TREK-773

7" All-in-one Mobile Data Terminal

Acknowledgements

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

Product Warranty (2 years)

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

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

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective,

it will be repaired or replaced at no charge during the warranty period. For out of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

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

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandise 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 April 2012

Declaration of Conformity

CE

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

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference
to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference
to radio or television reception, which can be determined by turning the equipment

off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

This device complies with Part 15 FCC Rules.
Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference may cause undesired operation.

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

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-773 series Mobile Data Terminal
- USB/LAN cable clip
- Warranty card
- Power cord: DC power inlet cable
- WWAN or WLAN Antennas (by options)
- “Drivers, Utilities and User Manual" CD-ROM
- End User License Agreement (WES model), please download driver and related document from http://support.advantech.com

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.*

Caution! *Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.*

Attention! Danger d'explosion si la pile est remplacée de façon incorrecte. Remplacez seulement avec le même type ou équivalent recommandé par le fabricant. disposer des piles usagées selon les instructions du fabricant.

Ordering Information

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 where the storage temperature is under -40° C (-40° F) or above 80° C (175° F); it may damage the equipment.
8. Do not operate this equipment in an environment temperature may over 60° C (122° F). The surface temperature of metal chassis may be scorched or hot.
9. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
10. Position the power cord so that people cannot step on it. Do not place anything over the power cord. The voltage and current rating of the cord should be greater than the voltage and current rating marked on the product.
11. All cautions and warnings on the equipment should be noted.
12. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. 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.

15. 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

Part Number Description

TREK-773R-LWB8A0E TREK-773 full configuration with WW WWAN module card(MC7304)
TREK-773R-LWB8B0E TREK-773 full configuration with US WWAN module card(MC7354)

16. 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.
17. 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-dissipating surface or in a static-shielded bag when they are not in the chassis.
18. 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.
19 .Cet appareil est conforme à la section 15 des réglementations de la FCC. Son fonctionnement est soumis aux deux conditions suivantes :
(1) cet appareil ne doit pas causer d'interférences nuisibles, et (2) cet appareil doit accepter toute autre interférence reçue, y compris les interférences pouvant entraîner un fonctionnement non désiré.
ATTENTION !! Pour réduire le risque de décharge électrique, ne démontez pas l'appareil. Aucune pièce interne n'est réparable par l'utilisateur. Référez-vous à une personne qualifiée.

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 system chassis before you work on it. Don't touch any components on the main board or other cards while the system is on.
- Disconnect power before making any configuration changes. A sudden power surge as you connect a jumper or install a card may damage sensitive electronic components.

Warning! *1. Input voltage rated: 9 ~ 32 Vdc (12/24V power) or 18 ~ 58 Vdc (48V power, option).*
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. CFast/SD/SIM card: Turn off the power before inserting or removing
5.This product is intended to be supplied by a Listed Power Adapter or DC power source, rated 9-32Vdc, 6A minimum or 18-58Vdc, 3A minimum and Tma 60 degree C

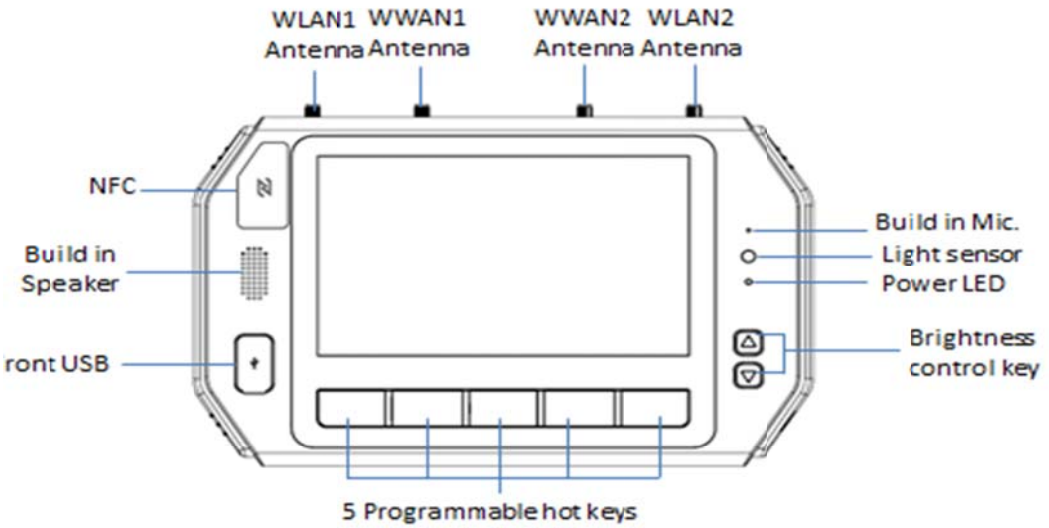
Contents

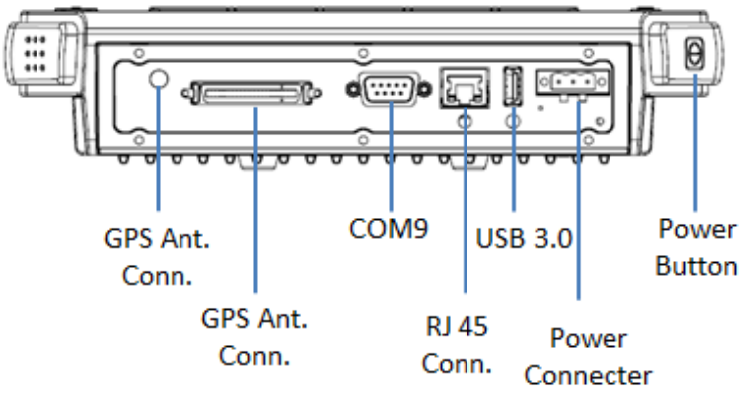
Chapter 1 General Information

1.1 Introduction

Advantech TREK-773 is a new generation, all-in-one 7” mobile data terminal with touchscreen. Its compact and rugged industrial design is perfect for different uses where space, vibration, transient power, and temperature fluctuations will damage most computer equipment. TREK-773 is the higher performing cousin of the award-winning TREK-773 with its Intel® Atom™ Bay Trail-I Series processor, increased memory, the addition of an analog video input port, GbE LAN, and a rich complement of I/O ports (additional COM ports, audio, CAN bus, and J1708). TREK-773 has also been re-engineered to optimize internal space, gained by its full-flat panel touchscreen; and it has moved the CFast/SD/SIM card slot to make it externally accessible, allowing easy access without having to open the unit. TREK-773 is built tough. It has an EN 60721-3-5 certification, and meets military standards for vibration and shock. This ruggedness allows TREK to boldly go where others dare not, opening a wide range of vertical market applications. TREK-773 is suitable for taxi and bus transport, in vehicle fleets of all types, in long-haul trucking, and as an affordable solution to heavy duty applications. TREK-773 is designed to operate flawlessly in transient power conditions. It supports 12/24 V options, operating from 9 ~ 32 volts, and it is ISO7637-2 and SAEJ1113 compliant. With power-on/power-off delay features which are software configurable, TREK holds its own in unstable power conditions. And TREK can operate in the temperature extremes found in harsh environments.

I/O Connectors





1.2 General Specifications

Key Features

- 7" WVGA LCD with 5 programmable, adjustable brightness hot keys
- Support Windows Embedded System 8(WES8), Fedora 18 Remix
- Vehicle diagnostics interface with CAN Bus(Raw CAN, J1939, OBD-II/ISO 15765) and J1708 (J1587) protocols
- Built-in GNSS, WLAN, Bluetooth, NFC, and LTE WWAN modules
- 12V/24V option: 9~32V input range compliant with IOS7637-2 & SAE J1113 standards
- 48V option: 18~58V input range for specific applications
- Fanless and ruggedized aluminum chassis, able to work in -30° C ~ 60° C
- IP54 rating for the entire system, giving protection in harsh environments subject to shock and vibration (Passed EN60721-3-5 5M3 Shock/vibration 100G/4G test).

Specifications

- **Dimensions:** (W x H x D) - 255.7 x 161 x 56 mm (10.04" x 6.30" x 2.20")
- **Weight:** 2.2 kg (max.)
- **Power features:**

– Input voltage: 9 ~ 32 Vdc, supports 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

- **CPU/Chipset:** Industrial Intel Atom E3826 1.46GHz
- **Chipset:** On board Intel Bay Trail-I Serial
- **OS:** Windows Embedded System 8(WES8), Fedora 18 Remix
- **RAM:** Support up to 4GB DDR3L-1600 memory module (Default configuration: 2GB)

 Storage:

– 1 x SD card with external access (not for boot device)
– 1 x external accessible CFast (boot device)

– 1 x SIM card socket for LTE

- **LCD:** Display Type 7" 16:9 industrial degree TFT LCD, 800x480 resolution
- **Touchscreen:** Type 4-wire Analog resistive, continuous resolution, with 3H and IK06 (drop ball 510g @300mm) supported
- **I/O Functions:**

– 1 x video input port for rear view monitor (Note: bypasses video to screen, does not support video recording)
– 1 x RS-232 COM port from rear I/O; 1 x RS-232 COM port; 1 x RS-485 port with high density connector.
– 1 x USB 2.0 port from front panel; 1 x USB 3.0 port from rear I/O; 1x USB 2.0 with high density connector
– 1 x 100/1000-T Gb LAN by RJ-45 connector
– 1 x CAN Bus Support Raw CAN, J1939, OBD-II/ISO 15765 with high density connector
– 1 x J1708 with high density connector
– 1 x built-in 2.0w speaker and 1 x built-in microphone in front panel
– 1 x Line-in/Line-out/Mic-in interface with high density connector or switch to high density connector (via software)
– 5 x green lighted, programmable function keys, 2 x for LCD brightness control
– 1x light sensor on front cover for auto LCD brightness control
– 1x G-sensor on front cover for G value detection
– 4 x isolated DI & 4 x isolated DO connectors

- **RF Functions:**
- GPS:Built-in uBlox MAX-M8Q GPS module with external antenna in I/O plate
- Bluetooth: Built-in Class 2 Bluetooth V4.0 LE, V3.0+HS, V2.1+EDR module
- WWAN:

– LTE module; Sierra wireless MC73xx with SMA type connector

- **WLAN:** Built-in 802.11a/b/g/n module with SMA type connector
- **Power Supply:**

– Input Voltage 12V/24V option supports 9~32 V power design with ISO7637-2 & SAE J1113 compliant
– 48v option support 18~58V input for specific application (Optional)

- **Mechanical Design:**

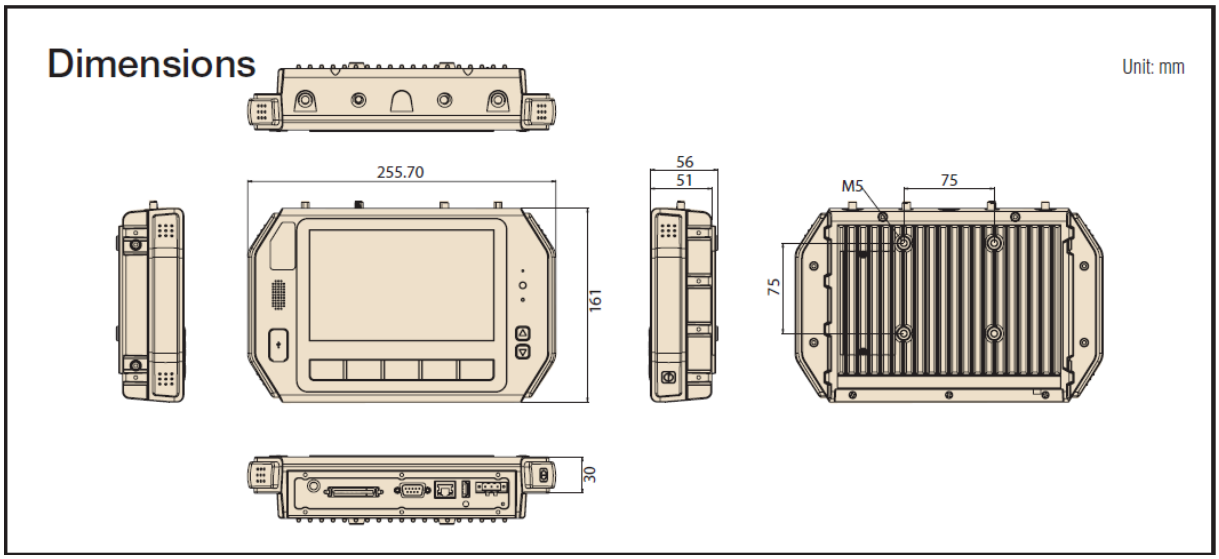
– Aluminum chassis, optional, to support entire system IP54 rating with an extended I/O cover
– Weight- under 2.2 kg (~4.85 lbs)
– Dimensions (W x H x D) - 255.7 x 161 x 56 mm (10.04" x 6.30" x 2.20")

- **Environmental Specifications:**

– Operating Temperature : -30° C ~ 60° C
– Relative Humidity 95% @ 40° C (No condensing)
– Vibration & Shock: MIL-STD-810G (US highway truck), Method 516.5,
– SAE J1455, Class 5M3 according DIN EN 60721-3-5 (Lv.2 100G, 6ms, shock)

1.3 Dimensions

Figure 1.1 TREK-773 Dimensions



Chapter 2 System Setup

2.1 A Quick Tour of the TREK-773 Mobile Data Terminal

Before starting to set up the Mobile Data Terminal, 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 Mobile Data Terminal 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 2.1 Front View of TREK-773


TREK-773
F1
F2
F3
F4
F5

Figure 2.2 Rear View of TREK-773

Chapter 2 System Setup

Figure 2.3 Side View of TREK-773

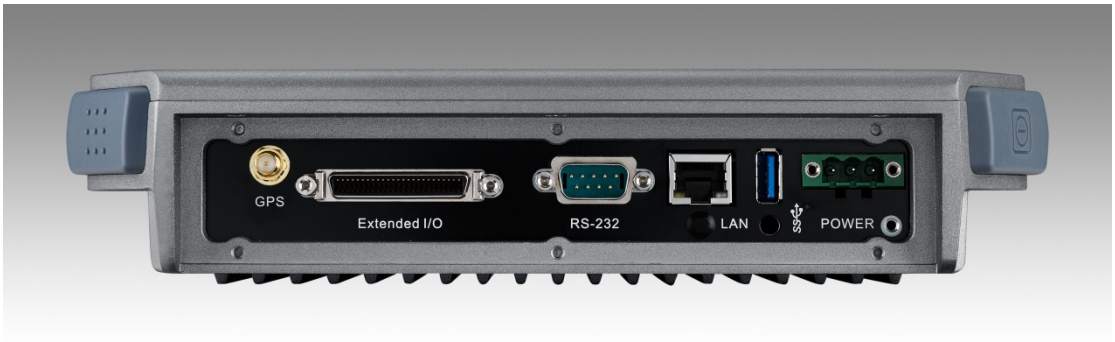


Figure 2.4 Bottom View of TREK-773

2.2 Installation Procedures

When you install TREK-773, the first step is to connect the power and ignition correctly.TREK-773's power cable is designed to connect to the battery directly. TREK-773 can be switched ON/OFF both by the ignition signal or its power button.

Note! *TREK-773 power input supports 12V/24V & 48V DC input. The default setting is for 12V or 48V (option board) only. If customer needs 24V DC input, please contact regional sales or distributors to customize in advance.*

Note! *The fuse in the power cable for a 12V/24V (6A) and a 48V (3A) system is different. Please check the fuse in your power cable before the system is powered on*

Caution! Use suitable mounting apparatus to avoid risk of injury.

2.2.1 Connecting the Power Cord

Connect the three pin waterproof power cord to the DC inlet of TREK-773. On the open-wire end, one pin is reserved for positive voltage and is marked "+" which needs to be connected to the power "+" side; one pin is reserved for ground and is marked "-"; which needs to be connected to the power "-" side. And, one pin is reserved for the ignition signal with an "ignition" mark. There's an independent "Shield" pin in the power cable; please fix it to the O-ring which is beside the TREK-773 power connector.
Note! *Ignition on/off setting: The TREK-773 supports an ignition on/off function so that you can power on/off the TREK-773 via the ignition signal/voltage.*

Connector : DECA Switchlab ME050-50803
Mating connector: MC101-50803-3Y

Figure 2.5 Power Connector Photo

Tsable 2.1 Pin Definition of Power Cord		
PIN	Definition	Color
1	+	Red
2	Shield	Black
3	-	Black
4	Ignition	Orange

2.2.2 Power Connector

TREK-773 can be powered on/off from the power button or directly from the vehicle ignition. There is a 5 second delay when using ignition on/off. This avoids impact from fluctuating power supply which might impact or damage system operation. For more power management details, please see Power management in Chapter 5.

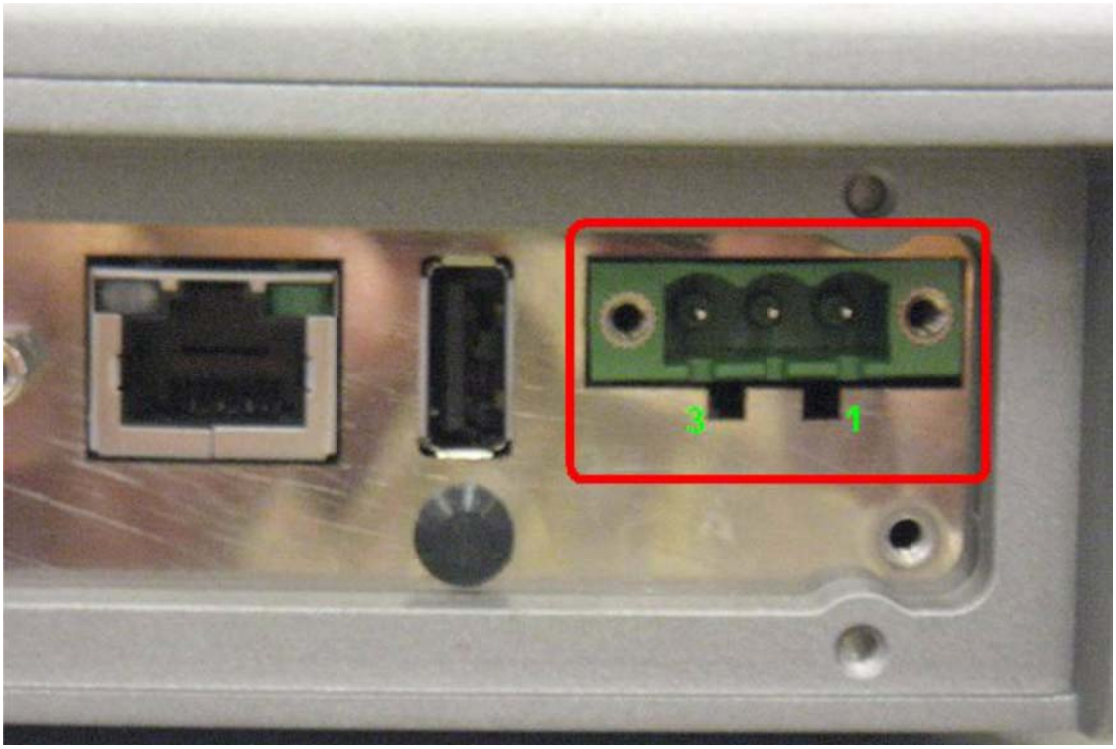


Figure 2.6 Power Connector Appearance

Table 2.2: Power Connector			
Pin	Signal	Pin	Signal
1	Ground	2	Power input (9~32VDC;18~58VDC)
3	Acc 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 system integrator 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

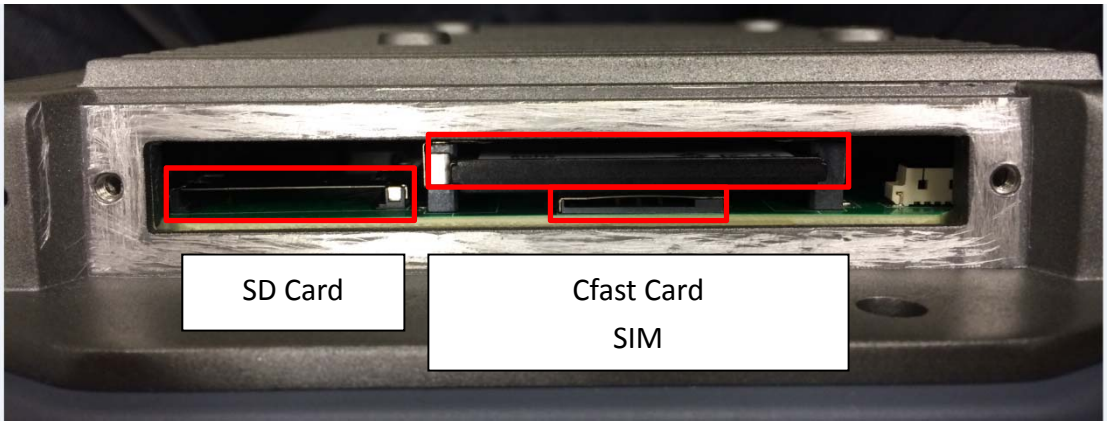
Installation

3 Overview of Hardware Installation & Upgrading

The Mobile Data Terminal consists of a industrial computer that is housed in a ruggedized aluminum enclosure. Any memory module or storage maintenance or hardware upgrades can be completed after removing the rear side RAM door/ side cover,or remove the front panel to install.

