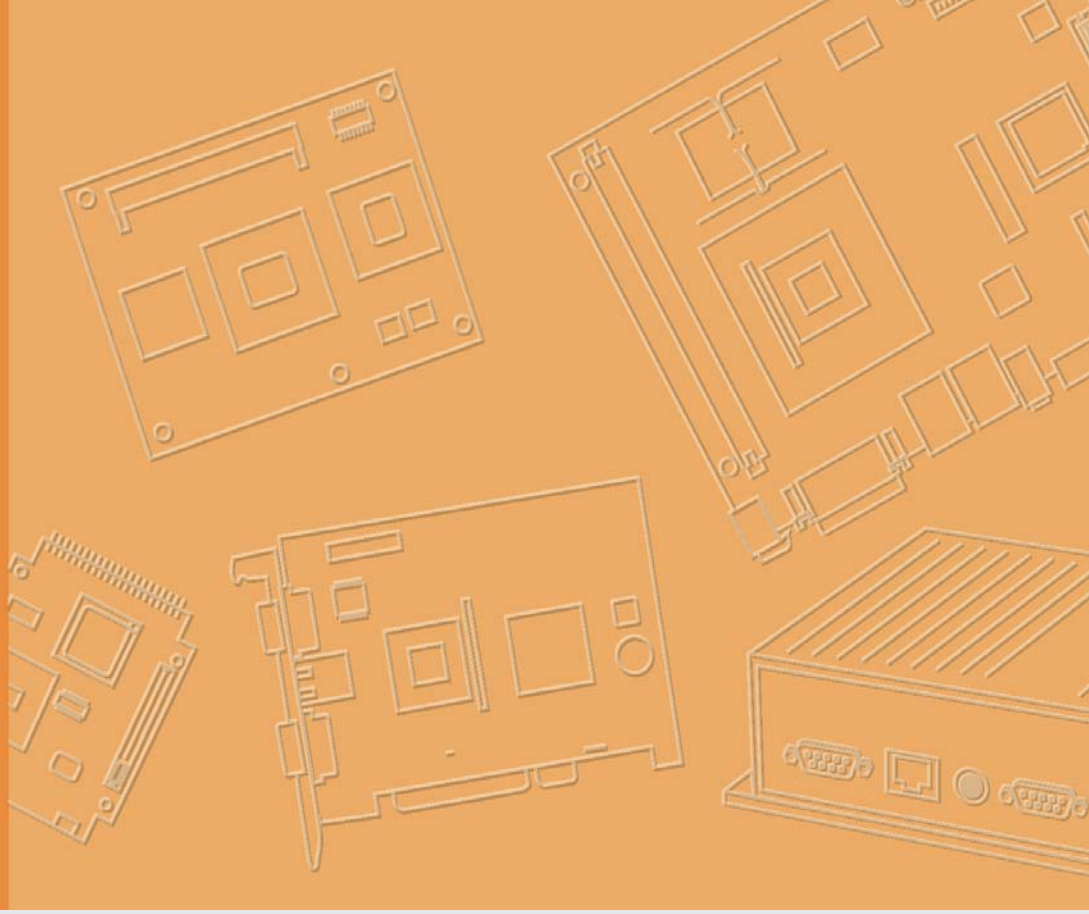

User Manual

TREK-572

Computer

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Microsoft Windows.

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.

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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 Q1 2015

Declaration of Conformity

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-572 Series In-Vehicle Computing Box
- USB/Audio cable clip
- Power cable
- Video in Cable
- CAN Cable
- Antenna (base on order configuration request)

Ordering Information

P/N	Description
TREK-572-VNOM-00E	TREK-572 w/LTE/GPS/WLAN/BT/Linux
TREK-572-VNOM-01E	TREK-572 w/LTE/GPS/WLAN/BT/Linux and 7” Display

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. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
6. Do not leave this equipment in an environment unconditioned where the storage temperature
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. 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.
10. All cautions and warnings on the equipment should be noted.
11. Never pour any liquid into an opening. This may cause fire or electrical shock.
12. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
13. If one of the following situations arises, get the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated into the equipment.
    - The equipment has been exposed to moisture.
    - The equipment does not work well, or you cannot get it to work according to the user's manual.
    - The equipment has been dropped and damaged.
    - The equipment has obvious signs of breakage.
16. CAUTION: The computer is provided with a battery-powered real-time clock circuit. There is a danger of explosion if battery is incorrectly replaced. Replace

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

17. This device complies with Part 15 of the FCC rules. Operation is subject to the following two conditions:
    (1) this device may not cause harmful interference, and
    (2) this device must accept any interference received, including interference that may cause undesired operation.
18. CAUTION: Always completely disconnect the power cord from your chassis whenever you work with the hardware. Do not make connections while the power is on. Sensitive electronic components can be damaged by sudden power surges.
19. CAUTION: Always ground yourself to remove any static charge before touching the motherboard, backplane, or add-on cards. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the chassis.
20. CAUTION: Any unverified component could cause unexpected damage. To ensure the correct installation, please always use the components (ex. screws) provided with the accessory box.
21.

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: 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.*

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 1

1.1 Introduction 2
1.2 General Specifications 3
1.3 Dimensions 5
Figure 1.1 TREK-572 dimensions..... 5

Chapter 2 System Setup 7

2.1 A Quick Tour of the TREK-572 Computing Box..... 8
Figure 2.1 Front view of TREK-572 8
Figure 2.2 Rear view of TREK-572 8
Figure 2.3 Side view of TREK-572 8
Figure 2.4 Bottom view of TREK-572 8
Figure 2.5 Top view of TREK-572 9
2.2 Installation Procedures..... 9
2.2.1 Connecting the Power Cord..... 9
Table 2.1: Pin Definition of Power Cord 9
2.2.2 Power Connector 9
Figure 2.6 Power connector outlook 9
Table 2.2: Pin Definition of Power Connector (Molex Manufacturer Part no.0430451200)..... 10
Figure 2.7 Power connector photo 10
2.3 Running the BIOS Setup Program 10
2.4 Installing the Drivers for Win XP 11

Chapter 3 Hardware & Peripheral Installation ..13

3.1 Overview of Hardware Installation & Upgrading 14
3.2 Installing the Storage Device and Memory 14
3.3 Installing Optional Accessories 14
3.3.1 Installing TREK-572 Peripheral Modules 14
Figure 3.1 Install peripheral in the system 14
3.3.2 Installing the MiniPCI Type WWAN, SIM Card and Coin Battery 15
Figure 3.2 Mini PCI type WWAN module, SIM card and coin battery from bottom view 15
3.3.3 Installing mSATA Card 15
Figure 3.3 Installing mSATA Card..... 15
Figure 3.4 Install cable clip 15
3.3.4 GPS Module..... 16
3.4 Paired with TREK-303 Specifications 16

Chapter 4 Jumper Settings and Connectors 17

4.1 Setting Jumpers and Switches..... 18
4.1.1 Locations of the Jumpers and Connector 18
Figure 4.1 Locations of jumpers and connectors on top side the motherboard 18
Figure 4.2 Locations of jumpers and connectors on bottom side of the motherboard 19
Figure 4.3 Locations of jumpers and connectors on bottom side of the daughter board 19
4.1.2 Jumpers 20

Table 4.1: Jumpers on Motherboard 20
Table 4.2: Jumpers on Daughter Board 20
4.1.3 Connectors 20
Table 4.3: Connectors on Motherboard 20
Table 4.4: Connectors on Daughter Board 20
4.2 Jumper Settings 21
4.2.1 CMOS Clear for External RTC (JP2) 21
Table 4.5: Clear CMOS / External RTC (JP1) 21
4.2.2 Power Input Voltage Setting (JP1) 21
Table 4.6: Power Input Voltage Selection (JP1) 21
4.2.3 Pin 9 of COM3 Function Selection (JP3) 21
Table 4.7: Pin 9 of COM3 Function Selection (JP3) 21
4.2.4 Pin 9 of COM8 Function Selection (J3) 21
Table 4.8: Pin 9 of COM8 Function Selection (JP3) 21
4.2.5 DI/GPS Function Selection (SW2) 22
Table 4.9: Pin 9 of COM8 Function Selection (J3) 22
4.2.6 COM Port Interface 22
Table 4.10: Serial Port Function 22
Table 4.11: Serial Port Settings 22

Chapter 5 Pin Assignments 23

5.1 Front Side Connectors 24
5.2 Rear Side Connectors 24
5.3 Power Connector (12/24 V; 9 ~ 32 V) 24
Table 5.1: Power Connector 24
5.4 Smart Display Connector 25
Table 5.2: Smart Display Connector 25
5.5 RS-232 Connector (COM3, COM8) 25
Table 5.3: Table 5.5: RS-232 / RS-485 / J1708 Connector 25
5.6 RS-232 (COM9) / RS-485 (COM5) / J1708 (COM6) Connector 26
Table 5.4: RS-232 / RS-485 / J1708 Connector 26
5.7 DI / DO Connector 26
Table 5.5: DI / DO Connector 26
5.8 CAN / Video-In Connector 27
Table 5.6: CAN / Video-In Connector 27
5.9 LED Indicator 27

Chapter 6 Software Demo Utility Setup 29

6.1 Introduction 30
6.1.1 Execute J1939 Demo Utility 30
Figure 6.1 IMC demo utility 30
Figure 6.2 J1939 test - 1 Figure 6.3 J1939 test - 2 31
6.1.2 Execute CAN Demo Utility 31
Figure 6.4 CAN test 31
6.2 RTC Test 32
Figure 6.5 RTC test - 1 Figure 6.6 RTC test - 2 32
Figure 6.7 RTC test - 3 Figure 6.8 RTC test - 4 32
Figure 6.9 RTC test - 5 33
6.3 Vehicle Power Management 33
6.3.1 Power Management Mechanism 33
6.3.2 Power Management Utility Program 35
6.3.3 Power Management Parameter Settings 35
Figure 6.10 Power management test utility 35
6.3.4 TREK-572 Power Consumption 35

6.4 GPIO Test 36
Figure 6.11 DI/O test 36
Figure 6.12 Digital in 36
Figure 6.13 Digital out 37
6.5 Video in Test 37
Figure 6.14 Video test utility 37
6.6 Dead Reckoning 38
6.7 G-sensor (3-axis Accelerometer) 38

Appendix A TREK-303 39

A.1 TREK-303 Specifications 40
Table A.1: TREK-303 Specification 40
Table A.2: Smart Display Connector 41
Figure A.1 Hotkey utility 43

Chapter 1

General Information

This chapter gives background information on the TREK-572 In-Vehicle Computing Box.

Sections include:

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

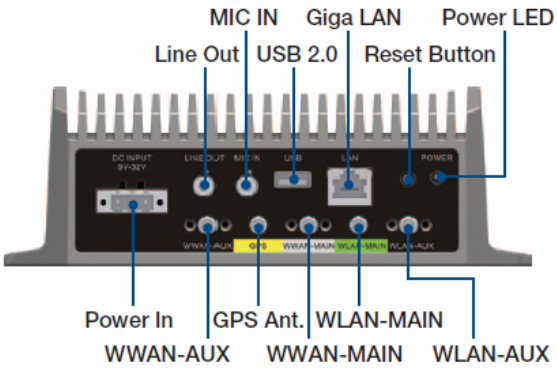
1.1 Introduction

TREK-572 is a vehicle-grade, Intel Atom E3815 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-572 provide dual CAN Bus ports which can support several kind of vehicle protocols for vehicle diagnostics and driver behavior management. Built-in wireless communications enable TREK-572 to send important driver/vehicle/location/ cargo information back to the control center. Smart Display Port makes TREK-572 can be easily paired with TREK's in-vehicle smart. Display by one –cable –connection. With these charming features. TREK-572 becomes the most compact and economical solution for fleet management.

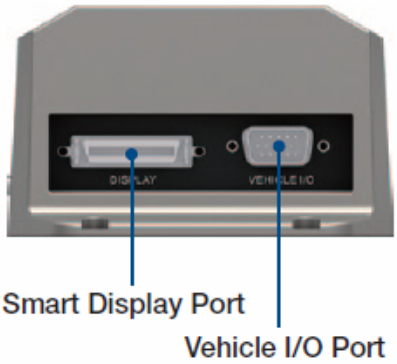
I/O Connectors

Back



Front

Left Side



1.2 General Specifications

Key features

„ Intel Atom Baytrail-I SOC inside

One-Cable-Connection to pair with TREK in-vehicle smart display (TREK-303/306)

Vehicle diagnostic interface with configurable protocols support: CAN (j1939, OBD-II / ISO-15765) and J1708 (J1578)

„ Built-in GNSS,WLAN,BT and WWAN Modules

„ Intelligent Vehicle Power Management: Ignition on/off delay, wake up event controls and system health monitoring and diagnostic.

„ Wide working temperature (-30~70℃), 12/24V Car power system compliant(ISO-7637-2)and Anti-shock/vibration(MIL-STD-810G & 5M3)

Specifications

„ **Dimensions:** (W x H x D): 188.9 x 63.5 x 105.9 mm

„ **Weight:** 1.15 kg

„ **Vehicle power feature:**

- Input voltage: 9 ~ 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 E3815(1C, 1.46GHz)

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

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

„

Storage:

Video output: 1 x LVDS output by Smart Display

- **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 S0~S4
- **Vehicle commutation port:**
  -Support CAN V2.0B up to 1000 kb/s
  -Support J1708

1 * USB2.0 port Type A

- **Audio:** One is for smart display, one is for line out phone jack(Audio source share with Smart Display)
  And mic in phone jack.
- **On Board modules:**
  - GPS:
    MAX-7Q (also support Gloness / AGPS)
  - RF:
    4G LTE MC7354
    WLAN: IEEE802.11a/b/g/n+Bluetooth
    V4.0
- **Giga-LAN :** Ethernet: support 1000/100/10Base-T
- **Operating temperature:** -30 ~ 70° C
- **Relative humidity:** 10 ~ 95% @ 50° C (non-condensing)
- **Shock:** 30 G peak acceleration (11 msec duration)
- **Certifications:** FCC, SAE J1455 class C, ISO 7637-2, SAE J1113
- **Vibration:** MIL-STD-810G

1.3 Dimensions

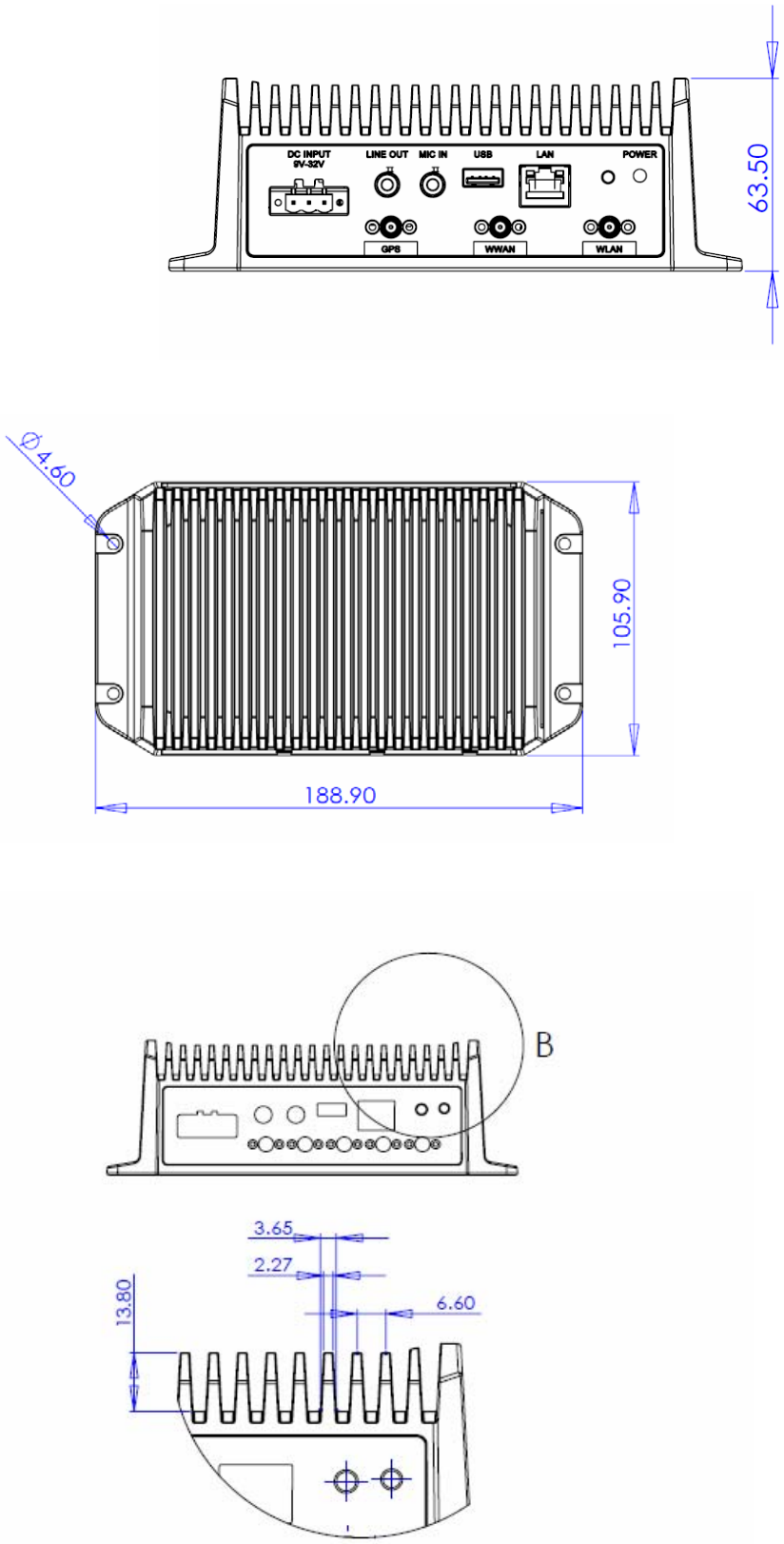


Figure 1.1 TREK-572 dimensions

Chapter 2

System Setup

This chapter details system setup on TREK-572

Sections include:

- A Quick Tour of the Computer Box
- Power define
- Running the BIOS Setup Program

2.1 A Quick Tour of the TREK-572 Computing Box

Before starting to set up the In-Vehicle Computing Box, take a moment to become familiar with the locations and functions of the controls, drives, connectors and ports, which are illustrated in the figures below. When the Computer box is placed inside truck glove cabinet or under the passenger's seat next to the driver, its front appears as shown in Figure 2.1.

