port pin9 setting

1-2	2-3	4-5
+12V/0.5A	RING	+5V/0.5A

default: 2-3

Chapter 5

Pin Assignments

This chapter explains pin assignments on the TREK-550 A2.

Sections include:
- Front/side Connector
- Power Connector
- Smart Display Connector
- RS232 Connectors
- DI/DO Connectors
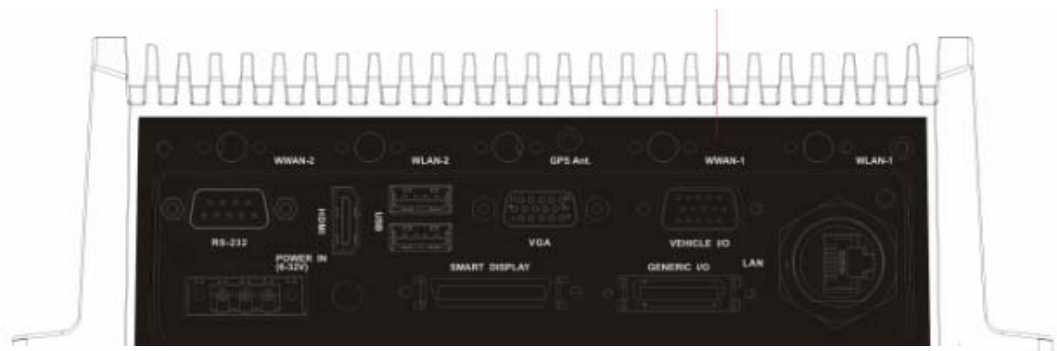
5.1 Front Side Connectors

5.2 Rear Side Connectors

Table 2.2: Power Connector			
Pin	**Signal**	**Pin**	**Signal**
1	Ground	2	Power input (6~36VDC;18~58VDC)
3	Acc Ignition Input		

Table 2.2: Power Con			
Pin	**Signal**		**Signal**
1	Ground		Power input (6~36VDC;18~58VDC)
3	Acc Ignition Input		

Table 2.2: Power Connector			
Pin	**Signal**	**Pin**	**Signal**
1	Ground	2	Power input (6~36VDC;18~58VDC)
3	Acc Ignition Input		

Pin	Signal	Pin	Signal
1	Ground	2	Power Input (6~36VDC;18~58VDC)
3	Acc Ignition Input		

5.4 Smart Display Connector
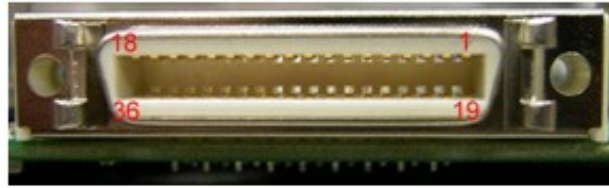
Pin	Signal	Pin	Signal
1	Backlight Enable output #	2	Panel Power Enable output #
3	LVDS Ground	4	Reset Button Input #
5	LVDS Clock +	6	LVDS Clock -
7	LVDS Ground	8	LVDS Ground
9	LVDS Data2 +	10	LVDS Data2 -
11	RS232 TXD1 #	12	RS232 RXD1 #
13	LVDS Data1 +	14	LVDS Data1 -
15	LVDS Ground	16	LVDS Ground
17	LVDS Data0 +	18	LVDS Data0 -
19	USB D-	20	USB D+
21	USB Ground	22	USB Ground
23	+12 V_{DC} output (+/- 5%, max 1A)	24	+12 V_{DC} output (+/- 5%, max 1A)
25	+12 V_{DC} output (+/- 5%, max 1A)	26	+12 V_{DC} output (+/- 5%, max 1A)
27	Power Ground	28	Power Ground
29	Power Ground	30	Power Ground
31	RS232 TXD2 #	32	RS232 RXD2 #
33	RS232 RTS2	34	Power Button Input #
35	Audio Ground	36	Mono. Line-out

5.5 RS-232 Connector (COM3, COM8)
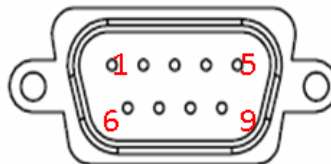
Table 5.3: Table 5.5: RS-232 / RS-485 / J1708 Connector

Pin	Signal	Pin	Signal
1	RS-232 DCD	2	RS-232 RXD
3	RS-232 TXD	4	RS-232 DTR
5	RS-232 Ground	6	RS-232 DSR
7	RS-232 RTS	8	RS-232 CTS
9	RS-232 RI / +5 V (max. 500 mA) / +V12 (max. 250 mA)		

5.6 RS-232 (COM9) / RS-485 (COM5) / J1708 (COM6) Connector
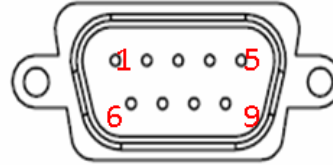
Pin	Signal	Pin	Signal
1	RS-232 RTS	2	RS-232 RXD#
3	RS-232 TXD	4	RS-232 CTS
5	Ground	6	RS-485 D-
7	RS-485 D+	8	J1708 D-
9	J1708 D+		

5.7 VIO Connector

A(DSUB15)	Define	B(Housing)
1	CAN_L	1
2	CAN_H	2
3	GND	3
4	J1708_DN	4
5	J1708_DP	5
6	NC	6
7	DGND	7
8	ODB_CAN_L	8
9	ODB_CAN_H	9
10	DGND	10
11	DR_SPEED#_R	11
12	DR_SPEED_R	12
13	DR_DIRECTION#_R	13
14	DR_DIRECTION_R	14
15	NC	15

Chapter 6

Software Demo Utility Setup

This appendix explains the software demo utility for TREK-550 A2.

Sections include:

,, Introduction

,, How to Set up Demo Utility

6.1 Introduction

To make the hardware easier to access for programmers, Advantech has developed and demo program in order to let customer test the functions on TREK-572. This document describes detailed information for each Advantech demo program so that application developers can become more familiar with using them.

For technical support, contact Advantech application engineers worldwide. For news updates, visit our website: www.advantech.com

6.1 Execute VCIL Sample Code

TREK V3 VCIL Sample Code is demonstration of Vehicle Communication Interface Layer (VCIL) which let user easily to use vehicle protocol.

6.1.1 System Menu

TREK V3 VCIL Sample Code as below figure
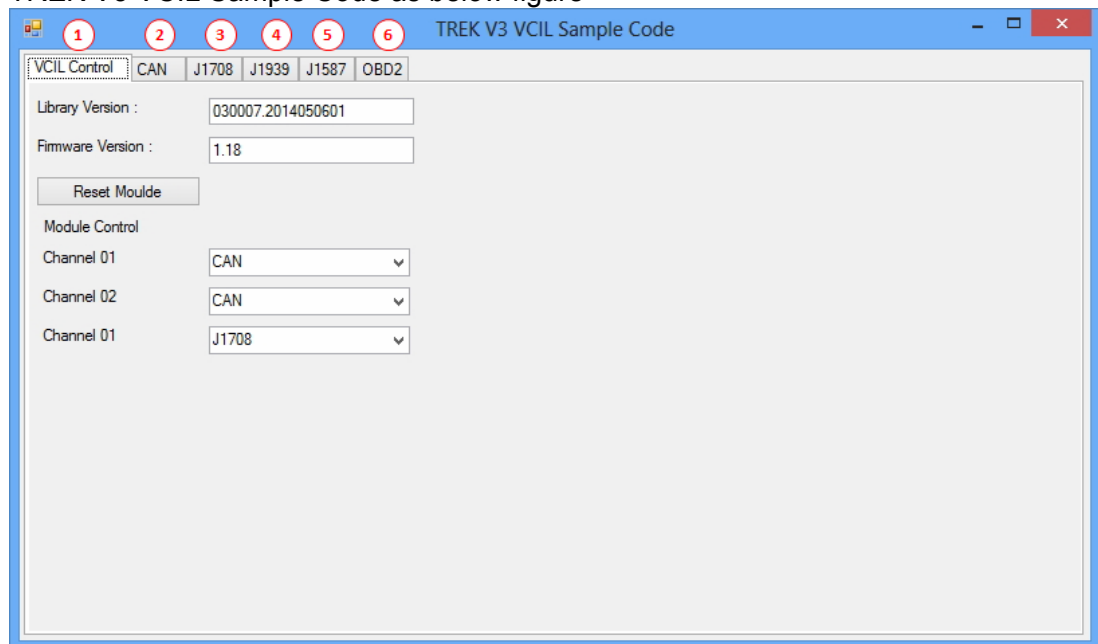
- VCIL Control page
- CAN page
- J1708 page
- J1939 page
- J1587 page
- OBD2 page

VCIL Control Page
VCIL Control page as below figure
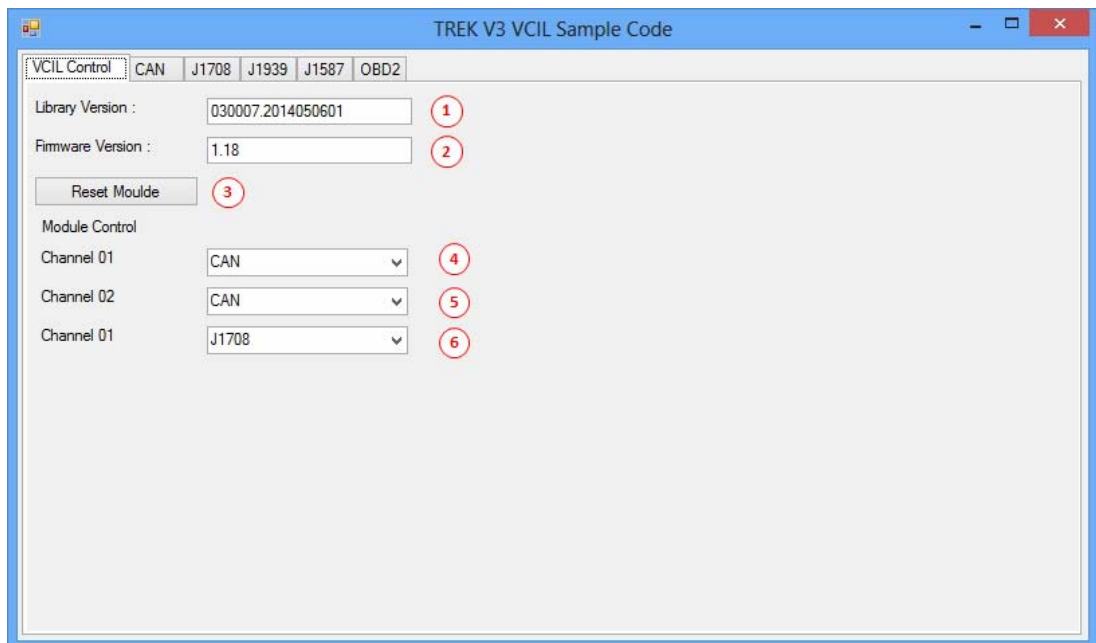
- ● Library Version
- ● Firmware Version
- ● Reset firmware to default
- ● (CAN/J1939/OBD2) Channel 1 bus type control
- ● (CAN/J1939/OBD2) Channel 2 bus type control
- ● (J1708/J1587) Channel 1 bus type control

Note: Each channel only can select one bus type at same time.
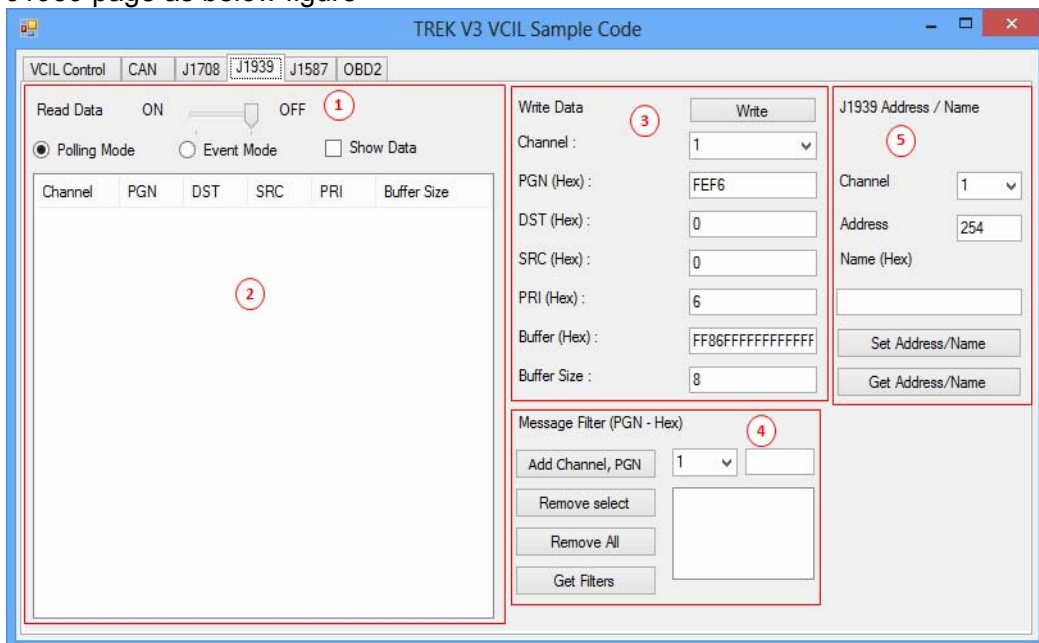
CAN Page
CAN page as below figure
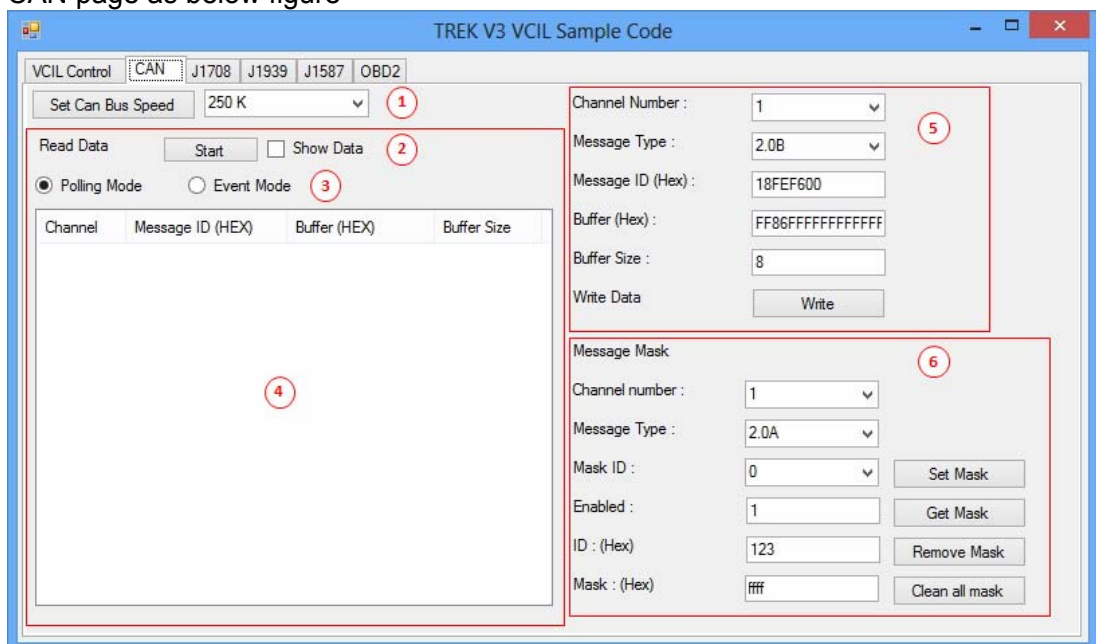
- ● Bus Speed
- ● Read Data control (Press "Start" to monitor bus to read)
- ● Read Data method
- ● Read Data list
- ● Write Data control
- ● CAN bus message mask control

