I-7565-H1 / I-7565-H2
High Performance USB/CAN Converter

User's Manual

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year from the date of delivery to the original purchaser.

Warning

ICP DAS assumes no liability for damages resulting from the use of this product. ICP DAS reserves the right to change this manual at any time without notice. The information furnished by ICP DAS is believed to be accurate and reliable. However, no responsibility is assumed by ICP DAS for its use, or for any infringements of patents or other rights of third parties resulting from its use.

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1. Introduction

I-7565-H1 and I-7565-H2 are the high performance intelligent USB to CAN converters with one and two CAN channels separately. They provide faster CAN bus communication performance than I-7565. Both I-7565-H1 and I-7565-H2 support CAN2.0A/2.0B protocol and different baud rates from 5 Kbps to 1 Mbps. The important feature of I-7565-H1/H2 is to support the user-defined baud rate function no matter what the baud rate is. When connecting I-7565-H1/H2 to PC, PC will load the relevant device driver automatically (hot plug & play). Therefore, users can make data collection and processing of CAN bus network easier and quicker by applying I-7565-H1/H2. The application fields can be CAN bus monitoring, building automation, remote data acquisition, environment control and monitoring, laboratory equipment & research, factory automation, etc.

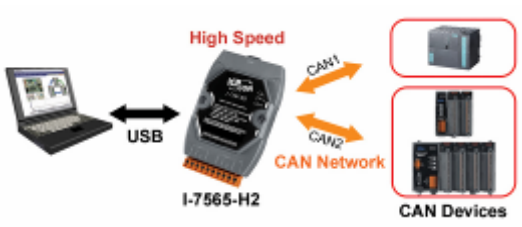
The following is the application for these two USB/CAN modules **:**

(1) **I-7565-H1:** High performance intelligent USB to 1- port CAN bus Converter.

(2) **I-7565-H2:** High performance intelligent USB to 2- port CAN bus Converter.

Figure 1-1**:** Application of I-7565-H1/H2

I-7565-H1 application



I-7565-H2 application

1.1 Features

- RoHS Design
- Fully compliant with USB 1.1/2.0 (Full Speed)
- Fully compatible with the ISO 11898-2 standard
- Support both CAN2.0A and CAN2.0B
- No external power supply (powered by USB)
- Integrated with one or two CAN bus interface
- Programmable CAN bus baud rate from 5Kbps to 1Mbps or user-defined baud rate
- Support CAN bus acceptance filter configuration
- Support Listen Only Mode (LOM). (For FW v1.05 or newer)
- Support 5 sets of Hardware Send Timer for high precision CAN messages sending. (For FW v1.05 or newer)
- Timestamp of CAN message with at least ±1ms precision
- Support firmware update via USB
- Provide utility tool for users module setting and CAN bus communication testing conveniently
- Provide API library for user program development
- Provide Hardware Serial Number to protect users' program. (For FW v1.04 or newer)
- Provide PWR / RUN / ERR indication LED
- Built-in jumper to select 120 ohm terminal resister
- Max data flow for CAN channel**:** 3000 fps (depends on users' PC hardware performance)
- The CAN buffer is 256 data frames for I-7565-H1 and 128 data frames in each CAN port for I-7565-H2.
- Watchdog inside
- Driver supported for Windows 2000/XP, Win7(32/64bit) and WinCE (available soon)

1.2 Specifications

[USB specs:]

- Input port **:** USB (USB Type B)
- Compatibility **:** USB 1.1 and 2.0 standard
- Driver Supported **:** Windows 2000/XP, Win7(32/64bit) and WinCE (available soon)

[CAN specs:]

- CAN interface connector:
  I-7565-H1 **:** 9-pin D-sub male
  I-7565-H2 **:** 10-pin terminal-block
- CAN Baud Rate **:** 5K ~ 1Mbps or User-defined baud rate
- Isolation Voltage **:** 3000Vrms on the CAN side

[Module specs:]

- Dimensions **:** 108mm x 72mm x 35mm (H x W x D)
- Operating temperature **:** -25 to 75°C (-13 to 167°F);
- Storage temperature **:** -40 to 80°C (-40 to 176°F);
- Humidity **:** 5 to 95%, non-condensing;
- LEDs **:** PWR LED for power
  RUN LED for communication
  ERR LED for error

[Software Utility Tool / API Library:]

- Provide CAN bus user-defined baud rate / acceptance filter configuration
- Easily transmit / receive CAN messages for testing and display the time-stamp of each received CAN message.
- Provide saving the CAN message as “TXT” file for data log.
- Provide sending CAN message by using the internal timer of module for high precision transmission.
- Check / Reset module status remotely and get current CAN bus message flow.
- Users can develop own program by API library quickly and easily.

[Application:]

- Factory Automation;
- Building Automation;
- Home Automation;
- Control system;
- Monitor system;
- Vehicle Automation;

2. Hardware

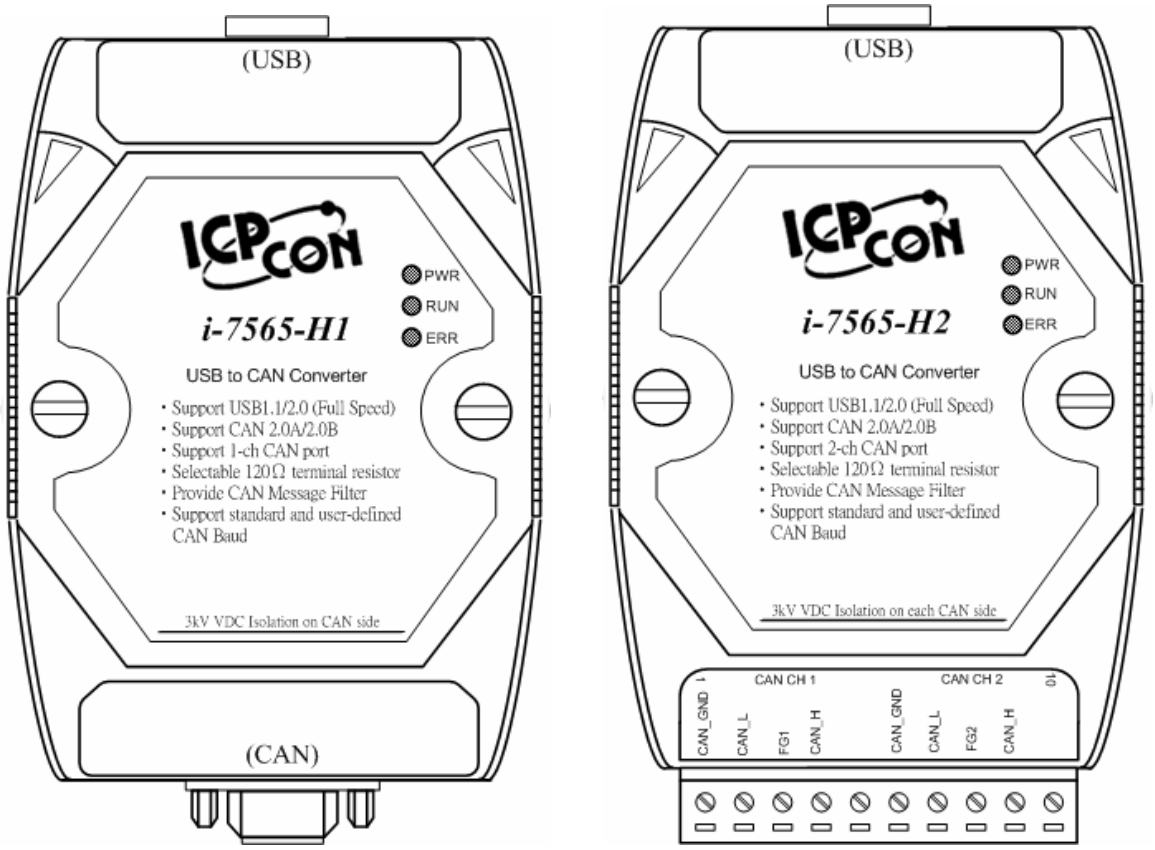


Figure 2-1: Hardware externals of I-7565-H1/H2

2.1 Block Diagram

Figure 2-2 is a block diagram illustrating the functions on the I-7565-H1/H2 module. It provides the 3000Vrms Isolation in the CAN interface site.