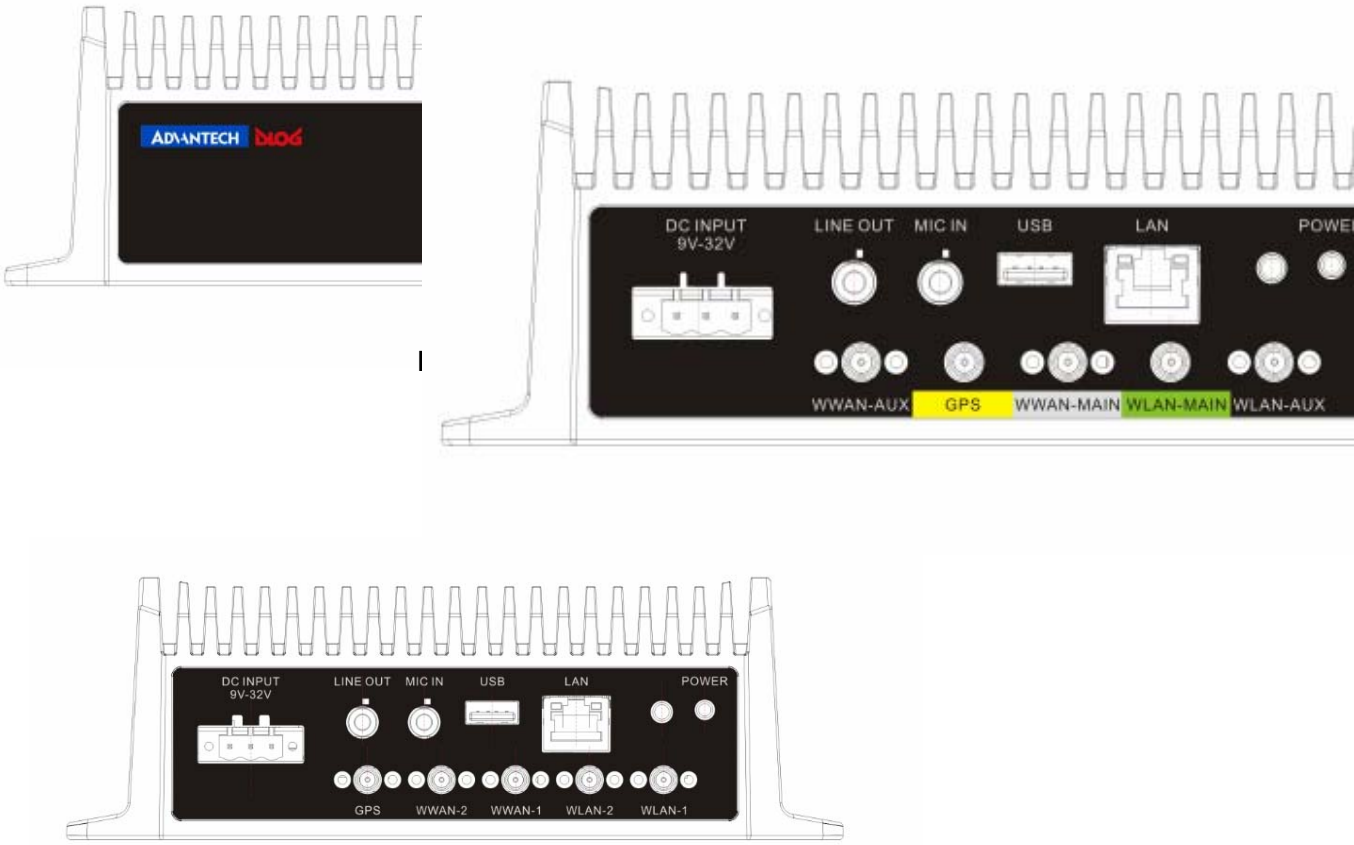


Figure 2.2 Rear view of TREK-572

2.2 Power Define

2.2.1 Connecting the Power Cord

Connect the three pin power cord to the DC inlet of the In-Vehicle Com- puting 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-572 supports an ignition on/off function so that you can power on/off the TREK-572 via the ignition signal/voltage and connect the TREK-572 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

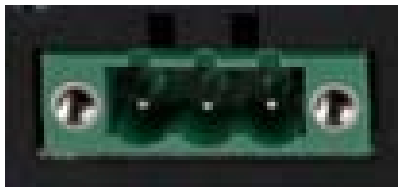


Figure 2.6 Power connector outlook

Pin	Signal
1	Ground
2	Power Input (9-32 VDC)
4	Ignition Input

2.3 Running the BIOS Setup Program

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-572

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-572. The following are instructions for accessory installation.

3.3.1 Installing TREK-572 Peripheral Modules

There are 4 screws on the bottom of TREK-572, if you want to install the peripherals in TREK-572, please use M2 type screw to open the system.

`

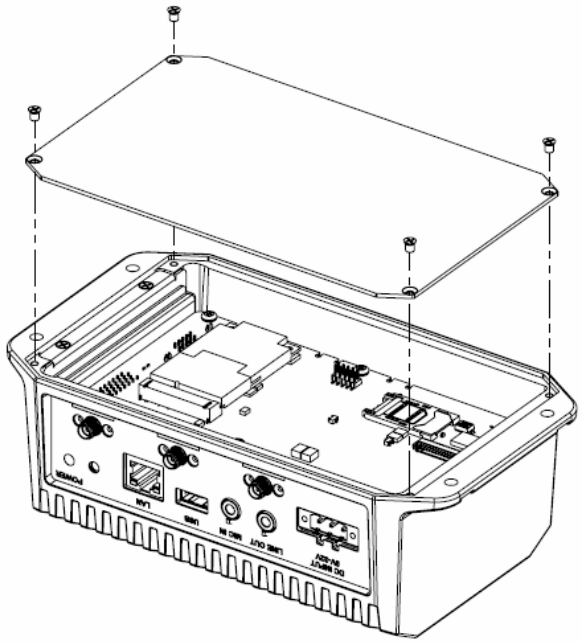


Figure 3.1 Install peripheral in the system

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

The Storage mSATA and SIM Card can be easily installed, just undo the 4 screws from the bottom cover to install WWAN, SIM card, and battery.

3.3.4 LTE and WIFI module

The LTE and WIFI module is not easy to install by the customer with breaking the warranty. If customers don't need LTE or WIFI module please go through customization process.

3.4 Paired with TREK-303 Specifications

See Appendix A

TREK-572 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.

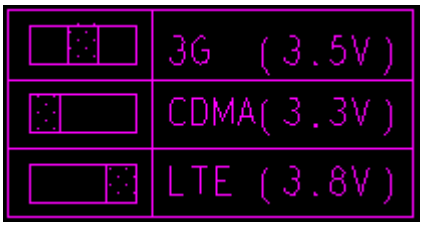
Sections include:

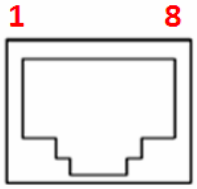
- Setting Jumpers and Switches
- Jumpers Setting

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.

	SW2 WWAN Voltage Setting
Description	For MC7354/MC8090/MC8092
Setting	Function
(2)	MC8090/MC8092(3.5V)
(1-2)	(3.3V)
(2-3)	MC7354(3.8V)

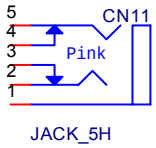




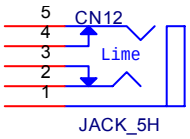
CN7 10/100/1000 LAN			
Pin	**Signal**	**Pin**	**Signal**
1	LAN_MDI0+	2	LAN_MDI0-
3	LAN_MDI1+	4	LAN_MDI1-
5	LAN_MDI2+	6	LAN_MDI2-

7	LAN_MDI3+	8	LAN_MDI3-

CN8 USB2.0			
Pin	**Signal**	**Pin**	**Signal**
1	+V5 (0.5A)	2	USB DATA -
3	USB DATA+	4	GND



CN11 MIC in			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	MIC Right
3	GND	4	GND
5	MIC Left		



CN12 Line out			
Pin	**Signal**	**Pin**	**Signal**
1	GND	2	Line out Right
3	GND	4	GND
5	Line out Left		

Chapter 5

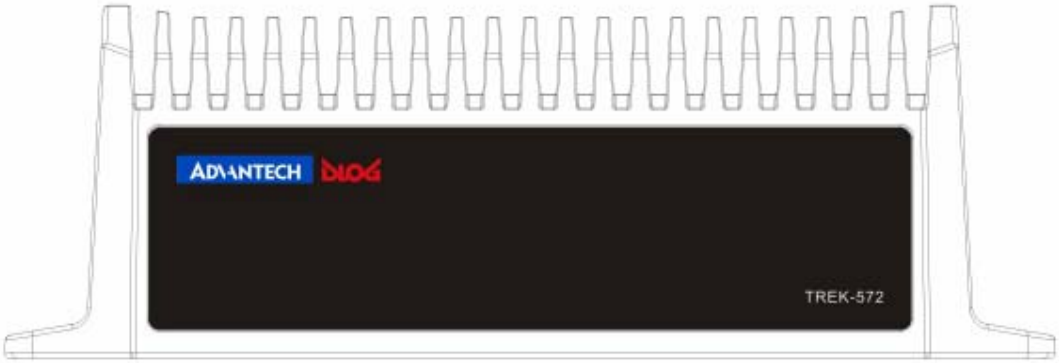
Pin Assignments

This chapter explains pin assignments on the TREK-572

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

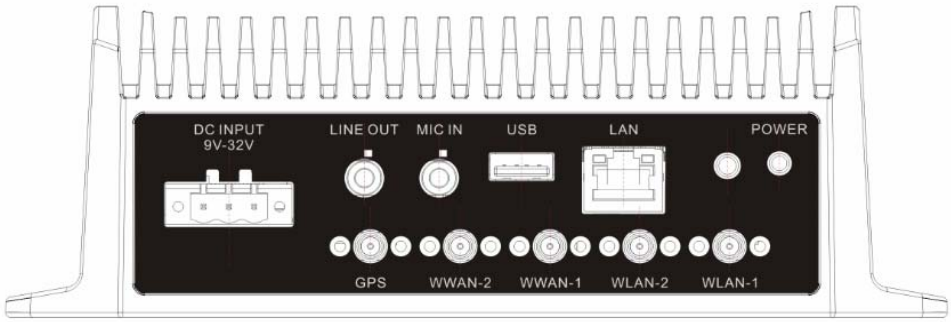
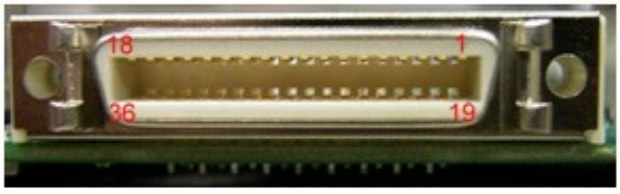


Table 2.2: Power Connector

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

5.3 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

5.4 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-572

Sections include:

- Introduction
- How to Set up Demo Utility

6.1 Introduction

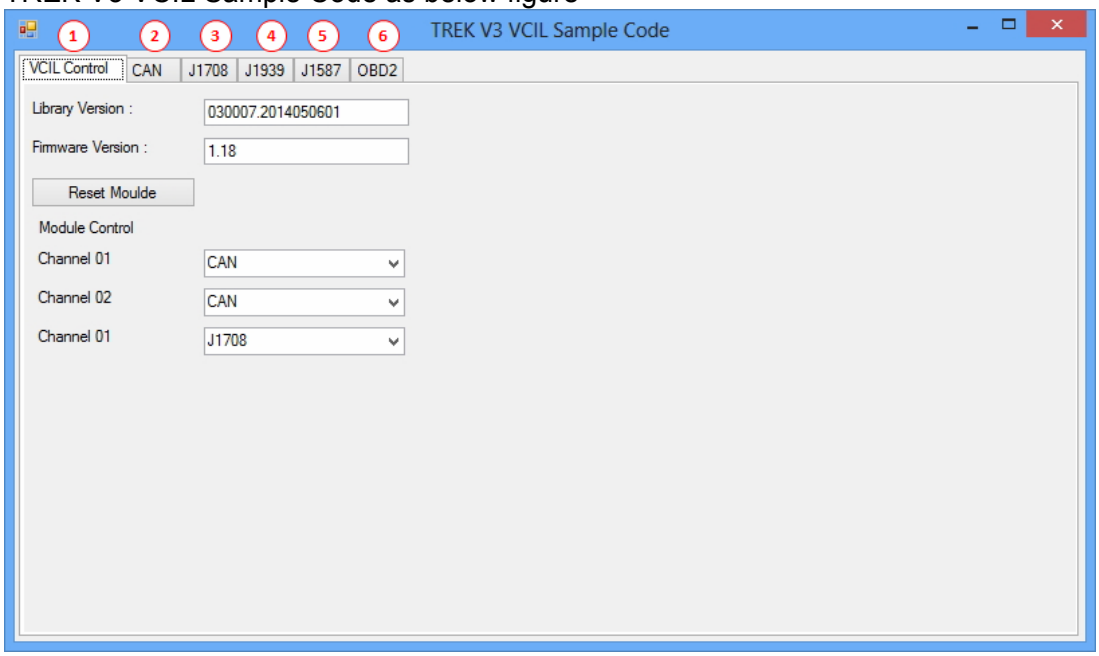
To make the hardware easier to access for programmers, Advantech has developed and demo program in order to let customer test the functions on TREK-572. This document describes detailed information for each Advantech demo program so that application developers can become more familiar with using them.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

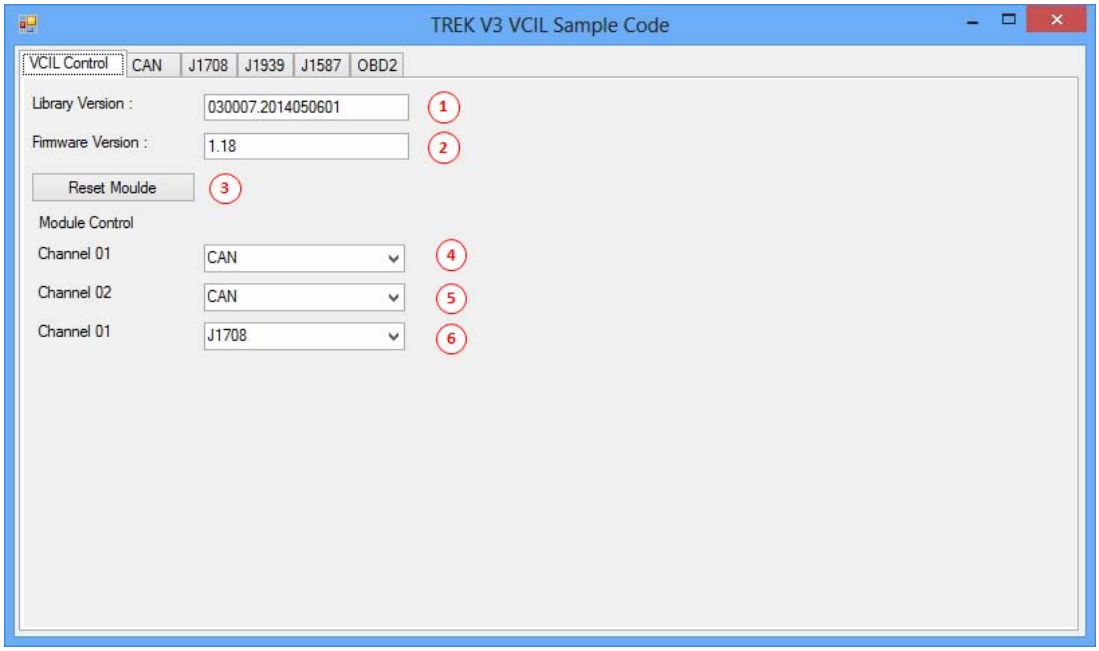
6.1.1 System Menu

TREK V3 VCIL Sample Code as below figure



- VCIL Control page
- CAN page
- J1708 page
- J1939 page
- J1587 page
- OBD2 page