J1708 Page
J1708 page as below figure
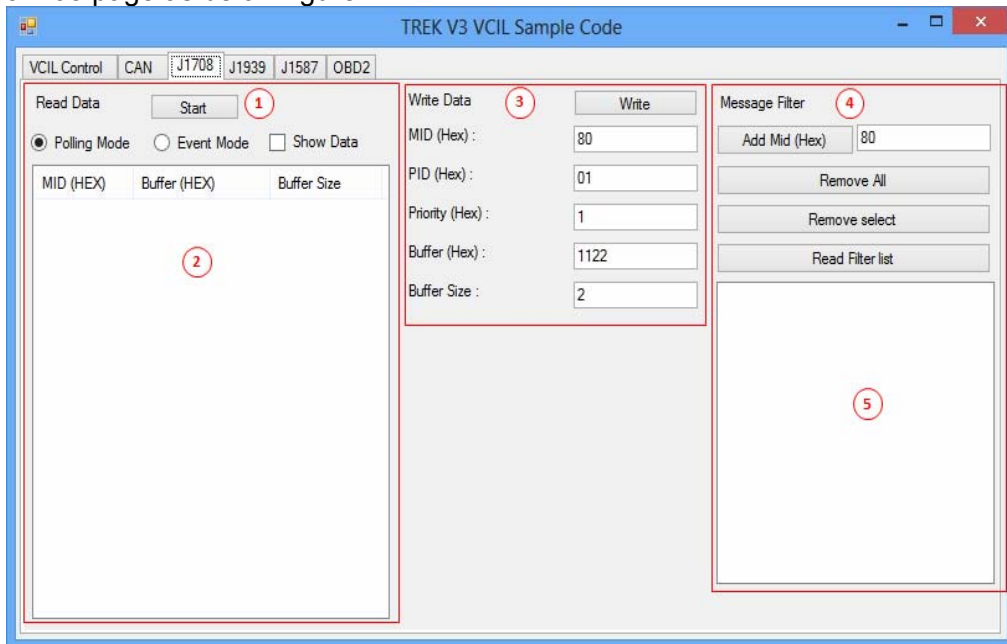
- Read Data control (Press "Start" to monitor bus to read)
- Read Data list
- Write Data control
- J1708 bus message filter control
- Message filter list


J1939 Page
J1939 page as below figure

- Read Data control (Press "Start" to monitor bus to read)
- Read Data list
- Write Data control
- J1939 bus message filter control
- J1939 Address mapping

J1587 Page
J1587 page as below figure
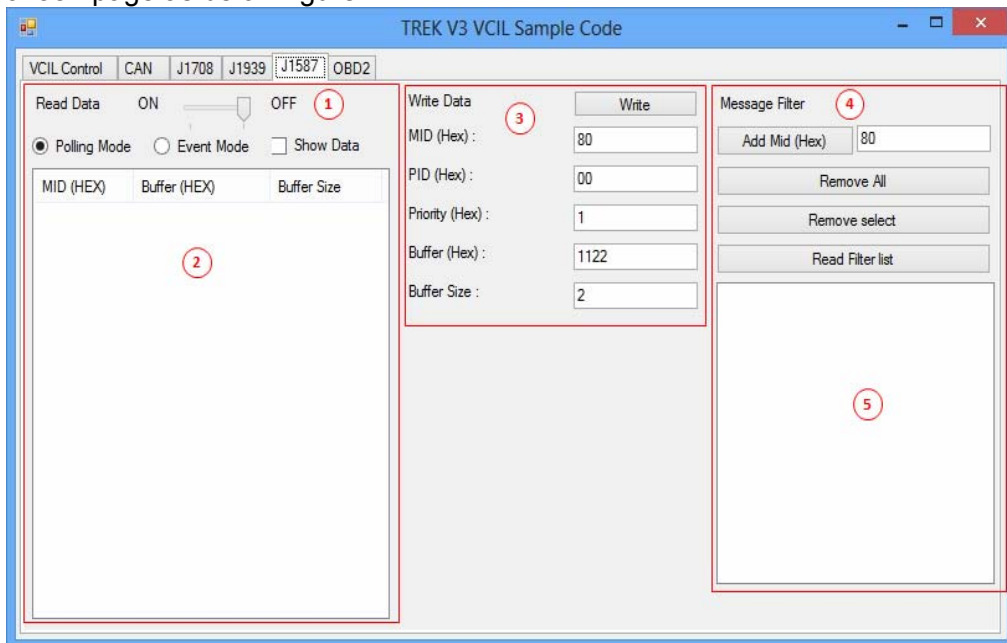
- Read Data control (Press "Start" to monitor bus to read)
- Read Data list
- Write Data control
- J1587 bus message filter control
- Message filter list

ODB2 Page
ODB2 page as below figure
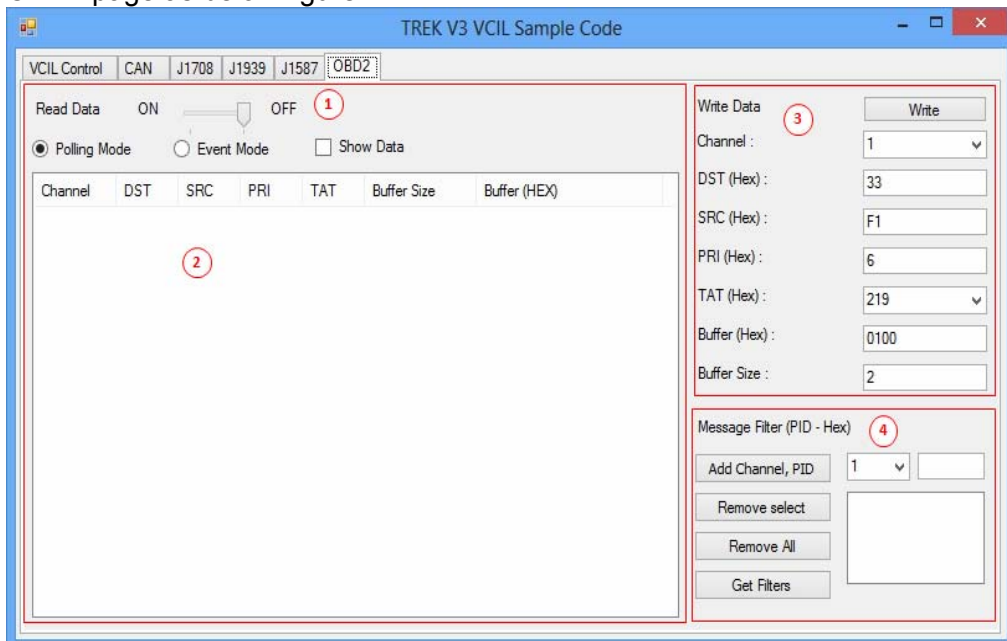
- Read Data control (Press "Start" to monitor bus to read)
- Read Data list
- Write Data control
- ODB2 bus message filter control

6.1.2 Testing VCIL

1. Opening "TREK_V3_Sample_Code_VCIL.exe"
2. Select VCIL port and speed for your platform. For example, select the port number 8 on TREK-674
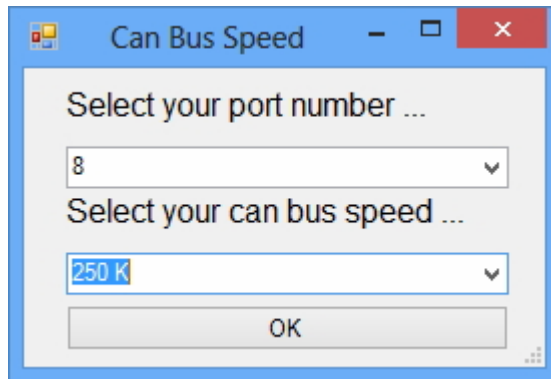
3. Selecting "VCIL Control" page as below figure
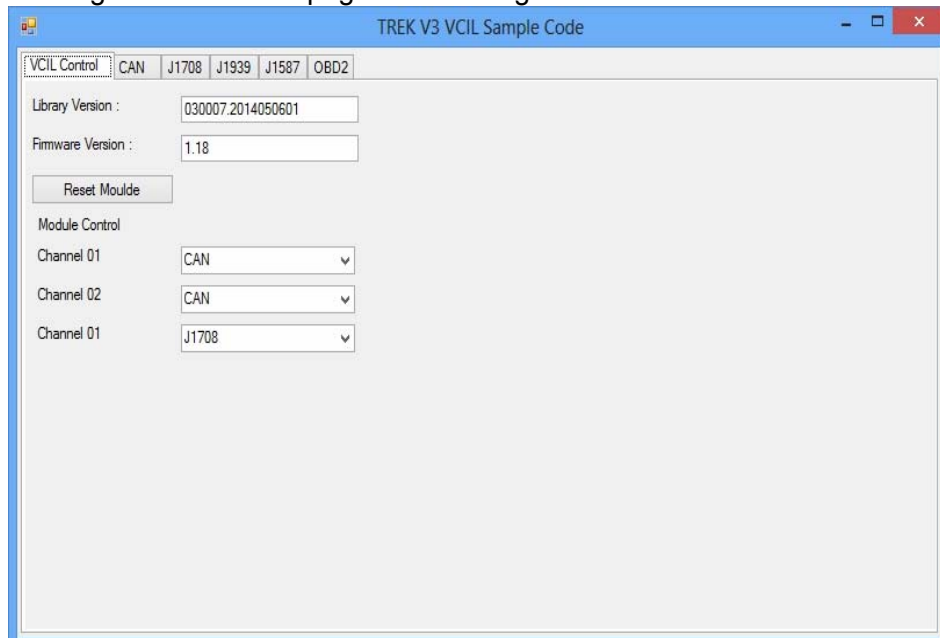
4. You should see the firmware version on this page when success opening VCIL.
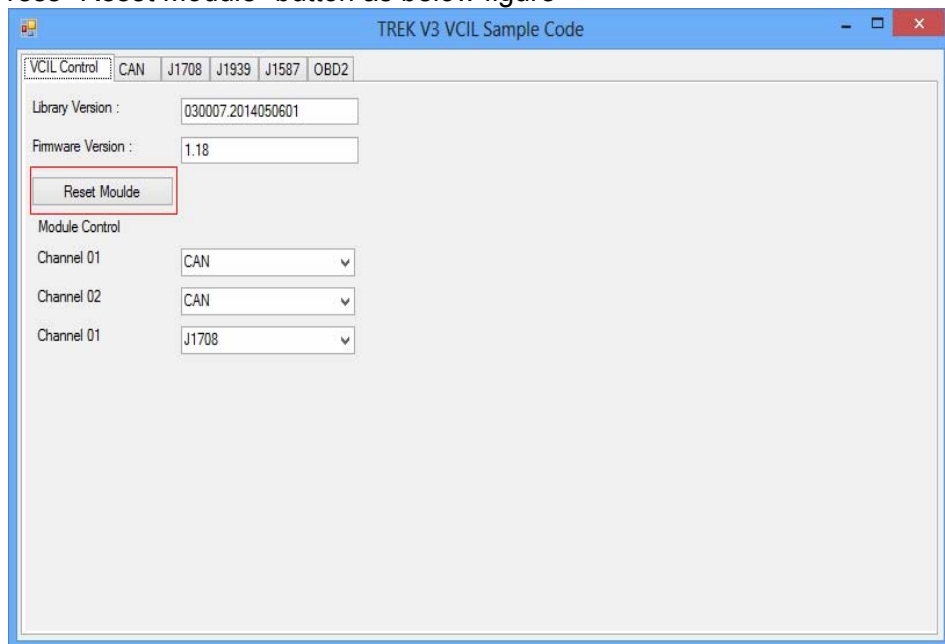
Bus Type Control
1. Selecting "VCIL Control" page
2. Press combo box on the channel which you want to configure as below figure
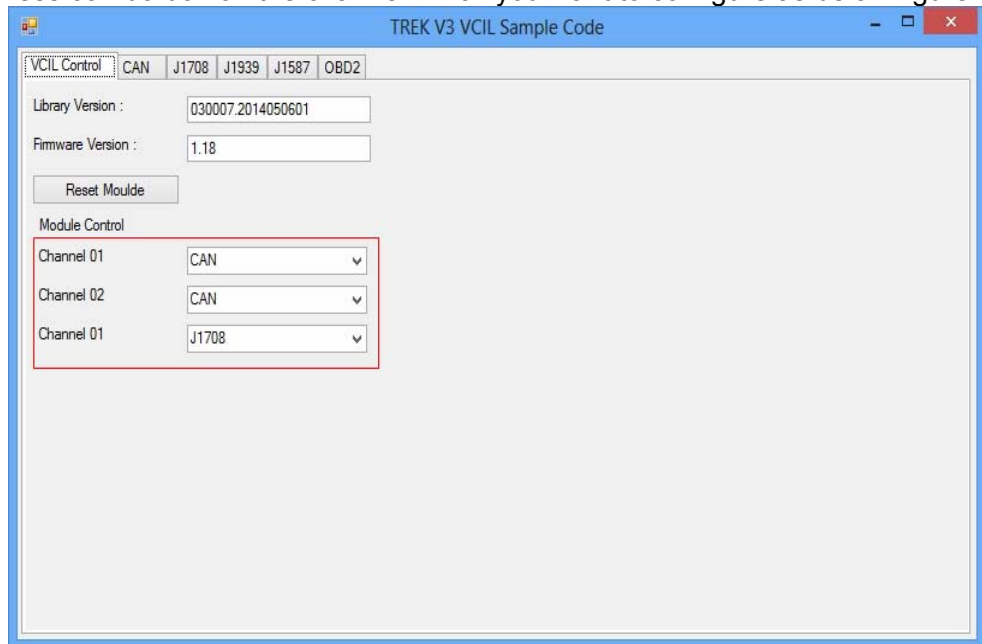
3. Selecting Bus type
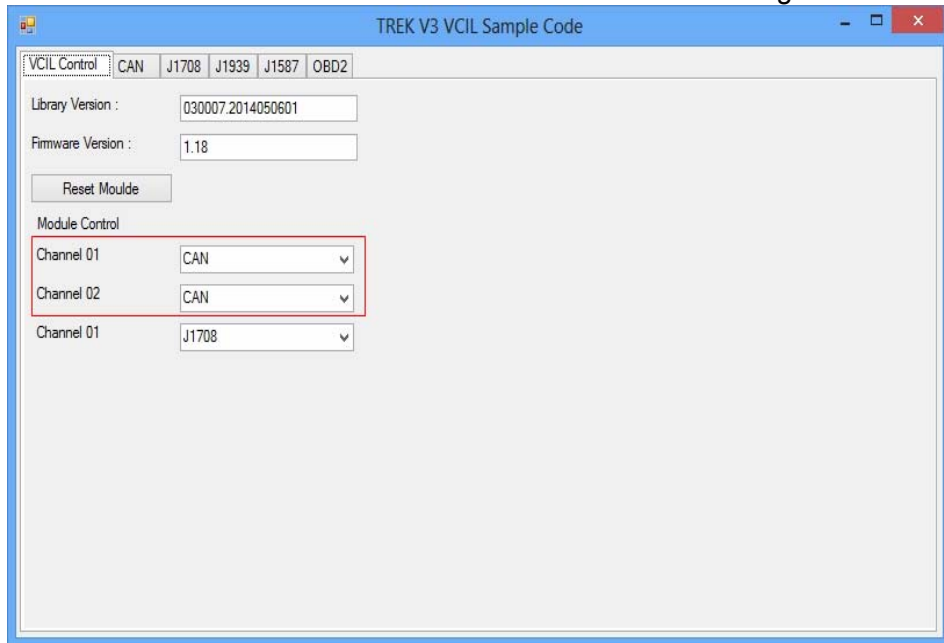   Note: Each channel only can select one bus type at same time.