3.2 Installing the Storage Device and SIM Card

TREK-773 has a side door and a user can easily install a SIM card or storage (CFast or SD) card. The CFast card is the main bootable storage card which has the operating system pre-installed from Advantech. The CFast slot with an ejector (on the top side) can eject the CFast card from the socket with a press. The SD card acts as secondary storage in TREK-773. The system is NOT allowed boot up from SD.



Note! *Please do NOT paste any sticker or label on a CFast or SD card; it might cause jamming and not be able to be ejected from the slot/socket.*

3.3 Installing System Memory

TREK-773 supports 204-pin SODIMM type DDR3L DRAM. There's a door which can be opened for RAM installation. It is very easy to open to install memory. However, we suggest this change performed by our service center to avoid any possible damage(like electrostatic discharge or memory inserted in the wrong position.)

Note! *For best thermal management, please make sure the thermal pad on RAM door (Block in black) is always in place before the door cover is put back on. (For a bare bone system, the thermal pad is in the accessories box).*

3.4 Installing Optional Accessories

Optional accessories, like RAM mount kits or other functional modules are available for purchase as complements for TREK-773. All accessories use standard 75mm type mounting with M5 type screws only.

3.5 Installing the I/O Cover

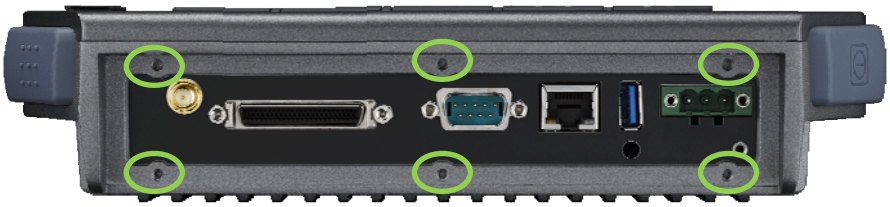
To ensure TREK-773’s entire system is protected with an IP54 rating, assemble the IP54 I/O cover kit to mask all the connectors on the bottom side.

From left to right: plastic I/O cover, rubber seal, and plastic I/O box. Remove tape adhesive cover on the back side of rubber seal, adhere the a rubber seal to the plastic I/O cover and route all cables across the plastic I/O box starting from the outside and moving toward the inside.

Chapter 3 Hardware & Peripheral Installation

Connect all cables to system and secure before the cover is installed.

There are 6 screws holes designed for the extra mechanical part installation. The mounting frame needs to be secured by these holes.



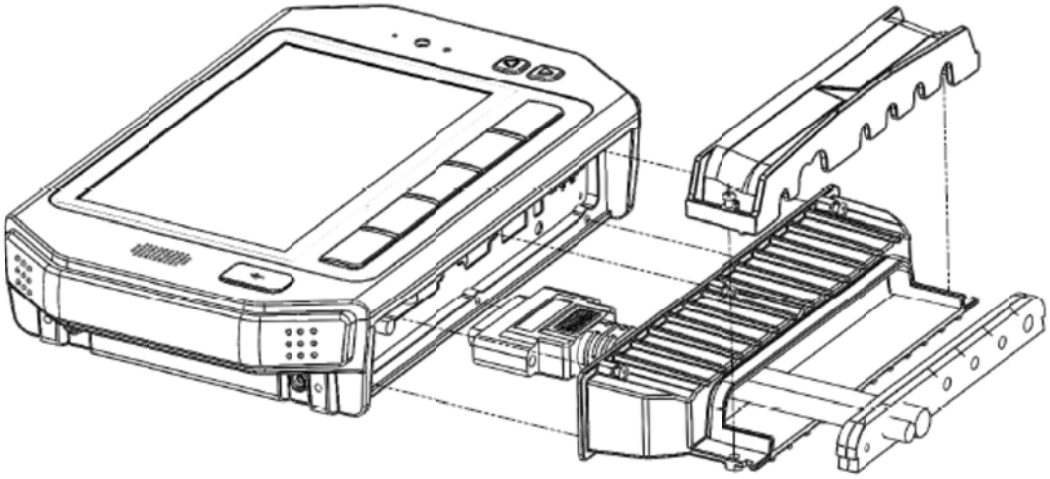
Install the cover attaching it in place with the 6 screws.

Screw the plastic I/O cover onto the plastic I/O box.

Installation complete.

Chapter 3 Hardware & Peripheral Installation

See the exploded drawing for clear assembly illustration.



3.6 Installing Wireless Options

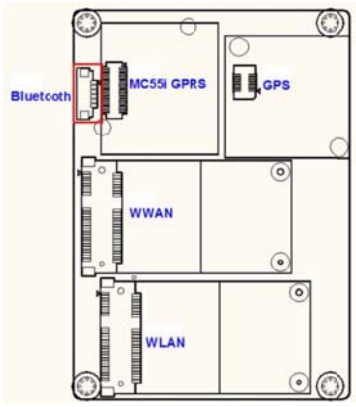
TREK-773 is a highly integrated all-in-one terminal, all wireless options are able to install at once and work by independent connection. In the standard OS that comes with TREK-773, all wireless connections have been setup in advance and users will not need to set them up again. This information is provided for those who need to build new wireless connections if necessary. RF options include:

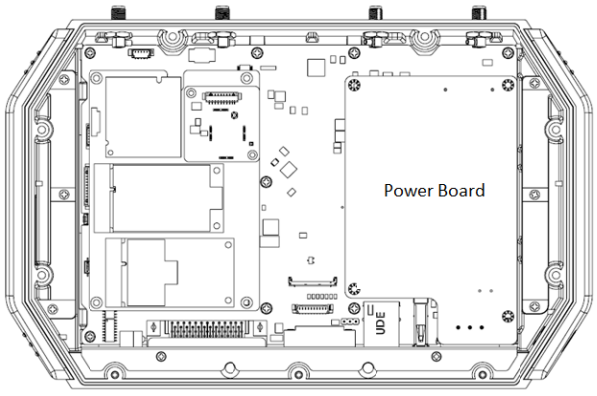
Bluetooth

Wireless LAN(WLAN)

WWAN (LTE)

GPS





Note! *All hardware or reconfiguration changes should be performed by Advantech or its authorized service partners.*

3.6.1 WLAN

Driver Installation

1. Make sure the Wi-Fi module has been installed in the TREK-773.

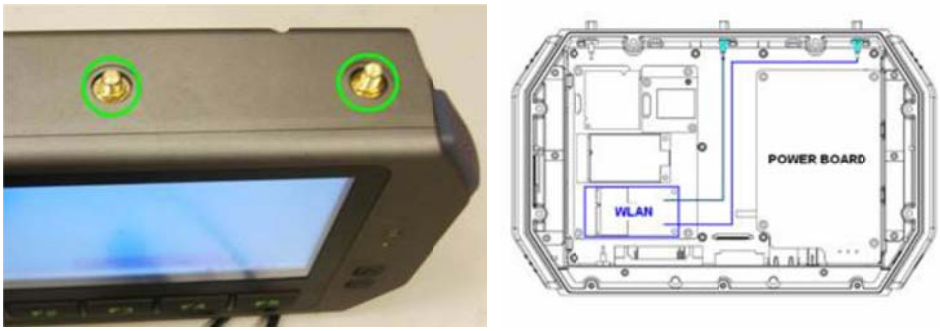
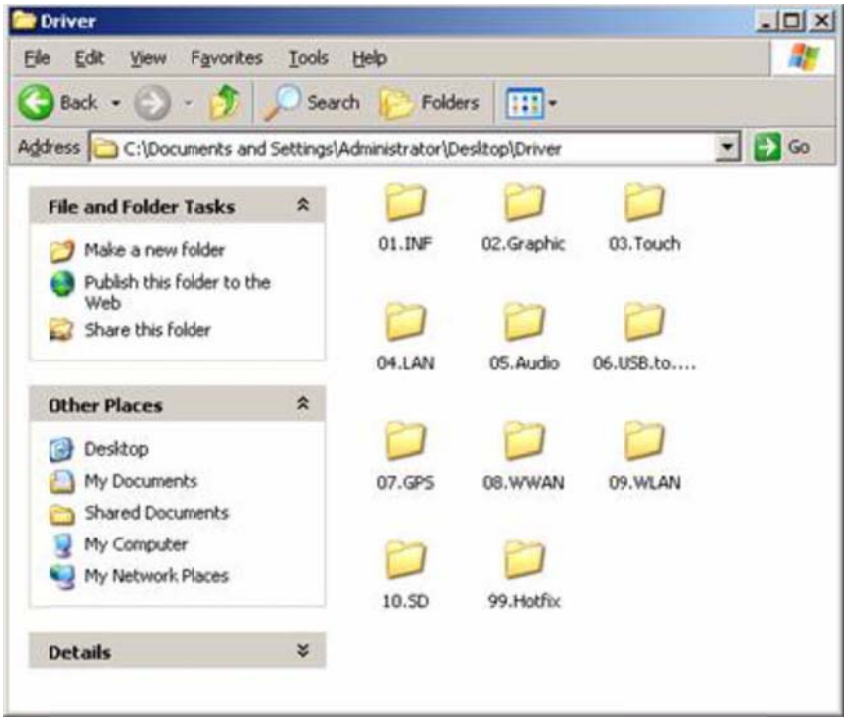


Figure 3.1 Top View of TREK-773

2. Make sure there is a wireless router and access point working available for TREK-773 to connect to.

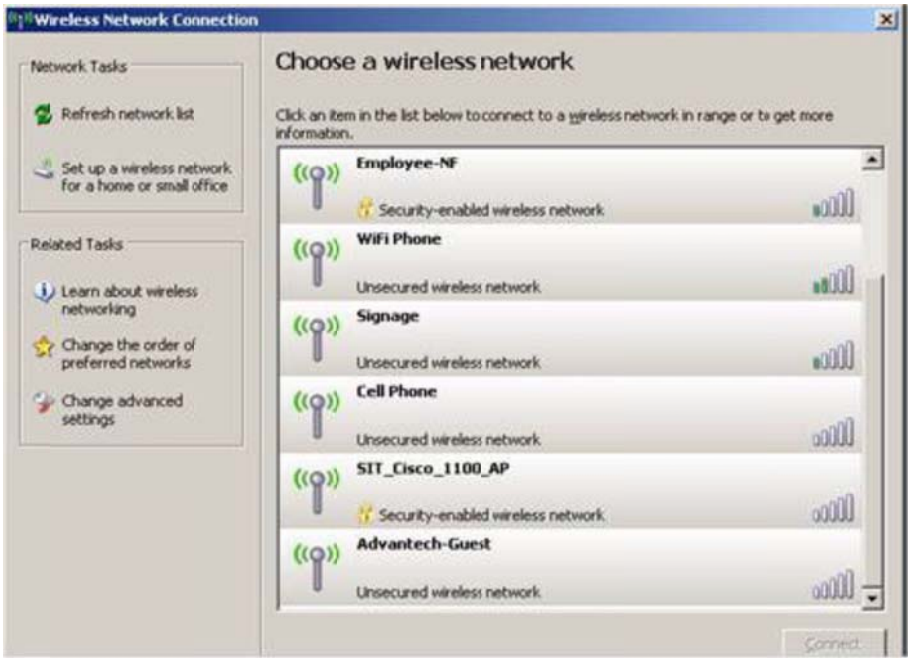
3. Turn on the TREK-773, and boot into the OS.

4. Double click "Setup.exe" from the driver CD (WLAN_AW-NE768_090714) to install driver



Setup Connection

1. Press Start - Control panel - Network connections - Press right mouse button and select properties for the wireless network connection; click "View Available Wireless Networks".

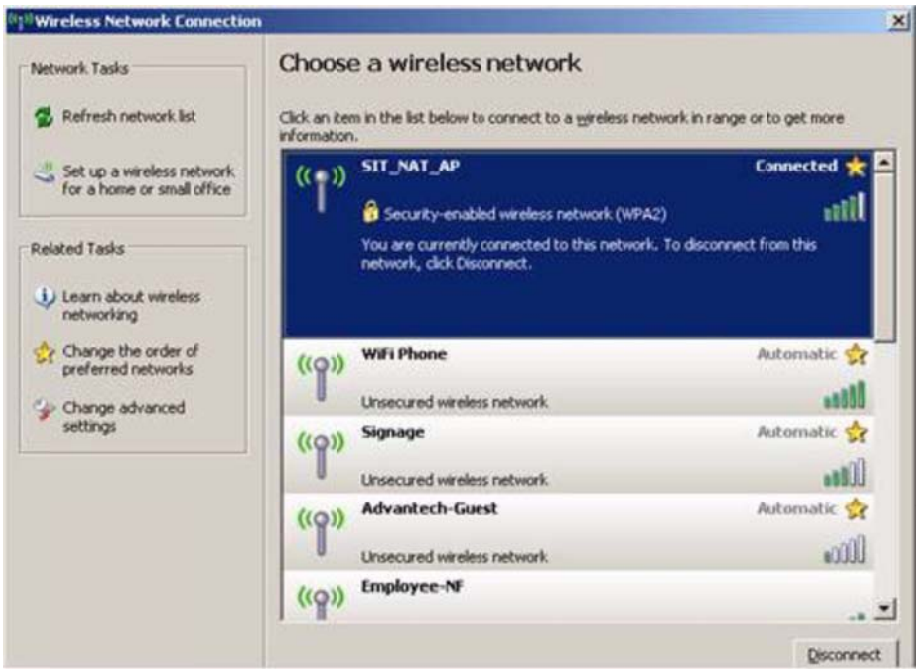


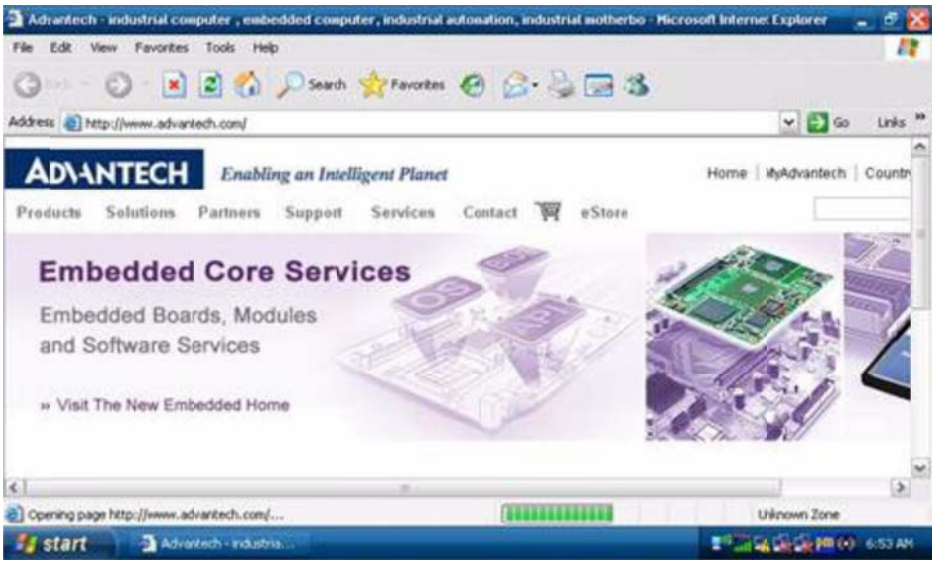
Chapter 3 Hardware & Peripheral Installation

2. Highlight one of the available wireless LAN icons and double click on the Connect button found in the lower right-hand corner.

3. Some APs devices will have different SSIDs; choose an available one and connect (entering user ID & password if prompted).

4. Click Connect after entering key (if prompted) to connect to the wireless AP. Open the web browser and TREK-773 will connect to the internet.





3.6.2 LTE(4G)

Driver Installation

1. Make sure the LTE module has been installed in the TREK-773.

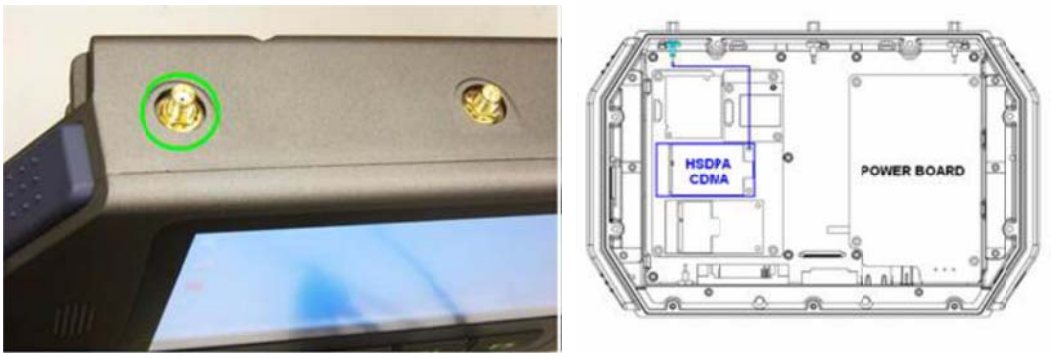


Figure 3.3 Top View of TREK-773

2. Insert the user's SIM card in the slot; make sure the SIM card has already applied to a GSM network in advance and can transmit/receive data.

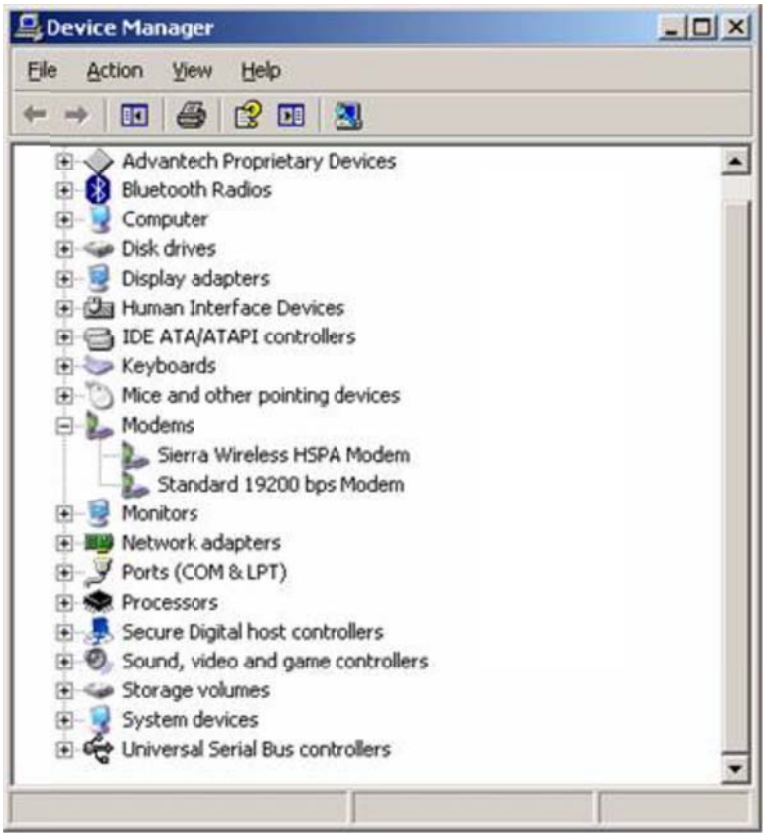
Chapter 3 Hardware & Peripheral Installation

3. Turn on the TREK-773, then boot into the OS.

4. Install the HSDPA USB module driver/AP "Watcher_Generic Build 2258.msi" from driver CD on the Windows Embedded OS.

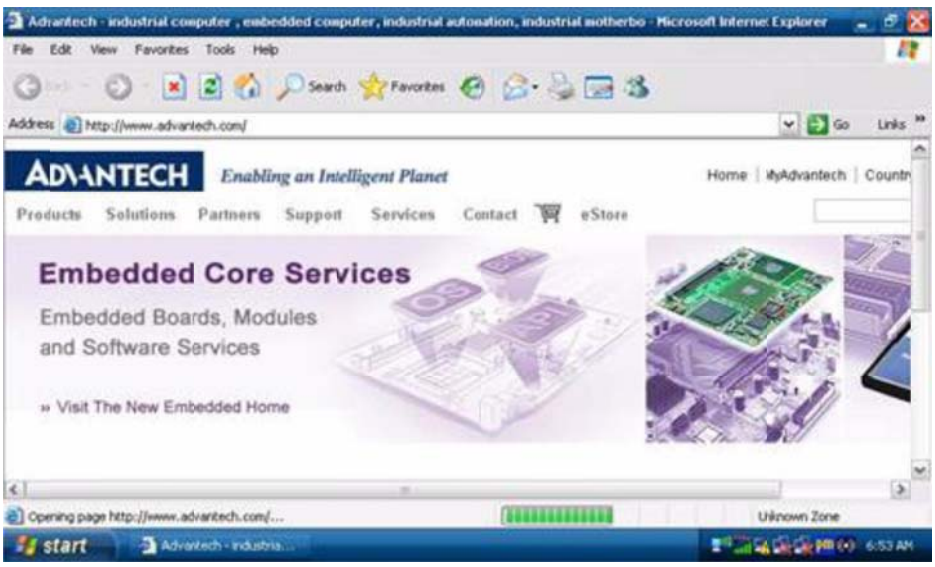
Setup Connection

1. Check the device manager to make sure there are no entries with question marks.



2. To complete the new connection wizard textbox, select "Add a shortcut to this connection to my desktop," then click “Finish.”
3. Once completed, the new connection will be created.
4. Double Click the "Sierra Wireless Watcher" and Click Button "Connect." The

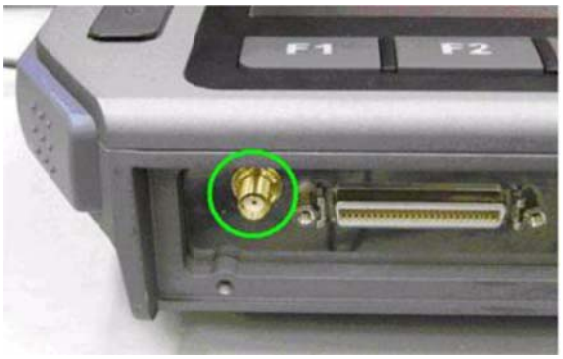
TREK-773 will connect to the internet.