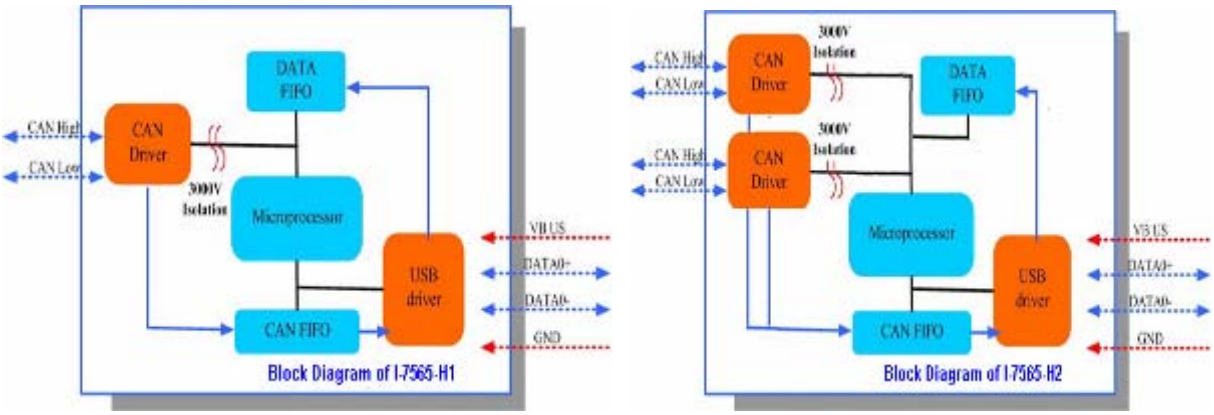
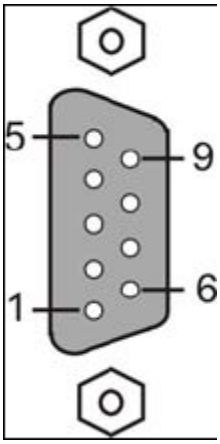


Figure 2-2: Block diagram of I-7565-H1 / I-7565-H2

2.2 Pin Assignment of CAN Port

Table 1: CAN DB9 Male Connector on I-7565-H1

Terminal	2-wire CAN
1	Not Connect
2	**CAN Low**
3	CAN Ground
4	Not Connect
5	
6	CAN Ground
7	**CAN High**
8	Not Connect
9	



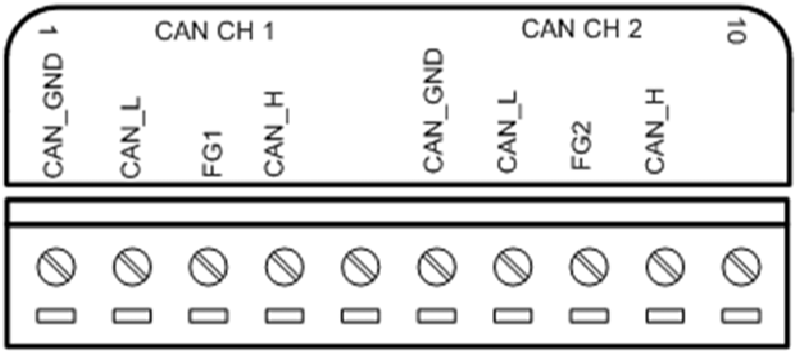


Figure 2-3: Pin Assignment on I-7565-H2

2.3 Hardware Connection

The pin assignment of the CAN port on the I-7565-H1 (DB9 male) defined in both the CANopen DS102 profile and in appendix C of the DeviceNet specifications. It is the standard pin assignment for CAN. The hardware connection between device and I-7565-H1/H2 is like Figure 2-4.

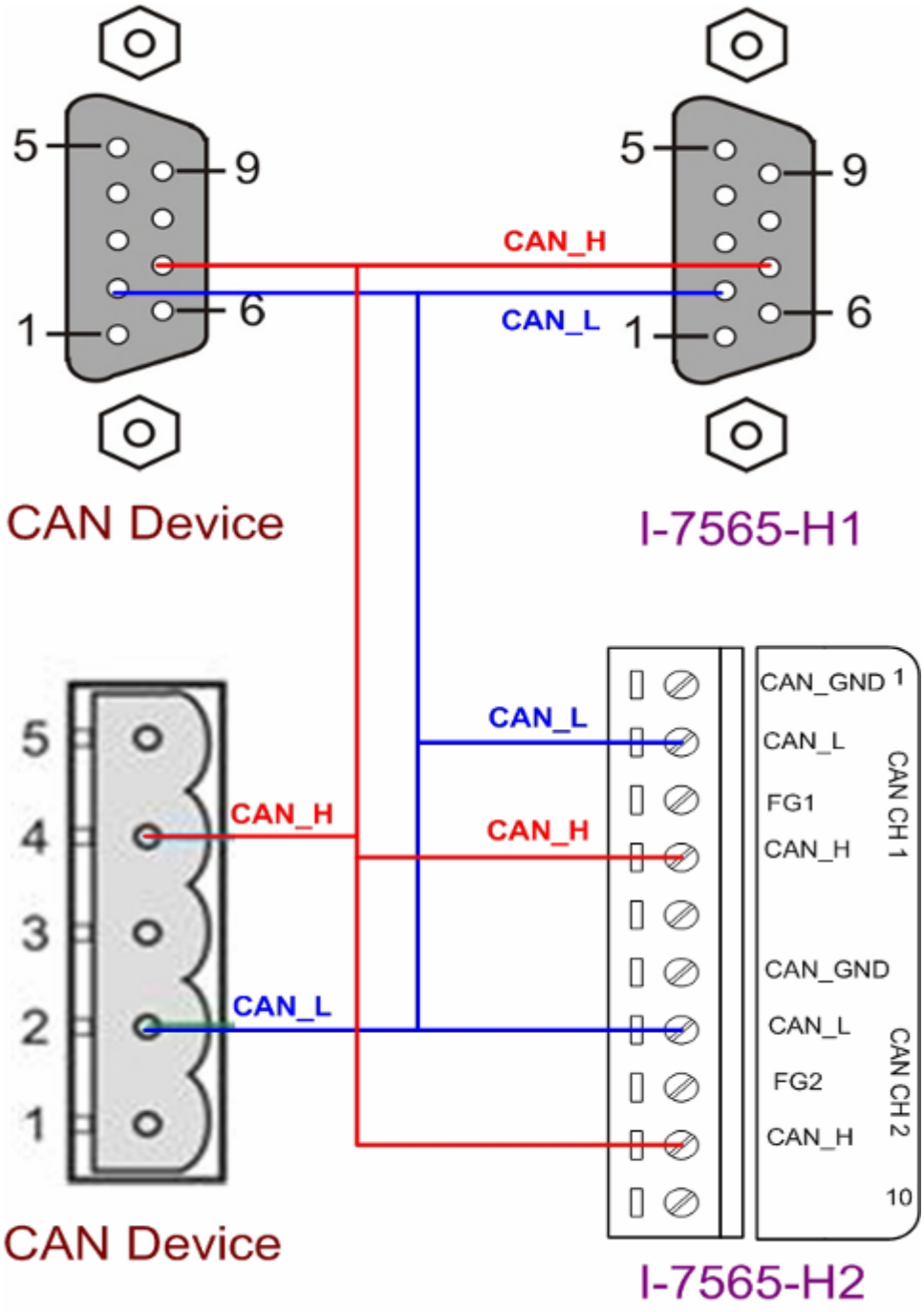


Figure 2-4: CAN Hardware Wire Connection

2.4 Terminator Resistor Settings

According to the ISO 11898 specifications, the CAN Bus network must be terminated by two terminal resistors (120Ω) for proper operation, as shown in the below figure.