Reset Module
1. Selecting "VCIL Control" page
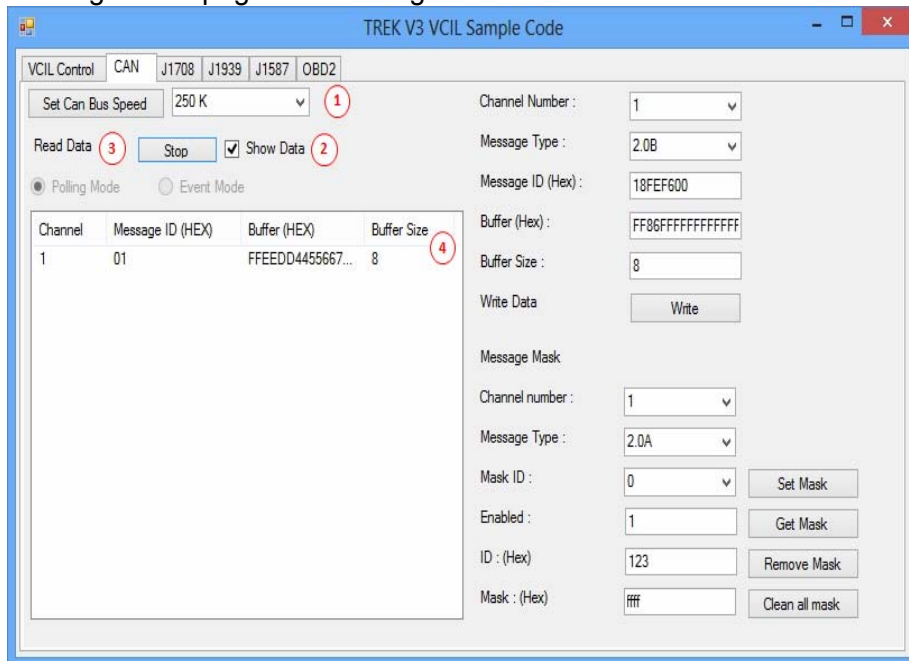2. Press "Reset Module" button as below figure

CAUTION: When reset module, all configure for each bus reset to default value.

6.1.3 Testing CAN

1. Selecting "VCIL Control" page
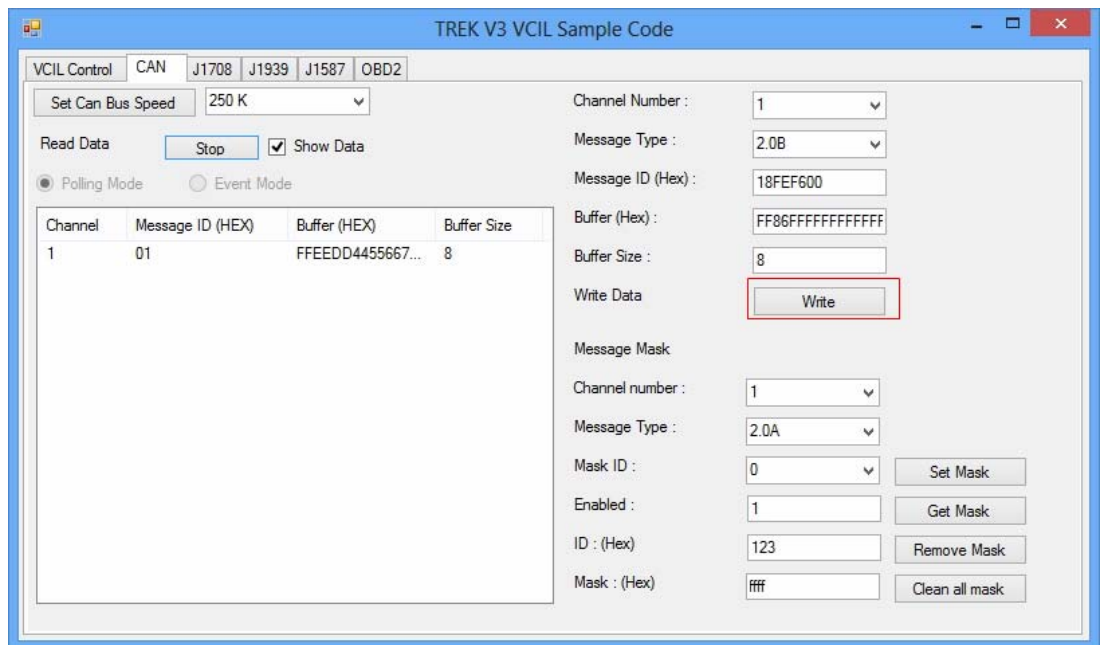2. Press combo box on the channel and select "CAN" as below figure

Reading Data
1. Selecting "CAN" page as below figure

   Set CAN bus speed. For example 250K
2. Checked "Show Data"
3. Press "Start" button to receive CAN bus data
4. You should see the data came from the CAN bus and show on the list
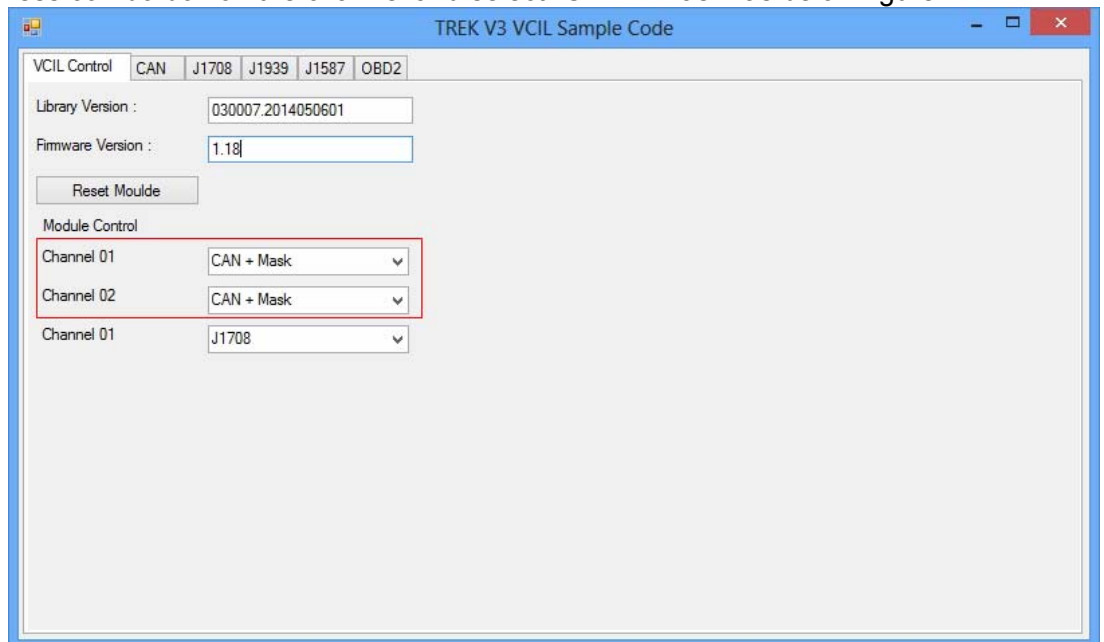
Writing Data
1. Selecting "CAN" page as below figure

Set CAN bus speed. For example 250K
2. Filling the CAN bus data prepare to send
3. Press "Write" button to send CAN bus data as above figure
4. You should see the data on the receiver

Testing Message Mask
1. Selecting "VCIL Control" page
2. Press combo box on the channel and select "CAN + Mask" as below figure

Set Mask

1. Selecting "CAN" page as below figure
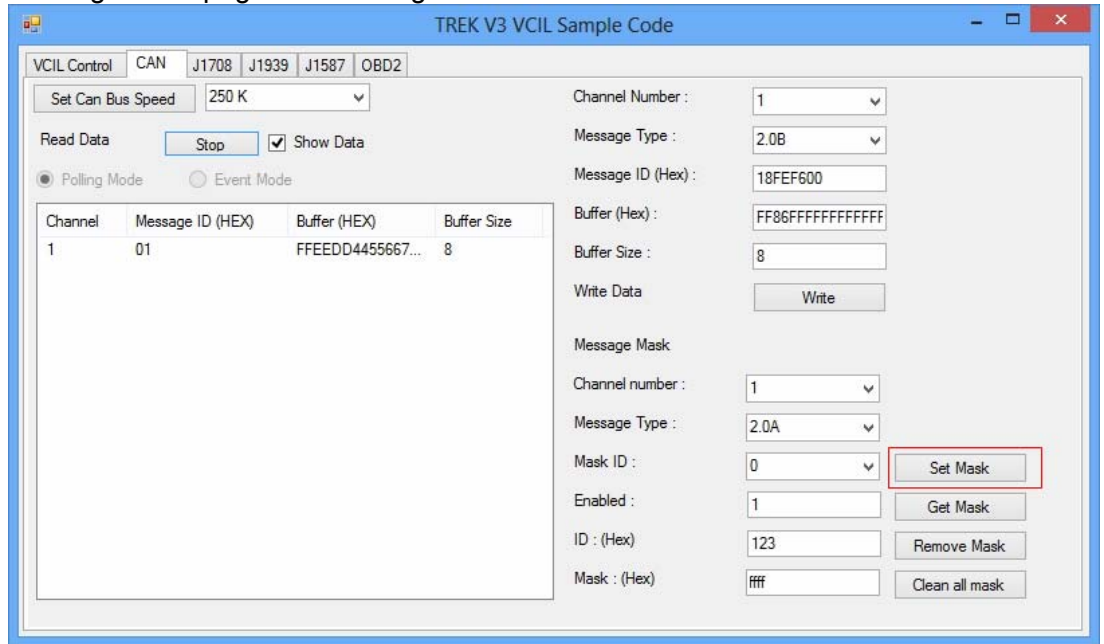
Set CAN bus speed. For example 250K
2. Configure the Message mask
3. Press "Set Mask" button to apply the mask to bus
4. You should see the mask was applied on the bus.
5. If you set a mask to bus. You should not see the specified CAN ID on the read data list if the ID not passed for the mask

Mask Rule:
The CAN Message ID & operator "Mask" equal the "ID" & operator "Mask" PASS
The CAN Message ID & operator "Mask" not equal the "ID" & operator "Mask" NO PASS

For example, as above figure setting. If the input CAN Message ID is 0x123, the result passed. Since 0x123 & 0xffff equal the ID 0x123 & 0xffff.
If the input CAN data ID is 0x120, the result not passed. Since 0x120 & 0xffff not equal the ID 0x123 & 0xffff.
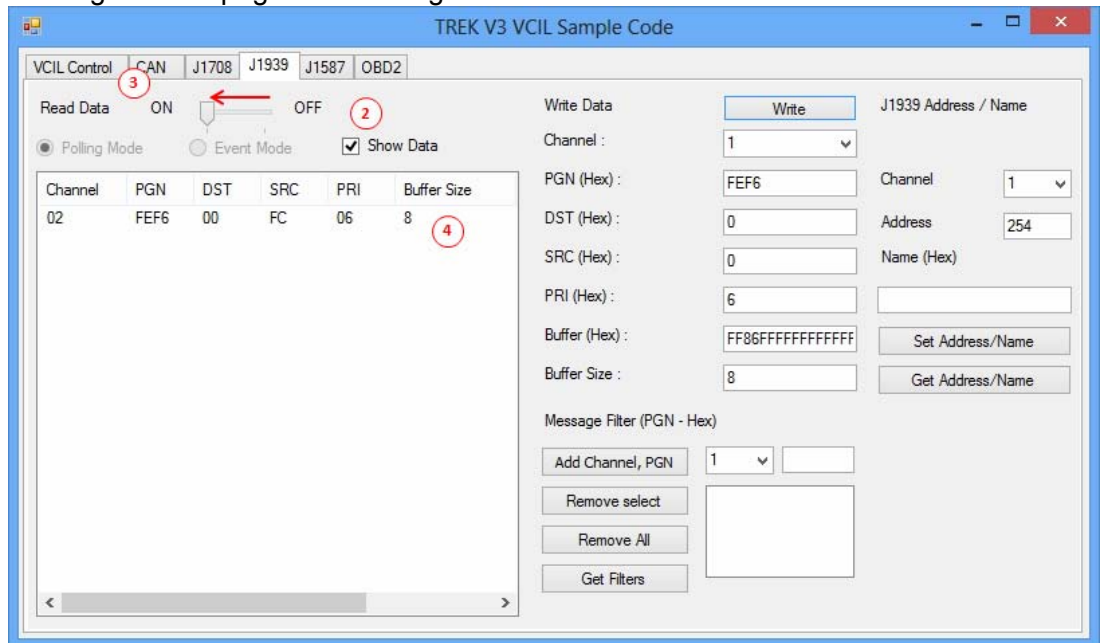
6.1.4 Testing J1939