3.6.3 GPS

Installation

1. Make sure the GPS module & antenna has already been installed in the TREK-773.



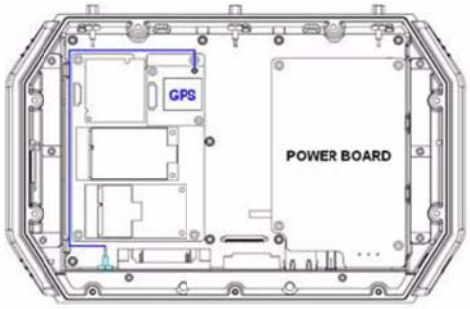


Figure 3.4 Bottom View of TREK-773

2. Turn on the TREK-773, boot up the OS.

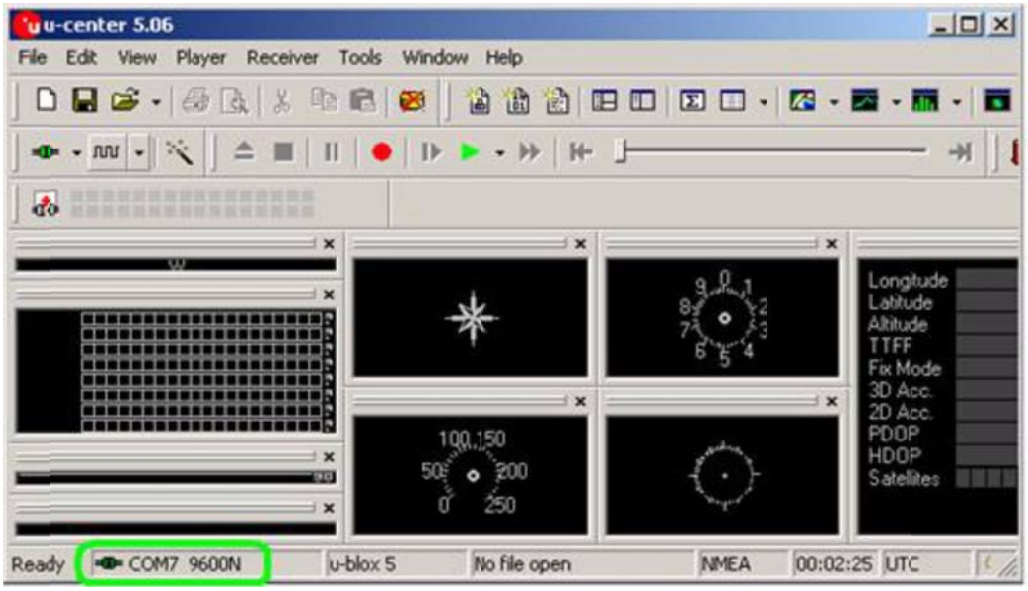
3. Double click "ublox_A4_U5_USB_drv3264_install_UI.exe" application program on the driver CD to install.

Chapter 3 Hardware & Peripheral Installation

Setup Connection

1. Install "u-Center" to setup and test.

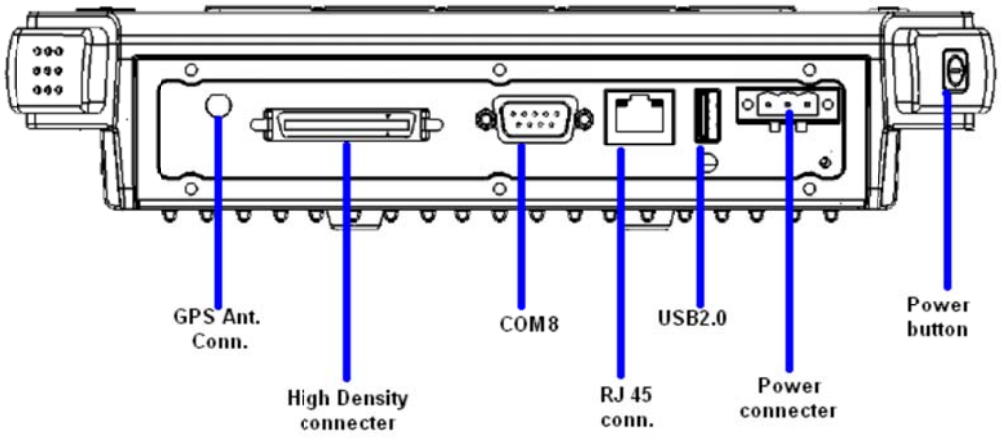
2. Start test in "u-Center," setting COM port (COM3) and baud rate (9600bps) used for GPS module.



3. After starting test, NMEA output messages are display in the Development Data View setup connection.

Chapter 4 Pin Assignments

4.1 Rear Side Connectors



4.2 Power Connector

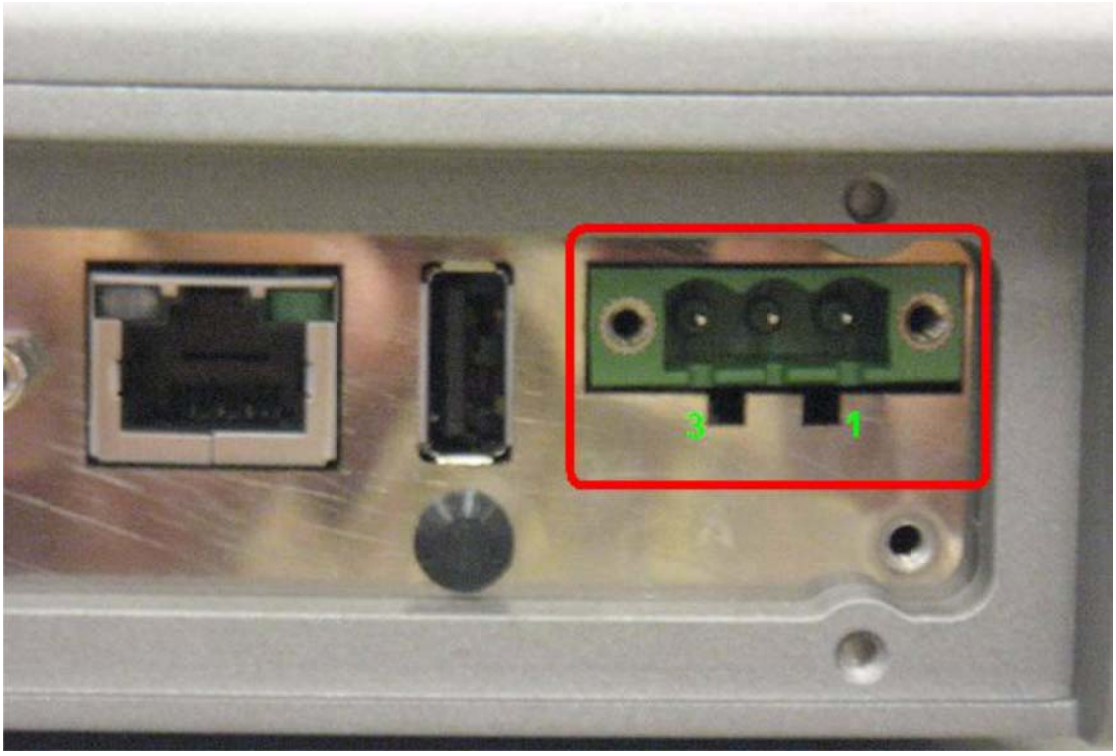


Table 4.1: Power Connector			
PIN	Signal	PIN	Signal
1	Ground	2	Power input
3	Acc Ignition Input		

Note! *TREK-773 has 2 power options for different applications:*

- *Input Voltage 12 V/24 V options support 9~32 V power design with ISO7637-2 & SAE J1113 compliance (default)*
- *48 V option supports 18~58 V input for specific applications (Optional)*

Chapter 4 Pin Assignments

4.3 High Density Connector

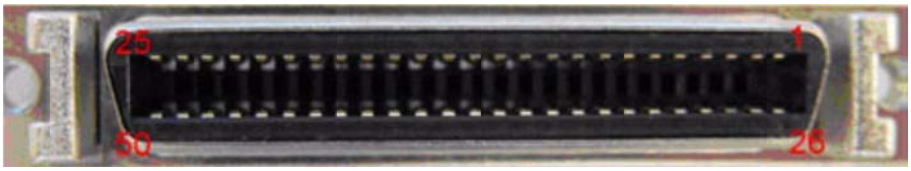


Table 4.2: High Density Connector			
Pin	Signal	Pin	Signal
1	+5VDC output (+/- 5%, max 0.5A)	2	+5VDC output (+/- 5%, max 0.5A)
3	USB Ground	4	USB D+
5	USB D-	6	CVBS Ground
7	CVBS IN	8	RSVD
9	Audio Ground	10	LINE OUT L
11	LINE OUT R	12	LINE IN R
13	LINE IN L	14	MIC IN
15	RS-485 Ground	16	COM5 485-
17	COM5 485+	18	J1708 Ground
19	COM6 J1708-	20	COM6 J1708+
21	Isolation CAN Ground	22	CAN L
23	CAN H	24	RSVD.
25	RSVD.	26	+12VDC output
27	+12VDC output	28	+12VDC output
29	Power Ground	30	Power Ground
31	Power Ground	32	COM9 RS-232 RI#
33	COM9 RS-232 CTS#	34	COM9 RS-232 RTS#
35	COM9 RS-232 DSR#	36	RS-232 Ground
37	COM9 RS-232 DTR#	38	COM9 RS-232 TXD
39	COM9 RS-232 RXD	40	COM9 RS-232 DCD#
41	RSVD.	42	Isolated Relay Driver Output 4#
43	Isolated Relay Driver Output 3#	44	Isolated Relay Driver Output 2#
45	Isolated Relay Driver Output 1#	46	Isolated Dry Contact Input 4
47	Isolated Dry Contact Input 3	48	Isolated Dry Contact Input 2
49	Isolated Dry Contact Input 1	50	Isolation DIO Ground

4.4 RS-232 Connector (COM9)

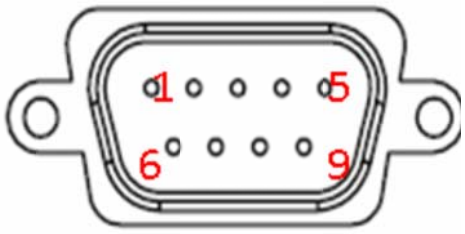


Table 4.3: RS-232 Connector (COM8)			
PIN	Signal	PIN	Signal
1	RS-232 DCD	2	RS-232 RXD
3	RS-232 TXD	4	RS-232 DTR
5	RS-232 Ground	6	RS-232 DSR
7	RS-232 RTS	8	RS-232 CTS
9	RS-232 RI / +12 VDC (max. 2500		

	mA)		

4.5 LED Indicator

This system power indicator is an orange LED, controlled by hardware.
This LED will be lit on when the system is in NORMAL mode.
When system is off, this LED will not be lit.

Chapter 5 Software Demo Utility Setup

5.1 Introduction

Advantech has developed demo utilities based on Advantech provided SDK APIs to let user test the functions on TREK-773. This document describes the usage of each demo utilities and also provide a basic concept of the application development on TREK-773.

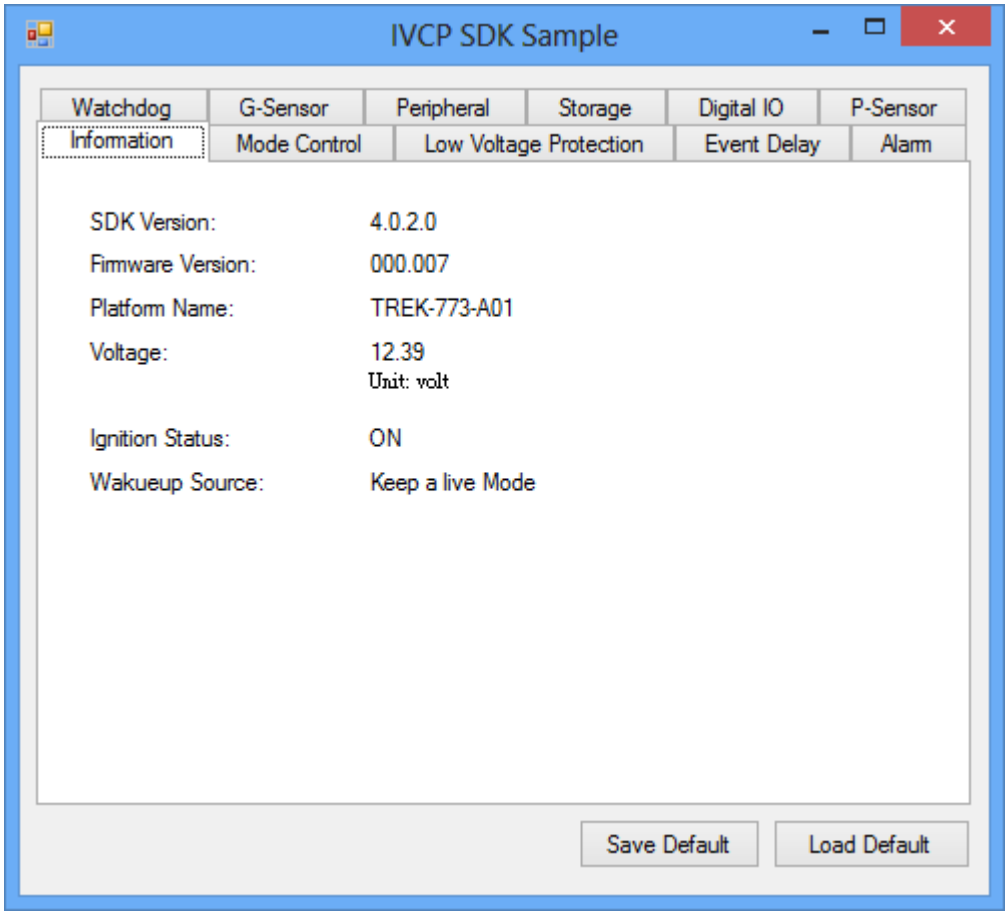
For technical support, contact Advantech application engineers worldwide. For news updates, visit our website: www.advantech.com

5.2 IVCP Demonstration

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

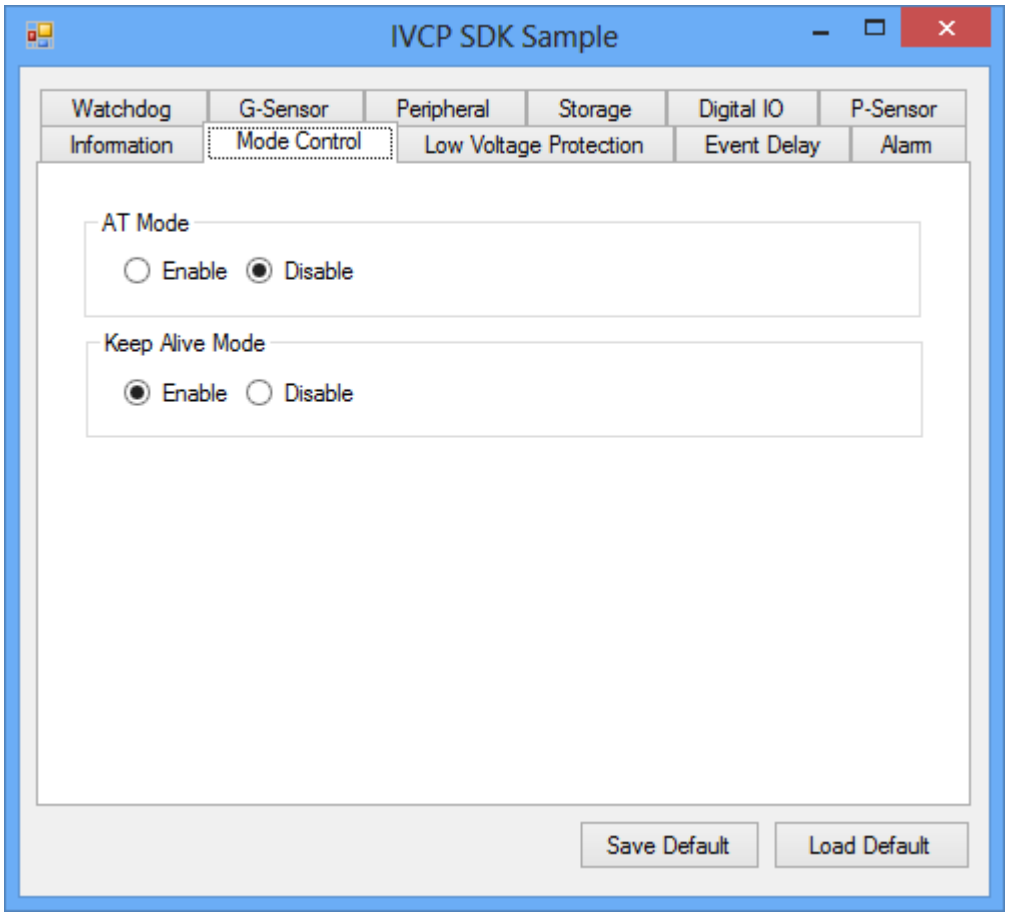
5.2.1 Information

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



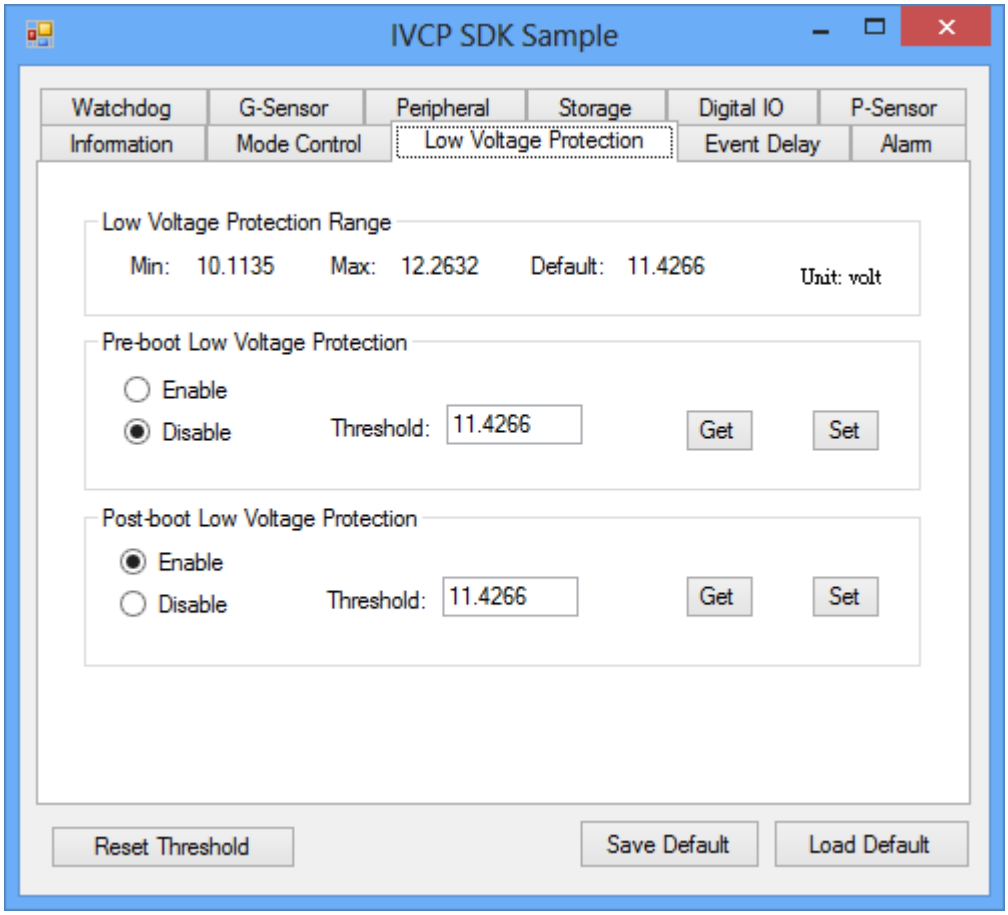
5.2.2 Mode Control

In this page, you can toggle “AT Mode” and “Keep Alive Mode”.
Press “Save Default” to set current settings as default value of VPM(Vehicle Power Management) controller.
Press “Load Default” to load the default values.