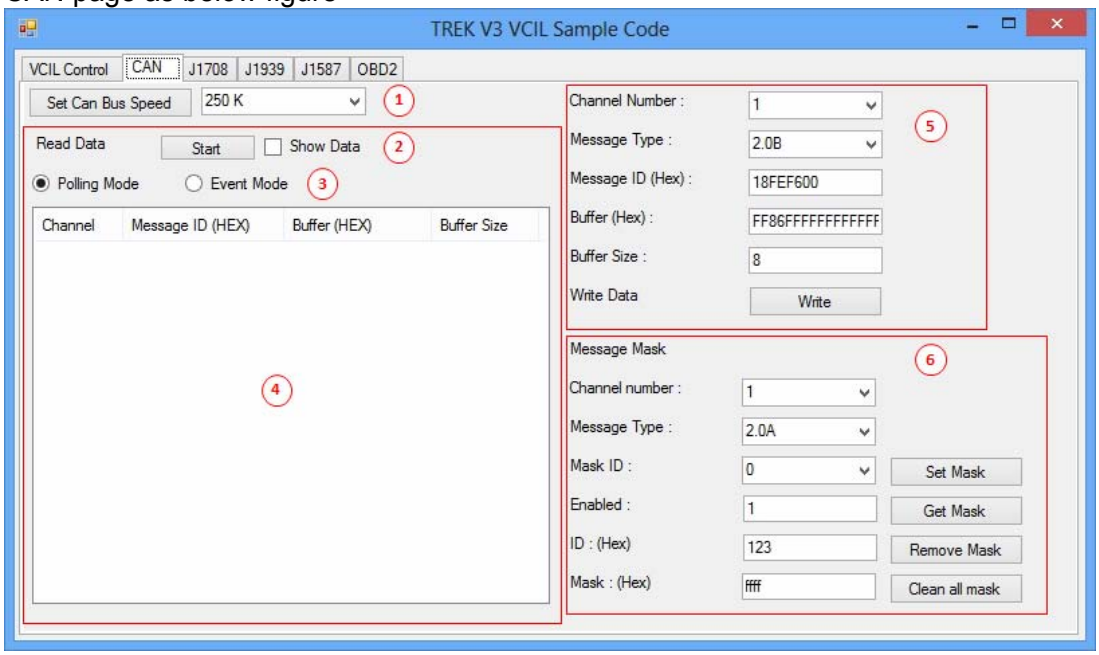
VCIL Control Page
VCIL Control page as below figure



- 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.

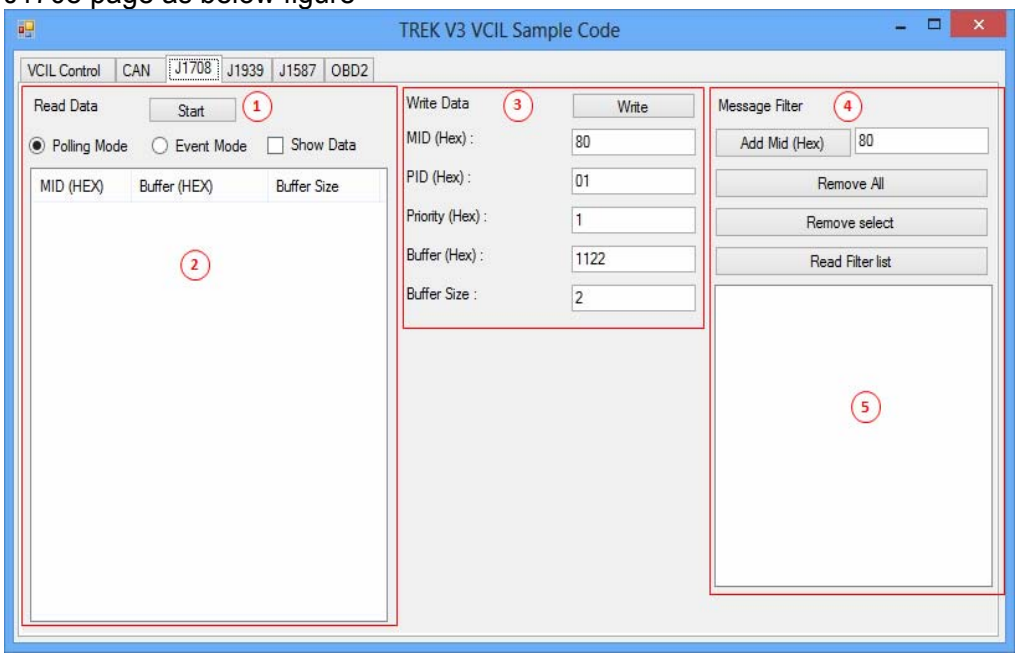
CAN Page
CAN page as below figure



- 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

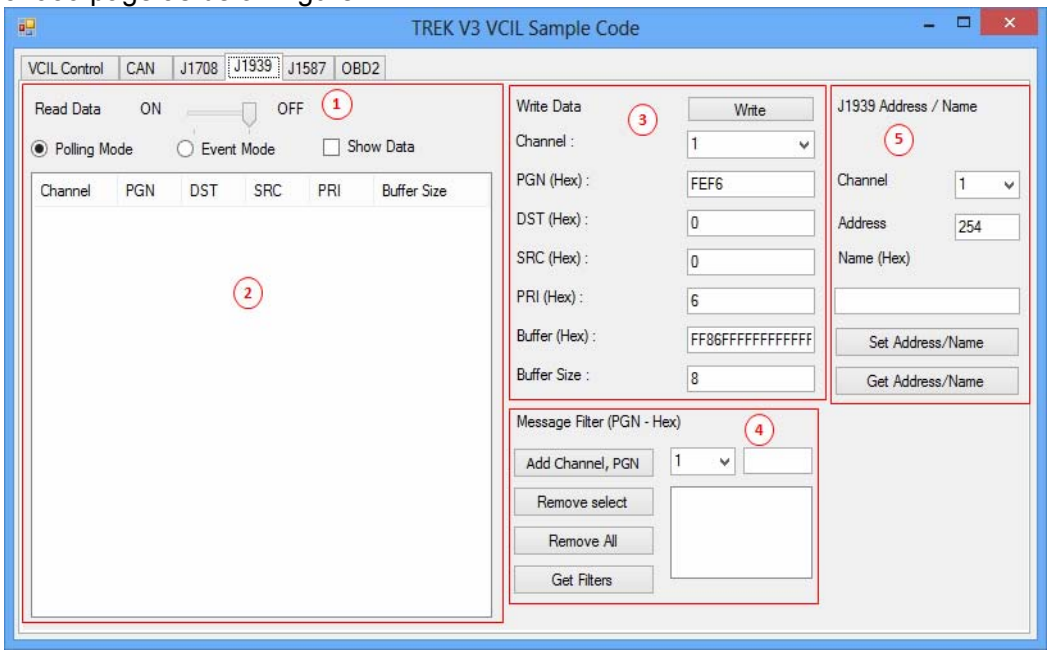
J1708 page as below figure



- 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

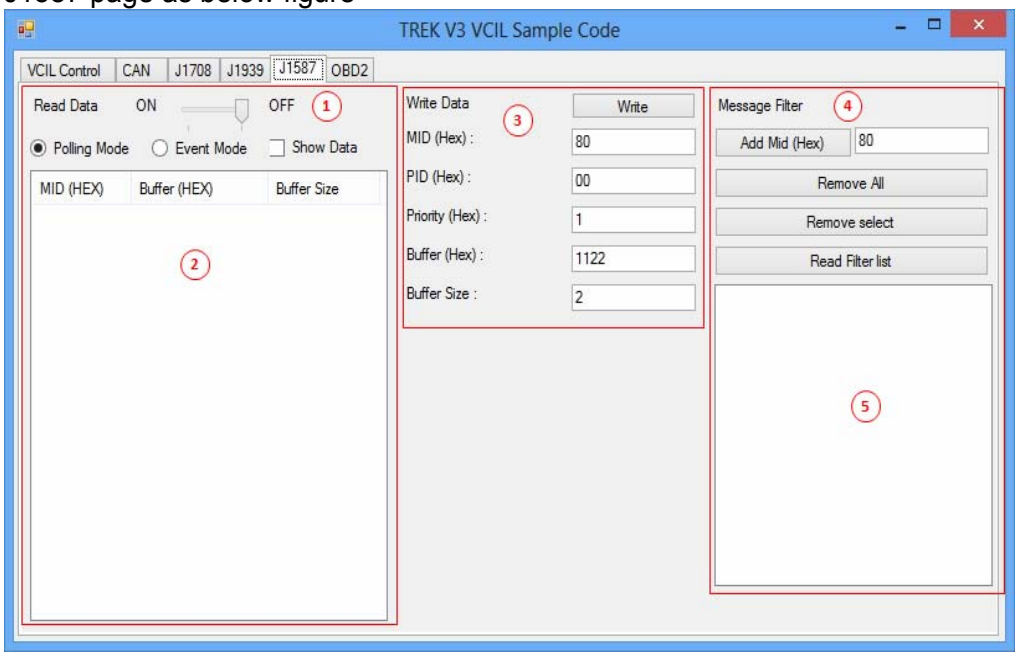
J1939 page as below figure



- 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

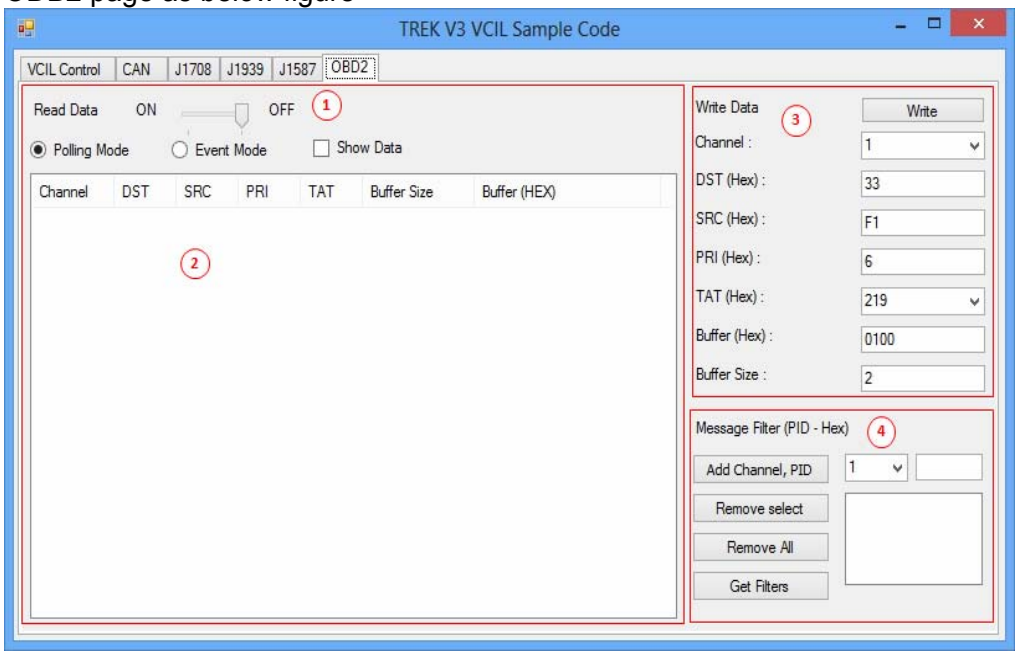
J1587 page as below figure



- 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

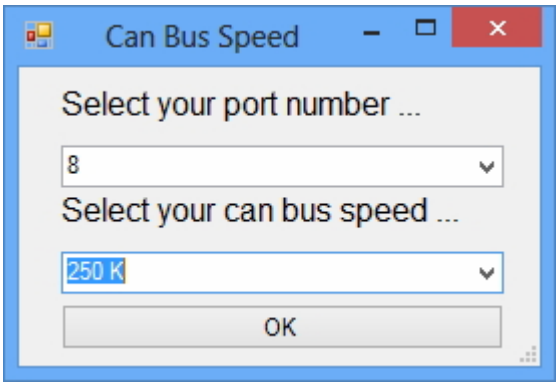
ODB2 page as below figure



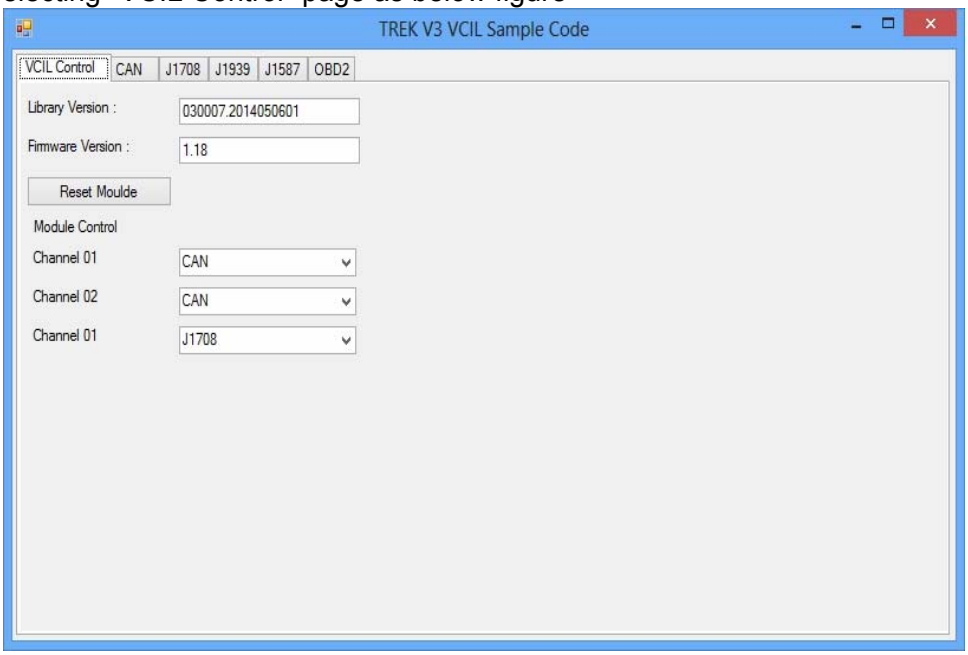
- Read Data control (Press "Start" to monitor bus to read)
- Read Data list
- Write Data control
- ODB2 bus message filter control

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



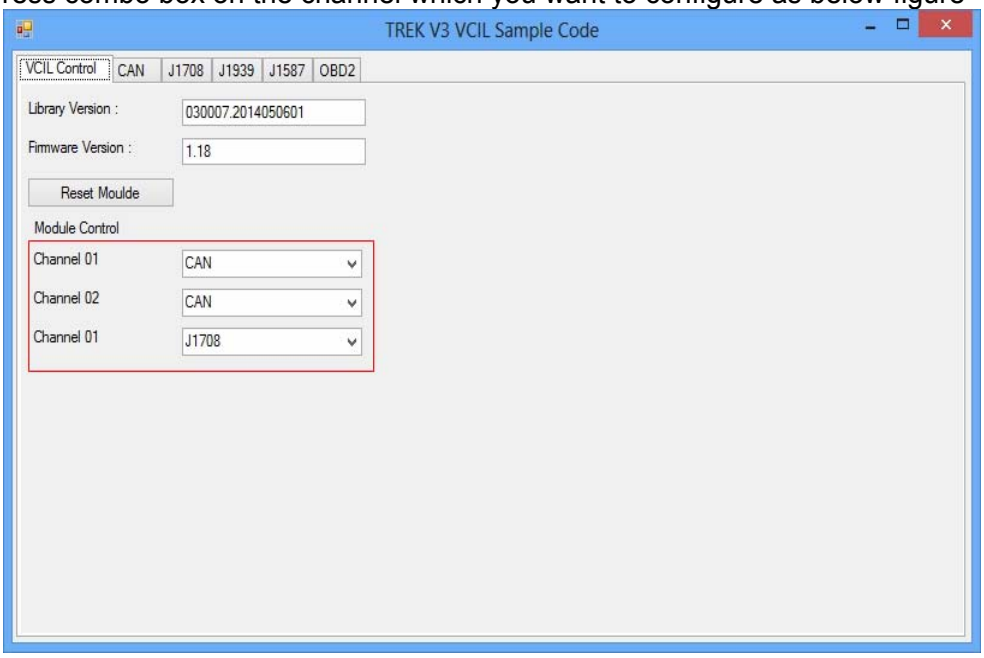
3. Selecting "VCIL Control" page as below figure