1. Selecting "VCIL Control" page
2. Press combo box on the channel and select "J1939" as below figure
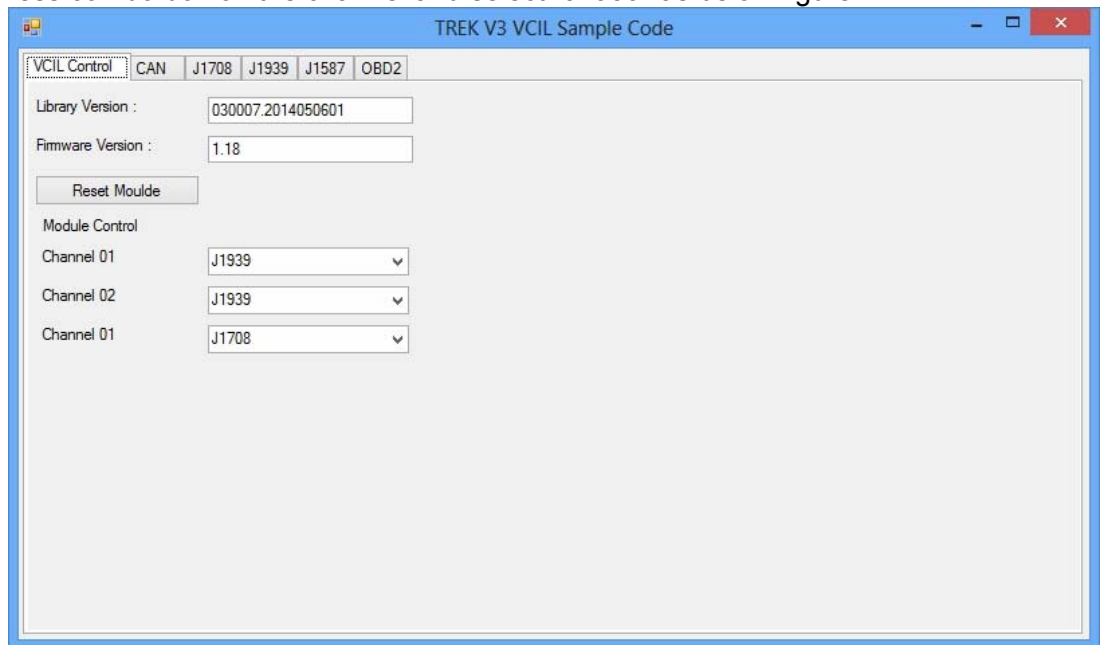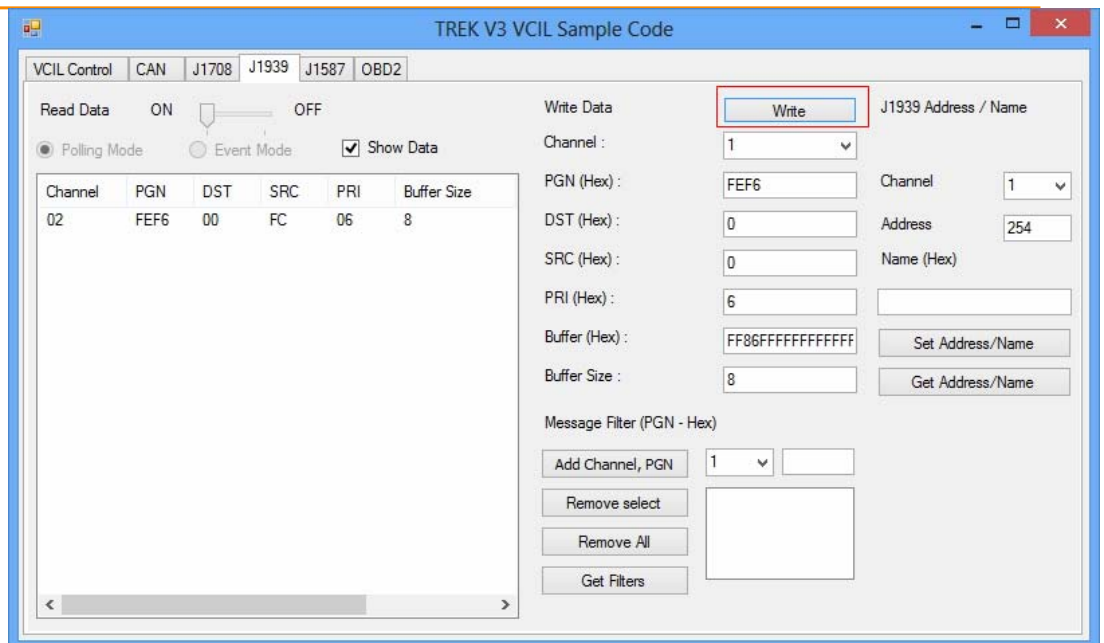

Reading Data
1. Selecting "J1939" page as below figure

2. Checked "Show Data"
3. Pull TrackBar "ON" to receive J1939 data
4. You should see the data came from the J1939 and show on the list

Writing Data
1. Selecting "J1939" page as below figure

2. Filling the J1939 data prepare to send
3. Press "Write" button to send J1939 data as above figure
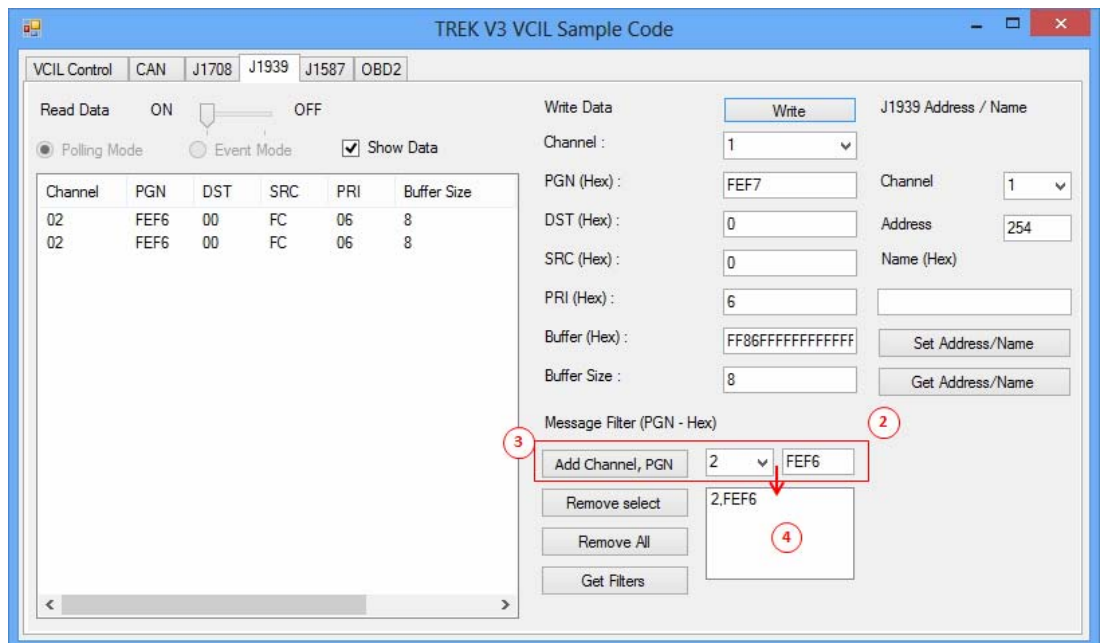4. You should see the data on the receiver

Testing Message Filter
1. Selecting "VCIL Control" page
2. Press combo box on the channel and select "J1939 + Mask" as below figure
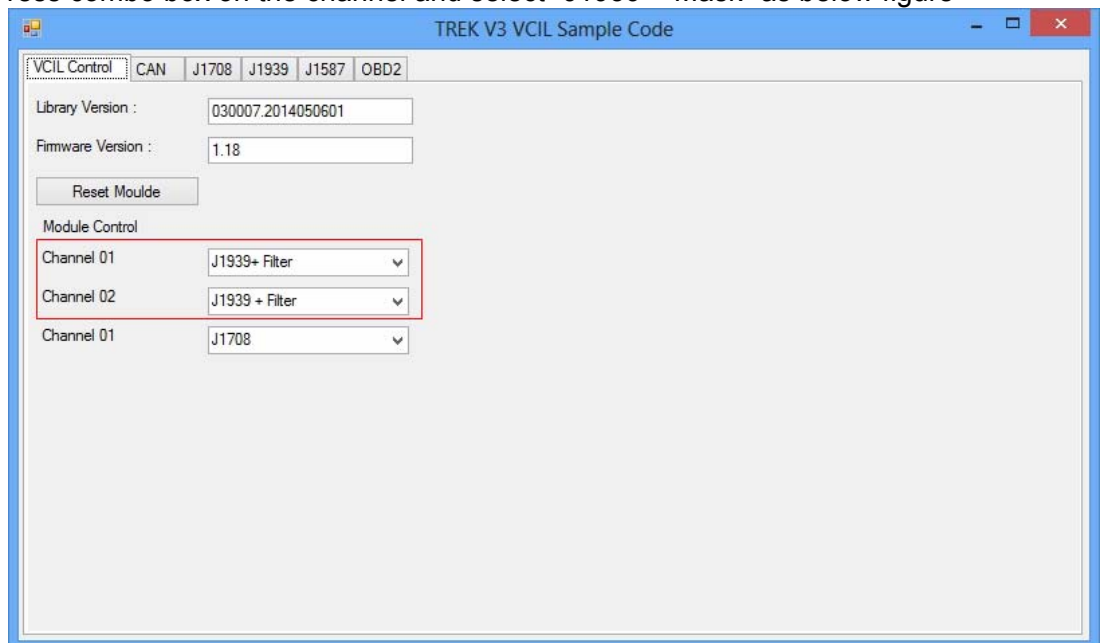
Set Message Filter
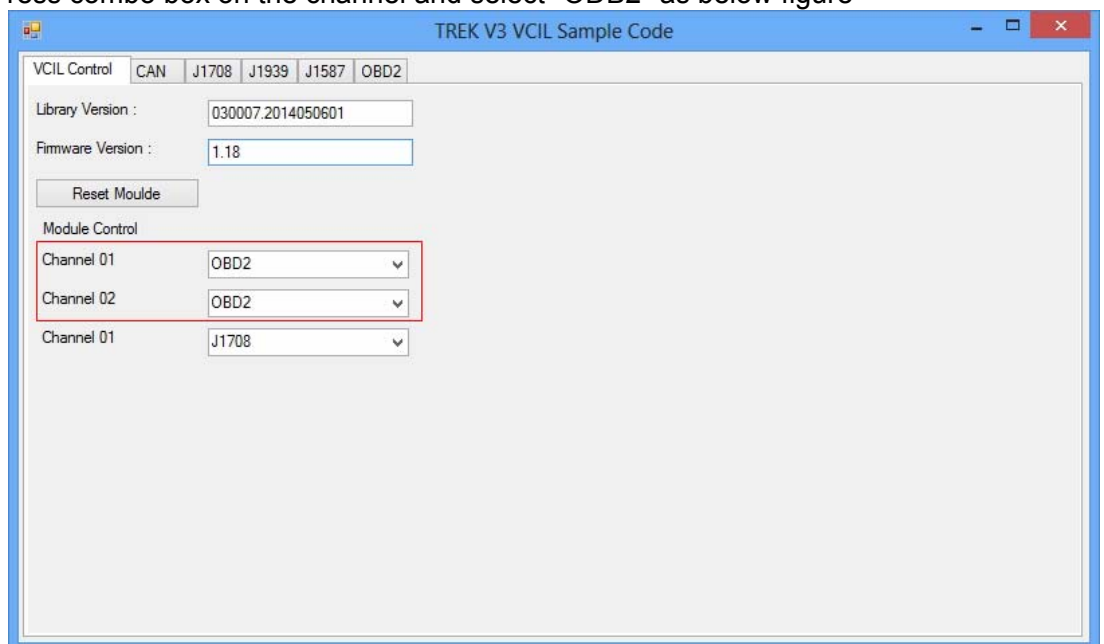1. Selecting "J1939" page as below figure

2. Select Channel and specified PGN to filter
3. Press "Add Channel, PGN" button to add the rule to filter
4. You should see the filter was applied on the bus
5. The system ignores all PGN is not on the list

For example, as above figure setting. The system can receive the PGN equal to 0xFEF6, otherwise no.
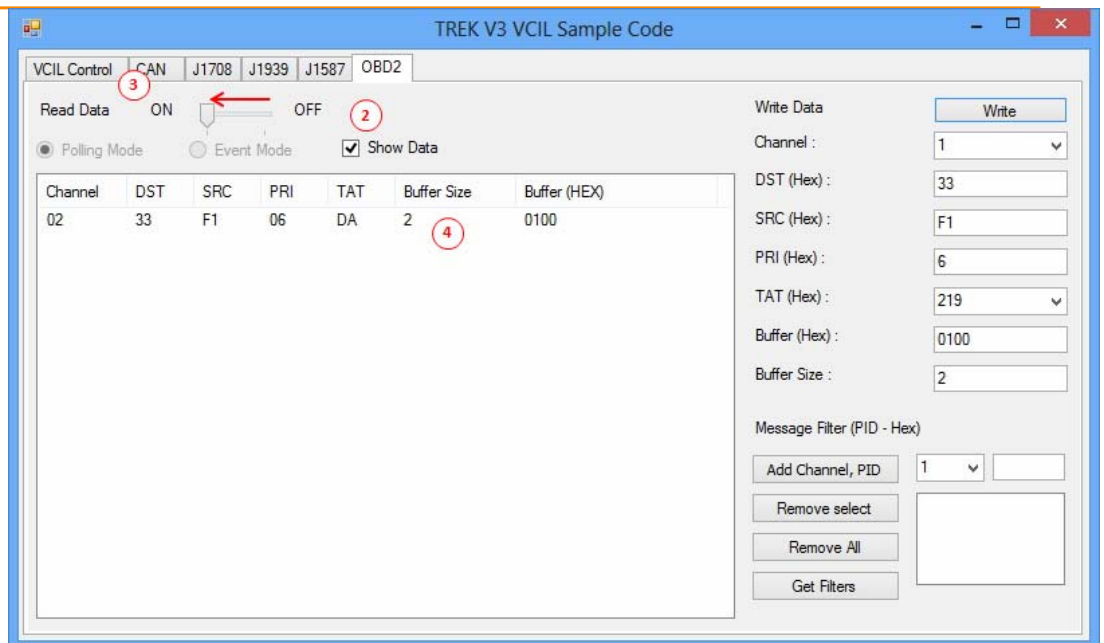
6.1.5 Testing ODB2

1. Selecting "VCIL Control" page
2. Press combo box on the channel and select "ODB2" as below figure

Reading Data
1. Selecting "ODB2" page as below figure

2. Checked "Show Data"
3. Pull TrackBar "ON" to receive ODB2 data
4. You should see the data came from the ODB2 and show on the list