5.2.3 Low Voltage Protection

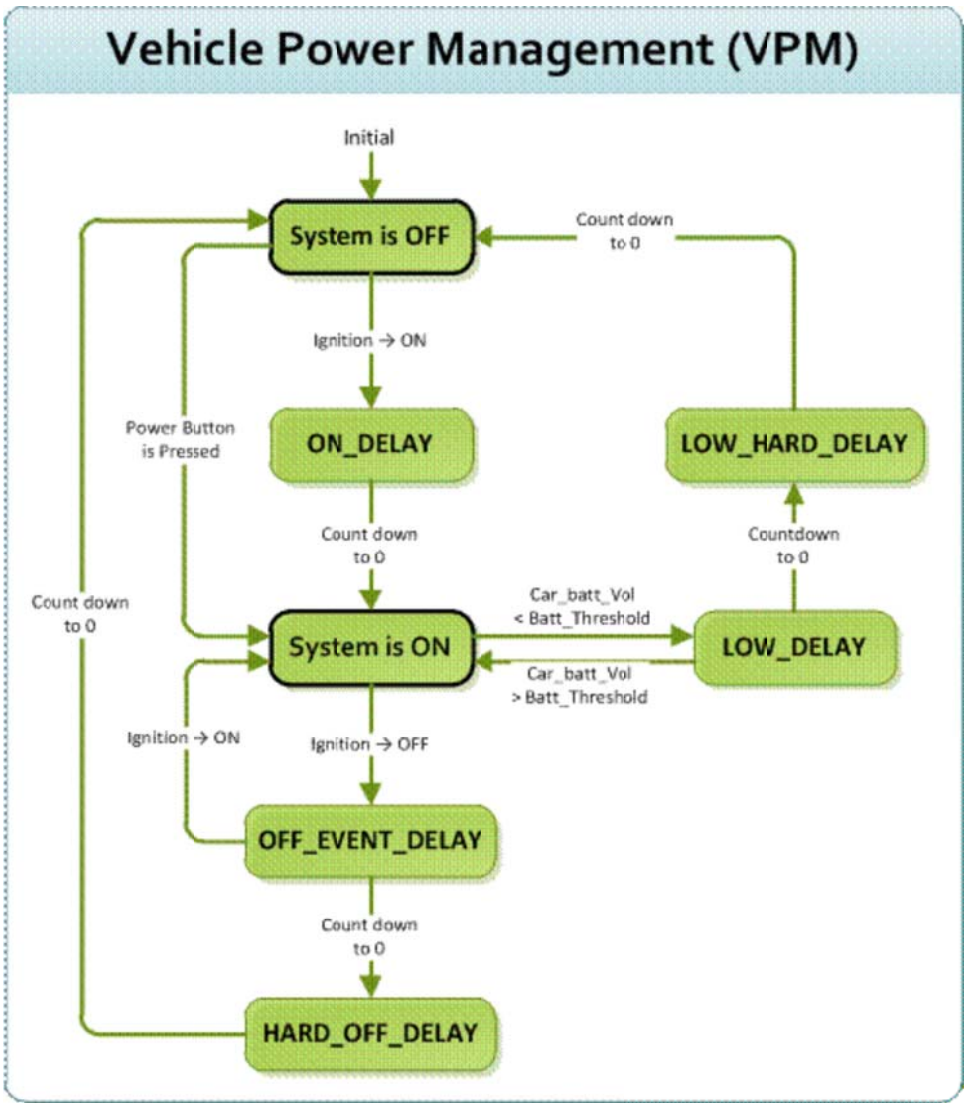
You can enable/disable and set the pre-boot/post-boot low voltage protection threshold in this page.
Press “Get” to get the current threshold value and Press “Set” to set the value.
Press “Save Default” to set current value as default value of VPM controller.
Press “Load Default” to load the stored default values.



5.2.4 Event Delay

5.2.4.1 Power control mechanism

TREK 773 provides VPM (Vehicle Power Management) features to fulfill specific requirements. The basic mechanism is shown in the following figure.



The power of system can be controlled with the following events:

- **Ignition ON**

The ignition signal can be used to power on or shutdown the system. When the system is in an OFF state and the ignition is turned ON, the VPM controller will countdown a delay period (ON_DELAY). Once it counts to zero, the system will be powered on.

- **Ignition OFF**

When the system is powered on and the ignition is turned off, the VPM controller will countdown a delay period(OFF_EVENT_DELAY). During this period, if the ignition is switched back to ON, the VPM controller will stop countdown and reset the OFF_EVENT_DELAY. If OFF_EVENT_DELAY counts to zero, the VPM controller will trigger an power off event (i.e. power button press). System and applications which receives this event can do pre-defined tasks, like storing data and preparing to turn off the system. After the event is triggered, VPM controller starts to countdown next delay period (HARD_OFF_DELAY). If HARD_OFF_DELAY counts to zero, the system power will be cut off abruptly to avoid unexpected system hang. Aldo, once VPM controller enter the HARD_OFF_DELAY stage, the process cannot be reversed.

- **Low power protection**

To avoid draining power, low-power protection is to ensure that there is enough power to start the machine. When the system is ON, the VPM controller will monitor the power voltage. If the voltage is lower than the programmable threshold (LOW_THRESHOLD), the VPM controller will start to countdown a delay(LOW_DELAY). During the stage of LOW_DELAY countdown, if voltage goes back above LOW_THRESHOLD, the VPM controller will stop counting down and exit.

If LOW_DELAY counts to zero, the VPM controller will trigger an power off event (i.e. power button press) and starts to countdown next delay period (LOW_ HARD_DELAY). If LOW_ HARD_DELAY counts to zero, the system power will be cut off abruptly to avoid draining the power.

5.2.4.2 Demonstration

You can set the delay and hard delay time of the low voltage event and ignition event.

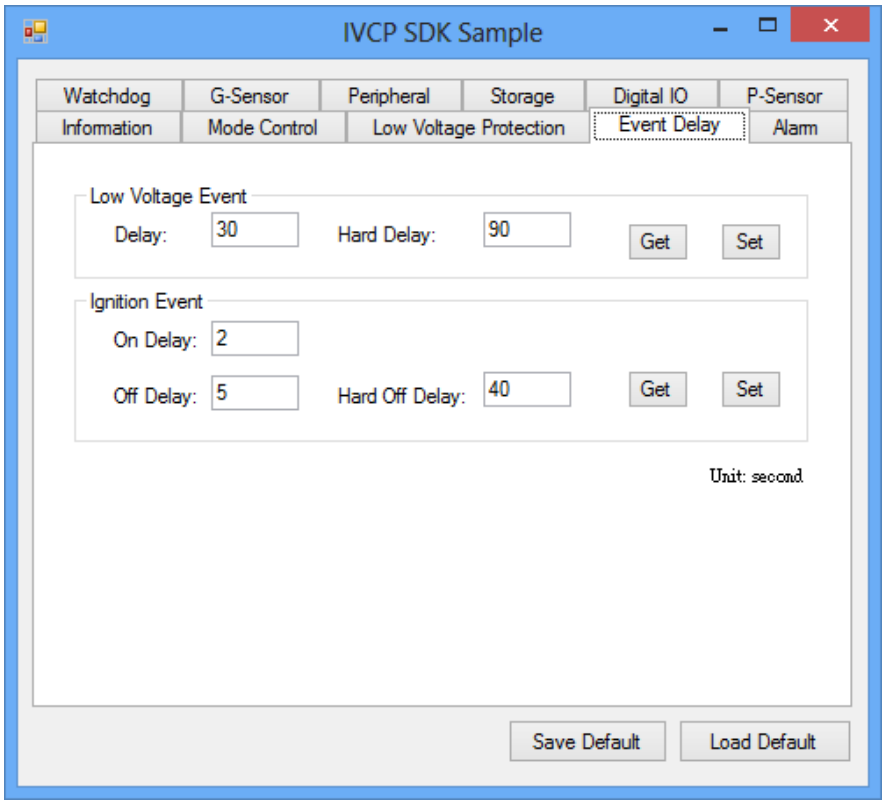
Low Voltage Event

- **Delay:**
  The delay time before VPM trigger a power off event (i.e. power button press).
- **Hard Delay:**
  The delay time counted down after a power off event is triggered. VPM will force power off the machine if the hard delay time is counted down to zero.

Ignition Event

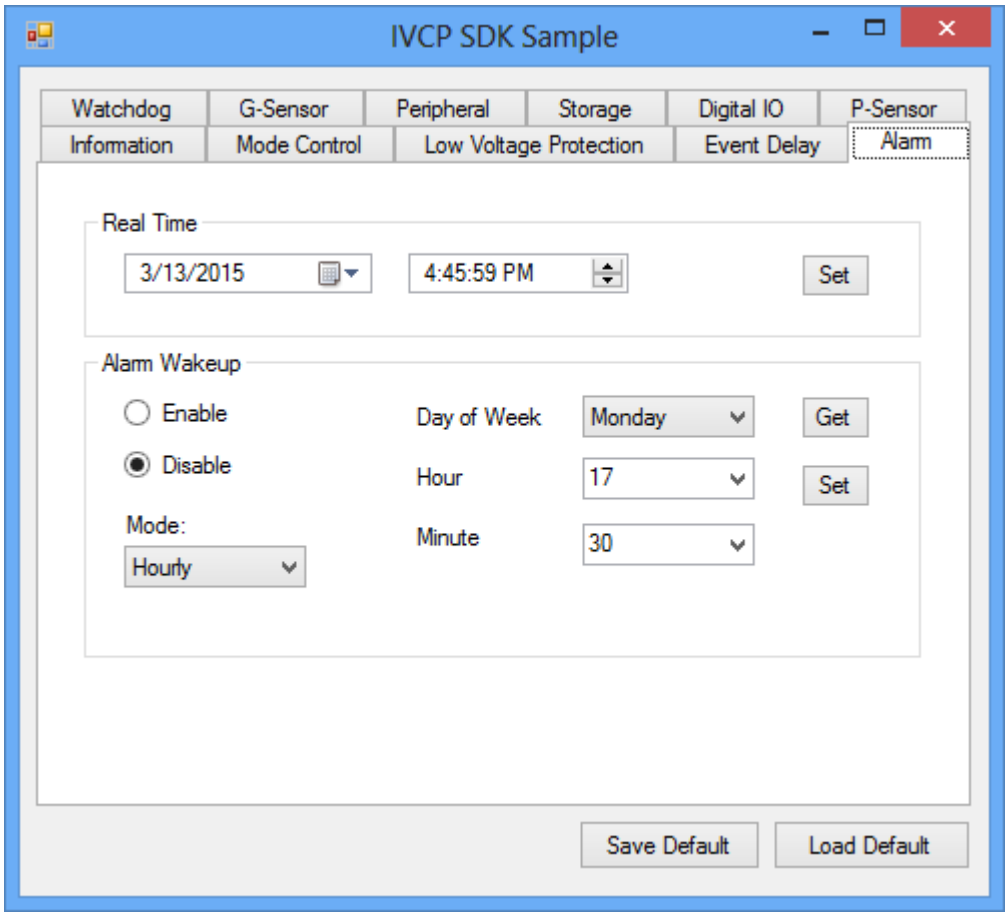
- **On Delay:**
  The delay time before VPM trigger an power on event (power on the machine).
- **Off Delay:**
  The delay time before VPM trigger an power off event (i.e. power button press).
- **Hard Off Delay:**
  The delay time counted after an power off event is triggered. VPM will force power off the machine if the hard delay time is counted down to zero.

Press “Save Default” to set current value as default value.
Press “Load Default” to load the stored default values.



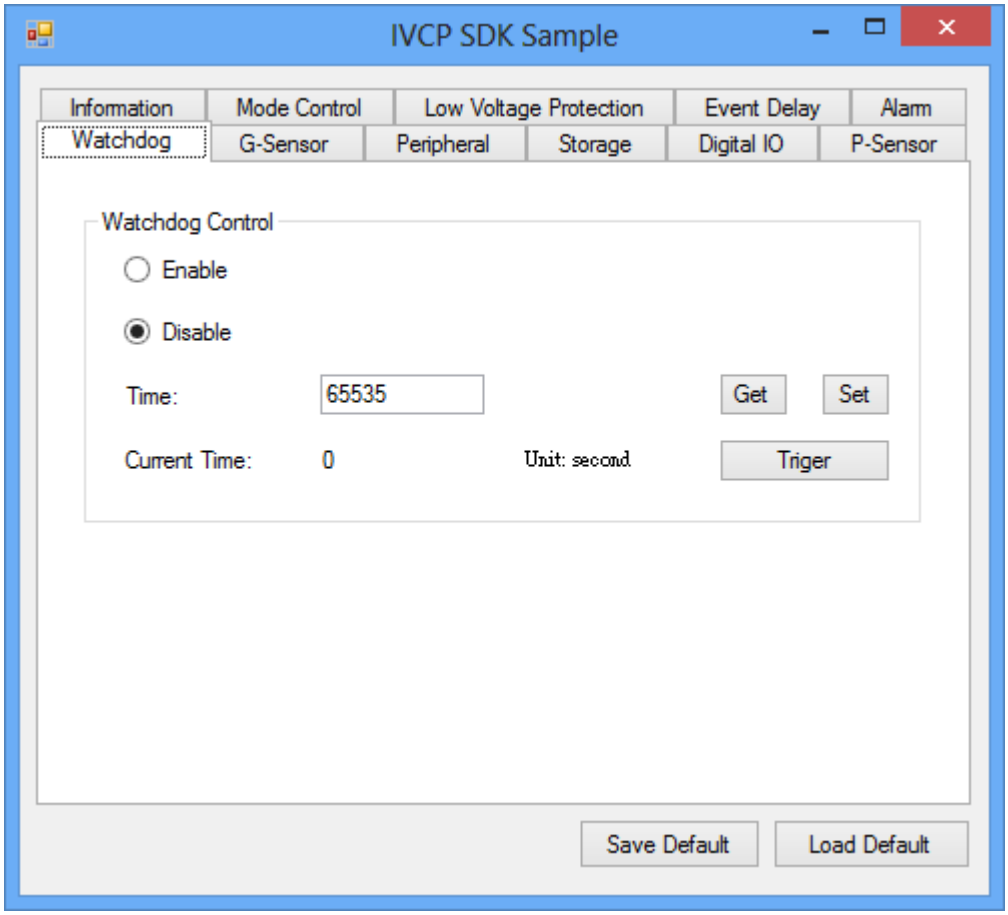
5.2.5 Alarm

In this page, you can set the time and set alarm wakeup time to VPM controller and enable/disable the alarm as a system wakeup source.
Press “Save Default” to set current value as default value.
Press “Load Default” to load the stored default values.


IVCP SDK Sample
Watchdog
G-Sensor
Peripheral
Storage
Digital IO
P-Sensor
Information
Mode Control
Low Voltage Protection
Event Delay
Alarm
Real Time
3/13/2015
4:45:59 PM
Set
Alarm Wakeup
Enable
Disable
Mode:
Hourly
Day of Week
Monday
Get
Hour
17
Set
Minute
30
Save Default
Load Default

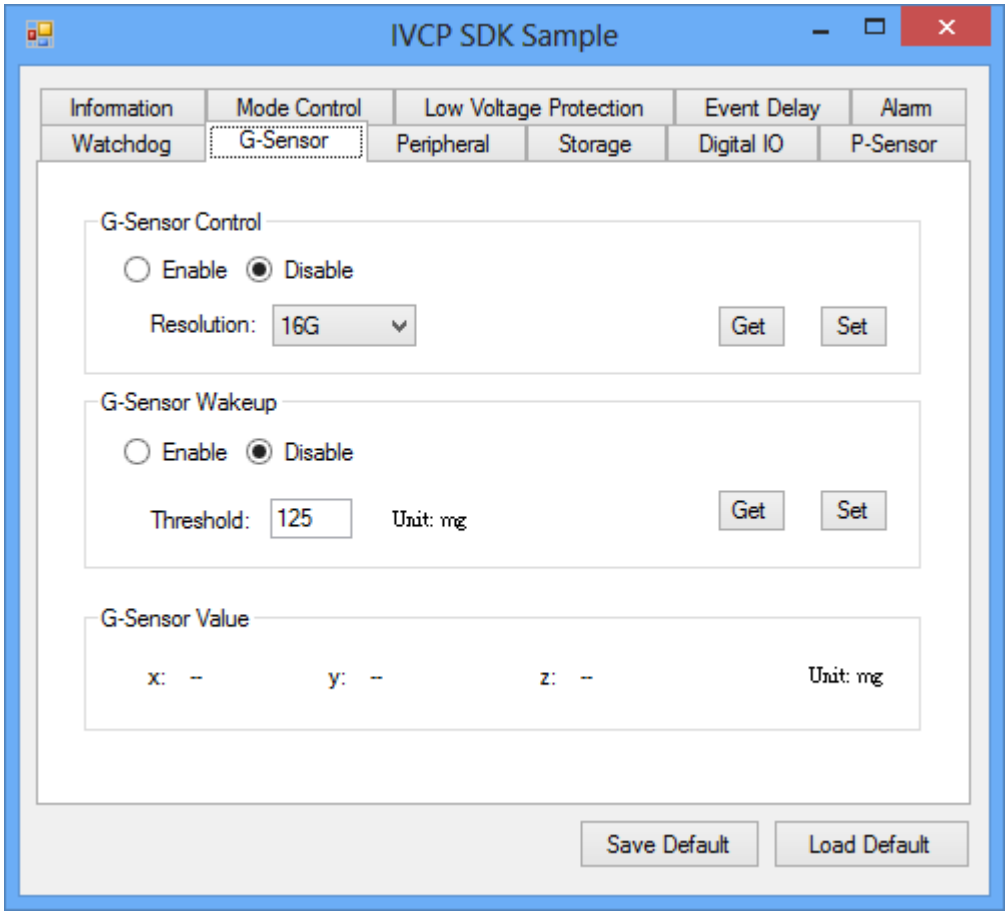
5.2.6 Watchdog

In this page, you can enable/disable the watchdog function and set the count time (second) for the watchdog to avoid unexpected system hang..
When watchdog is enabled, the VPM controller will start counting down the time set for watchdog and power off the machine if it is counted to 0. You can press “Trigger” button while watchdog is counting to reset the count down time and keep it counting.
Press “Save Default” to set current value as default value.
Press “Load Default” to load the stored default values.



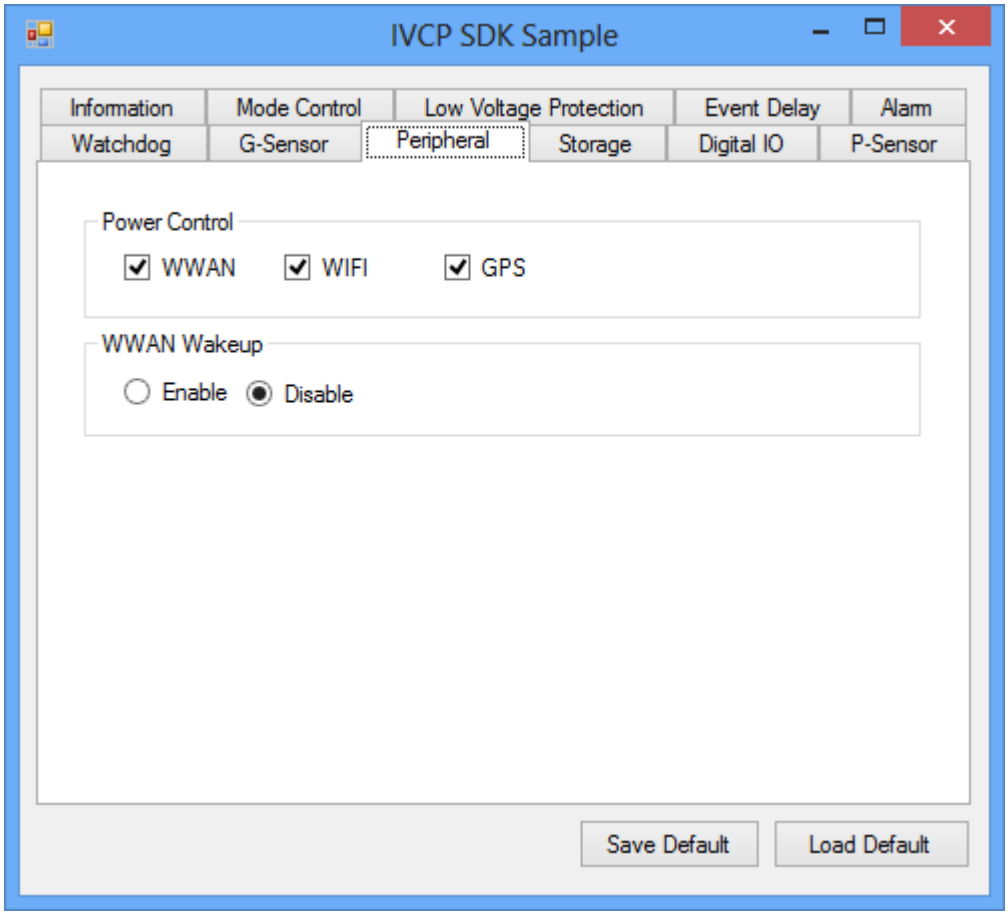
5.2.7 G-Sensor

In this page, you can enable/disable the G-sensor. Also, you can set G-sensor as a system wakeup source and set the threshold to trigger system wakeup.