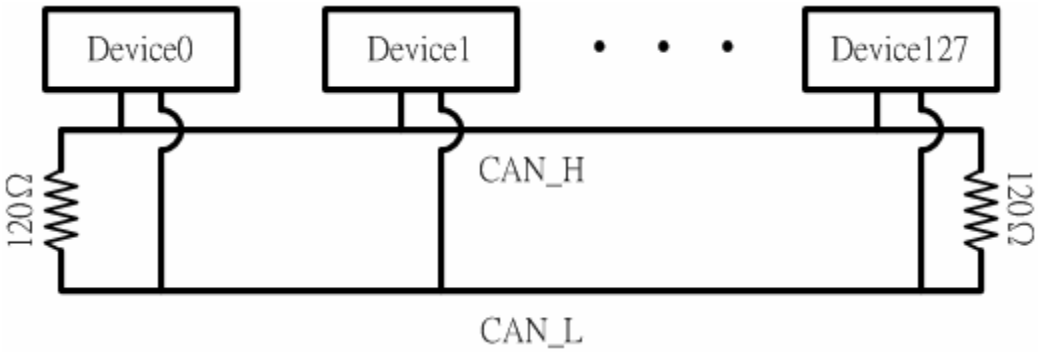


Figure 2-6: Terminal Resistor

Therefore, the I-7565-H1/H2 module supplies a jumper for users to active the terminal resistor or not. If users want to use this terminal resistor, please open the I-7565-H1/H2 cover and use the JP3 for I-7565-H1 / JP3, JP4 for I-7565-H2 to activate the 120Ω terminal resistor built in the module, as the Figure 2-7. Note that the default setting is active.

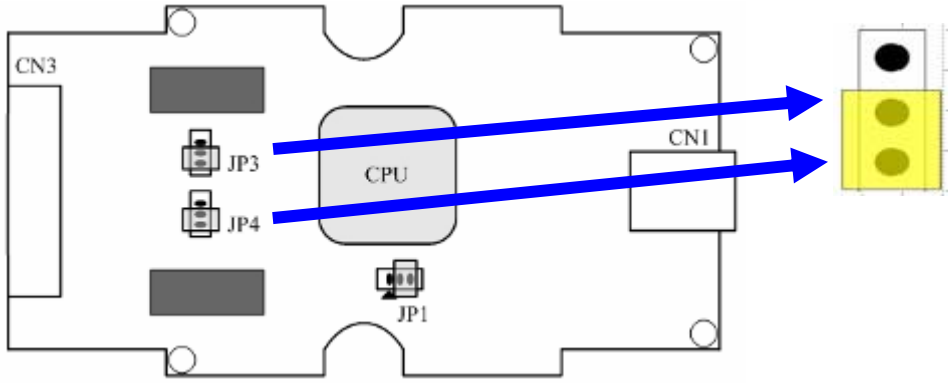
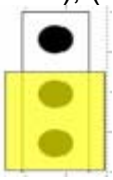


Figure 2-7: Terminal Resistor Jumper

Enable (default), (Position: 1-2)



Disable, (Position: 2-3)

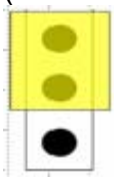


Figure 2-8: JP3/JP4 Jumper Position

2.5 Init / Normal Dip-switch

On the back of the I-7565-H1/H2 module, there is a dip-switch used for firmware operation or firmware updating of the module. The following steps show how to use this dip-switch.

2.5.1 Firmware Update Mode

Please set the dip-switch to the “Init” (Initial) position like Figure 2-9. Then the I-7565-H1/H2 will work in the “Firmware Update Mode” after the power of the module has been turned on again. In this mode, users can update the firmware of the I-7565-H1/H2 module via USB and the module will become a “USB Mass Storage Device” and also shows a folder like Figure 2-10 automatically.

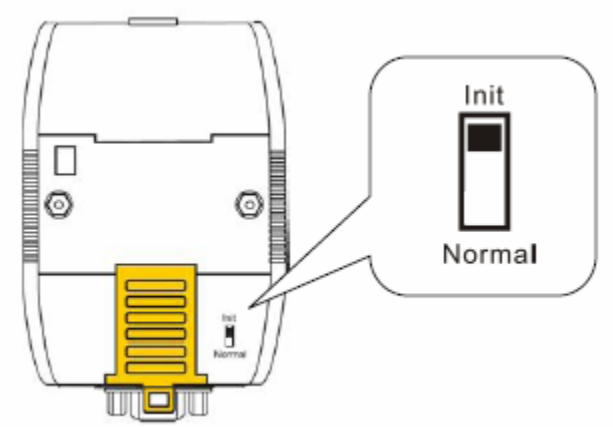


Figure 2-9: Init Position of Dip-Switch

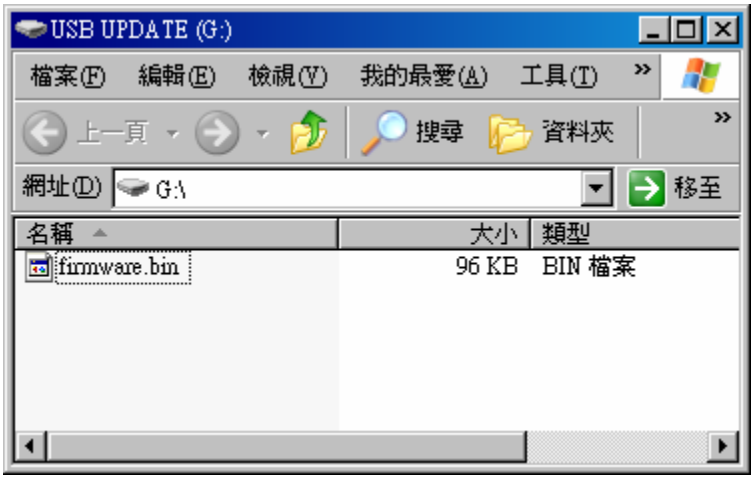


Figure 2-10: USB Mass Storage Device

Users just need to execute “Firmware_Update_Tool.exe” and follow

the below steps to complete the firmware updating process.
[1] Choose “**USB**” interface and “**USB Disk**”.
[2] Click “**Browser**” button to choose firmware file. (like **I7565H1_v1.01.fw**)
[3] Click “**Firmware Update**” button to start firmware updating process.
The result will show in “Firmware Update” field.

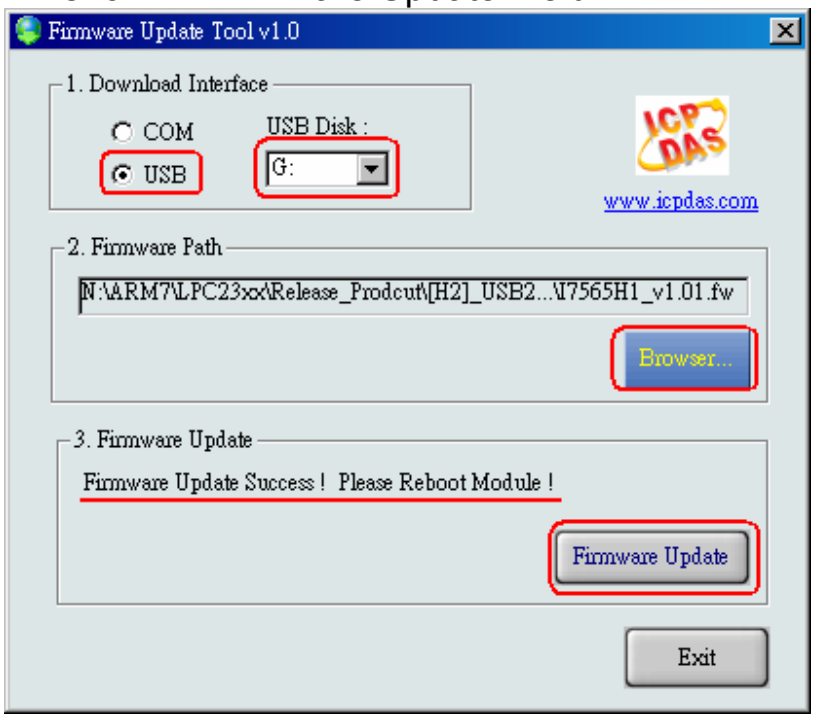


Figure 2-11: Normal Position of Dip-Switch

The Firmware_Update_Tool program can be downloaded from http://ftp.icpdas.com/pub/cd/fieldbus_cd/can/converter/i-7565-h1h2/software/tool

2.5.2 Firmware Operation Mode

In operation mode, users need to set the dip-switch to the “Normal” position like Figure 2-12 and turn the power off then on again so that the I-7565-H1/H2 can run in the operation mode. In this mode, users can send / receive CAN messages via PC USB port.