Writing Data
1. Selecting "ODB2" page as below figure
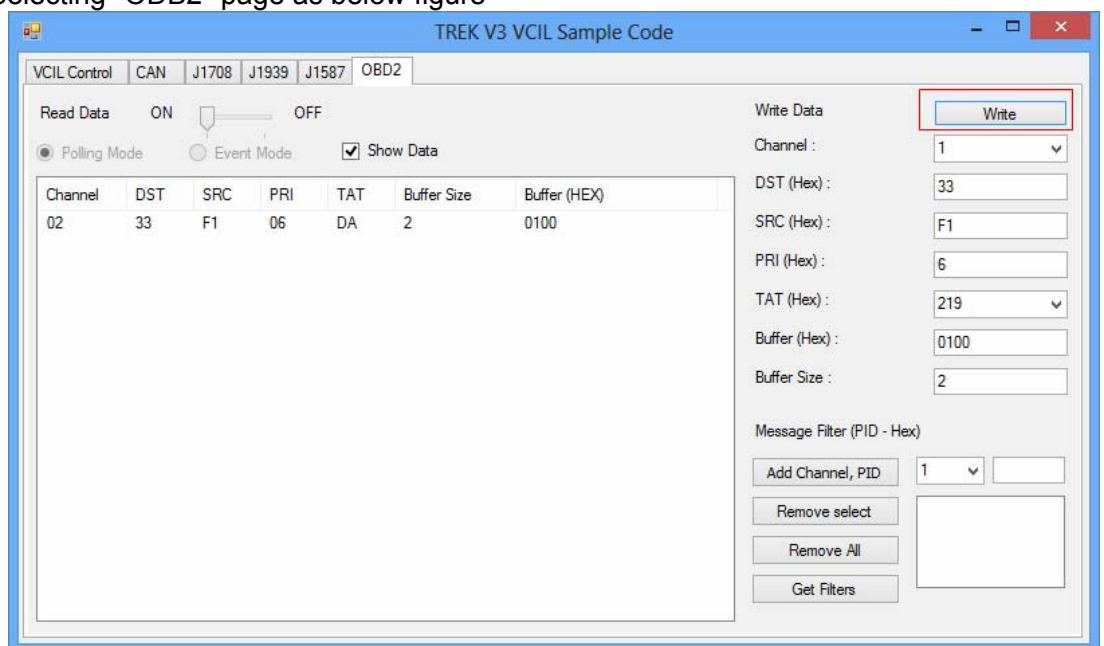
2. Filling the ODB2 data prepare to send
3. Press "Write" button to send ODB2 data as above figure
4. You should see the data on the receiver

Testing Message Filter
1. Selecting "VCIL Control" page
2. Press combo box on the channel and select "ODB2 + Mask" as below figure

Set Message Filter
1. Selecting "ODB2" page as below figure

2. Select Channel and specified PID to filter
3. Press "Add Channel, PID" button to add the rule to filter
4. You should see the filter was applied on the bus
5. The system ignores all PID is not on the list

For example, as above figure setting. The system can receive the PID equal to 0x00, otherwise no.

6.1.6 Testing J1708

1. Selecting "VCIL Control" page
2. Press combo box on the channel and select "J1708" as below figure
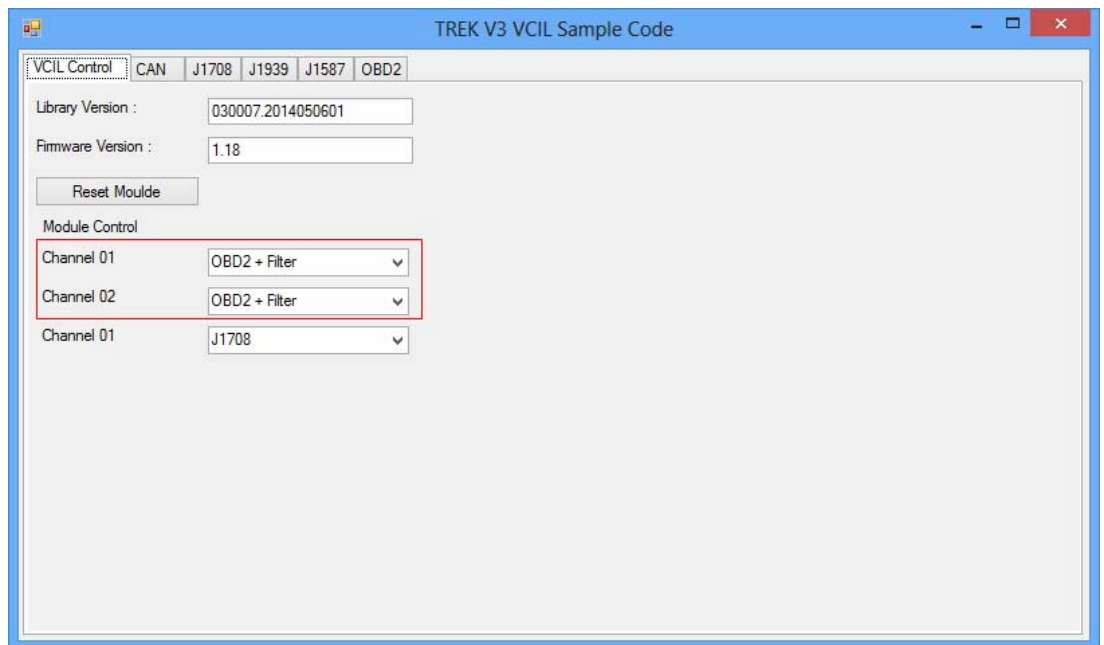

Reading Data
1. Selecting "J1708" page as below figure

2. Checked "Show Data"
3. Press "Start" button to receive J1708 data
4. You should see the data came from the J1708 and show on the list

Writing Data
1. Selecting "J1708" page as below figure

2. Filling the J1708 data prepare to send
3. Press "Write" button to send J1708 data as above figure
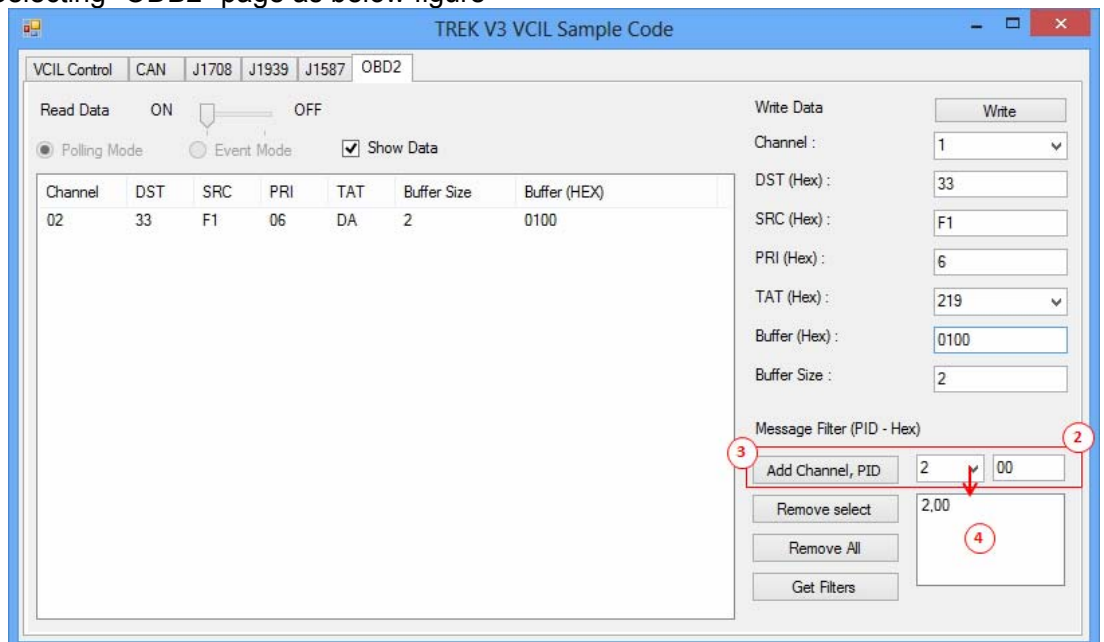4. You should see the data on the receiver
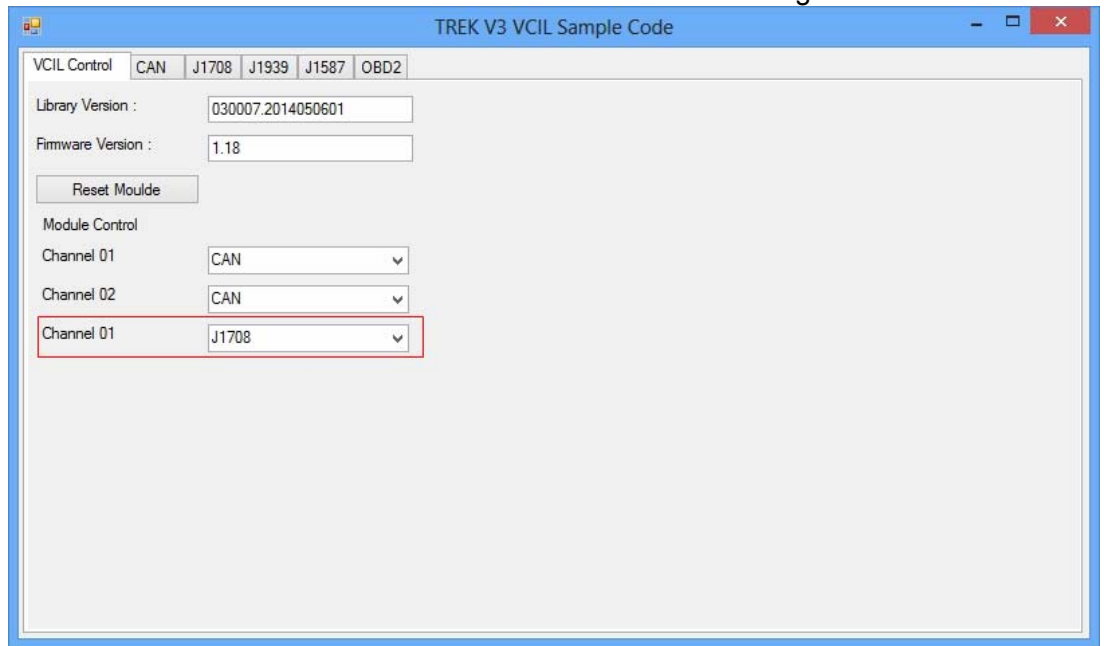
Testing Message Filter
1. Selecting "J1708" page as below figure

2. Enter specified MID to filter
3. Press "Add MID" button to add the rule to filter
4. You should see the filter was applied on the bus
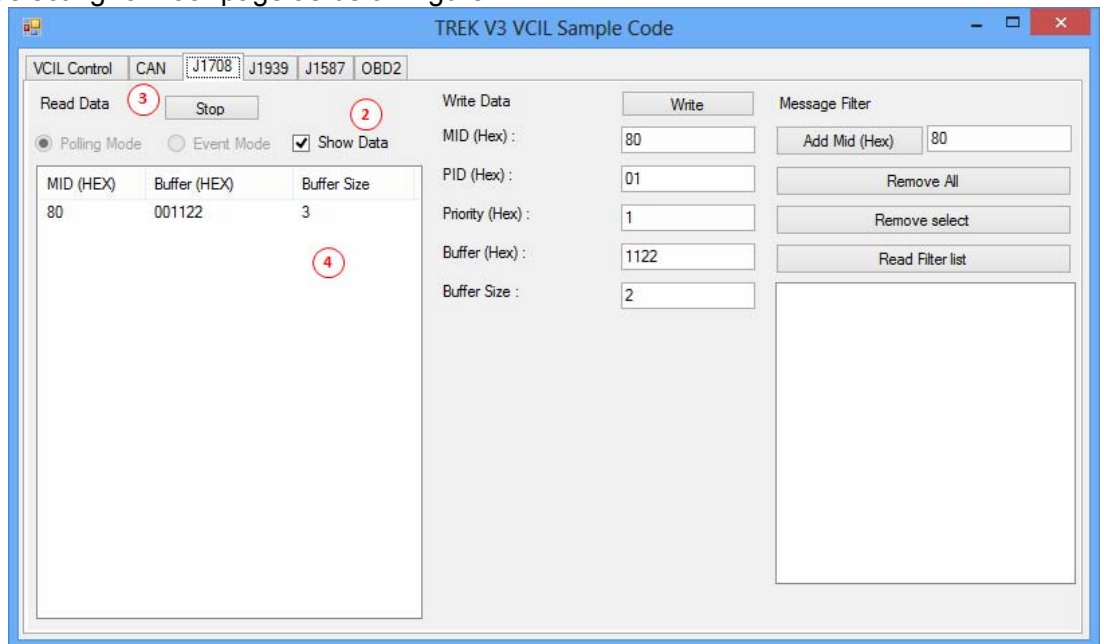5. The system ignores all MID is not on the list

6.1.7 Testing J1587

1. Selecting "VCIL Control" page
2. Press combo box on the channel and select "J1587" as below figure
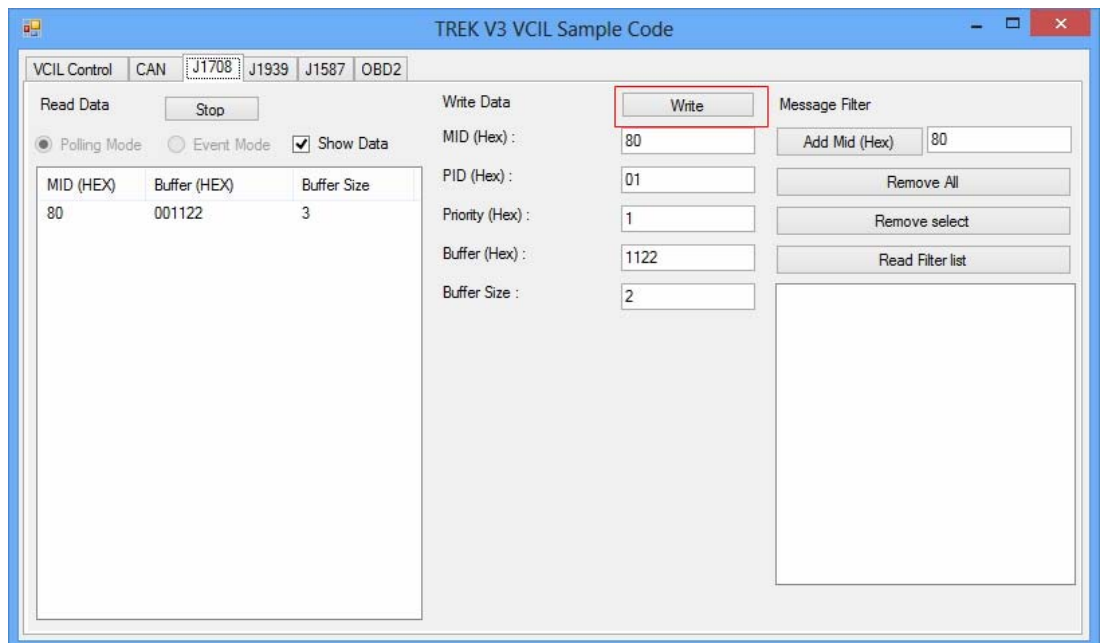