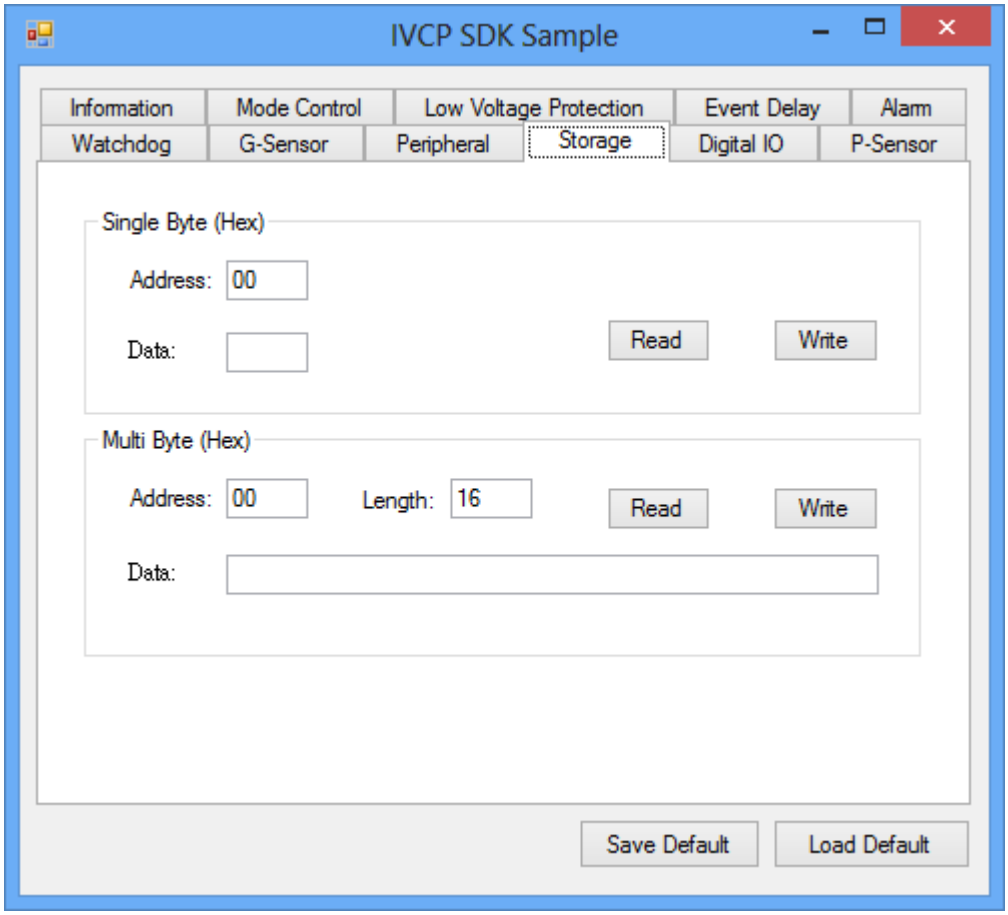
5.2.8 Peripheral

In this page, you can enable/disable the peripheral functions and set WWAN as system wakeup source.



5.2.9 Storage

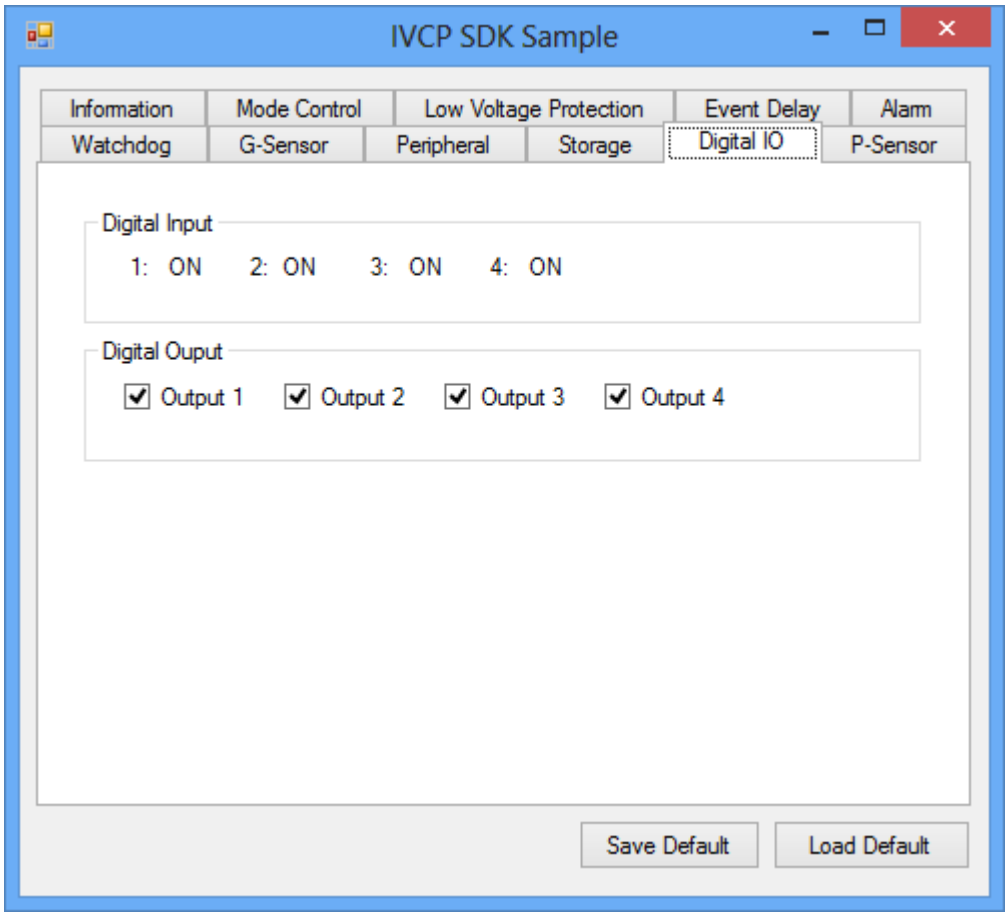
In this page, you can save/load arbitrary data to the private storage (256 byte) on the machine.



5.2.10 Digital IO

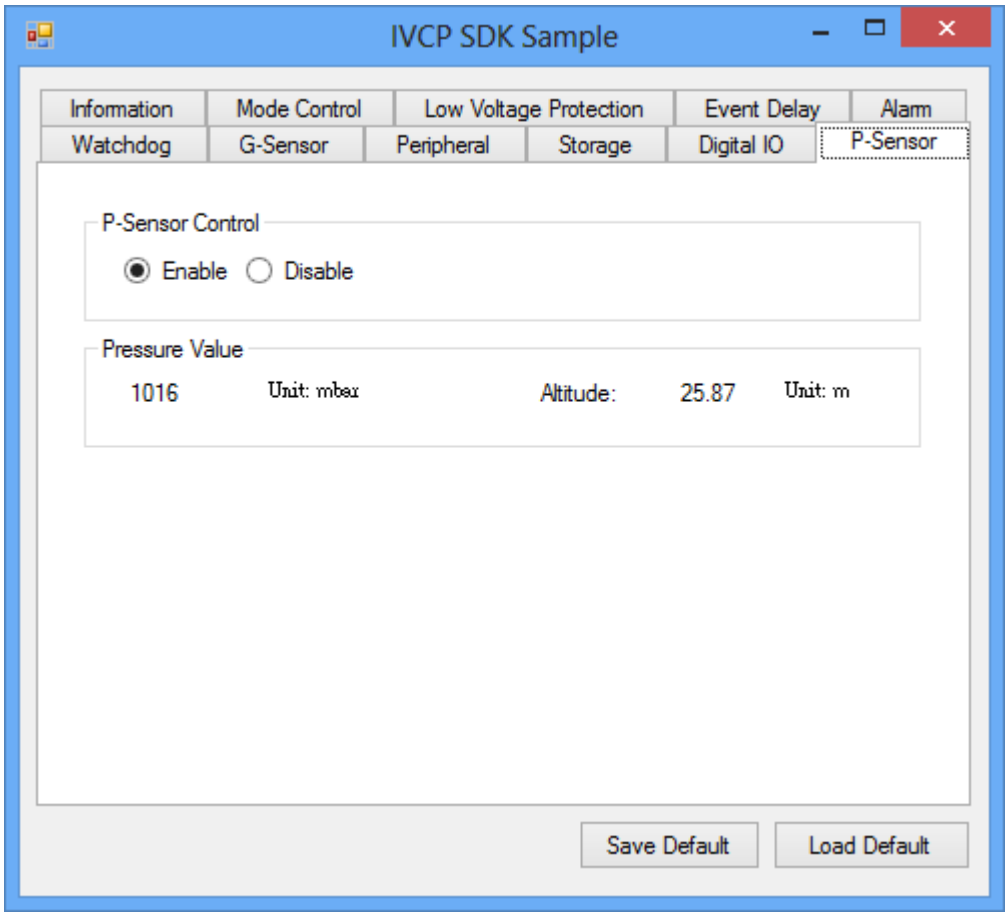
In this page, you can monitor the digital input status and enable/disable digital output.

DI1 default is normal digital input and can be set as dedicated reverse signal input.



5.2.11 P-sensor

In this page, you can monitor the p-sensor status and enable/disable it.

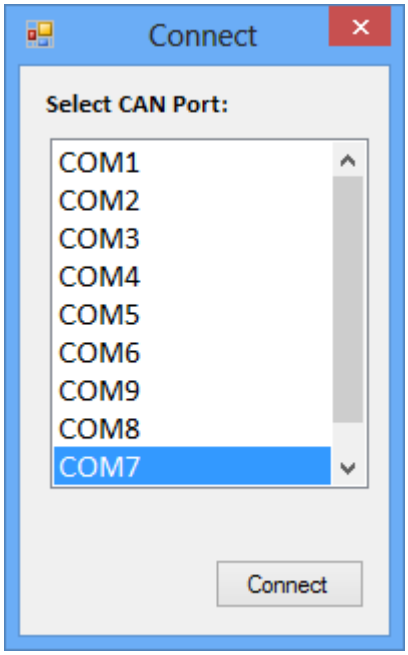


5.3 VCIL Demonstration

The VCIL demonstration application demonstrate the usage of MRM VCIL (Vehicle Communication Interface Layer) API which allow user to access vehicle protocol easily.

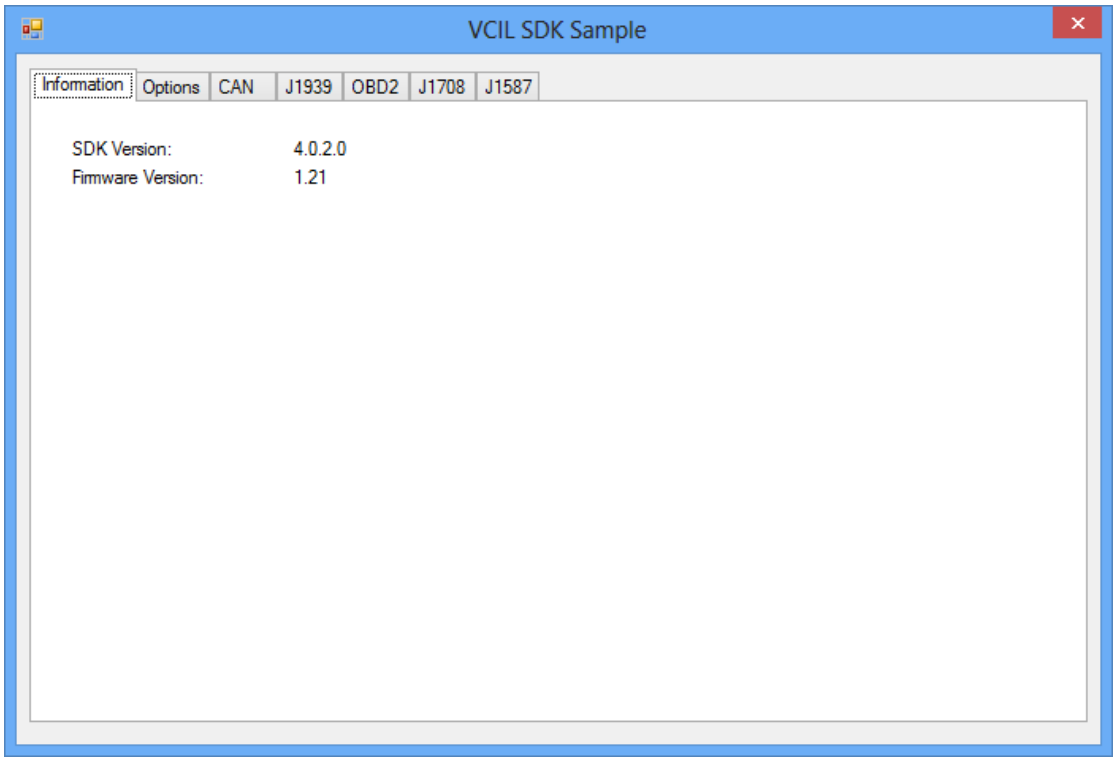
5.3.1 Port selection

When first open VCIL demonstration app, you will see a port selection windows as following.
Please select the VCIL port path and press **Connect** button.
VCIL port path in different platforms have different nodes. The common path at Window is **COM7**.



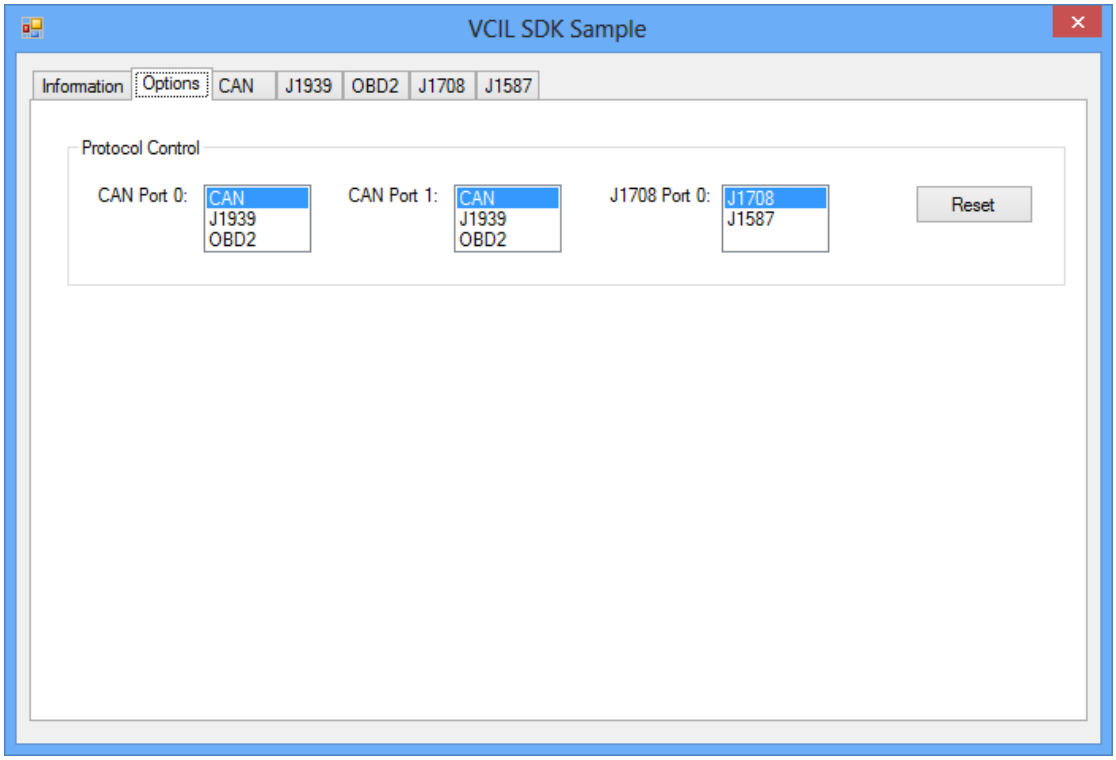
5.3.2 Information

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



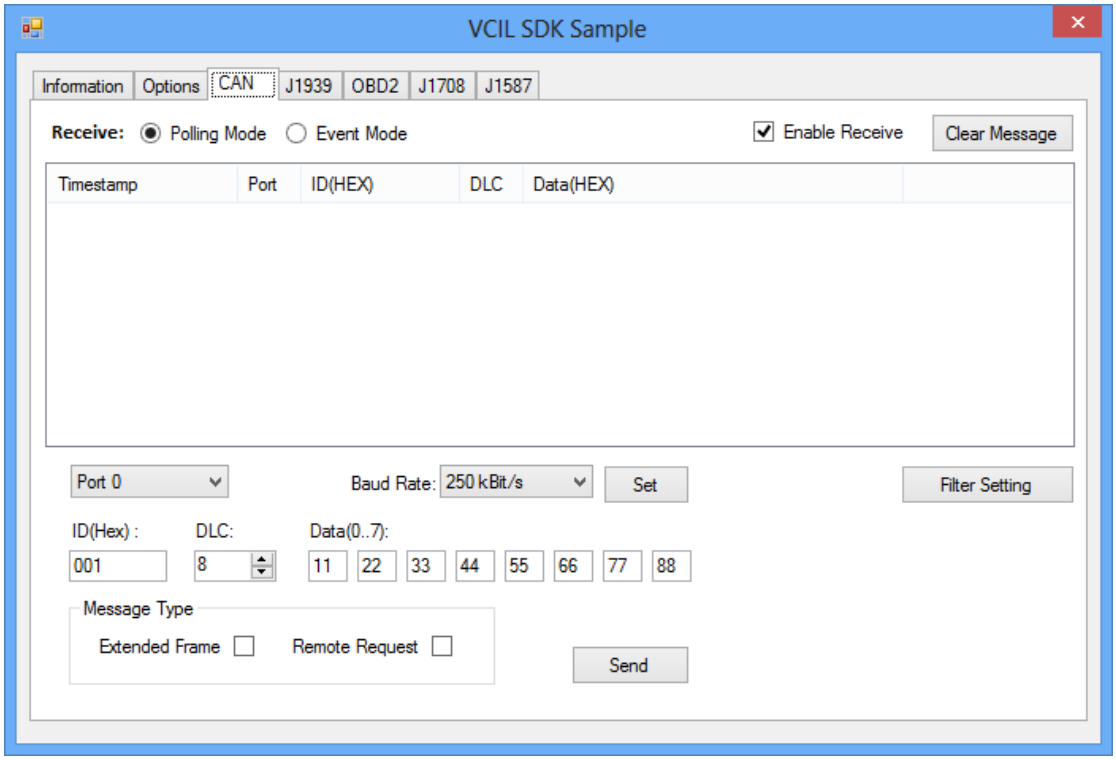
5.3.3 Option

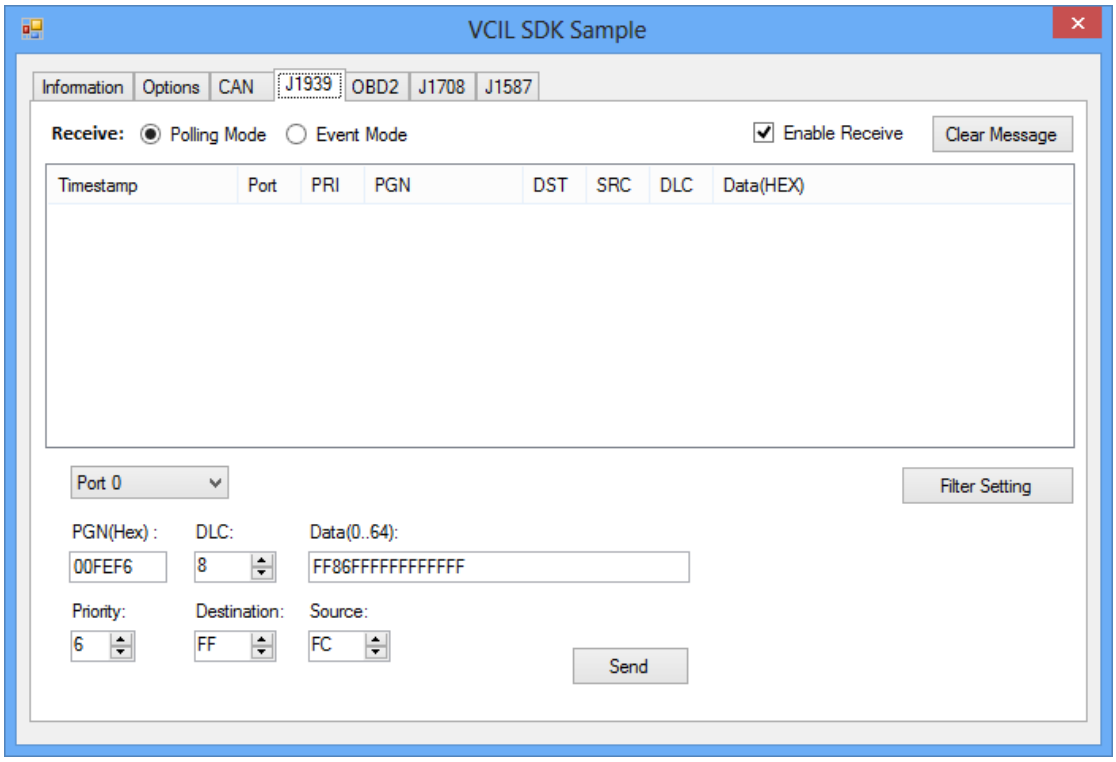
In this page, you can the set the protocol for each port.