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

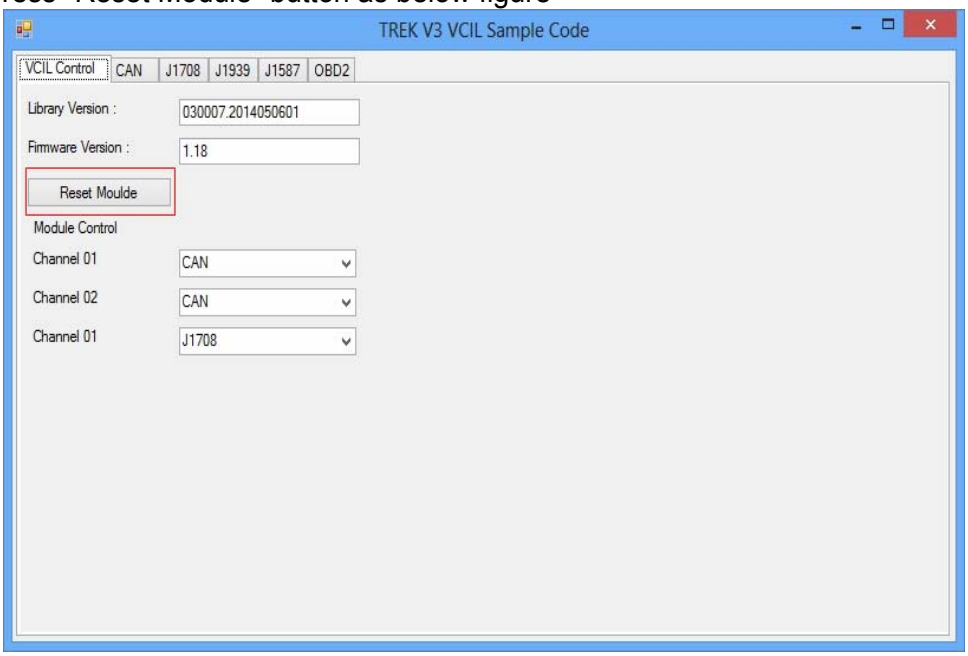


3. Selecting Bus type

   Note: Each channel only can select one bus type at same time.

Reset Module

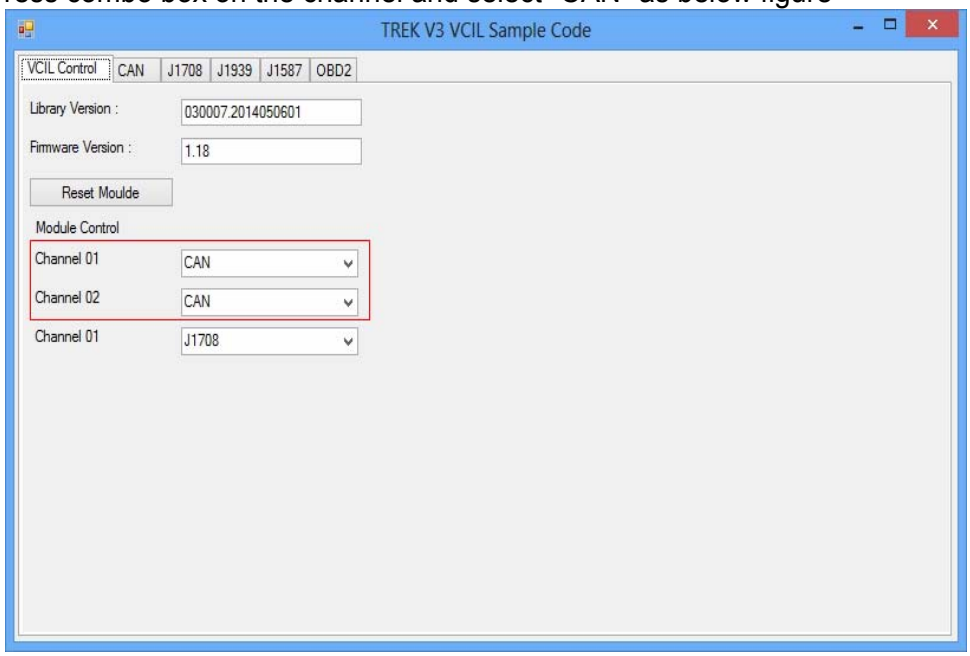
1. Selecting "VCIL Control" page
2. Press "Reset Module" button as below figure



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

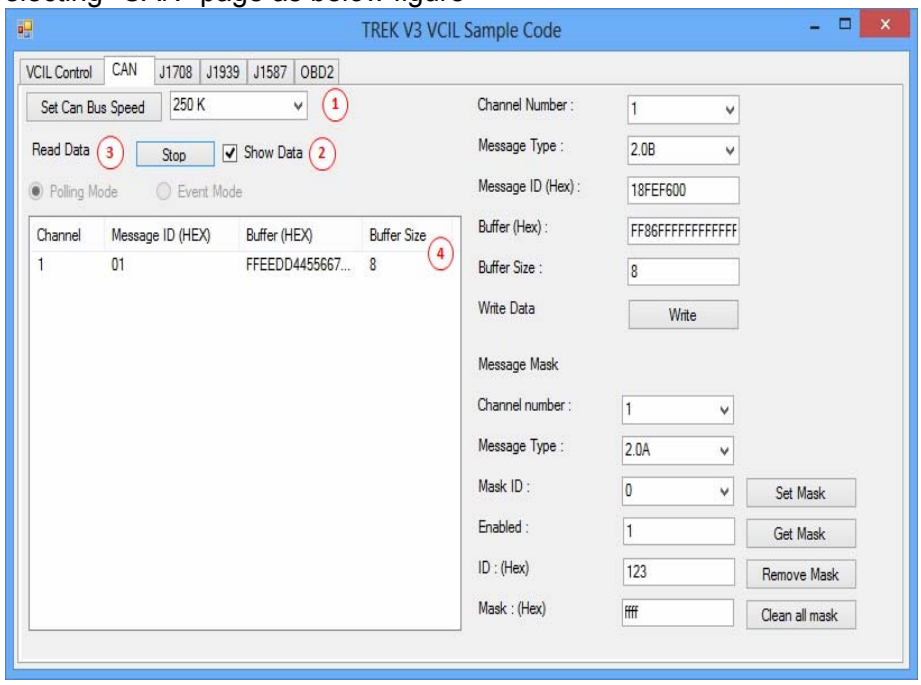
6.1.3 Testing CAN

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

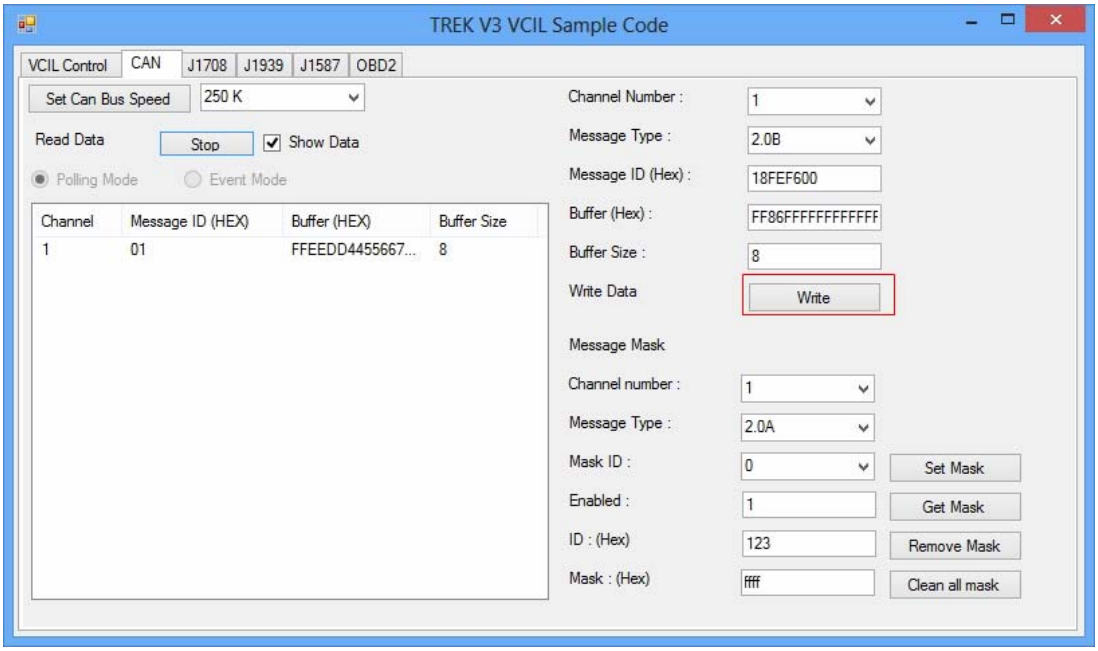


Set CAN bus speed. For example 250K

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

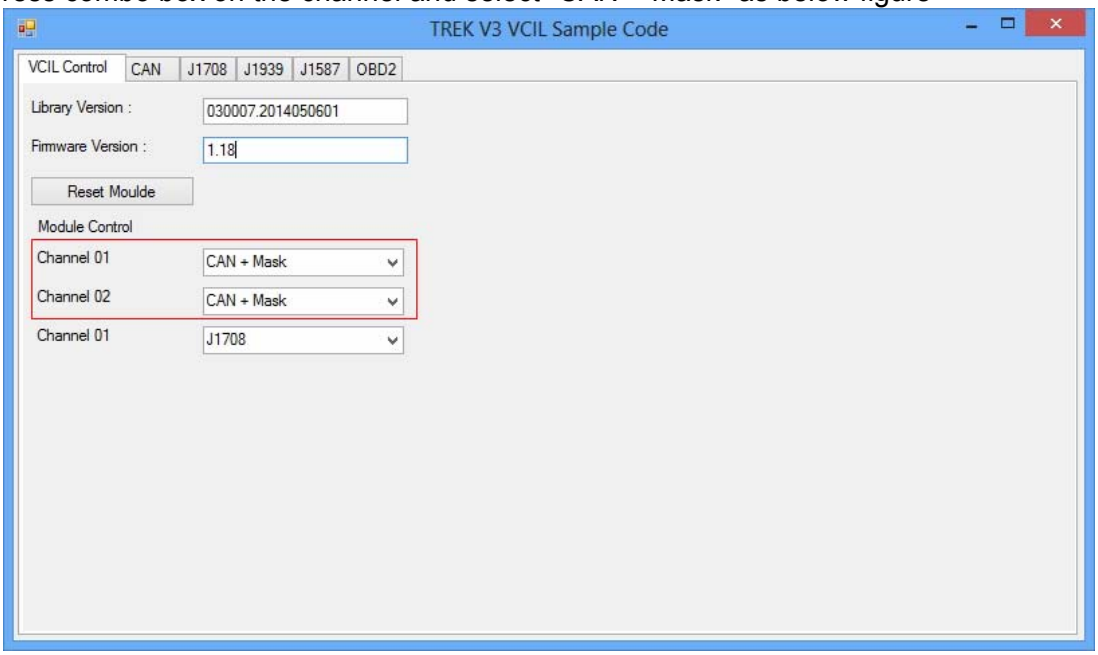


Set CAN bus speed. For example 250K

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

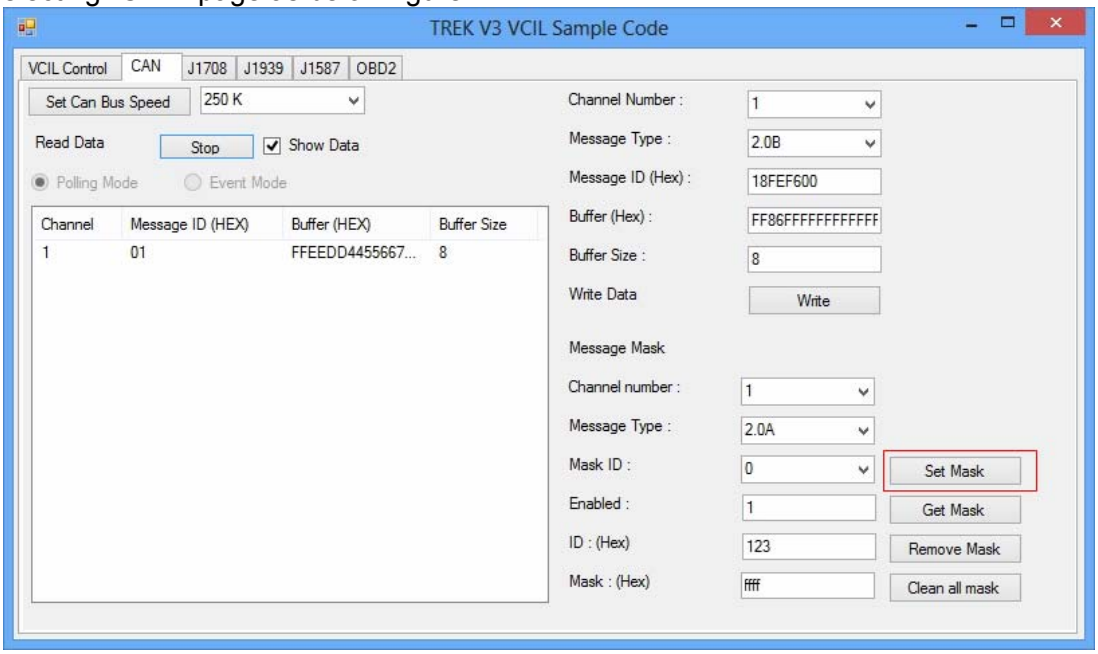
Testing Message Mask

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



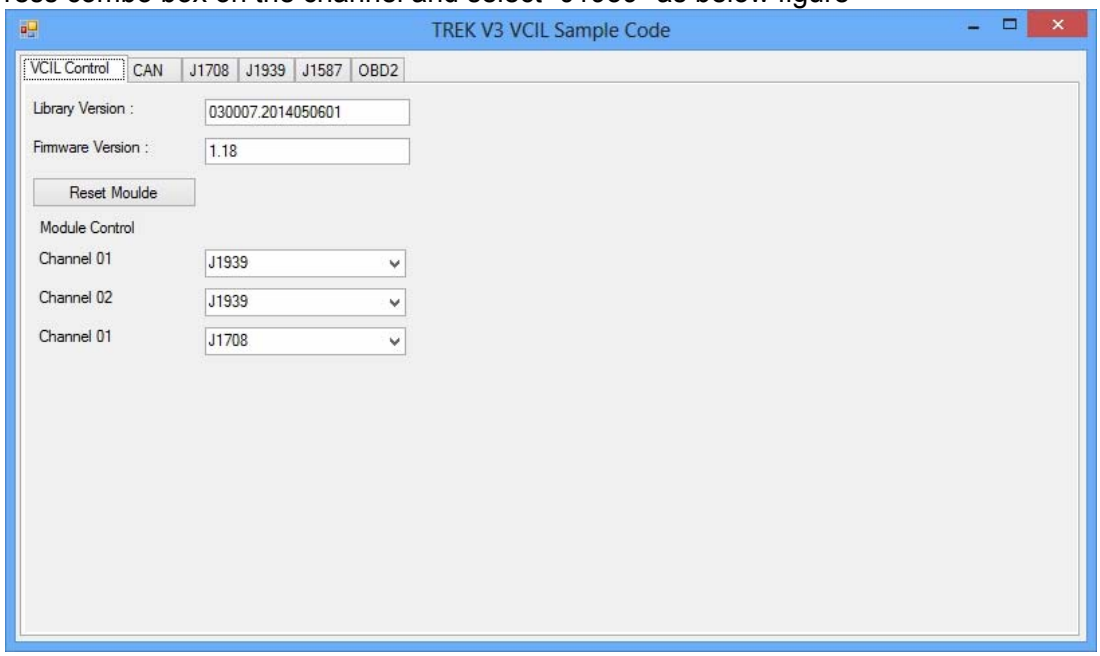
   Set CAN bus speed. For example 250K
2. Configure the Message mask
3. Press "Set Mask" button to apply the mask to bus
4. You should see the mask was applied on the bus.
5. If you set a mask to bus. You should not see the specified CAN ID on the read data list if the ID not passed for the mask

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.