Reading Data
1. Selecting "J1587" page as below figure

2. Checked "Show Data"
3. Press "Start" button to receive J1587 data
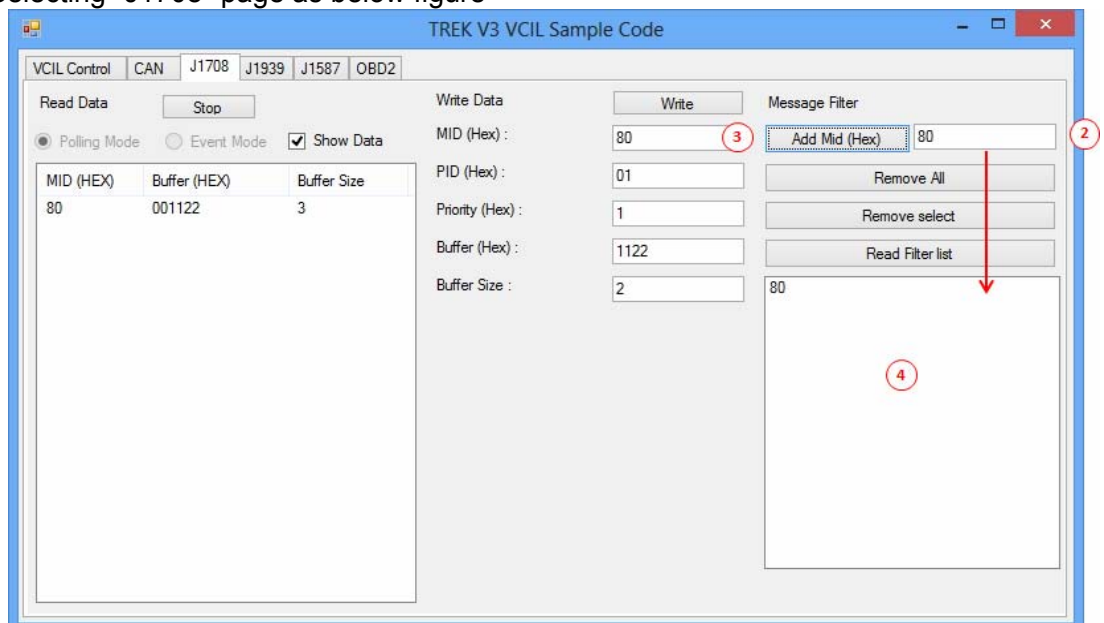4. You should see the data came from the J1587 and show on the list

Writing Data
1. Selecting "J1587" page as below figure
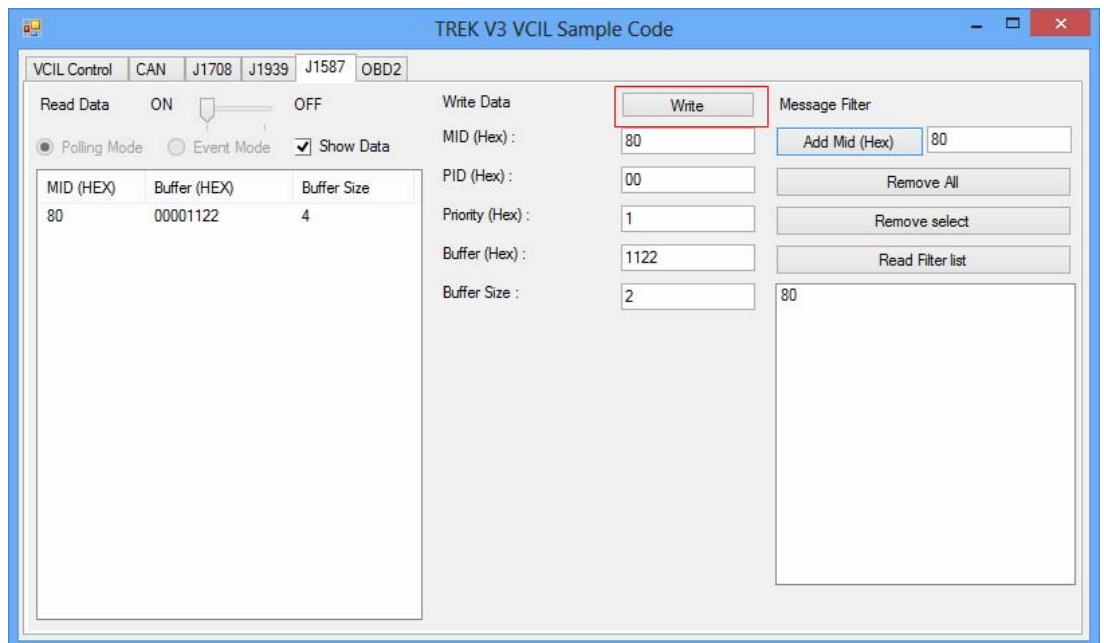
2. Filling the J1587 data prepare to send
3. Press "Write" button to send J1587 data as above figure
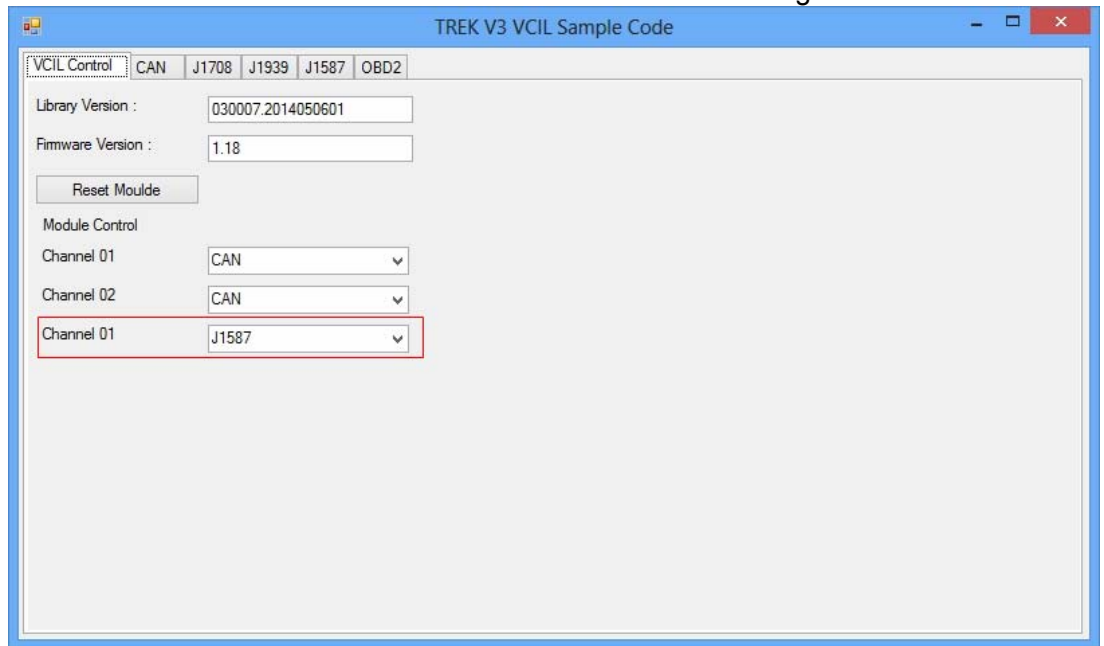4. You should see the data on the receiver

Testing Message Filter
1. Selecting "J1587" page as below figure
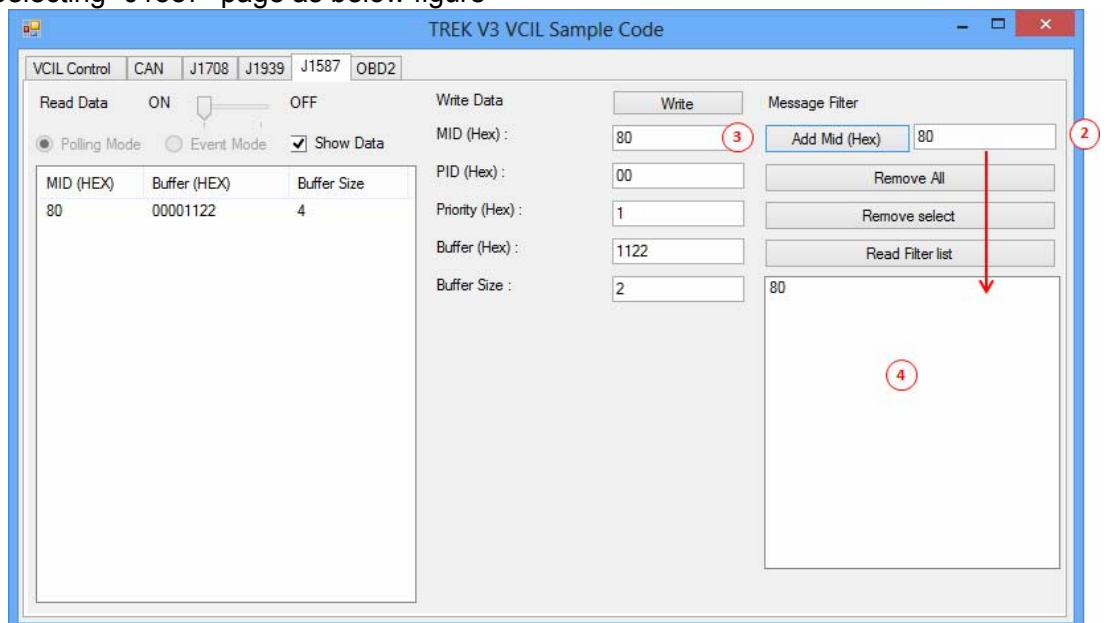
2. Enter specified MID to filter
3. Press "Add MID" button to add the rule to filter
4. You should see the filter was applied on the bus
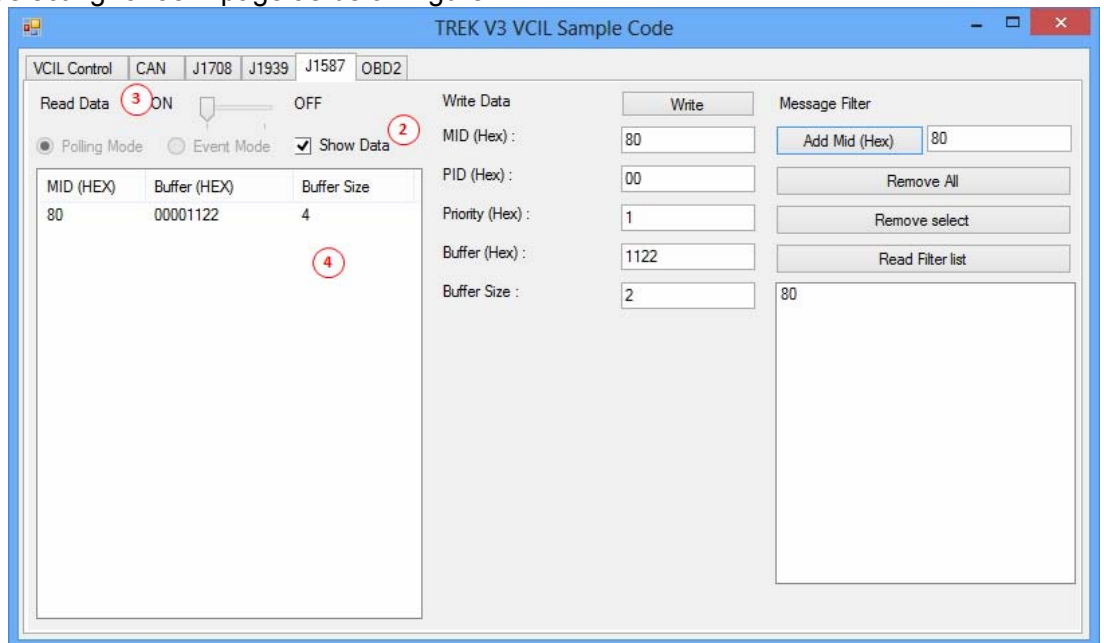5. The system ignores all MID is not on the list

6.3   Vehicle Power Management

6.3.1   Power Management Mechanism

The feature of Vehicle Power Management (VPM) is provided for users to fulfill the special requirements on in-vehicle applications.

„   Ignition on/off

– Turn on the system by ignition

For the cases of in-vehicle applications, an ignition signal is often used to turn on or shutdown the system. When the system is in an OFF state and ignition is turn ON, the VPM controller will countdown ON_DELAY; once it counts to zero, the system will be turned on.

– Shutdown the system by ignition

When the system is powered on and the ignition is turn off, the OFF_EVENT_DELAY will start to count down. During this stage, if the ignition is back to ON, the VPM controller will stop countdown and reset the OFF_EVENT_DELAY value. If OFF_EVENT_DELAY counts to zero, the VPM controller will send an event (power button press) to the system and start to count HARD_OFF_DELAY. Application programs could watch this event to do pre-defined tasks, like storing data and preparing to turn off the system.

Once going into the HARD_OFF_DELAY stage, this process will be irreversible. And if HARD_OFF_DELAY counts to zero, the system power will be cut off abruptly.

„   Low battery protection

To avoid draining out the car battery, low-battery protection is involved to ensure the car battery is capable to start the vehicle. When the system is ON, the VPM controller will monitor the car battery voltage. If the battery voltage is lower than a programmable threshold (LOW_THRESHOLD), the VPM controller will go into

LOW_DELAY stage and start to count down. During the stage of LOW_DELAY countdown, if battery voltage is back above LOW_THRESHOLD, the VPM controller will stop counting down and exit. If LOW_DELAY counts to zero, the VPM controller will send an event (power button press) to notify the system, go into LOW_ HARD_DELAY stage and start to count down. Once LOW_ HARD_DELAY counts to zero, the VPM controller will cut off the system power abruptly to avoid draining out the car battery.