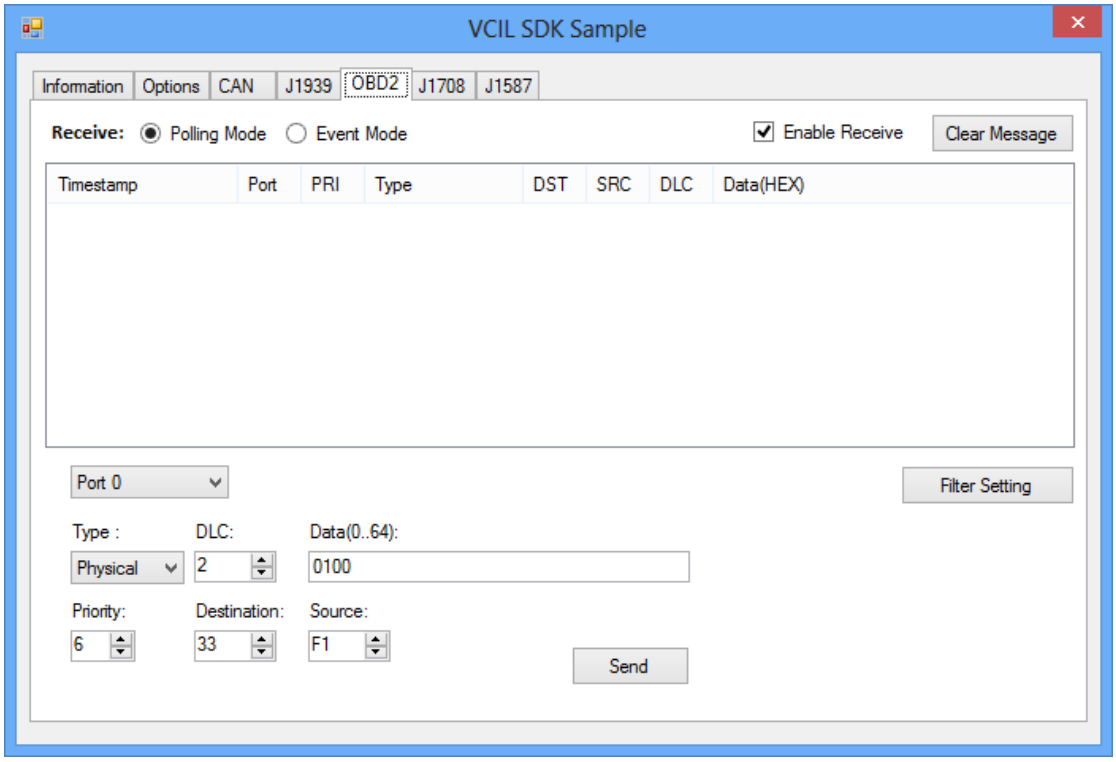


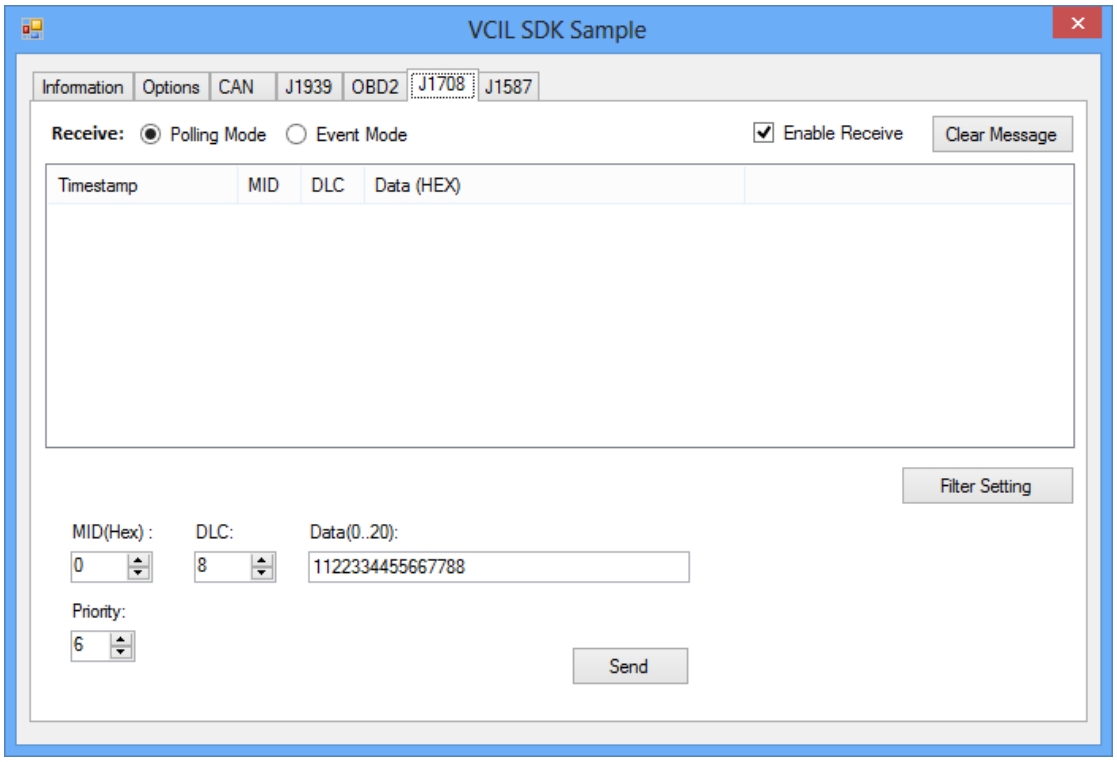
5.3.4 CAN / J1939 / OBD2 / J1708 / J1587

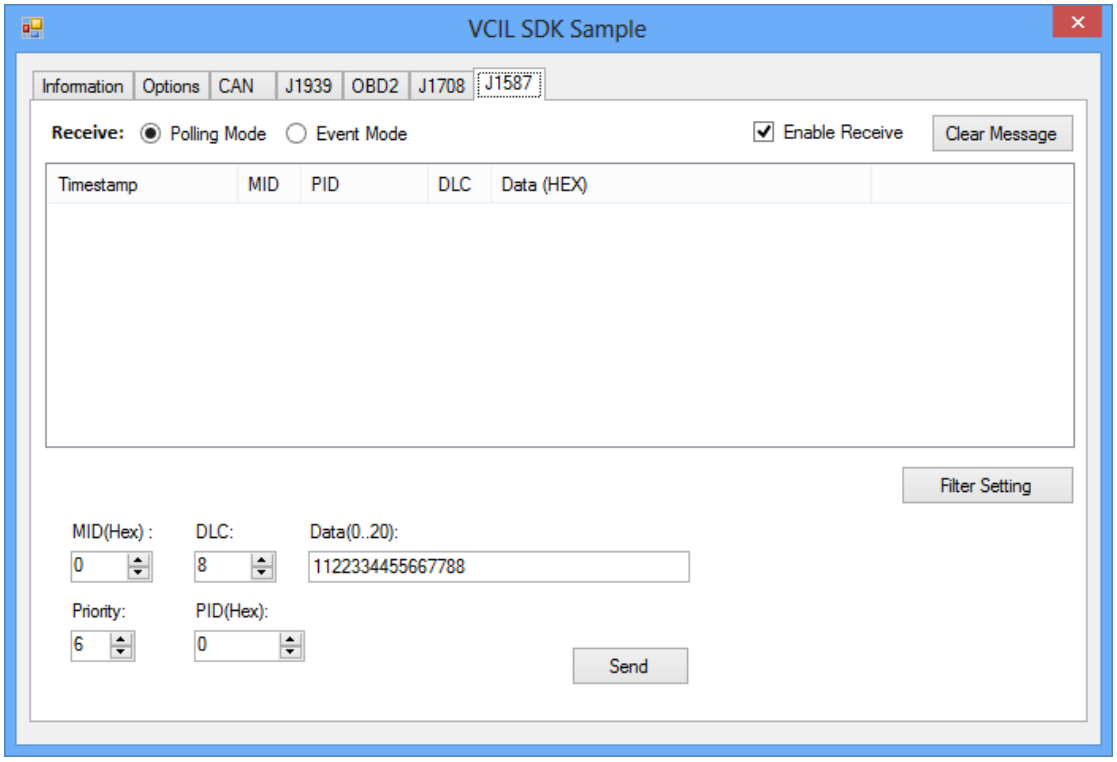
To use CAN / J1939 / OBD2 / J1708 / J1587 protocol on each port, please click on corresponding tab to switch to the page of specific protocol, then you can send/read message on specific port by setting the detail items.




VCIL SDK Sample
Information
Options
CAN
J1939
OBD2
J1708
J1587
Receive:
Polling Mode
Event Mode
Enable Receive
Clear Message
Timestamp
Port
PRI
PGN
DST
SRC
DLC
Data(HEX)
Port 0
Filter Setting
PGN(Hex) :
DLC:
Data(0..64):
00FEF6
8
FF86FFFFFFFFFFFF
Priority:
Destination:
Source:
6
FF
FC
Send


VCIL SDK Sample
Information
Options
CAN
J1939
OBD2
J1708
J1587
Receive:
Polling Mode
Event Mode
Enable Receive
Clear Message
Timestamp
Port
PRI
Type
DST
SRC
DLC
Data(HEX)
Port 0
Filter Setting
Type :
DLC:
Data(0..64):
Physical
2
0100
Priority:
Destination:
Source:
6
33
F1
Send


VCIL SDK Sample
Information
Options
CAN
J1939
OBD2
J1708
J1587
Receive:
Polling Mode
Event Mode
Enable Receive
Clear Message
Timestamp
MID
DLC
Data (HEX)
Filter Setting
MID(Hex) :
DLC:
Data(0..20):
0
8
1122334455667788
Priority:
6
Send

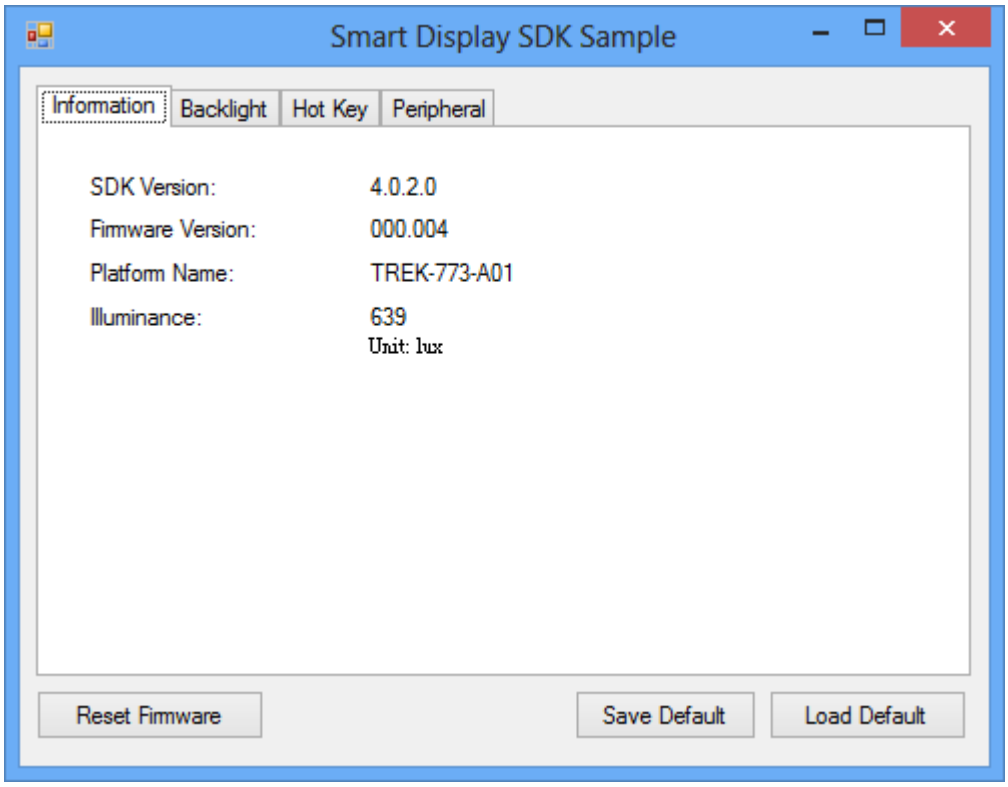

VCIL SDK Sample
Information
Options
CAN
J1939
OBD2
J1708
J1587
Receive:
Polling Mode
Event Mode
Enable Receive
Clear Message
Timestamp
MID
PID
DLC
Data (HEX)
Filter Setting
MID(Hex) :
DLC:
Data(0..20):
0
8
1122334455667788
Priority:
PID(Hex):
6
0
Send

5.4 Smart Display Demonstration

The smart display demonstration application demonstrate the usage of MRM SDP API which is a lightweight interface between OS (Operating system) and SDP (Smart Display Co-Processor) allow user to control the font-end display, backlight setting, hotkey, peripheral control, etc.

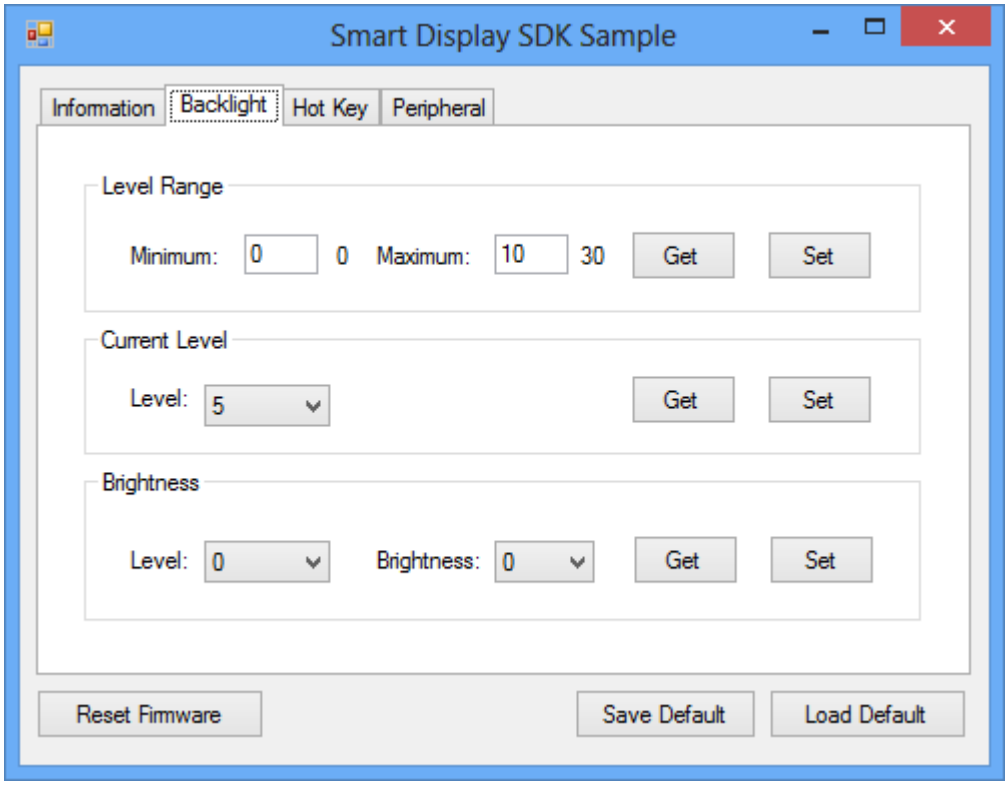
5.4.1 Information

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



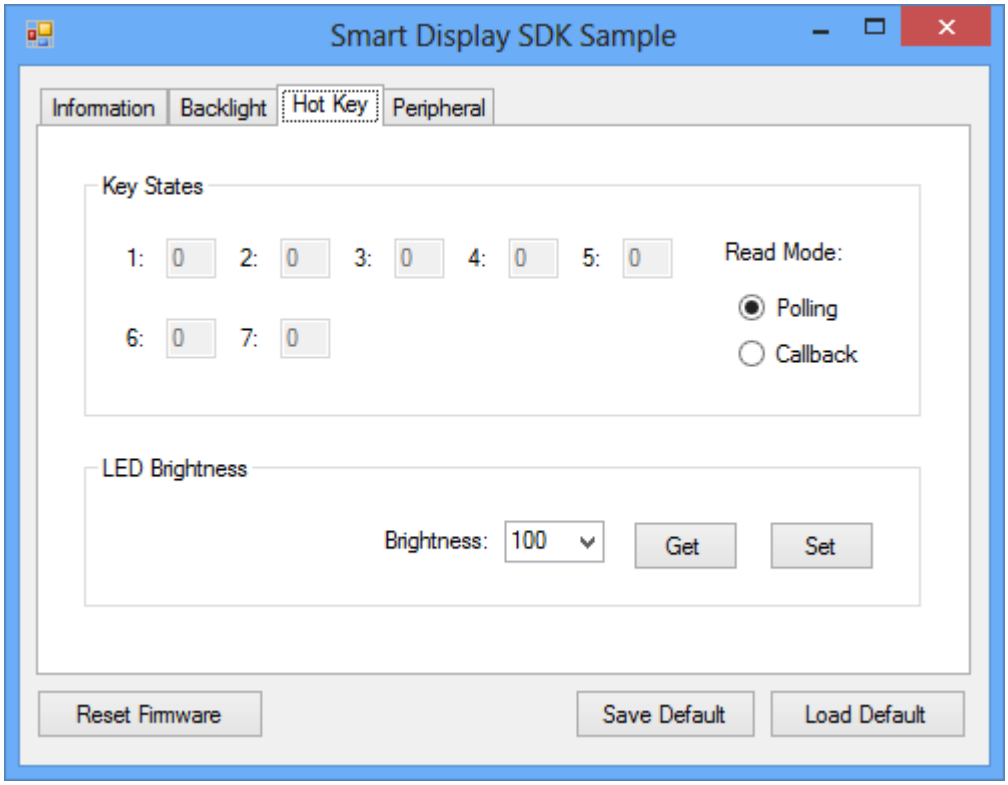
5.4.2 Backlight

In this page, you can set the levels for backlight, the brightness for each level and the current brightness level.



5.4.3 Hot key

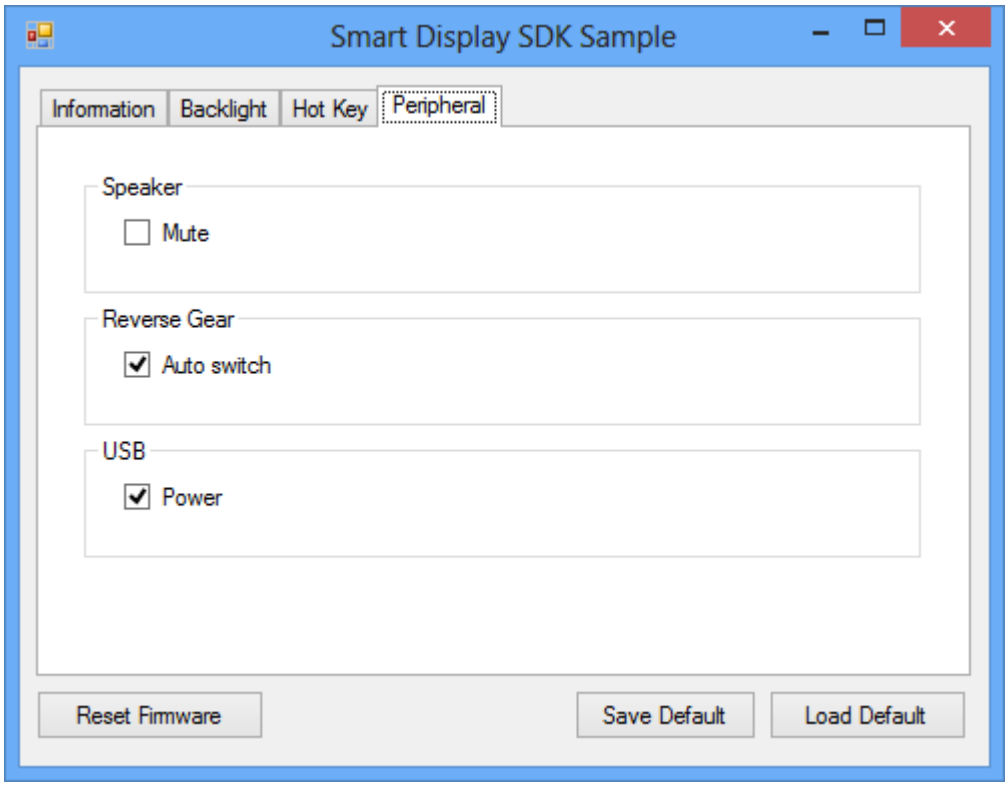
In this page, you can monitor the press state of each hot key and set the LED brightness of the hot keys.



5.4.4 Peripheral

In this page, you can control the status of peripheral devices.

- **Speaker**
  Enable/disable speaker volume.
- **Reserve gear**
  Enable/disable auto switch of display. If enabled, the display will be switched to camera view if reverse gear detected and switched to LVDS view if reverse gear absent.
- **USB**
  Enable/disable power of front-end USB port.

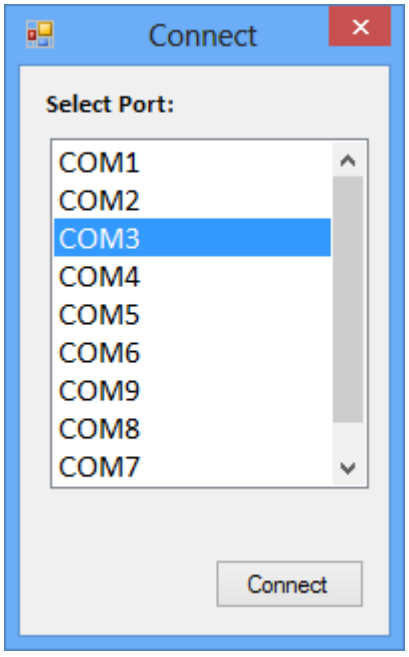


5.5 GPS Demonstration

The GPS demonstration application demonstrate the usage of MRM GPS API which is a lightweight interface between OS (Operating system) and GPS module allows user to easily get GPS information.