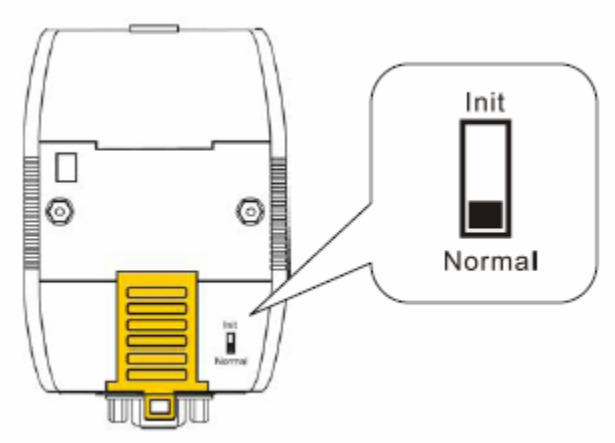


Figure 2-12: Normal Position of Dip-Switch

2.6 LED Indication

There are three LEDs provided to indicate to users what situation the I-7565-H1/H2 is in. The following is the illustration of these three LEDs and the position of these three LEDs shows as Figure 2-12.

(1) PWR LED :

It is used to help users to check whether the I-7565-H1/H2 is standby. If the module is working in “firmware operation” mode, the PWR LED is always turned on. However, when the module is working in the “firmware updating” mode, the PWR LED will flash approximately once per second.

(2) RUN LED :

It is used to show whether the I-7565-H1/H2 is transmitting/receiving CAN messages. The RUN LED will flash whenever a CAN message is sending or receiving. In I-7565-H2, the RUN LED is shared by CAN1 port and CAN2 port.

(3) ERR LED :

It is used for demonstrating an error that has occurred. The ERR LED is normally turned off when the module works in a good condition. When the Bus-Off error happened, the ERR LED will always turn on until the Bus-Off condition disappeared. If the CAN/USB buffer built in I-7565-H1/H2 overflows or CAN message can’t be sent out successfully, then the ERR LED will flash continuously. In I-7565-H2, the ERR LED is shared by CAN1 port and CAN2 port.

Figure 2-13**:** LED position of I-7565-H1/H2

Table 2: LED indication of I-7565-H1/H2

LED Name	I-7565-H1/H2 Status	LED Status
ALL LED	Hardware Init Fail	All LED always turned on permanently after reset
	Hardware WDT Fail	All LED flash per 2 second
	Contact to ICP DAS	All LED flash take turns
PWR LED	Firmware Updating Mode	Flash per second
	Firmware Operation Mode	Always turned on
	Power Off	Off
RUN LED	Transmission	Flash
	Bus Idle	Off
ERR LED	Transmission Fail	Flash per 100 ms
	Buffer Overflow	Flash per second
	Bus-Off	Always turned on
	No Error	Off

2.7 Cable Selection

The CAN bus is a balanced (differential) 2-wire interface running over either a Shielded Twisted Pair (STP), Un-shielded Twisted Pair (UTP), or Ribbon cable. The CAN-L and CAN-H Wire start on one end of the total CAN network that a terminator of 120 Ohm is connected between CAN-L and CAN-H. The cable is connected from CAN node to CAN node, normally without or with short T connections. On the other end of the cable again a 120Ω(Ohm) terminator resistor is connected between the CAN lines. How to decide a cable type, cable length, and terminator depends on the baud rate in the CAN bus network, please refer to the following table 3.

Figure 2-14: Un-shielded Twisted Pair (UTP)

Table 3: Cable selection

Bus speed	Cable type	Cable Resistance/m	Terminator	Bus Length
50k bit/s at 1000m	0.75~0.8mm2 18AWG	70 mOhm	150~300 Ohm	600~1000m
100k bit/s at 500m	0.5~0.6 mm2 20AWG	< 60 mOhm	150~300 Ohm	300~600m
500k bit/s at 100m	0.34~0.6mm2 22AWG, 20AWG	< 40 mOhm	127 Ohm	40~300m
1000k bit/s at 40m	0.25~0.34mm2 23AWG, 22AWG	< 40 mOhm	124 Ohm	0~40m

Note: The AWG means a standard method used to measure wire. The numbering system works backwards from what people would think, the thicker (heavier) the wire, the lower the number. For example: a 24AWG wire is thicker/heavier than a 26AWG wire.

3. Driver Installation

This section will show how to install the I-7565-H1/H2 USB/CAN converter device driver under Windows 2000/XP and Win7. Users can download the I-7565-H1/H2 device driver from ICP DAS web site**:** http://ftp.icpdas.com/pub/cd/fieldbus_cd/can/converter/i-7565-h1h2/driver. Please follow the below steps to finish I-7565-H1/H2 driver installation.

3.1 Install I-7565-H1/H2 Driver by Auto

[Step - 1]

Plug in the I-7565-H1 or I-7565-H2 to PC first and Windows will detect the new device and shows the "Found New Hardware Wizard" screen prompting you to install the driver for the detected USB Device. Please click "Cancel" button to cancel driver installation by manual like Figure 3-1.

Figure 3-1**:** New Hardware Wizard (1)

[Step - 2]

Execute "I7565H1H2_DrvInst.exe" file to install driver automatically and then click "Continue Anyway" button like Figure 3-2. After driver installation process finished, it will show the screen like Figure 3-3.

Figure 3-2: New Hardware Wizard (2)

Figure 3-3: Install I-7565-H1/H2 Driver Finished

3.2 Install I-7565-H1/H2 Driver by Manual

[Step - 1]

Please execute "**ICPUsbConverter_DrvInst.exe**" (the driver file name for v1.2 or newer) file first to install necessary driver files of I-7565-H1/H2 to system.

[Step - 2]

Plug in the I-7565-H1 or I-7565-H2 to PC and Windows will detect the new device and shows the "Found New Hardware Wizard" screen prompting you to install the driver for the detected USB Device. Please select "No, not this time" option and click "Next" button like Figure 3-4.

Figure 3-4**:** New Hardware Wizard (1)

[Step - 3]

Please select “install from a list or specific location (Advanced)” option and click “Next” button like Figure 3-5.

Figure 3-5**:** New Hardware Wizard (2)

[Step - 4]

Please select “Search for the best driver in these locations” option and check “include this location in the search:” checkbox and click “Browser” button to assign the I-7565-H1/H2 driver location - C:\WINDOWS\inf\ and then click “Next” button like Figure 3-6.

Figure 3-6: New Hardware Wizard (3)

[Step - 5]

Please click “Continue Anyway” button like Figure 3-7 .