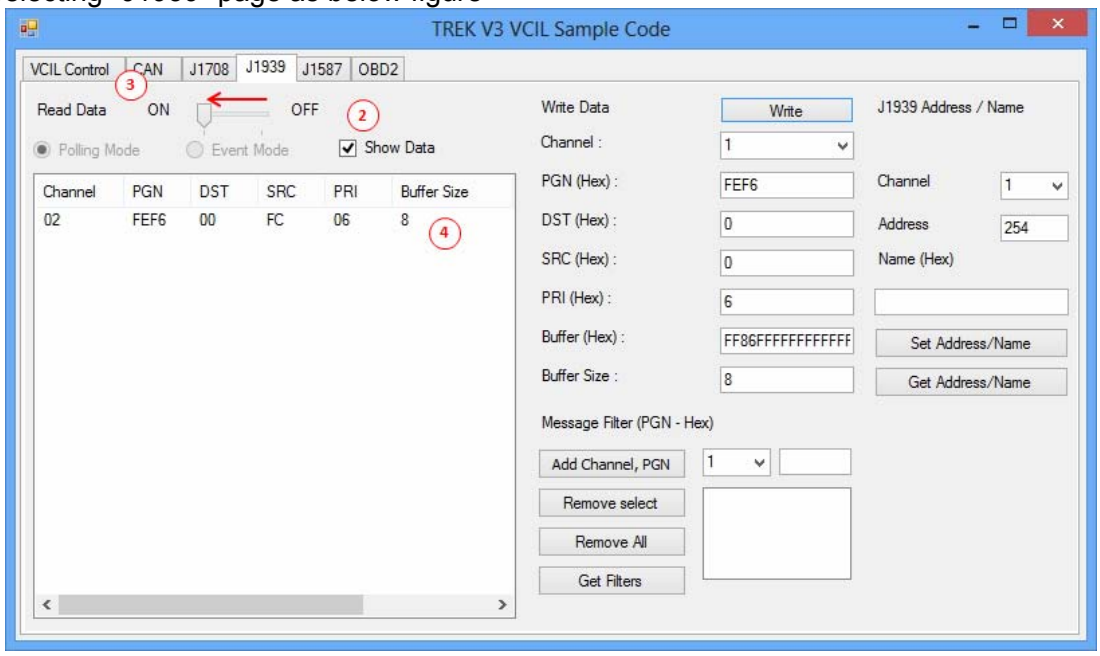
6.1.4 Testing J1939

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



Reading Data

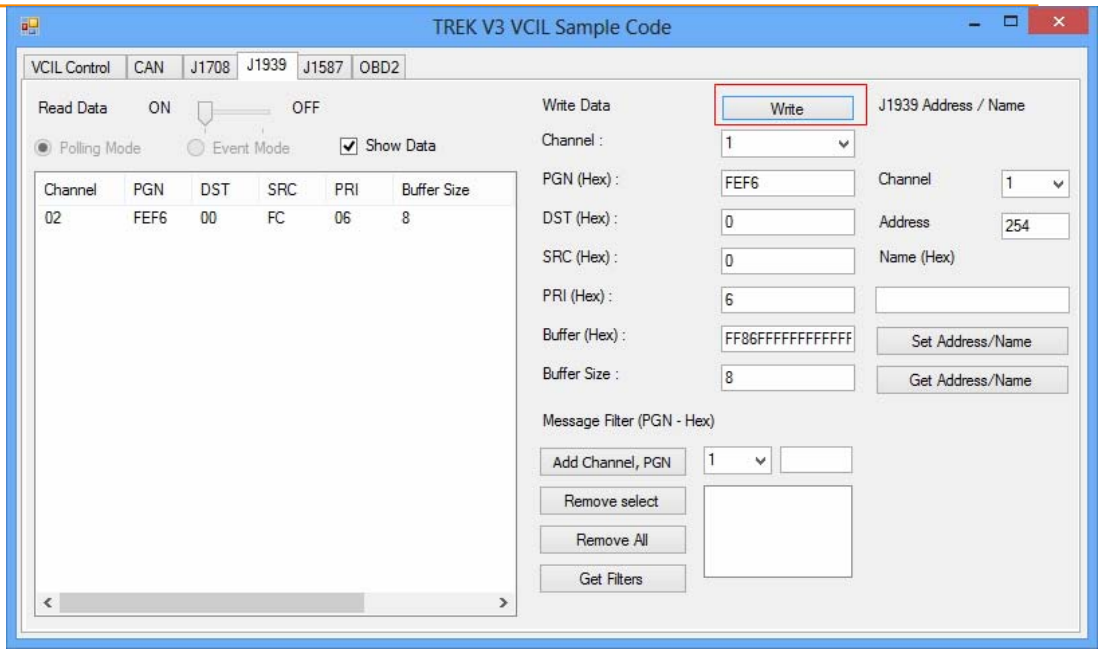
1. Selecting "J1939" page as below figure



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

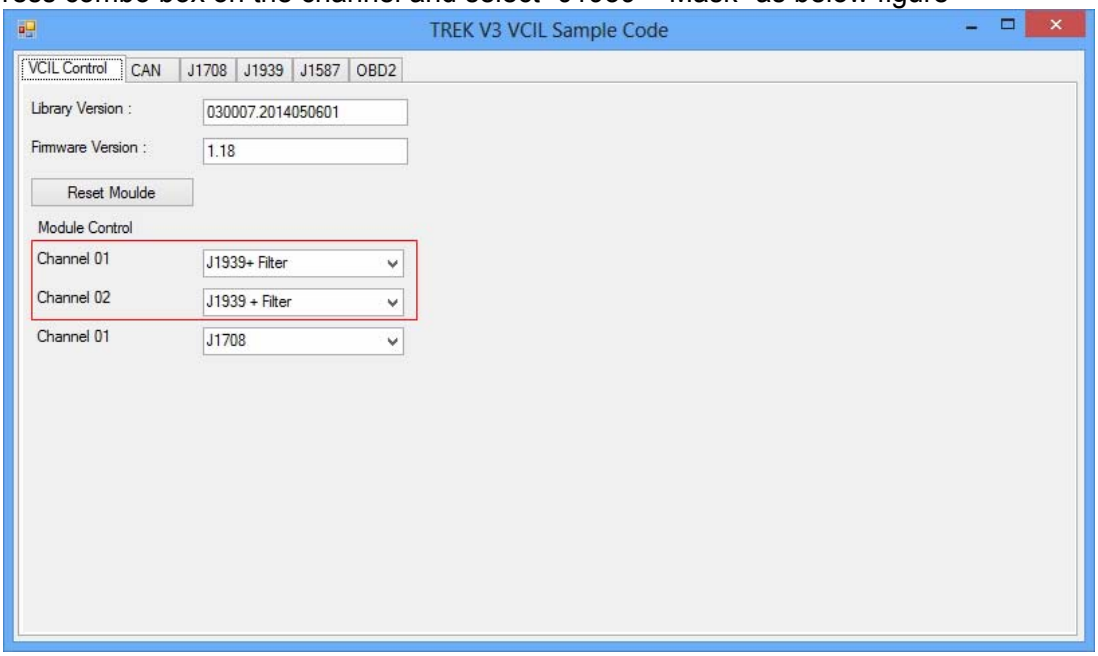
1. Selecting "J1939" page as below figure



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

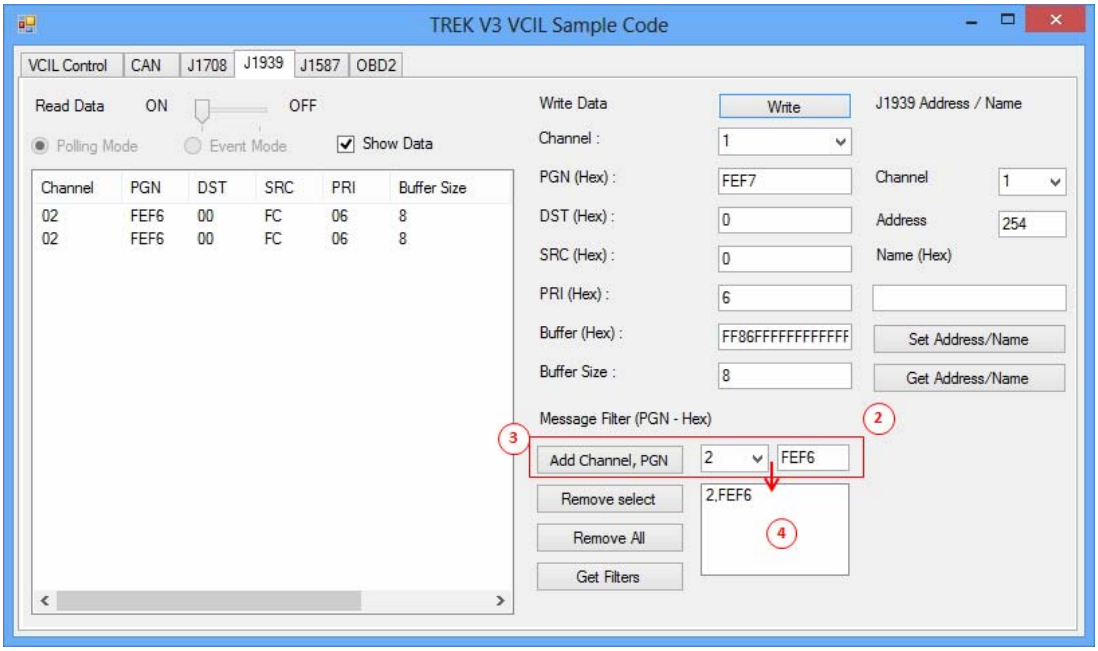
Testing Message Filter

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

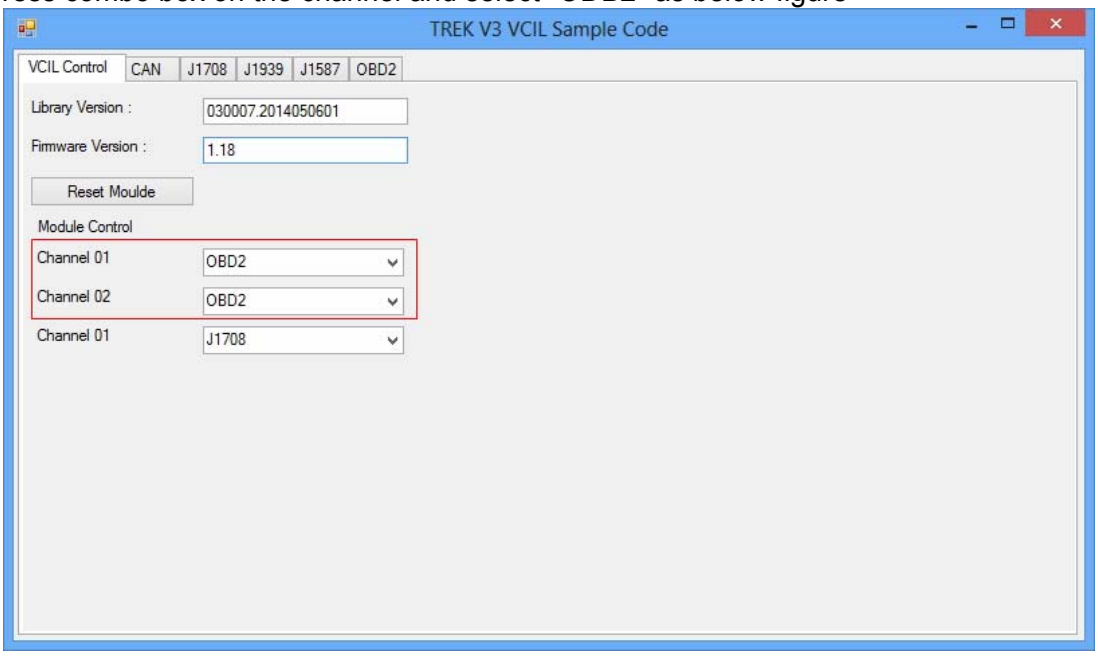


2. Select Channel and specified PGN to filter
3. Press "Add Channel, PGN" button to add the rule to filter
4. You should see the filter was applied on the bus
5. The system ignores all PGN is not on the list

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

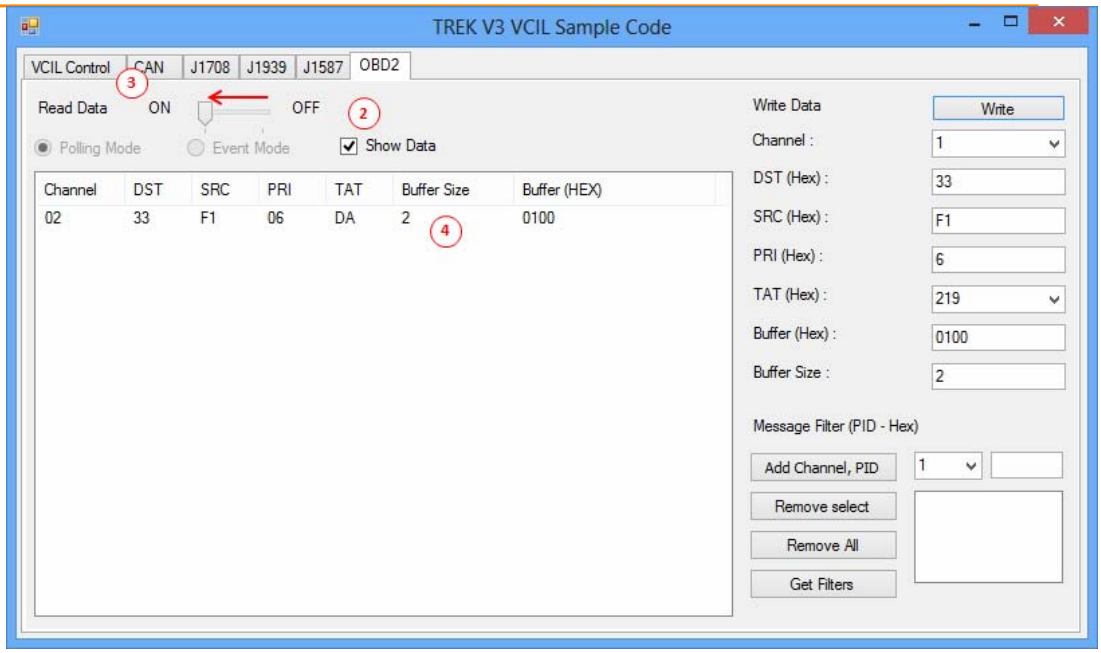
6.1.5 Testing ODB2

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



Reading Data

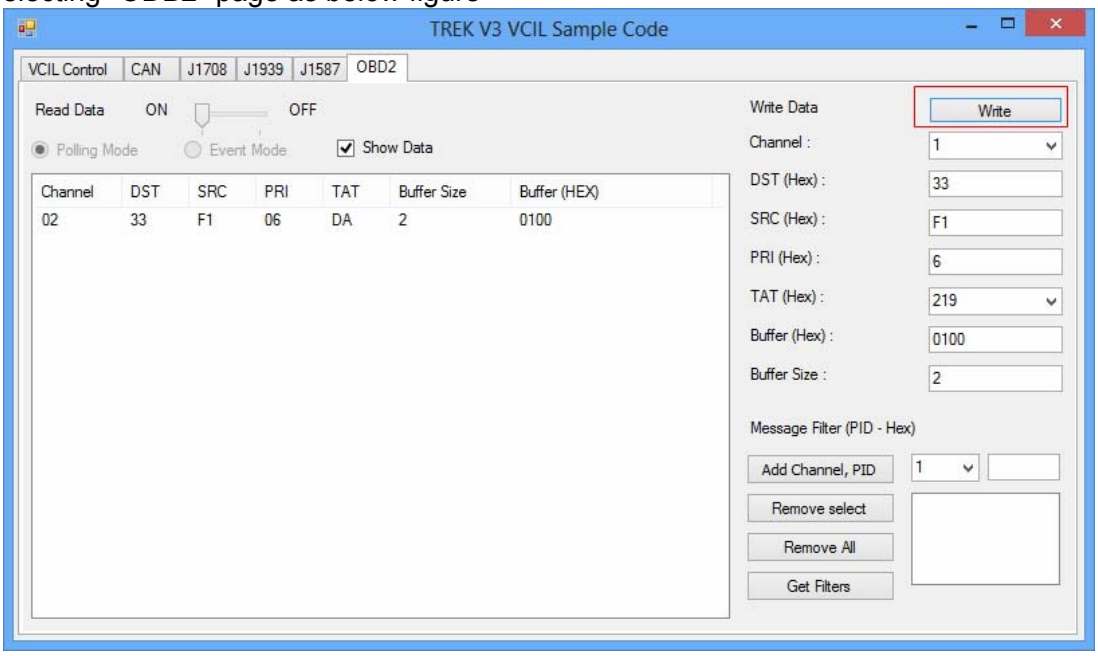
1. Selecting "ODB2" page as below figure