5.5.1 Port selection

When first open GPS demonstration app, you will see a port selection windows as following.
Please select the GPS port path and press **Connect** button. The common path at Window is **COM3.**



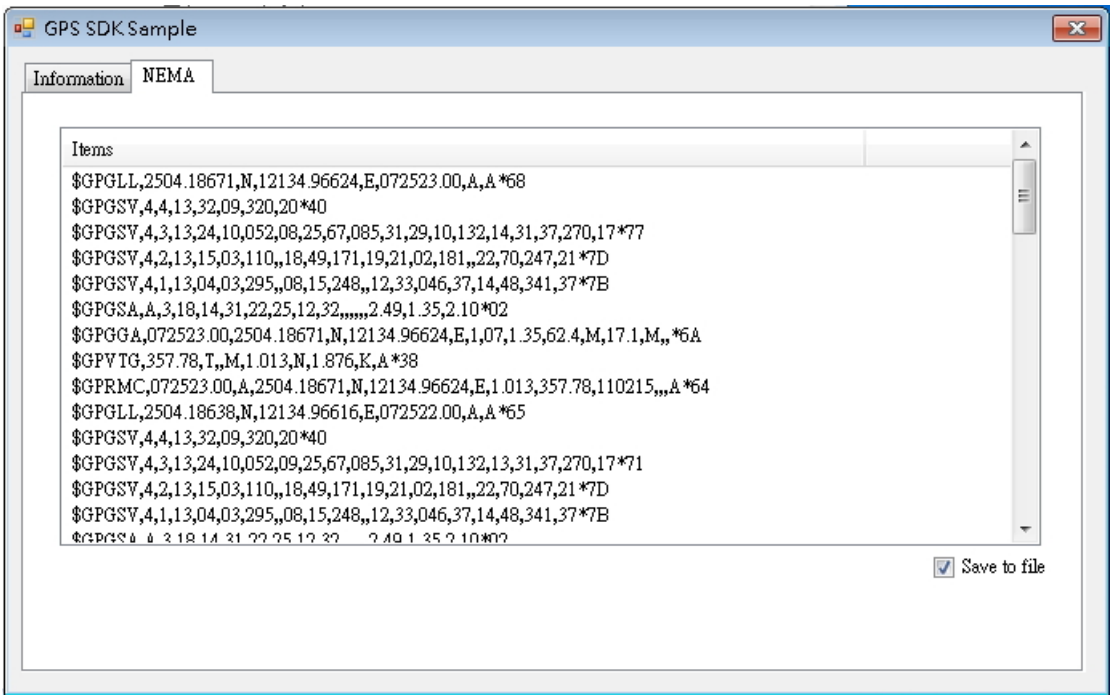
5.5.2 Information

In this page, the demo application shows the current GPS status.

1. GPS Status
2. Function demonstration selection
3. Satellite location Information

5.5.3 NEMA

In this page, the demo application shows the incoming NMEA code. Check ' Save to file ' to logging the NMEA code to file.



Appendix A

The high density connected for TREK-773 includes 48 wires in a 2-meter cable. It extends functionality of many of the I/O port with standard type connectors.

At the host side, a 3M 10150-3000 PE series 50-pin connector can be connected with TREK-773.

A.1 Standard USB A Type Female Connector

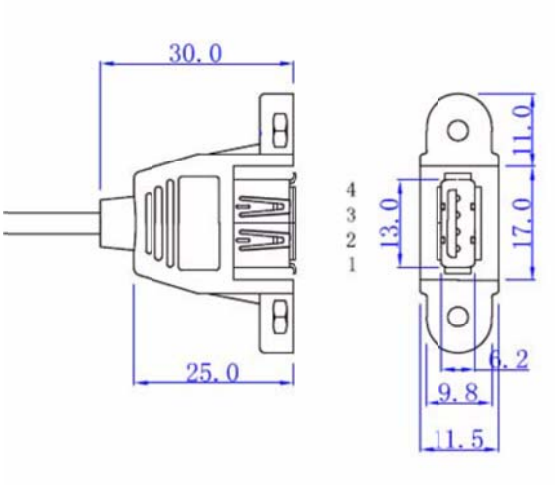


Table A.1: Standard USB A Type Female Connector	
Pin Number	**Definition**
1	+V5_USB
2	USB_D-
3	USB_D+
4	GND(Drain wire)

A.2 Video input, BNC Female Connector

Table A.2: Video Input, BNC Female Connector	
Pin Number	**Definition**
1	CVBS_IN
2	GND(Drain wire)

A.3 RS-232 Connector (DB9 Male) (COM9)

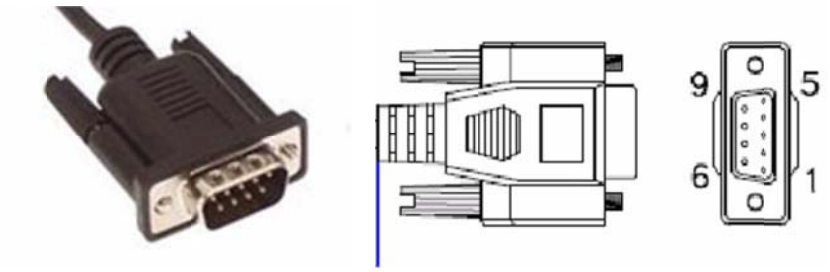


Table A.3: RS-232 Connector (DB9) (COM9)	
Pin Number	**Definition**
1	RS232_DCD
2	RS232_RXD#
3	RS232_TXD#
4	RS232_DTR
5	GND(Drain wire)
6	RS232_DSR
7	RS232_RTS
8	RS232_CTS
9	RS232_RI

A.4 4DI /4DO & RS-485 (DB15 Type Male) (COM5)

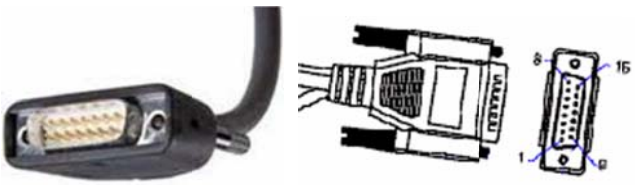


Table A.4: 4DI /4DO & RS-485 (DB15 Type Male) (COM5)	
Pin Number	**Definition**
1	ISO_DI1
2	ISO_DI2
3	ISO_DI3
4	ISO_DI4
5	GND_ISO
9	ISO_DO1
10	ISO_DO2
11	ISO_DO3
12	ISO_DO4
13	RS485-
14	RS485+
15	GND(Drain wire)

A.5 CAN Bus & J1708 (Terminal Block 6P, 5.08mm pitch)

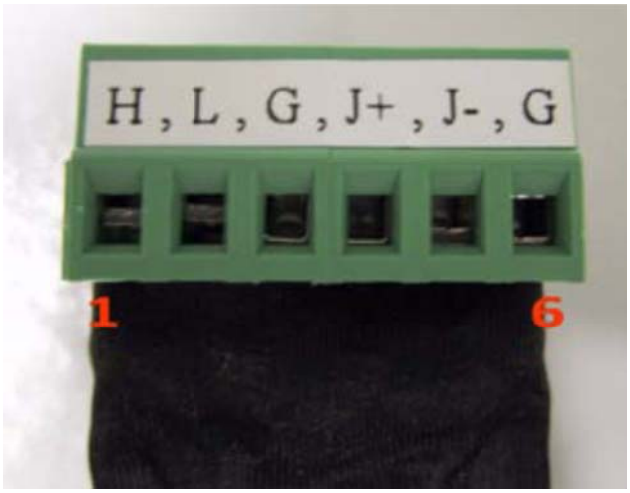


Table A.5: CAN Bus (Terminal Block 6P, 5.08mm Pitch)	
Pin Number	**Definition**
1	CAN_H (H)
2	CAN_L (L)
3	GND (G)
4	J1708+ (J+)
5	J1708- (J-)
6	GND (G)

A.6 Power Extension Connector (Terminal Block 3P, 5.08mm pitch)

Table A.6: Power Extension Connector (Terminal Block 3P, 5.08mm Pitch)

Pin Number	Definition
1	+V12(26AWG)
2	GND(26AWG)
3	+V5(26AWG)

Appendix A High Density Cable Pin Assignment

A.7 High Density & Connector Pin List

No.	Signal Name	Function / Conn	No.
1	+V5(26AWG)	Extended Power Terminal Block 3P, 5.08mm pitch	3
2	+V5_USB	USB type A female connector	1
3	GND(Drain wire)		4
4	USB_D+		3
5	USB_D-		2
6	GND(Drain wire)	Video input BNC Connector	2
7	CVBS_IN		1
8	N/A		
9	GND(Drain wire)	Line out jack	
10	LINEOUT_Left		
11	LINEOUT_Right		
12	LINEIN_Right	Line in jack	
13	LINEIN_Left		
14	MICIN	Mic. In jack	
15	GND(Drain wire)	DIO & RS-485 DB15 female	15
16	RS485-		14
17	RS485+		13
18	GND(Drain wire)	CAN Bus & J1708 Terminal Block 6P, 5.08mm pitch connector	6
19	J1708-		5
20	J1708+		4
21	GND(Drain wire)		3
22	CAN_L		2
23	CAN_H		1
24	N/A		
25	N/A		
26	+V12(26AWG)		1
27	+V12(26AWG)		
28	+V12(26AWG)	Extended Power Terminal Block 3P, 5.08mm pitch	
29	GND(26AWG)		2
30	GND(26AWG)		
31	GND(26AWG)		

32	RS232_RI	RS-232 male connector	9
33	RS232_CTS		8
34	RS232_RTS		7
35	RS232_DSR		6
36	GND(Drain wire)		5
37	RS232_DTR		4
38	RS232_TXD#		3
39	RS232_RXD#		2
40	RS232_DCD		1
41	N/A		
42	ISO_DO4	DIO & RS-485 DB15 female connector	12
43	ISO_DO3		11
44	ISO_DO2		10
45	ISO_DO1		9
46	ISO_DI4		4
47	ISO_DI3		3
48	ISO_DI2		2
49	ISO_DI1		1
50	GND_ISO (26AWG)		5

Appendix B

B.1 EWF (Enhanced Write Filter) Manager SOP

1. Open Start -> All Programs -> Advantech -> Advantech EWF Manager.

1. The following input screen will be shown.

A. EWF function: If you want to protect your operating system you can use the function

to recover your OS after a restart..

Note! *Please check "C" volume is not protected.*

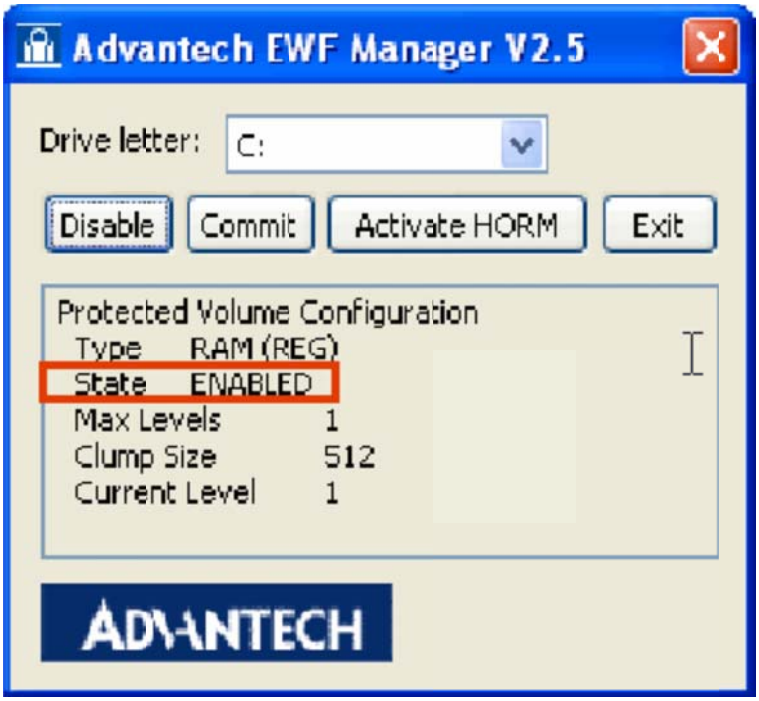
EWF Enable Method:

1. Click Enable and a reboot the system when prompted.

Note! *Please check "C" volume is not protected.*

Appendix B EWF (Enhanced Write Filter) Manager SOP

2. After restart EWF state will be set to "Enable"



3. If you try to create a folder or file and restart the OS, you will discover you can't modify data under the C volume.

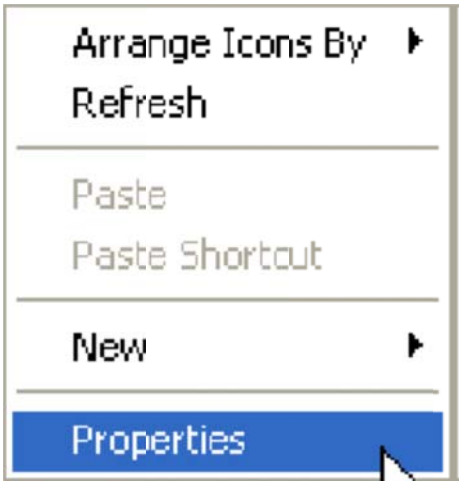
Note! *If you want to write data at EWF enable state you can click Commit to write data under C volume.*

HORM (Hibernate Once and Resume Many): The function can always resume your OS after hibernation, even after a shutdown or crash.

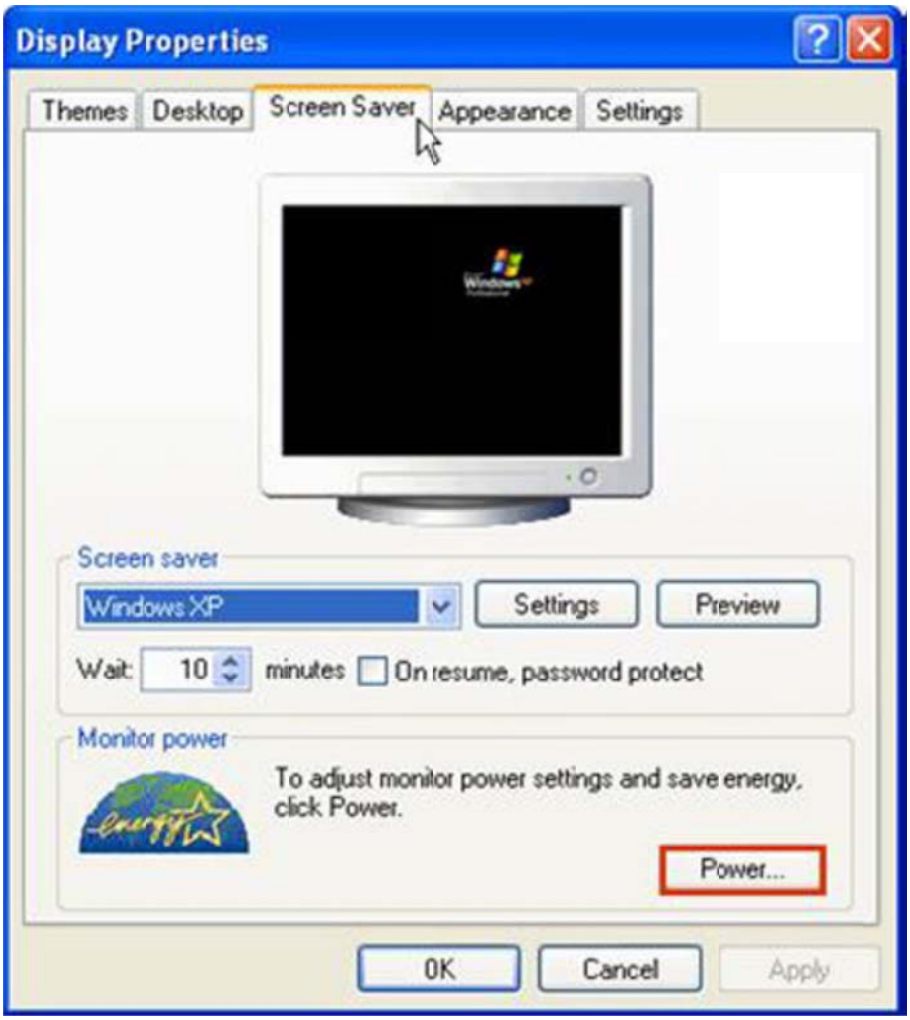
I Before using HORM you should set EWF to the state "disable"

II Check "Enable hibernate"

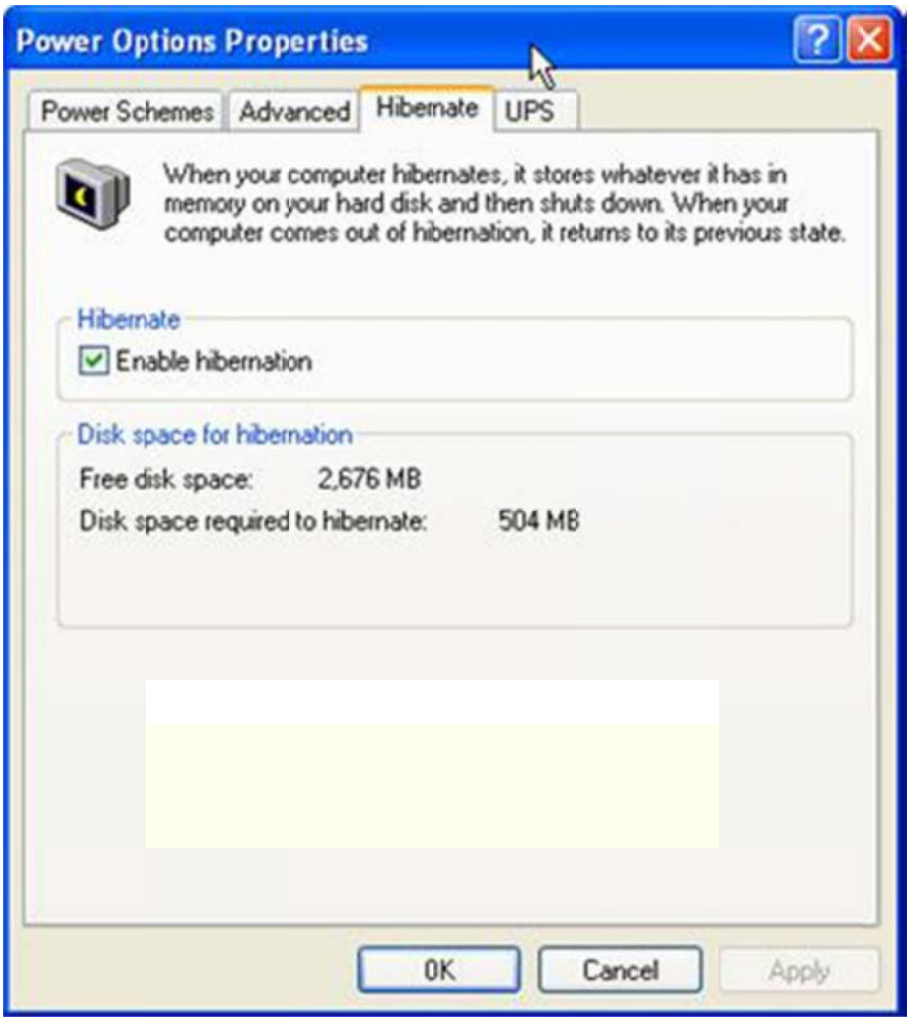
1. Right-Click on desktop and click "Properties"



2. Choose "Screen Saver" panel and click "Power."



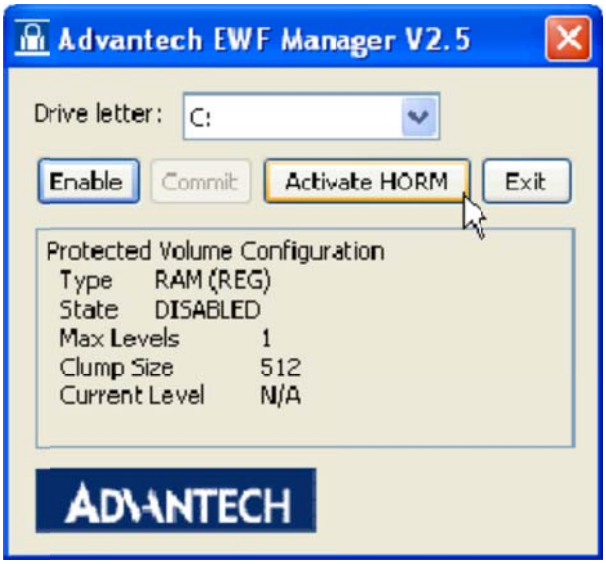
3. Check "Enable hibernate."