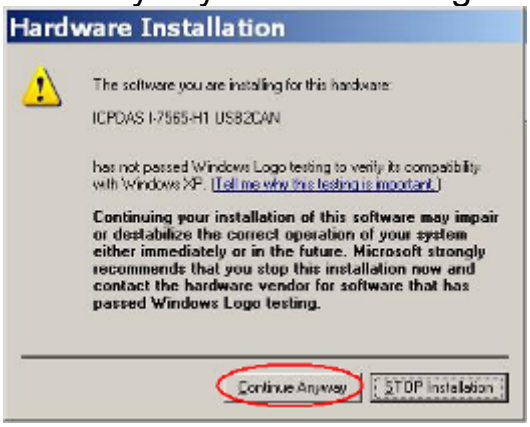


Figure 3-7: New Hardware Wizard (4)

[Step - 6]

Please click “Finish” button to complete I-7565-H1/H2 device driver installation like Figure 3-8.

Figure 3-8: New Hardware Wizard (5)

3.3 Verify Driver Installation

This section will show how to verify whether the driver of I-7565-H1/H2 was properly installed. If the driver is installed successfully, then there will be a “Virtual COM Port” assigned by Windows. Please follow the below steps to check it.

Click “**Start**” → “**Settings**” → “**Control Panel**” and then double click on the “**System**” icon. Once the “**System Properties**” screen displayed, click on ” **Hardware**” tab and then click on the “**Device Manager**” button. Double-click on **Ports (COM & LPT)** item. If the device driver was correctly installed, users can find the “ICPDAS I-7565-H1 USB2CAN” or “ICPDAS I-7565-H2 USB2CAN” device listing and the “Virtual COM Port” number that Windows has assigned to the device is **COM3** like Figure 3-9.

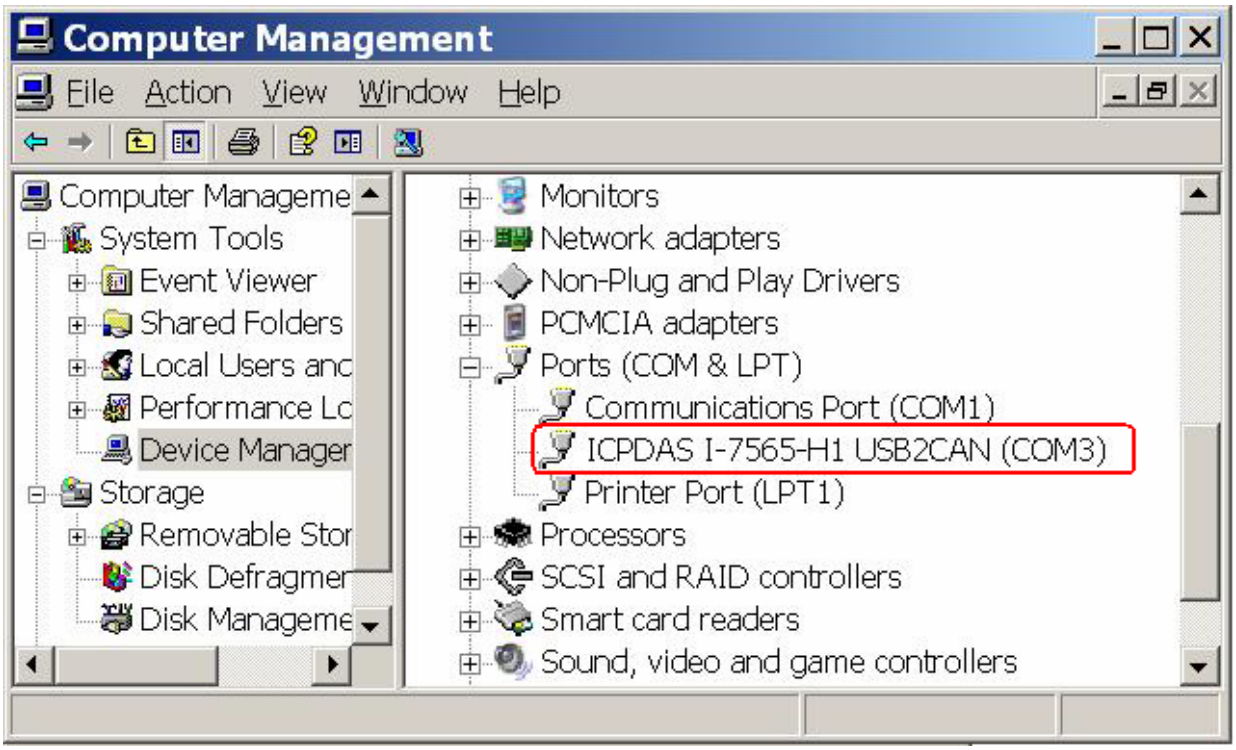


Figure 3-9: Virtual COM Port Number

3.4 Uninstall I-7565-H1/H2 Driver

Please follow the below steps to uninstall I-7565-H1/H2 device driver.

[Step - 1]

Click "**Start**" → "**Settings**" → "**Control Panel**" and then double click on the "**System**" icon. Once the "System Properties" screen displayed, click on " **Hardware**" tab and then click on the "**Device Manager**" button. Double-click on **Ports (COM & LPT)** item. Please find the "ICPDAS I-7565-H1 USB2CAN" or "ICPDAS I-7565-H2 USB2CAN" device listing and right click mouse button on it and choose "**Uninstall**" item like Figure 3-10.

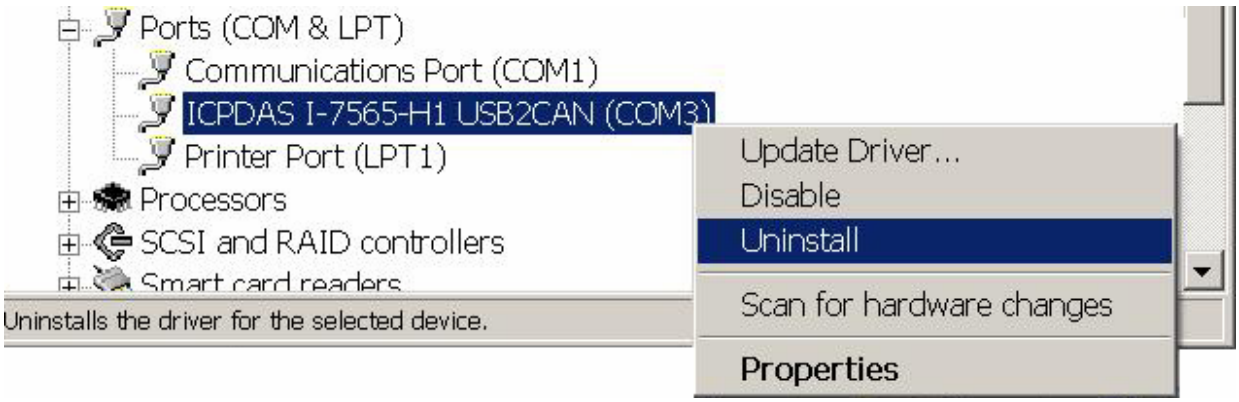


Figure 3-10**:** Uninstall I-7565-H1/H2 Driver (1)

[Step - 2]

Click "**OK**" button to complete I-7565-H1/H2 device driver un-installation like Figure 3-11. After that, the "ICPDAS I-7565-H1 USB2CAN" or "ICPDAS I-7565-H2 USB2CAN" device listing will disappear on **Ports (COM & LPT)** item.

Figure 3-11**:** Uninstall I-7565-H1/H2 Driver (2)

4. Software Utility

I-7565-H1/H2 Utility is provided by ICP DAS to transmit / receive CAN messages for CAN bus communication testing easily and quickly. In the meanwhile, it can also display the time-stamp of each received CAN message for data analyzing conveniently. I-7565-H1/H2 Utility can be downloaded from the ICP DAS web site **:** http://ftp.icpdas.com/pub/cd/fieldbus_cd/can/converter/i-7565-h1h2/software/utility. The following is the main functions provided by I-7565-H1/H2 Utility **:**

4.1 INI File Function

Whenever users execute the I-7565-H1/H2 Utility, it will look for the INT file **: I-7565-H1H2_Utility.ini** first to load the initial connection setting. If the INI file doesn't exist, then it will load the default setting. The below is the format illustration of the INI file like Figure 4-1.