The table below lists the user programmable parameters for VPM features:

	Default value	Acceptable range
ON_DELAY	2 seconds	1 ~ 18000 seconds
OFF_EVENT_DELAY	5 seconds	1 ~ 18000 seconds
HARD_OFF_DELAY	60 seconds	1 ~ 18000 seconds
LOW_THRESHOLD (12V mode)	11.42 V	10.09 ~ 12.25 V
LOW_THRESHOLD (24V mode)	22.44 V	21.11 ~ 23.28 V
LOW_DELAY	30 seconds	1 ~ 3600 seconds
LOW_ HARD_DELAY	60 seconds	1 ~ 3600 seconds

6.3.2 Power Management demo program

TREK V3 VPM Sample Code is demonstration of vehicle power management (VPM).
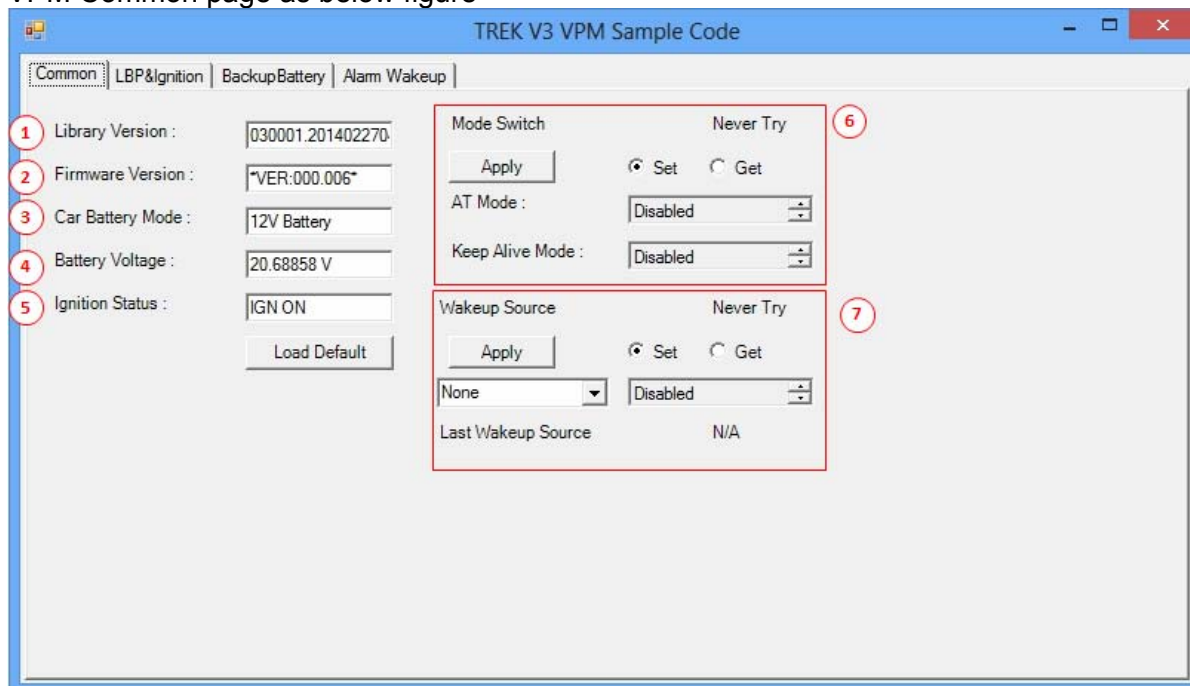
System Menu

- TREK V3 VPM Sample Code as below figure
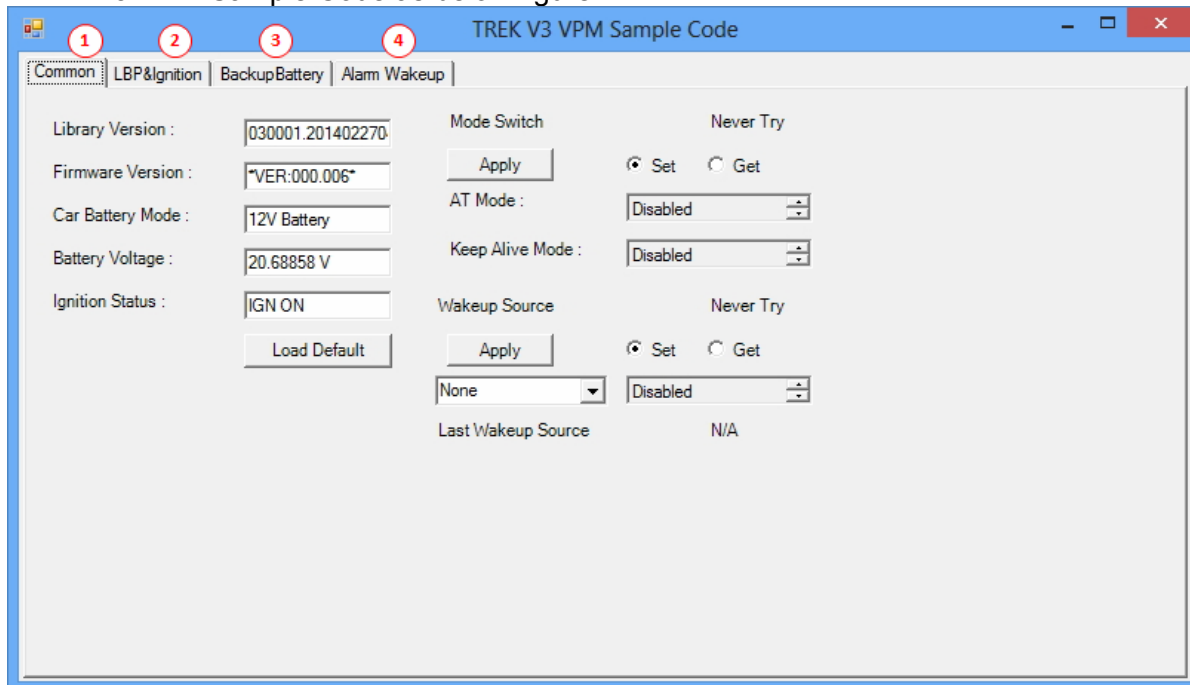
1. Common page
2. Low Battery Protection & Ignition Control page
3. Backup Battery Information page
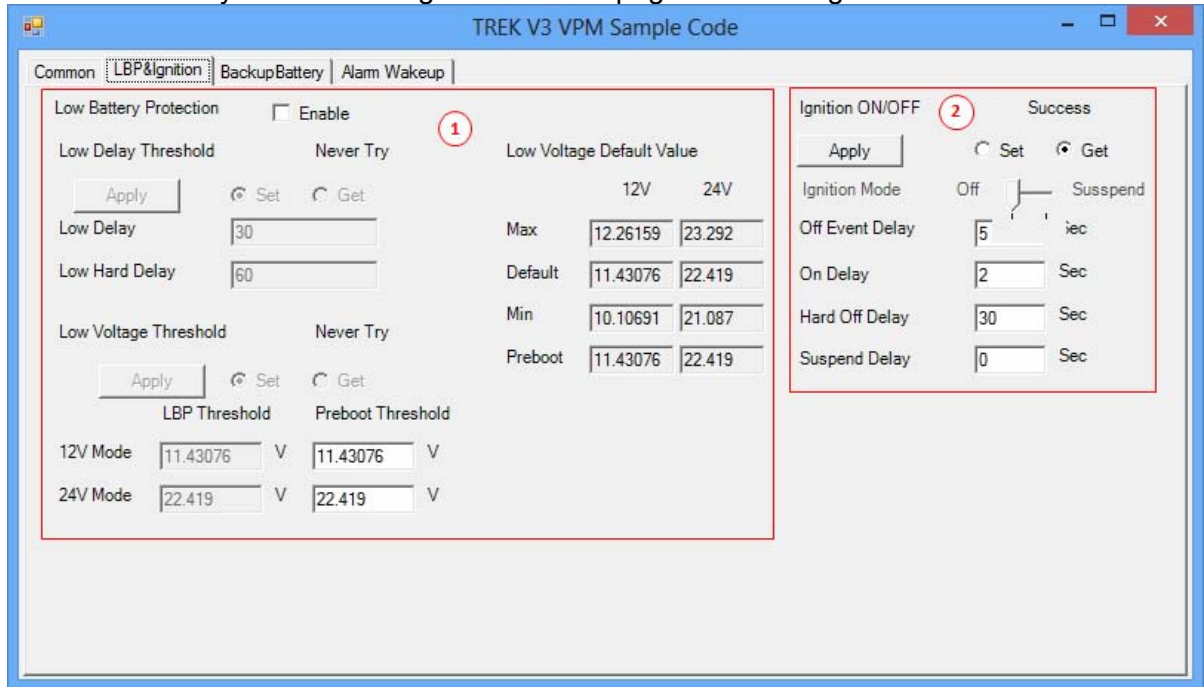4. Alarm Wakeup Control page

Common page

- VPM Common page as below figure

1. Library Version
2. Firmware Version
3. Car Battery Mode (Decide LBP what voltage mode to use)
4. Current Battery Voltage
5. Ignition Status
6. Mode Control
7. Wakeup Source Control
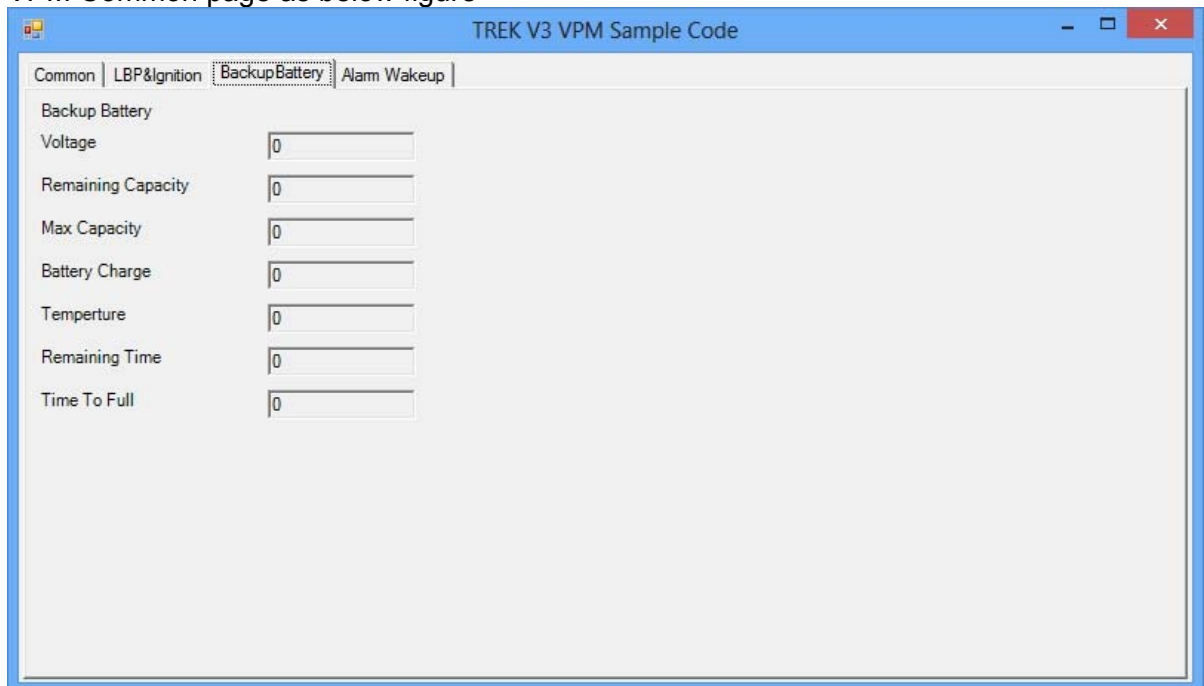
Low Battery Protection & Ignition Control page

- VPM Low Battery Protection & Ignition Control page as below figure

1. Low Battery Protection Control
2. Ignition Control

Backup Battery Information page

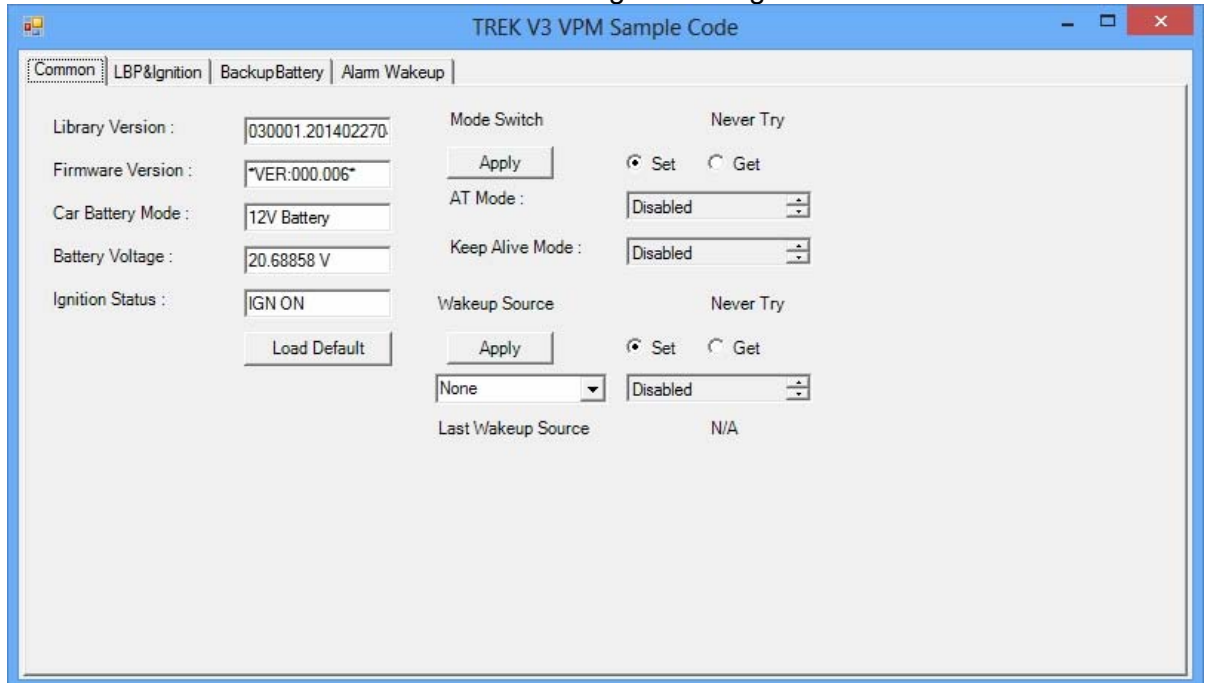- VPM Common page as below figure

Alarm Wakeup Control page

- VPM Common page as below figure
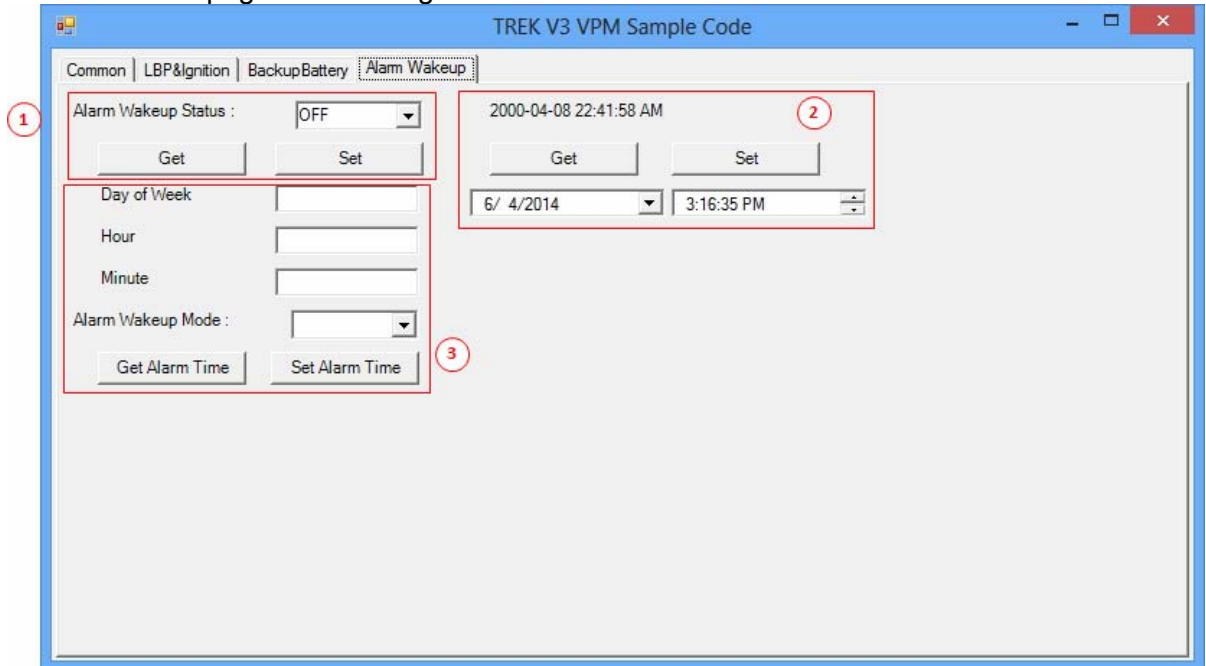
1. Alarm wakeup Status Control
2. RTC Timer Control
3. Alarm Wakeup Time Control