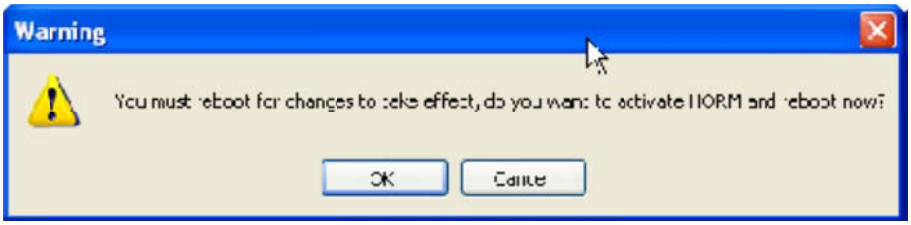
Appendix B EWF (Enhanced Write Filter) Manager SOP

III Activate HORM

1. Open Start -> All Programs -> Advantech -> Advantech EWF Manager.
2. Click "Activate HORM."



3. Chick "OK" to reboot OS.

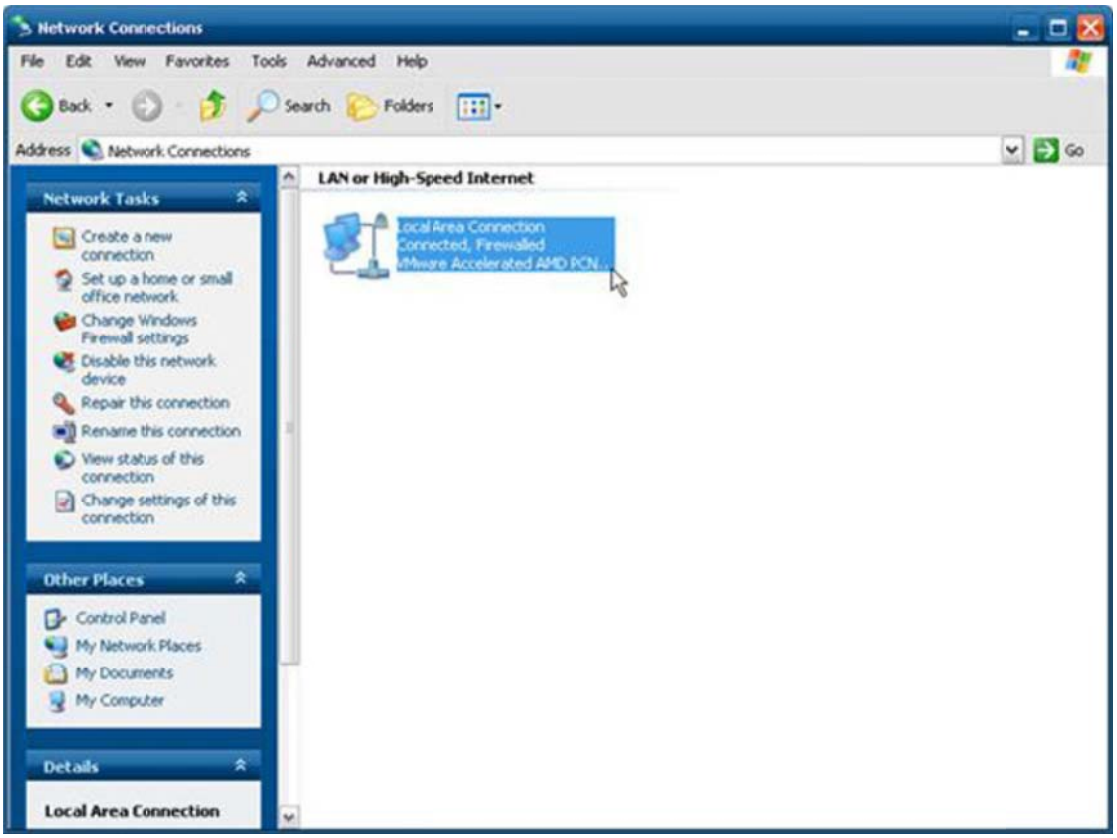


IV Check "Use the Welcome screen."

1. Open Start -> Control Panel.

2. Click "Network and Internet Connections."

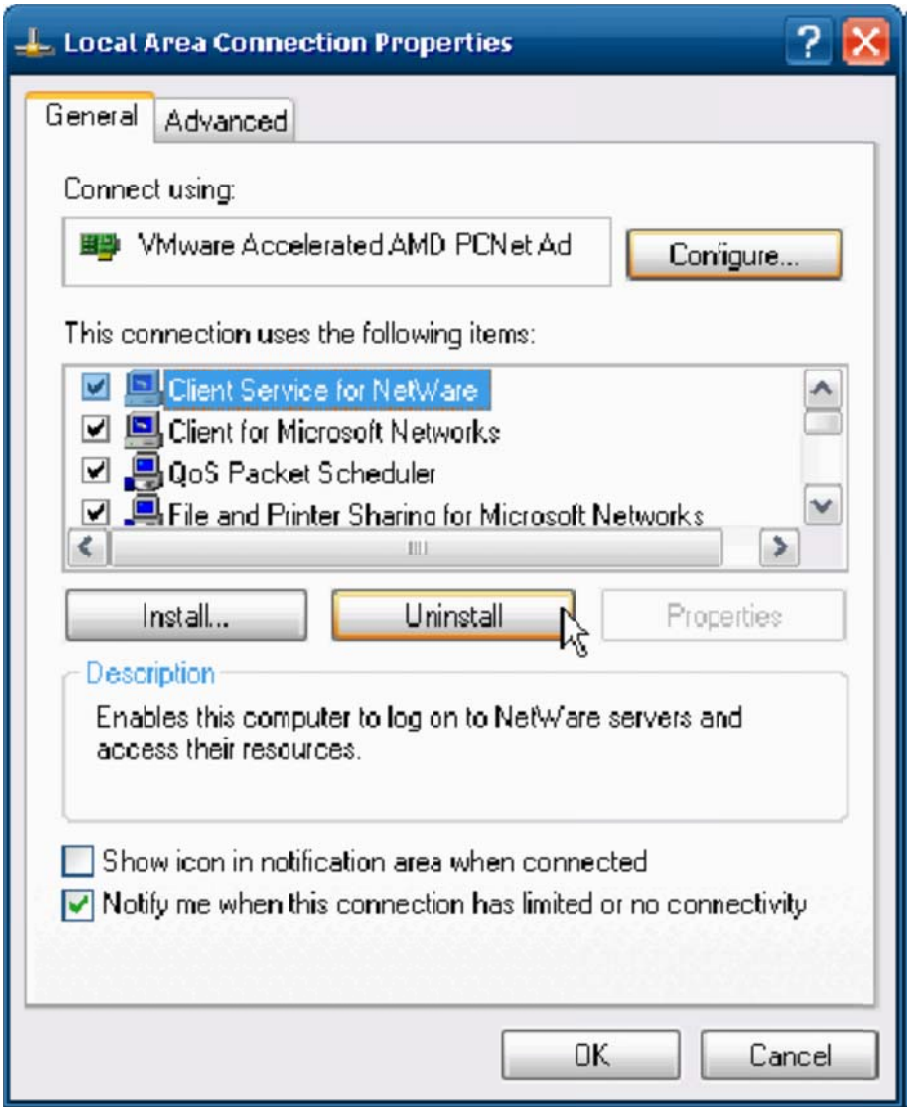
3. Click "Network Connection."



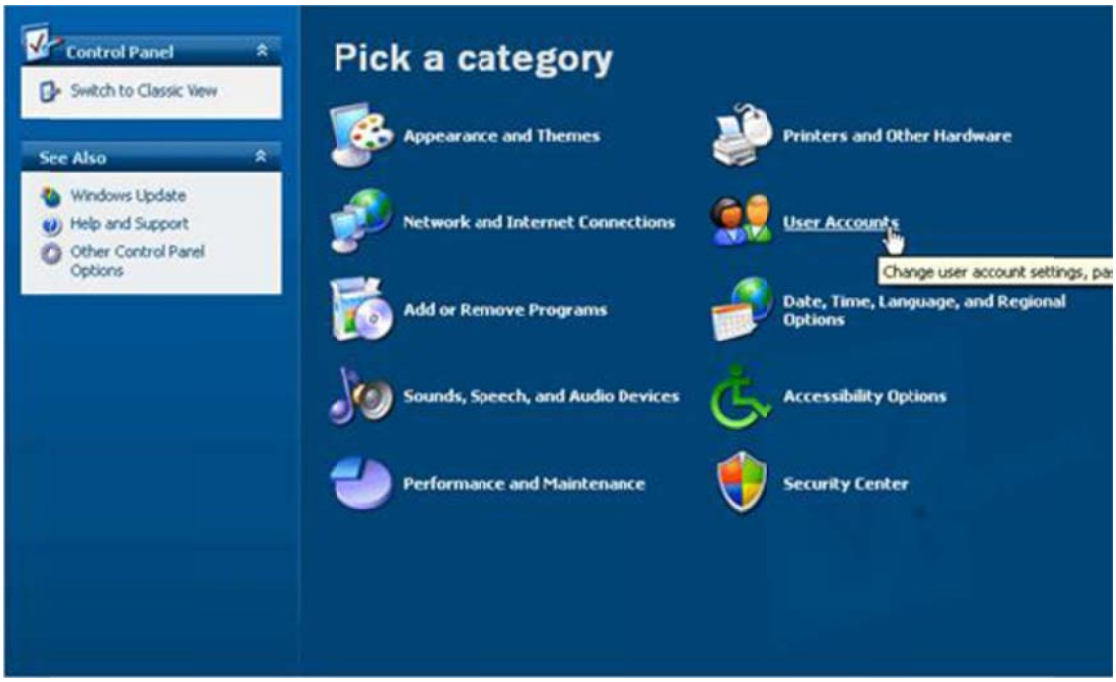
Appendix B EWF (Enhanced Write Filter) Manager SOP

4. Right-Click on "Local Area Connection" and click properties.

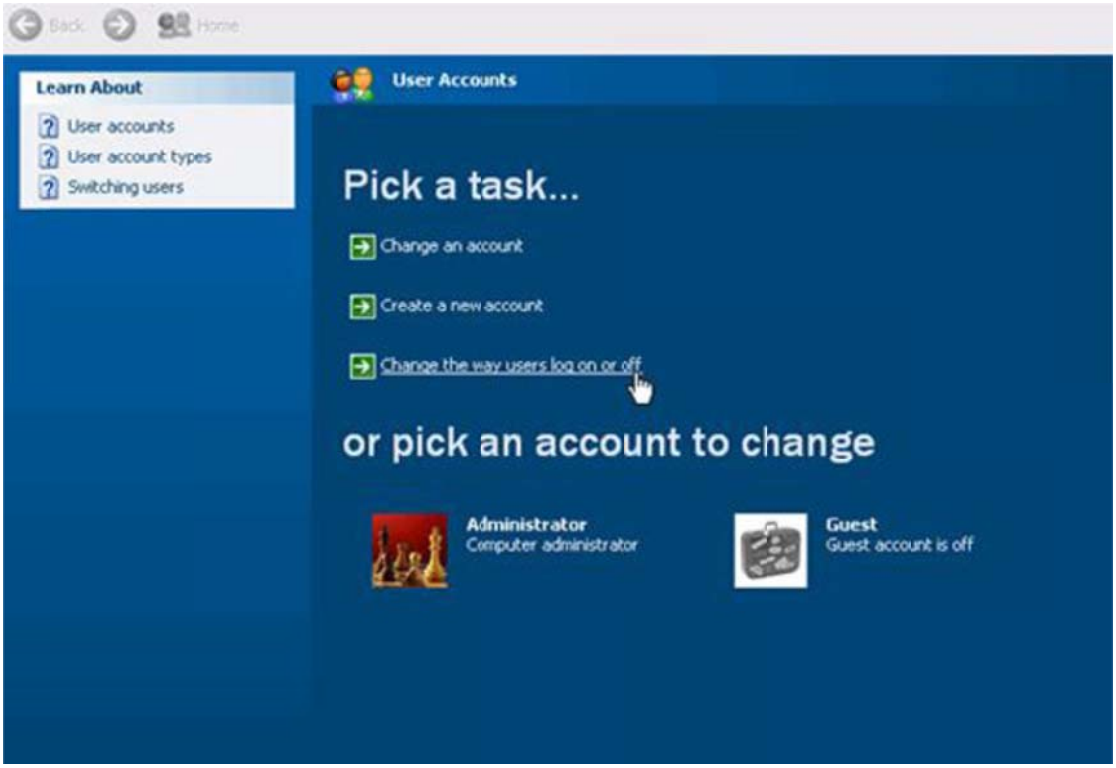
5. Uninstall "Client Service for NetWare."



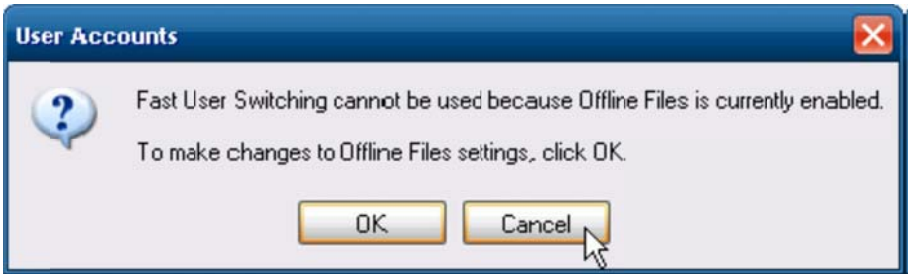
6. Click "Yes" to remove "Client Service for NetWare" and reboot OS.
7. Open Start -> Control Panel.



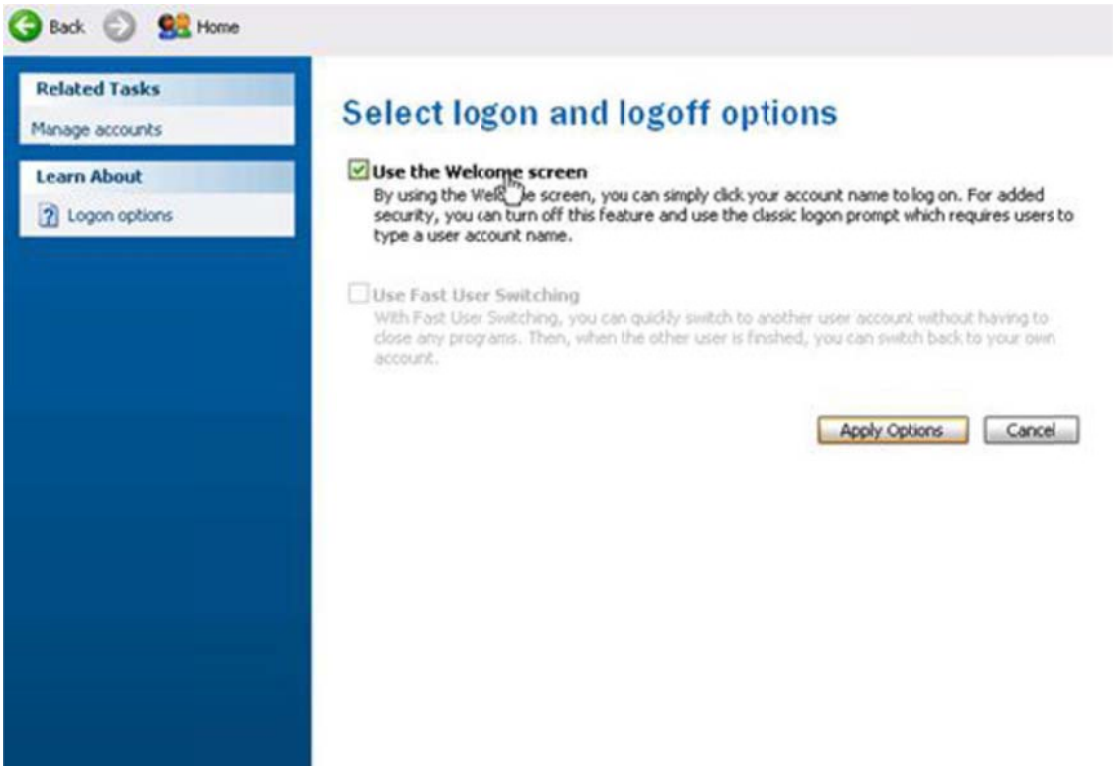
8. Click "User Accounts"



9. Click "Cancel."



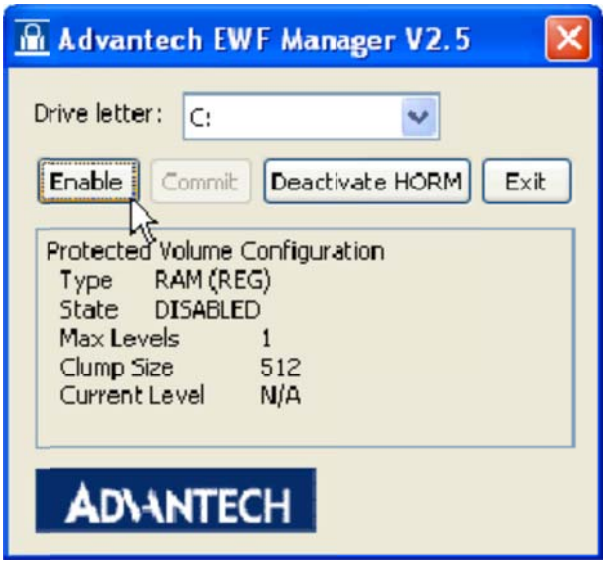
10. Check "Use the Welcome screen" and Click "Apply Options"



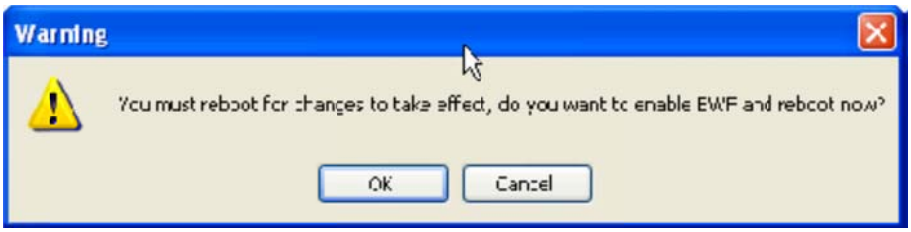
Appendix B EWF (Enhanced Write Filter) Manager SOP

V Enable EWF

1. Open Start -> All Programs -> Advantech -> Advantech EWF Manager.
2. Click "Enable."



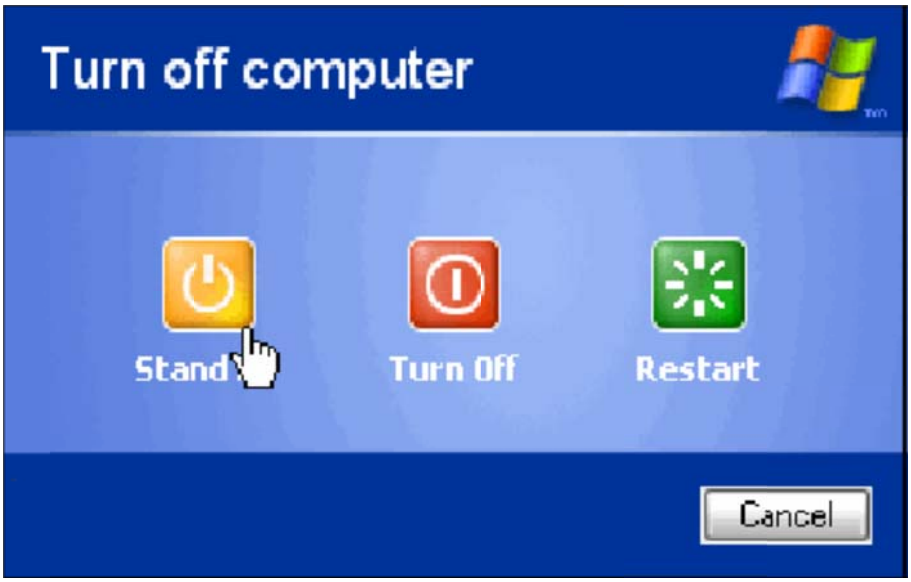
3. Click "OK" to reboot OS.

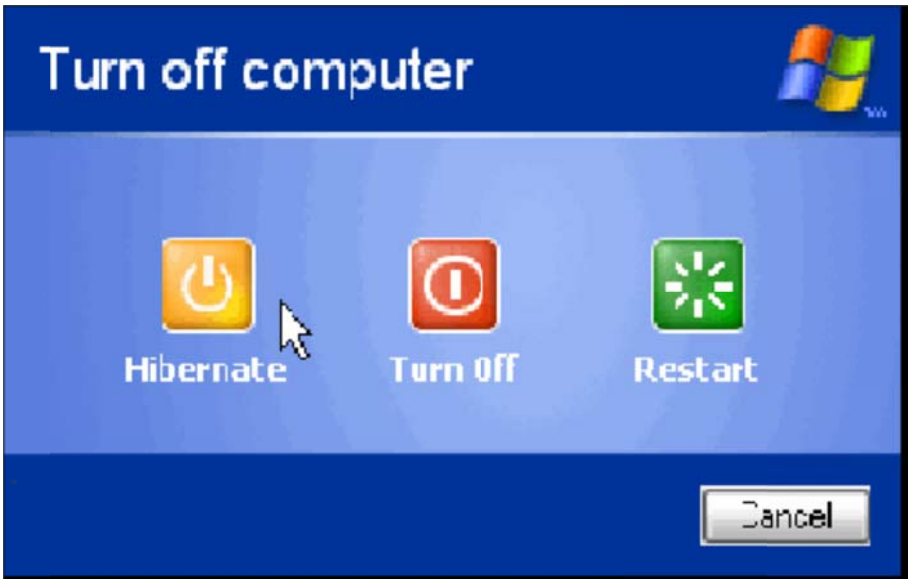


VI Run "Hibernate"

1. Open Start -> Shut Down

2. When you press "Shift" the Standby icon will be replaced with a Hibernate icon.





VII Enable HORM is finished.

VIII If you unplug power cord after resuming system, you will discover the OS will continue its resume state.

Appendix B EWF (Enhanced Write Filter) Manager SOP