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

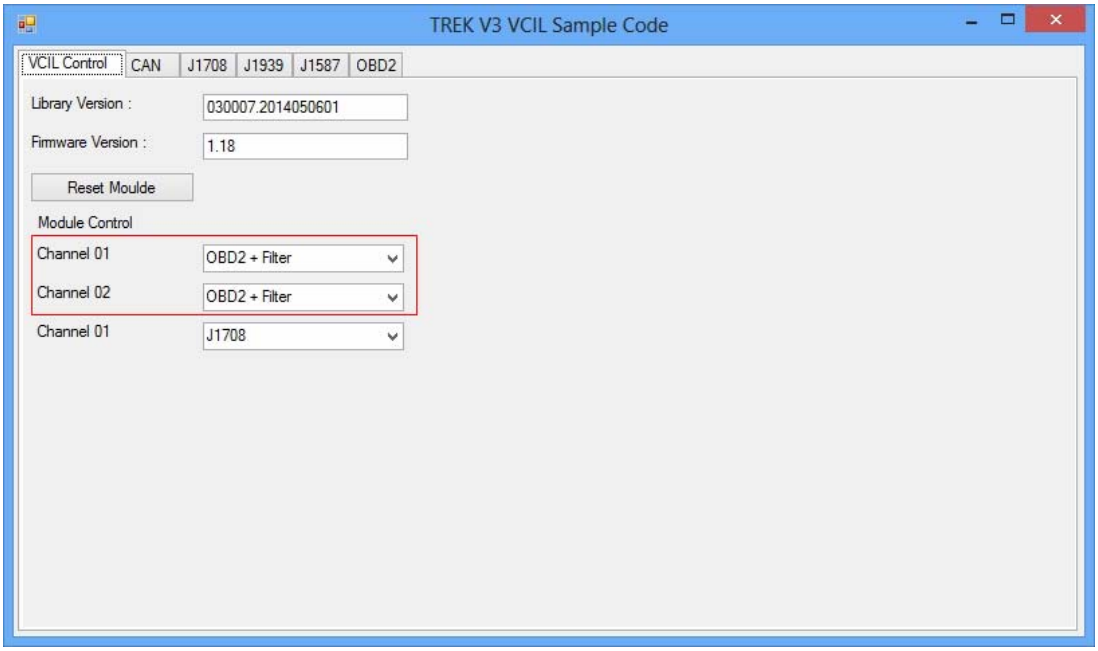
1. Selecting "ODB2" page as below figure



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

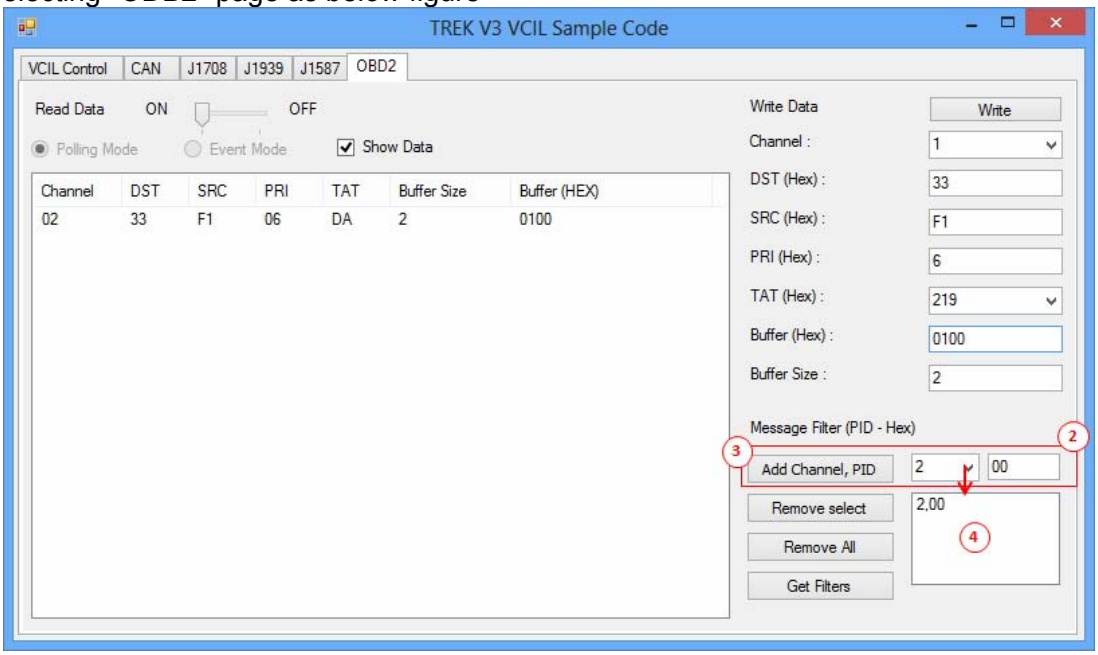
Testing Message Filter

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

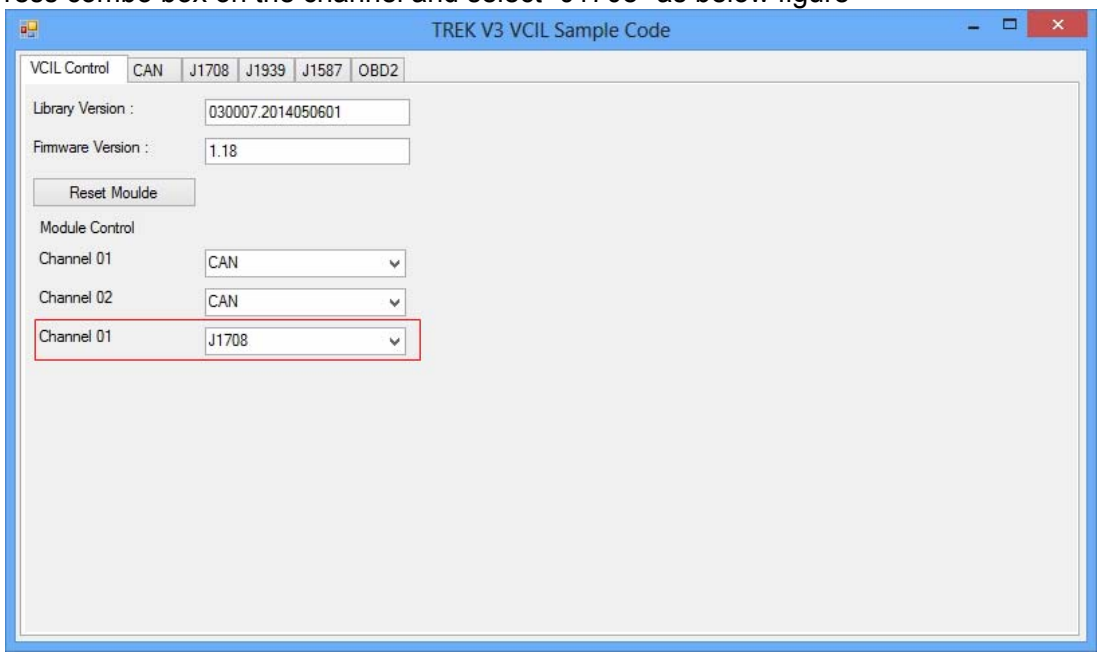


2. Select Channel and specified PID to filter
3. Press "Add Channel, PID" button to add the rule to filter
4. You should see the filter was applied on the bus
5. The system ignores all PID is not on the list

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

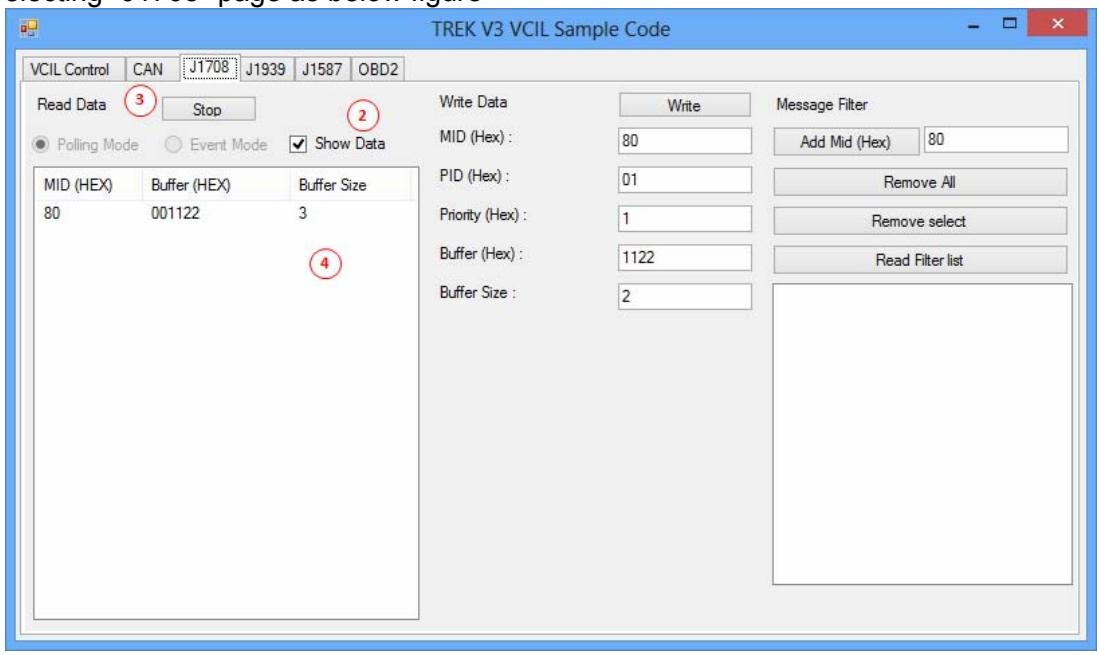
6.1.6 Testing J1708

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



Reading Data

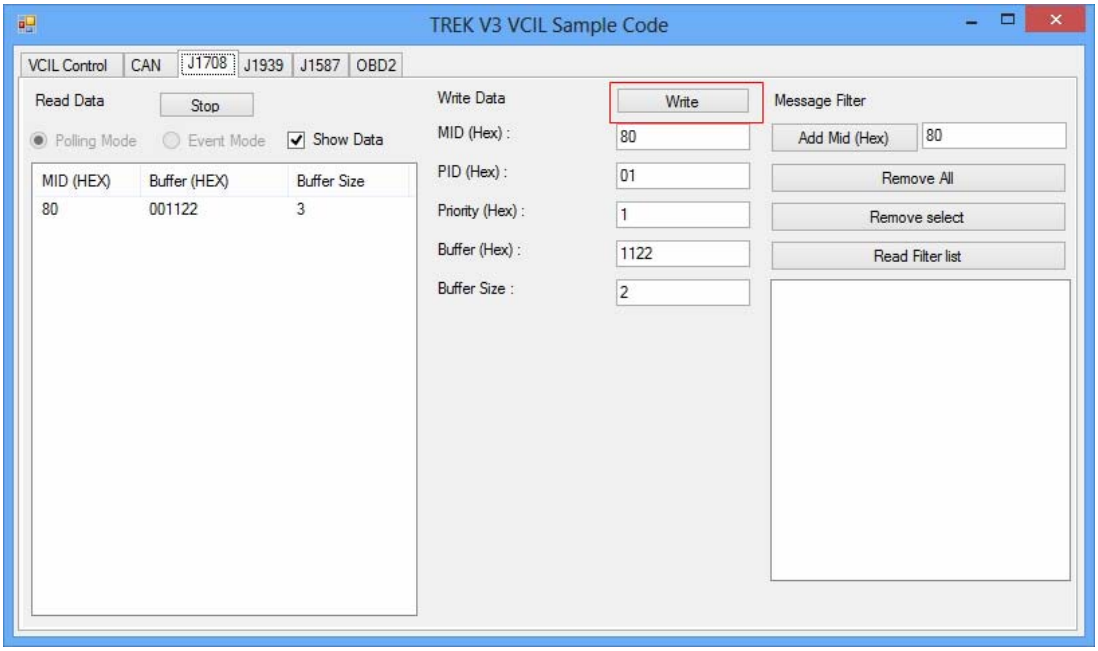
1. Selecting "J1708" page as below figure



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

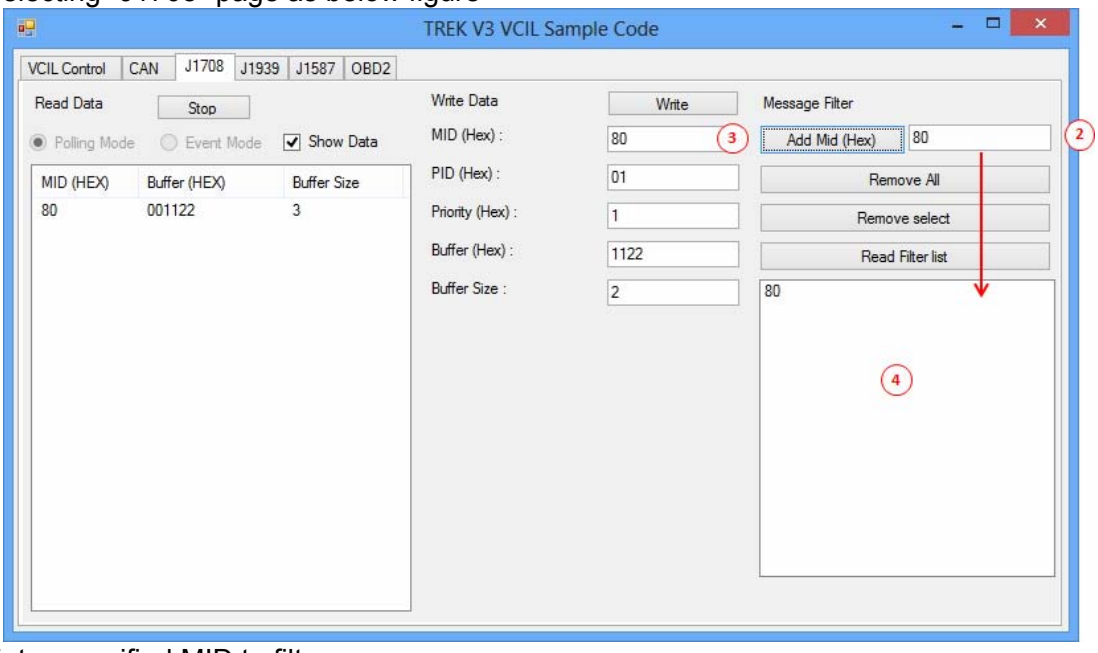
1. Selecting "J1708" page as below figure



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

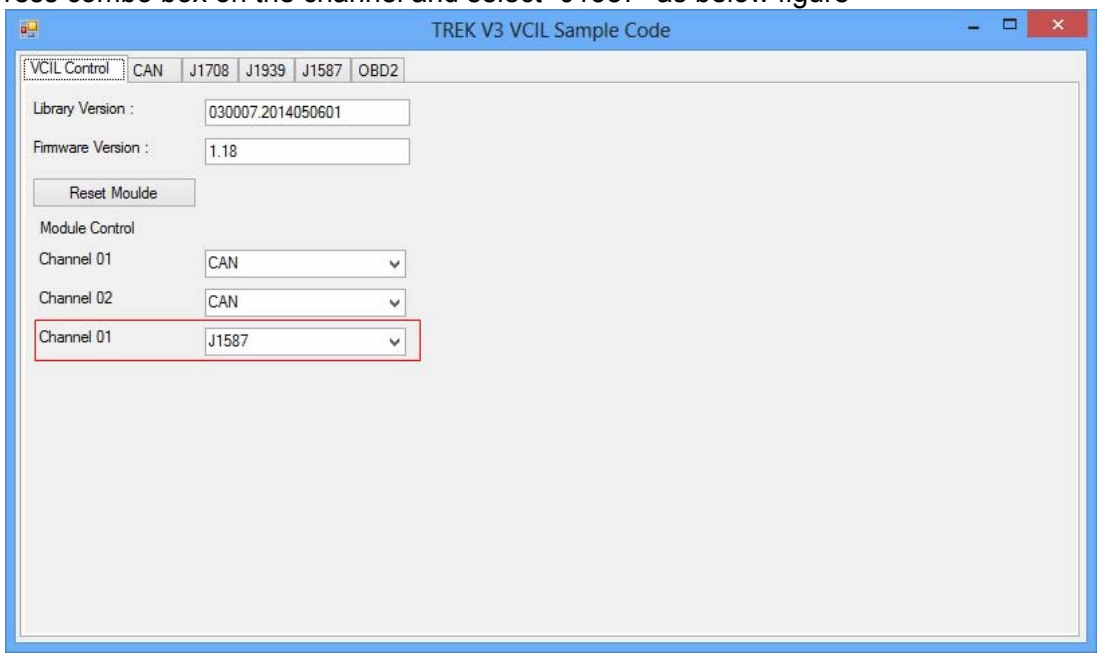
1. Selecting "J1708" page as below figure