[1] **COM** **:** The Virtual COM Port Number.
[2] **TYPE** **:** 1**:** I-7565-H1; 2**:** I-7565-H2.
[3] **C1BR** **:** CAN1 Baud Rate
[4] **C2BR** **:** CAN2 Baud Rate
[5] **C1EN** **:** CAN1 Port Function. (1**:** Enable; 0**:** Disable)
[6] **C2EN** **:** CAN2 Port Function. (1**:** Enable; 0**:** Disable)
[7] **C1LOM :** CAN1 Listen Only Mode (1**:** Enable; 0**:** Disable)
[8] **C2LOM :** CAN2 Listen Only Mode (1**:** Enable; 0**:** Disable)
[9] **SYMFILE:** Load Symbol Initial File (I-7565-H1H2_SymFile.ini) Automatically (1**:** Enable; 0**:** Disable) => Supported in Utility v1.10

```
COM=1 TYPE=1 C1BR=1000 C2BR=1000 C1EN=1 C1LOM=0 C2EN=1 C2LOM=0 SYMFILE=1
```

Figure 4-1**:** INI file Parameters of I-7565-H1/H2 Utility

4.2 Connection Function

When users execute the I-7565-H1/H2 Utility, it will show connection function screen first for connecting to I-7565-H1/H2 like Figure 4-2. The following is the illustration for connection parameters.

[1] **Com Port** **:** The Virtual COM Port Number.

[2] **Mod Name** **:** The Module Name.
[3] **CAN Port Enable :** Enable CAN Port Function. (Checked**:** Enable)
(3.1) Listen Only Mode **:** Enable Listen Only mode
[4] **CAN Baud Rate** **:** CAN bus Baud Rate Setting.

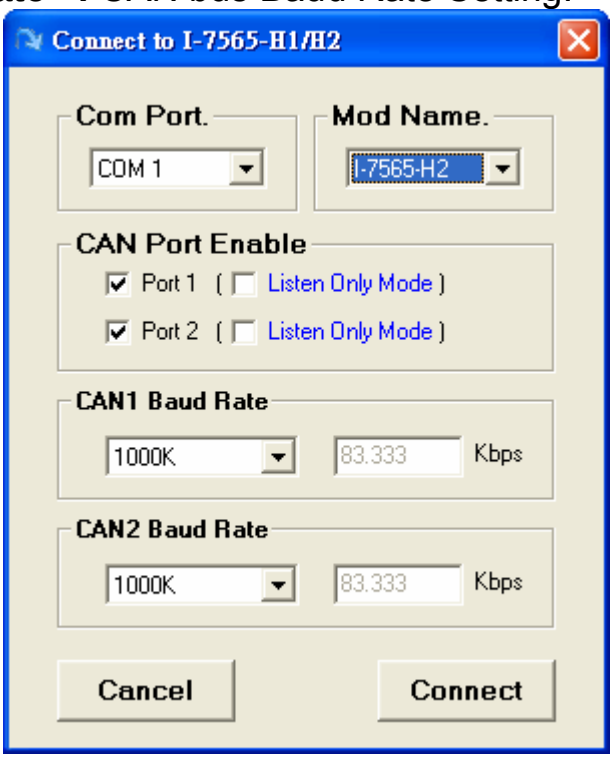


Figure 4-2**:** Connection Screen of I-7565-H1/H2 Utility

[Note]

1. “Listen Only Mode” (LOM) function is supported by I-7565-H1/H2 Utility v1.09 and FW v1.05 or newer. The LOM screen is like Figure 4-2-1. (In LOM, CAN message sending function is disabled.)

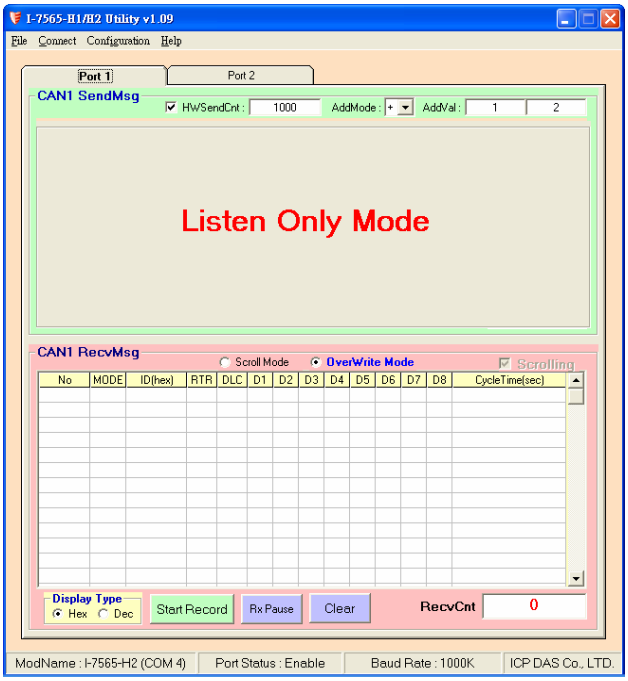


Figure 4-2-1: LOM Screen of I-7565-H1/H2 Utility

After finish the connection setting, please click "**Connect**" button to connect to I-7565-H1/H2 module. Note that I-7565-H1/H2 doesn't affect the CAN bus communication when power on because the CAN port function will keep disabled until users connect to I-7565-H1/H2 successfully. As soon as users disconnect to I-7565-H1/H2, the CAN port function on I-7565-H1/H2 will be disabled again. Besides, users can also click "Connect" item in the menu bar and choose "Connect To I-7565-H1/H2" function to connect to I-7565-H1/H2 like Figure 4-3 or "Disconnect" function to disconnect to I-7565-H1/H2 like Figure 4-4.

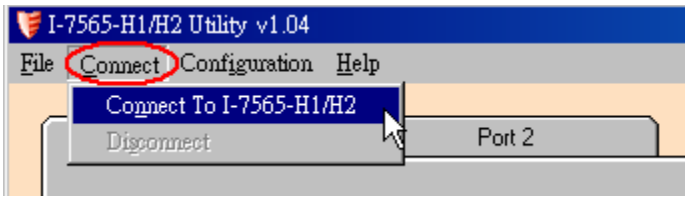


Figure 4-3: "Connect To I-7565-H1/H2" function

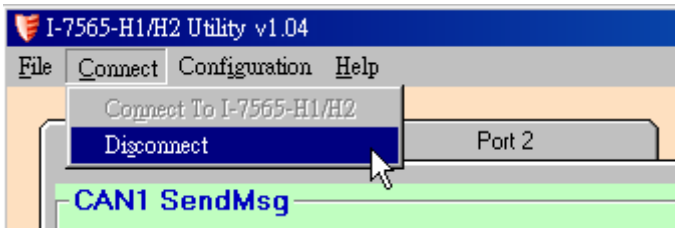


Figure 4-4: "Disconnect" function

4.3 Communication Function

If the connection to I-7565-H1/H2 is successful, then the screen for CAN bus communication function will show up like the Figure 4-5.