Testing VPM

1. Opening "TREK_V3_Sample_Code_VPM.exe"
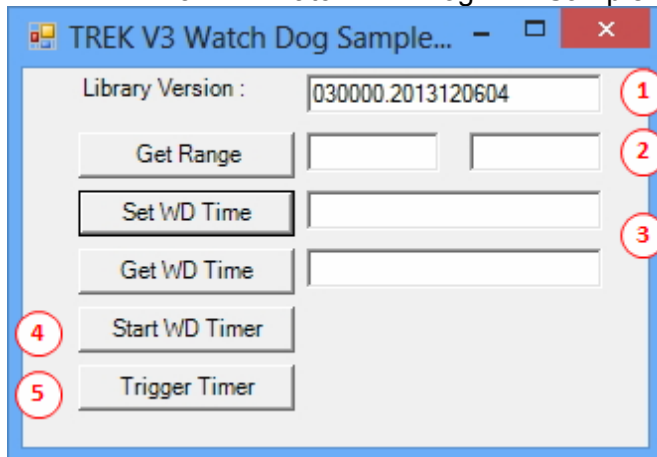2. You should see the firmware version and voltage below figure

6.4 WatchDog Sample Code

TREK V3 Watch Dog Sample Code is demonstration of controlling Watch Dog.

System Menu

- TREK V3 Watch Dog Sample Code as below figure

1. Library Version
2. Range of Watch Dog timer
3. Set/Get Watch Dog time
4. Enable Watch Dog timer
5. Reload the watchdog timer to prevent the system from rebooting

Testing Watch Dog

1. Opening "TREK_V3_Sample_Code_Watch_Dog.exe"
2. Press "Get Range" button to check the range of watch dog timer
3. Input the time which you want system keep alive. For example 1 minute as below figure
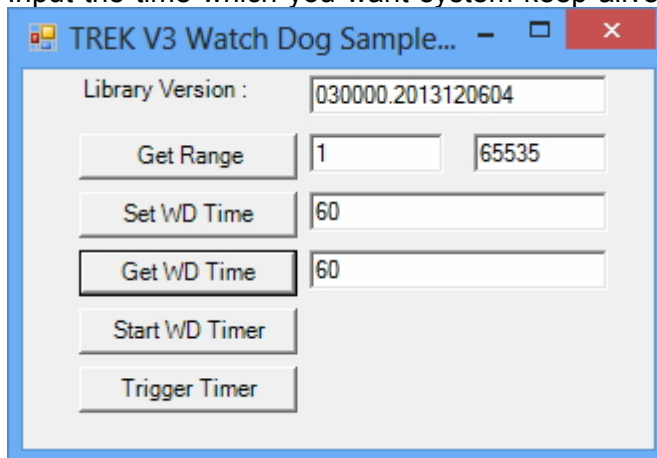
4. Press "Start WD Timer" to enable watch dog timer
5. Press "Trigger timer" to tell the watch dog system still alive
6. If system not trigger watch dog in the setting time, you should see the system automotive reboot

CAUTION: This demonstration may reboot your system, if you enable watch dog timer and not trigger watch dog timer in time.

Peripheral Control Demo Program

TREK V3 Peripheral Control Sample Code is demonstration of controlling peripheral power.

System Menu

- TREK V3 Peripheral Control Sample Code as below figure
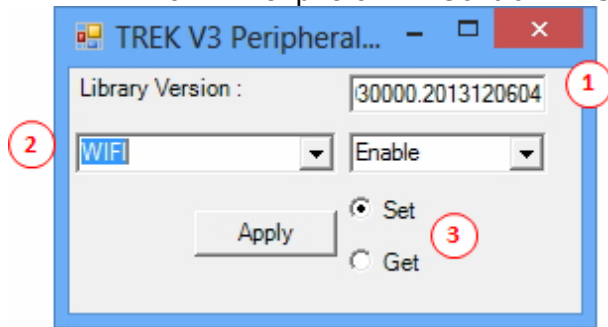

1. Library Version
2. Select Peripheral
3. Select Set or Get function

Testing Peripheral Control

Getting Peripheral Power Status

1. Opening "TREK_V3_Sample_Code_PeripheralCtrl.exe"
2. Selecting module, For example "WIFI".
3. Selecting "Get" radio button
4. Press "Apply" button
5. You should see the peripheral power status as below figure
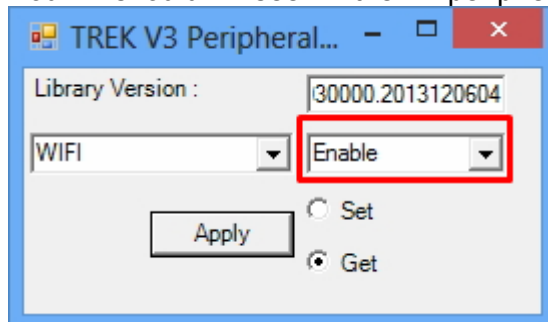
For example. Selecting WIFI module. I can see the WIFI module is enable.

Opening Peripheral Power

If you want close the specified peripheral power, following the instruction:

1. Opening "TREK_V3_Sample_Code_PeripheralCtrl.exe"
2. Selecting module, For example "WIFI"
3. Selecting "Set" radio button
4. Press "Enable/Disable" combo box and selecting "Enable"
5. Press "Apply" button
6. You should see the peripheral power is on

Note: System need a little time to enable peripheral.

Closing Peripheral Power

If you want close the specified peripheral power, following the instruction:

1. Opening "TREK_V3_Sample_Code_PeripheralCtrl.exe"
2. Selecting module, For example "WIFI"
3. Selecting "Set" radio button
4. Press "Enable/Disable" combo box and selecting "Disable"
5. Press "Apply" button
6. You should see the peripheral power is closed

Appendix A

TREK-303

This appendix explains the TREK-303 detailed information.

A.1 TREK-303 Specifications

Table A.1: TREK-303 Specification			
Display	Models	TREK-303R-LA0E	TREK-303R-HA0E
	Design compatible models	Paired with TREK-510 A2	Paired with TREK-550
	Resoultion (pixel)	480 x 234	800 x 480
	Number of colors	262 K (supports 18-bit)	262 K (supports 24-bit)
	Pixel pitch	0.107(W) x 0.37 (H)	0.2168(H) x 0.2168 (V)
	Brightness (cd/m^2)	500 (typical) without touchscreen	500 (typical) without touchscreen
	View angle (R/L/B/T)	70°/70°/60°/60°	70°/70°/60°/60°
	Contrast ratio	300	500
	Lamp life (hrs)	10,000 (min)	50,000 (min)
	Lamp type	CCFL	LED
Touchscreen	Touchscreen	4-wire resistive (GFG 4-wire design reserve)	
Front plane	Speaker	2 watts	
	Hotkey	Supports 5 hotkeys (user defined)	
	Brightness control	Light sensing (default), manually controlled by button (optional)	
	USB host	x 1	
Backplane	Power/wake up button	Yes	
	Reset button	Yes	
Power	DC input	12 V ± 5%	
	Power Consumption	~ 8 W (Max.)	~ 7 W (Max.)
Mechanical	Mounting	Design compatible with RAM mount	
	Material	PC	
	Weight	1 kg	
	Dimensions	244 x 160 x 41 mm	
	IP rating	IP54 (without I/O connector)	
Environment	Operating temperature	-30 ~ +70° C	
	Storage temperature	-40 ~ +80° C	
	Vibration	MIL-STD-810F, SAE J1455 4.9. 4.2	

Note!

1. *The Brightness control is adjusted by the auto light sensor in the front panel as default; it is also defined by button on the front panel by manual.*
2. *The color LCD display*

A. USB Host
B. 5 programmable hotkeys
C. D. Brightness control

E. Power LED
F. Light sensor
G. Speaker

Note: Backlight off: Press C button to the lowest level

Power button   LVDS connector

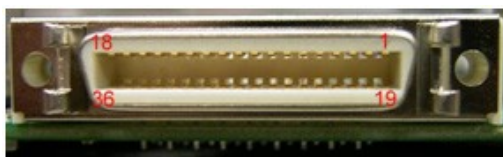**Pin out for TREK-303 LVDS connector**

Table A.2: Smart Display Connector			
Pin	**Signal**	**Pin**	**Signal**
1	Backlight Enable input #	2	Panel Power Enable input #
3	LVDS Ground	4	Reset Button Input #
5	LVDS Clock +	6	LVDS Clock -
7	LVDS Ground	8	LVDS Ground
9	LVDS Data2 +	10	LVDS Data2 -
11	RS232 RXD1 #	12	RS232 TXD1 #
13	LVDS Data1 +	14	LVDS Data1 -
15	LVDS Ground	16	LVDS Ground
17	LVDS Data0 +	18	LVDS Data0 -
19	USB D-	20	USB D+
21	USB Ground	22	USB Ground
23	+12 V_{DC} input (+/- 5%, max 1 A)	24	+12 V_{DC} input (+/- 5%, max 1 A)
25	+12 V_{DC} input (+/- 5%, max 1A)	26	+12 V_{DC} input (+/- 5%, max 1A)
27	Power Ground	28	Power Ground
29	Power Ground	30	Power Ground
31	RS232 RXD2 #	32	RS232 TXD2 #
33	RS232 RTS2	34	Power Button Input # (connect with system box)
35	Audio Ground	36	Mono. Line-in
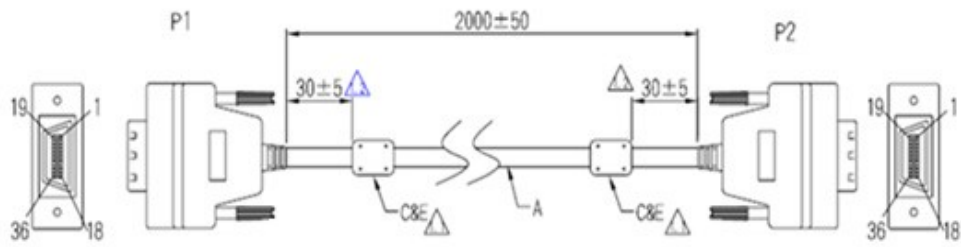
Pin assignment

P1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
P2	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Color	Brown	White	Ground	Brown	red	white	Ground	Ground			white	red		yellow	white	Ground	Ground	Green	white

19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
Blue	white	Ground	yellow		Blue	Purple	Grey	white	Black	Black Brown	black red	Orange	Black Yellow	Black green	Black blue	Black purple	Black grey

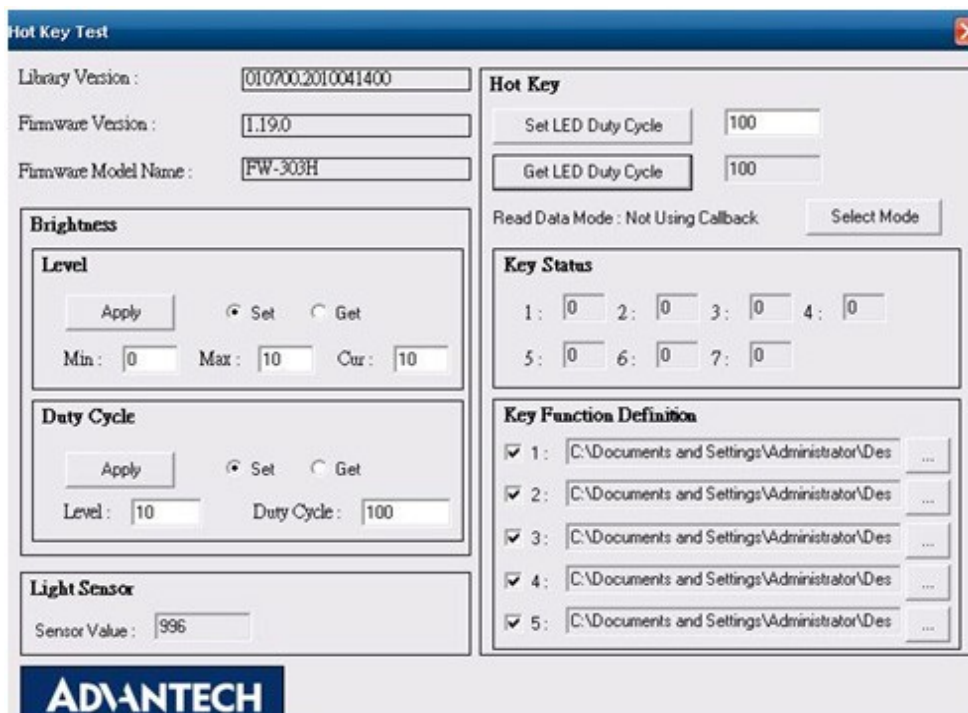## TREK-303 Hotkey Utility

Execute IMC demo utility

Figure A.1 Hotkey utility

1. Execute "Hot Key test" program →
2. Brightness level: You may set a panel's brightness from level 0 ~10, up to a total of 10 levels, when you finish setting the brightness level you want, please click "Apply". If you want to check the current brightness level of TREK-303, please click "Get".
3. Duty cycle: You may set every level's brightness strength, to a total 10 levels, when you finish setting the brightness strength for each level, please click "Apply". If you want to check the current brightness strength on certain level of TREK-303, please click "Get".
4. Light sensor: When the sensor has detected the change of the brightness in the environment, the value will change. The lowest level of brightness, the lowest value it is presented. On the contrary, the highest level of brightness, the highest value it is presented.
5. Hotkey: the backlight brightness of hotkeys could be adjusted by setting the value from 0 ~100.
6. Key Status: When you press Hot key, the status will change from 0 to 1.
7. Key function Definition: Set the parameters to connect to the application program function of the hot key.

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