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

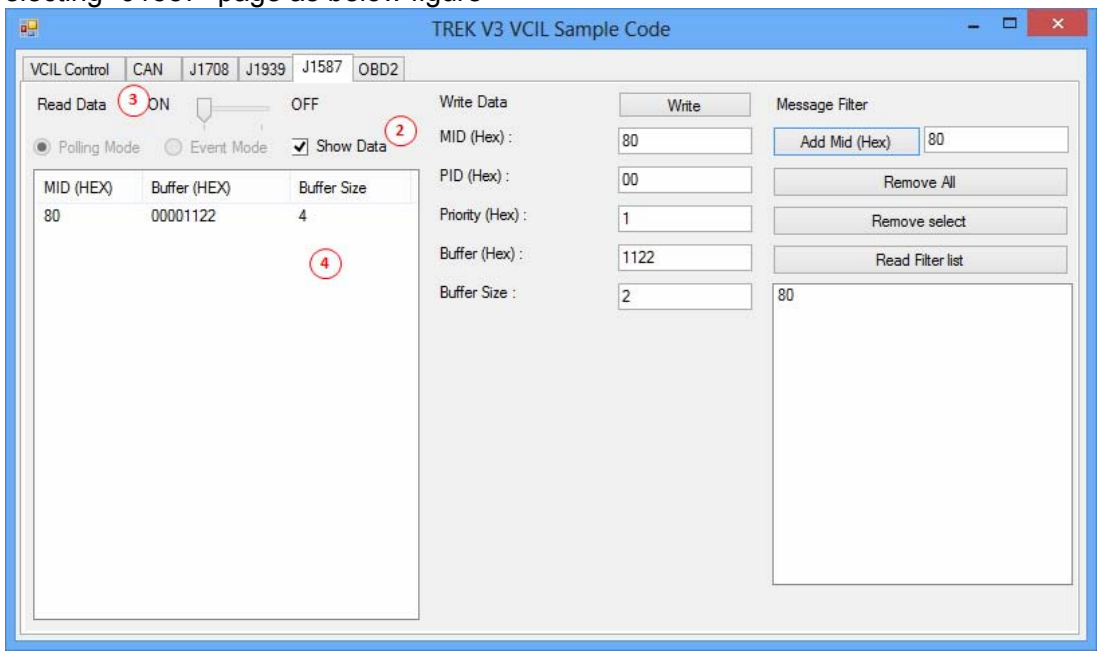
6.1.7 Testing J1587

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



Reading Data

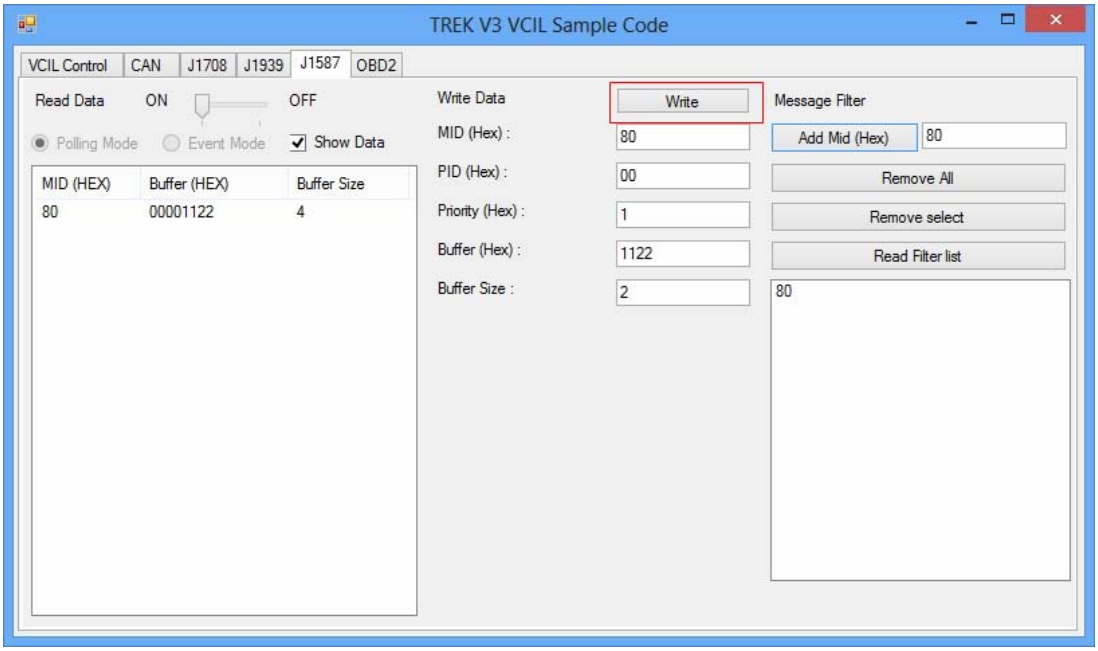
1. Selecting "J1587" page as below figure



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

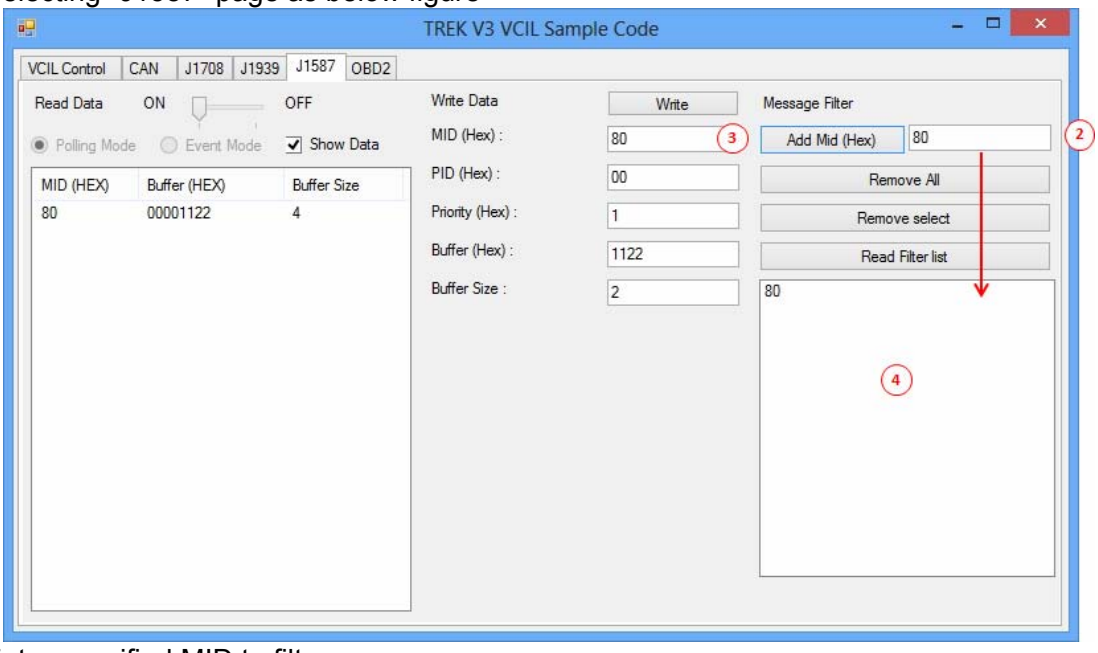
1. Selecting "J1587" page as below figure



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.

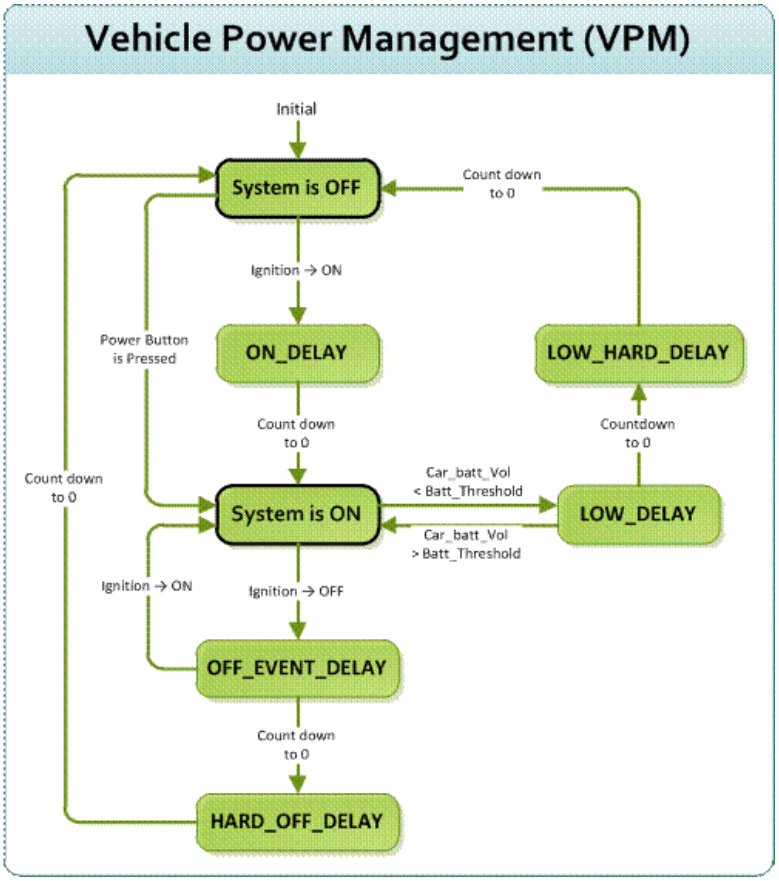
„ Low battery protection

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

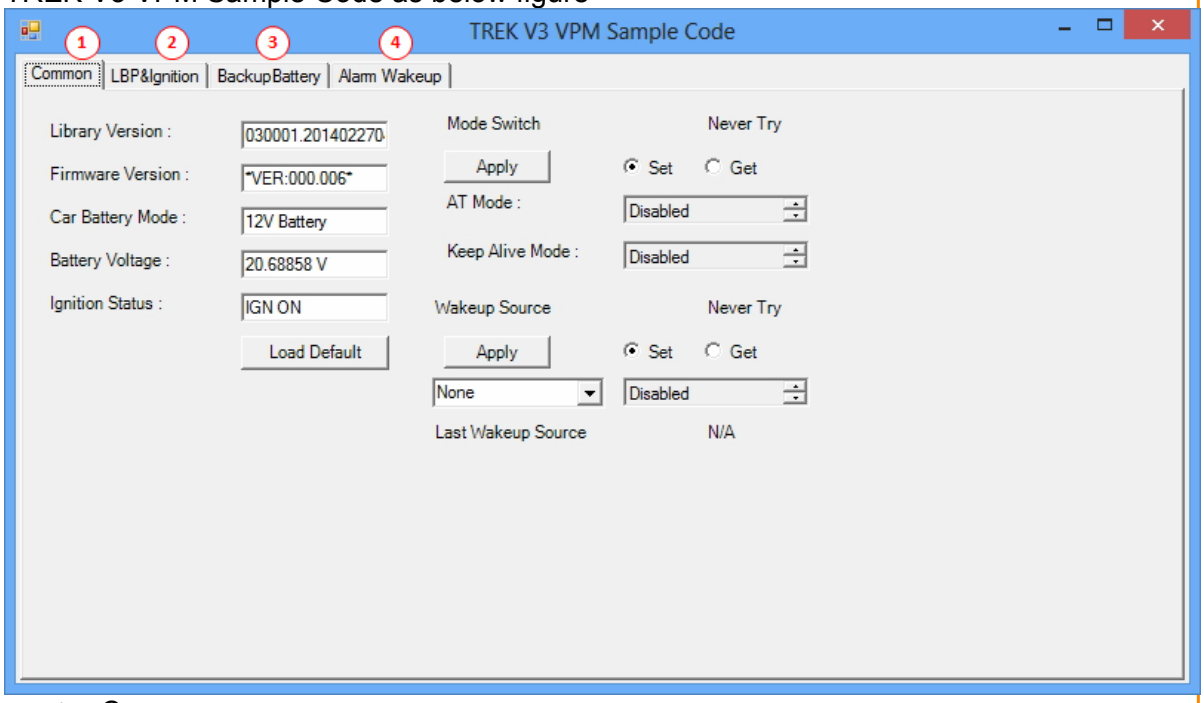


6.3.2 Power Management demo program

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

System Menu

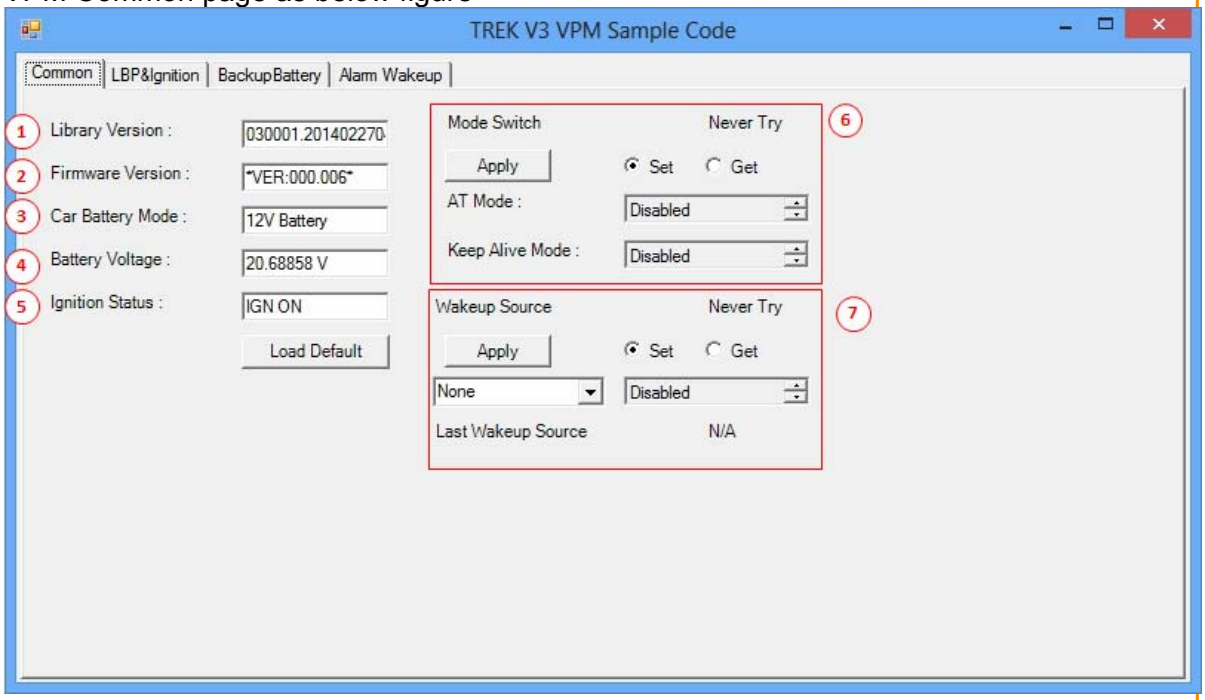
- TREK V3 VPM Sample Code as below figure



1. Common page
2. Low Battery Protection & Ignition Control page
3. Backup Battery Information page
4. Alarm Wakeup Control page