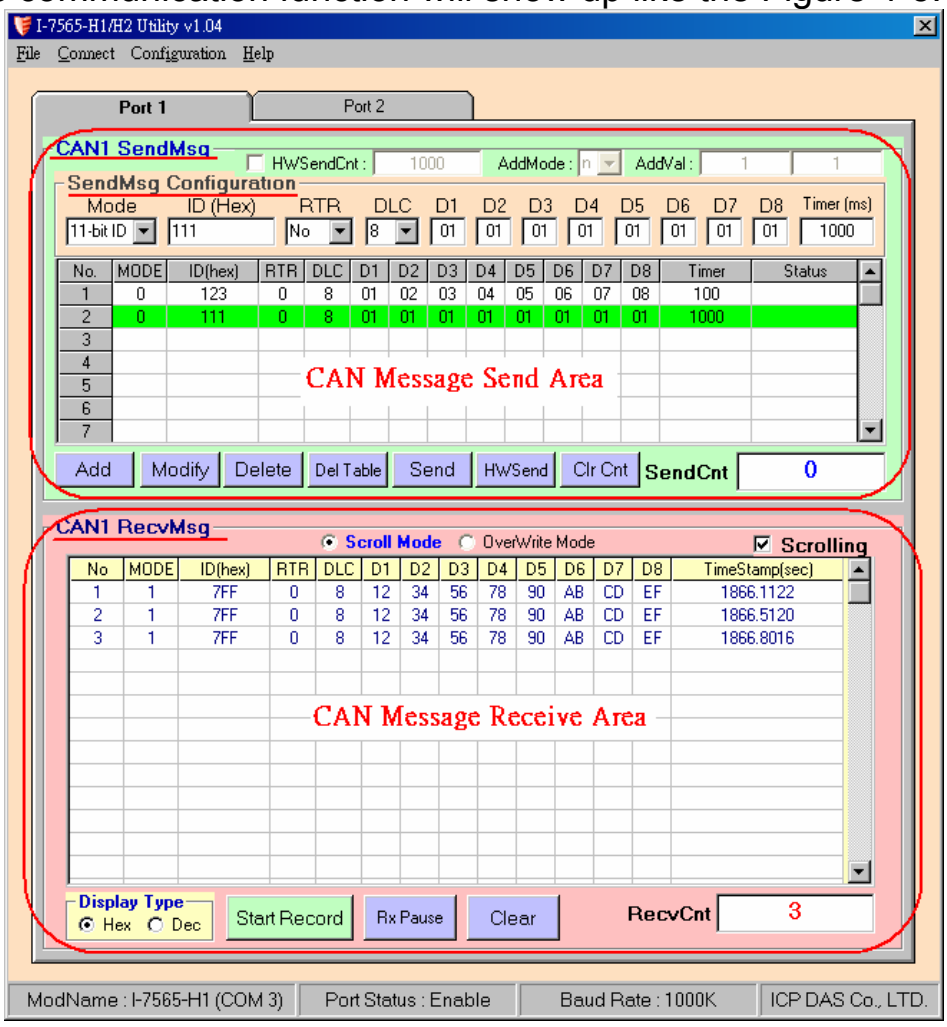


Figure 4-5**:** Communication Screen of I-7565-H1/H2 Utility

The following is the illustration for the communication screen and it can be divided to two blocks in each CAN port function. One is “SendMsg” block and the other is “RecvMsg” block. Besides, “**Port 1**” / “**Port 2**” tab is used to switch CAN1 / CAN2 communication screen.

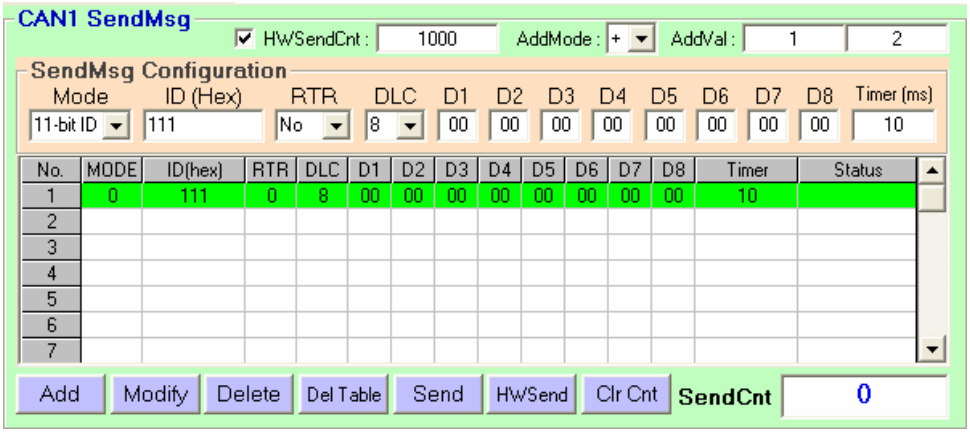


Figure 4-6-1**:** Send CAN Message Area

[1] For "CAN1/2 SendMsg" block **:**

<1> "**SendMsg Configuration**" frame **:**

It is used to edit the CAN message parameters and users can use "Add" button to add the CAN message to "CAN Message Send Area".

<2> "**Add**" button **:**

It will add the CAN message from "SendMsg Configuration" area to the last row in "CAN Message Send Area".

<3> "**Modify**" button **:**

It will modify the CAN message parameter from "SendMsg Configuration" area to the assigned green row in "CAN Message Send Area".

<4> "**Delete**" button **:**

It will delete the CAN message of the assigned green row in "CAN Message Send Area".

<5> "**Del Table**" button **:**

It will delete all the CAN messages in "CAN Message Send Area".

<6> "**Send**" button **:**

It will send the CAN message of the assigned green row in "CAN Message Send Area". If the value in the "Timer" field is zero, it will just send once. If not, it will send continuously by PC timer.

<7> "**HWSend**" button **:**

It will send the CAN message of the assigned green row in "CAN Message Send Area". If the value in the "Timer" field is zero, it will just send once. If not, it will send continuously by

module hardware timer and it will be more precise than PC timer. If users want to send the CAN message with fixed number, then before clicking “HWSend” button, please check the “HWSendCnt” checkbox first and input the count in the field like Figure 4-6-1.

In “AddMode” field, it is used to set the CAN Data value addition mode. The ‘**n**’ option is “disable” mode, the ‘**+**’ option is “addition” mode and the ‘**x**’ option is “multiple” mode. In “AddVal” field, the first field is used for CANL Data and the second field is used for CANH Data.

<8> “**Clr Cnt**” button **:**

It will clear the “SendCnt” value to be zero in “CAN Message Send Area”.

<9> “**SendCnt**” field **:**

Whenever the CAN message is sent out once, the “SendCnt” value will be added by 1 except “HWSend” function.

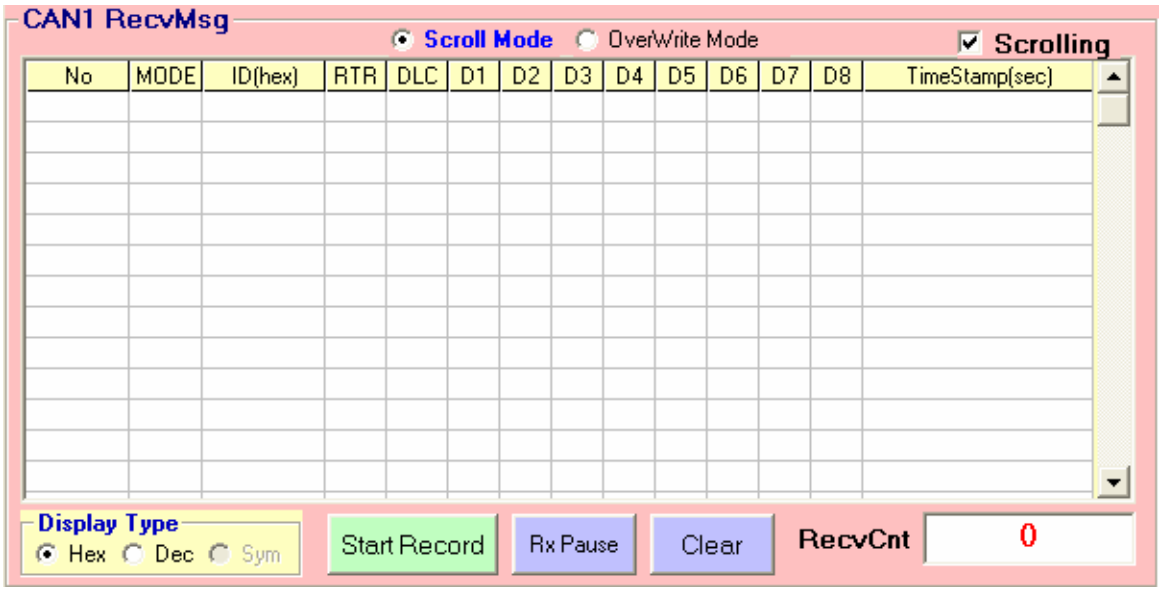


Figure 4-6-2**:** Recv CAN Message Area

[2] For “CAN1/2 RecvMsg” block **:**

<1> “**Display Type**” option **:**

Hex **:** Used to show the ID and Data with “Hex“ format in “CAN Message Receive Area”.