Common page

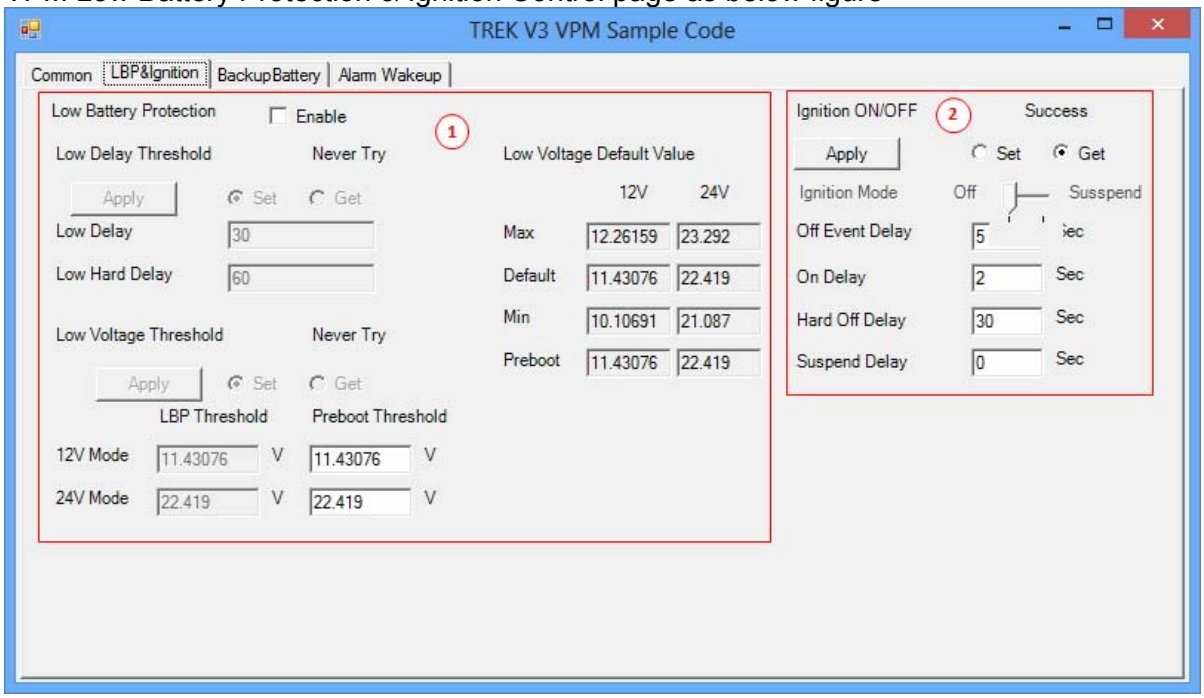
- VPM Common page as below figure



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

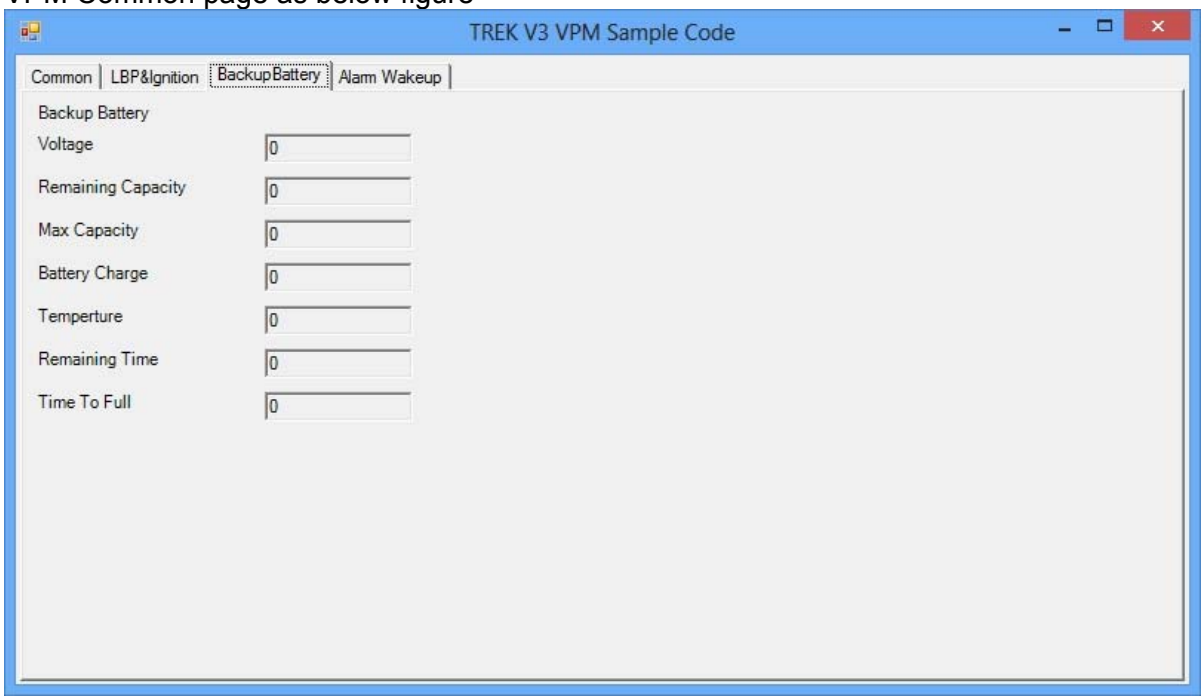
- VPM Low Battery Protection & Ignition Control page as below figure



1. Low Battery Protection Control
2. Ignition Control

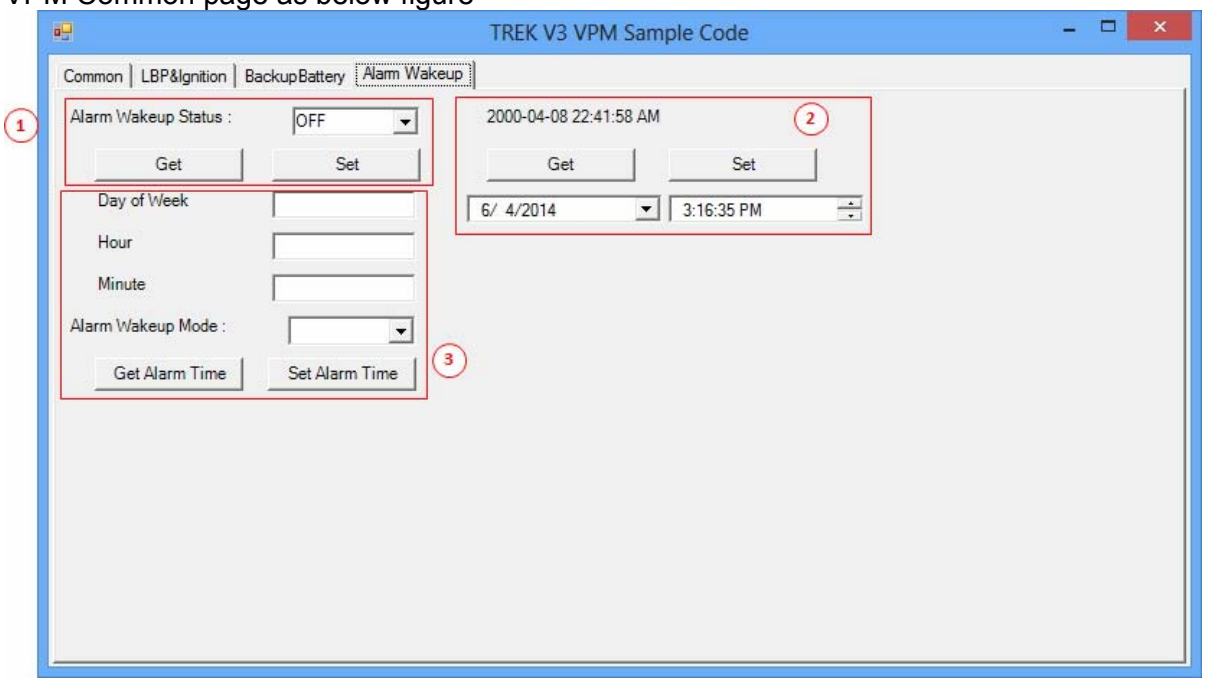
Backup Battery Information page

- VPM Common page as below figure



Alarm Wakeup Control page

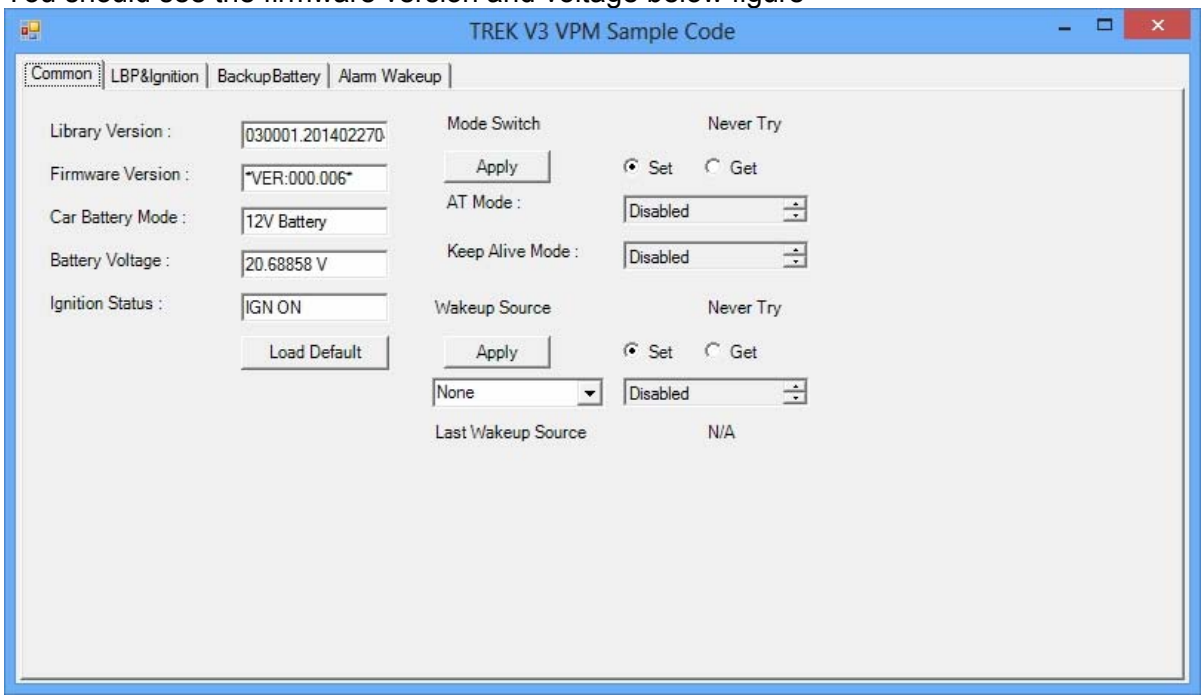
- VPM Common page as below figure



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

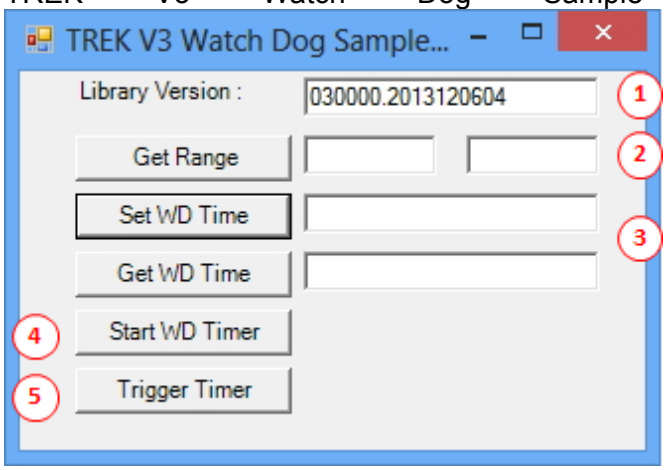


6.4 WatchDog Sample Code

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

System Menu

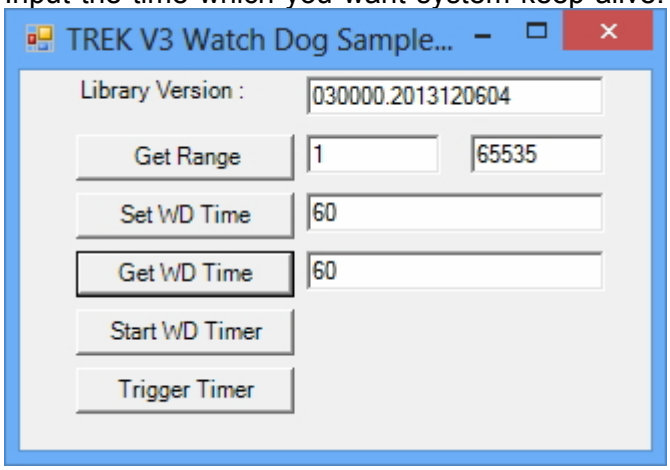
- TREK V3 Watch Dog Sample Code as below figure



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

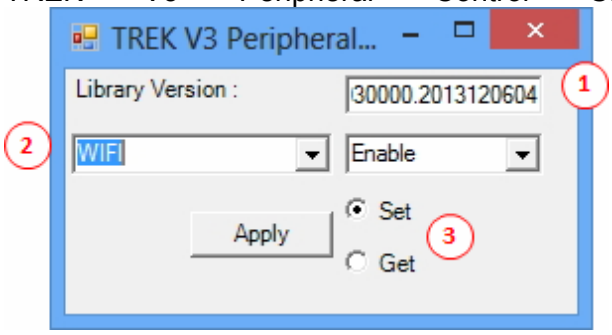
CAUTION: This demonstration may reboot your system, if you enable watch dog timer and not trigger watch dog timer in time.

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

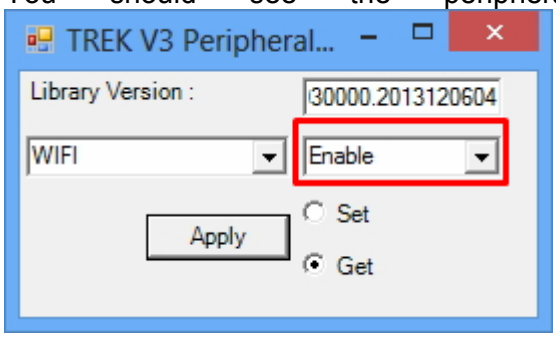


1. Library Version
2. Select Peripheral
3. Select Set or Get function

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	Paired with TREK-550
	A2		
	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

Pin out for TREK-303 Smart Display Port

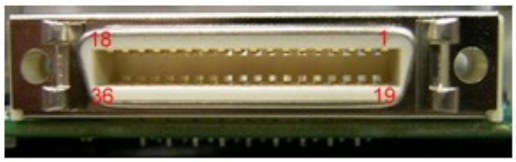
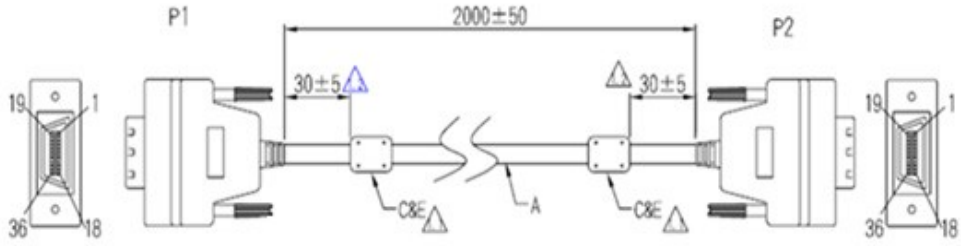


Table A.2: Smart Display Connector

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

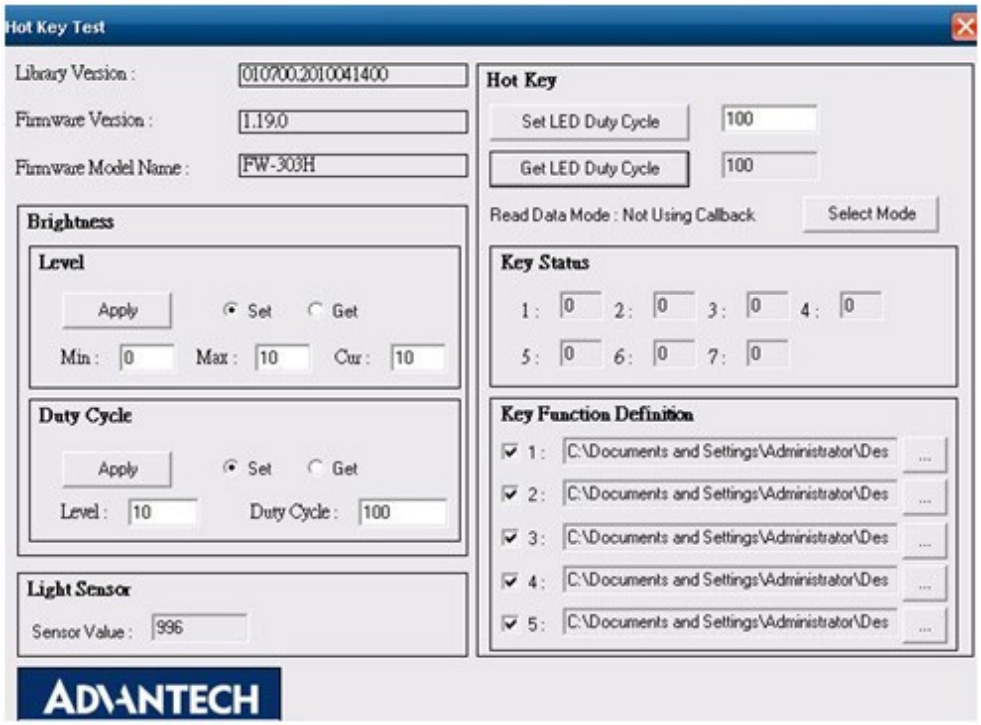


Figure A.1 Hotkey utility

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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