Dec **:** Used to show the ID and Data with “Decimal“ format in “CAN Message Receive Area”.

Sym **:** Used to show the ID with “Symbolic Name“ in “CAN

Message Receive Area". (Only supported in OverWrite mode and need to install symbolic file first. Provided in Utility_v1.10 or newer)

The following is the demo of symbolic name file.

```
[CAN1Sym]
SymNum=2
ID1=0x100
Name1=Engine Speed
ID2=0x101
Name2=Engine Temp.
[CAN2Sym]
SymNum=1
ID1=0x200
Name1=Motor Speed
```

[CAN1Sym] : For CAN1 Symbolic Name Setting
SymNum : Symbolic Name Total Number
ID1 : The First Set CANID Value (HEX)
Name1 : The First Set CANID Symbolic Name

⇨ After loading the above symbolic name file, in OverWirte mode, choose the "Sym" option. When receiving the CANMsg with CANID=0x100 in "CAN1 RecvMsg" table, it will show the symbolic name in ID field to replace the original 100 value like Figure 4-6-3 and Figure 4-6-4.

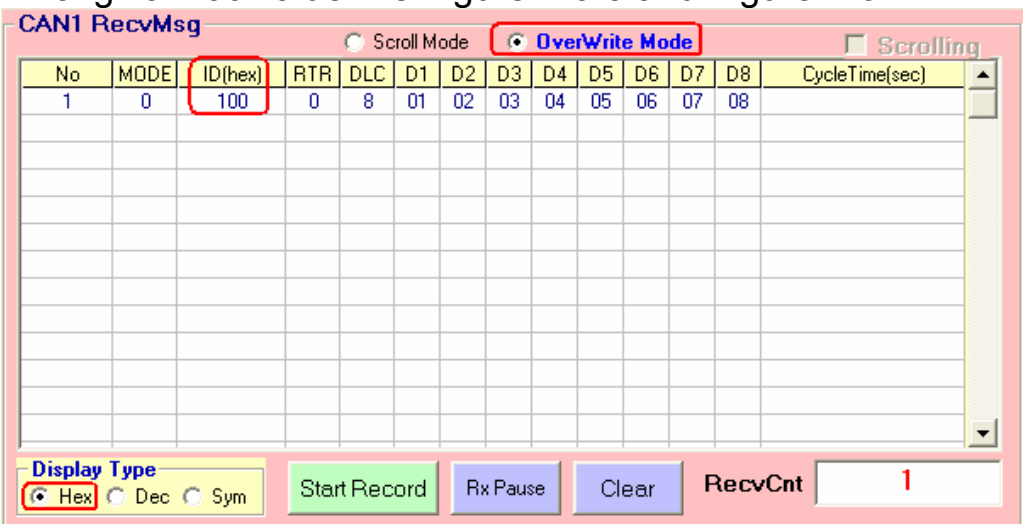


Figure 4-6-3: "Hex" type in OverWrite mode

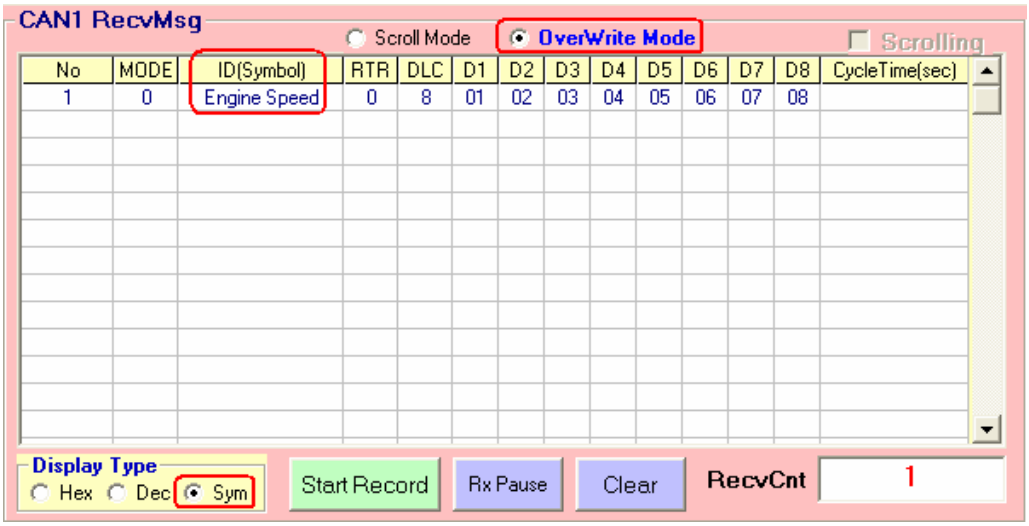


Figure 4-6-4**:** "Sym" type in OverWrite mode

<2> "**Start Record / Stop Record**" button **:**

When clicking "Start Record" button, the received CAN messages will be recorded in a file as ASCII text replacing showing in "CAN Message Send Area". When clicking "Stop Record" button, it will stop recording the received CAN messages on a file.

The filename format will be "CAN1_YYMMDD_HHMMSS.txt" or "CAN2_YYMMDD_HHMMSS.txt".

<3> "**Rx Pause / Rx Start**" button **:**

When clicking "Rx Pause" button, it will stop receiving the CAN messages. When clicking "Rx Start" button, it will start to receive the CAN messages.

<4> "**Clear**" button **:**

It will clear all the CAN message data in "CAN Message Receive Area" and the "RecvCnt" value to be zero.

<5> "**Scrolling**" checkbox **:**

If the "Scrolling" checkbox is checked, the received CAN message data in "CAN Message Receive Area" will be updated and the "RecvCnt" value to be the newest automatically. If not, it will not update the received CAN message data in "CAN Message Receive Area".

<6> "**Scroll / OverWrite Mode**" option **:** (Supported in Utility v1.09)

"Scroll Mode" option **:**

The received CAN message data will be shown in RecvTable by sequence.

"OverWrite Mode" option **:**

If the MODE and ID value are all the same of the received CAN message data, then they will be placed in the same row of RecvTable. The “No” field will be the number of the same CAN message and the “CycleTime” field is the period of the same CAN message.

4.4 Config Function

In I-7565-H1/H2 Utility, it provides two kinds of configuration functions. One is “Module Config” and the other is “Advanced Config”. Users can click “Configuration” item in the menu bar and choose one of them to show the corresponding function screen like Figure 4-7.

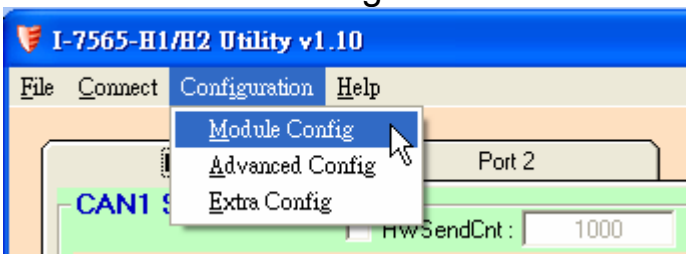


Figure 4-7: Configuration Function of I-7565-H1/H2 Utility

4.4.1 Module Config Function

The following is the illustration for “Module Config” screen. It can be divided to two blocks. One is “CAN Filter Setting” block and the other is “Config / Info Option” block like Figure 4-8.

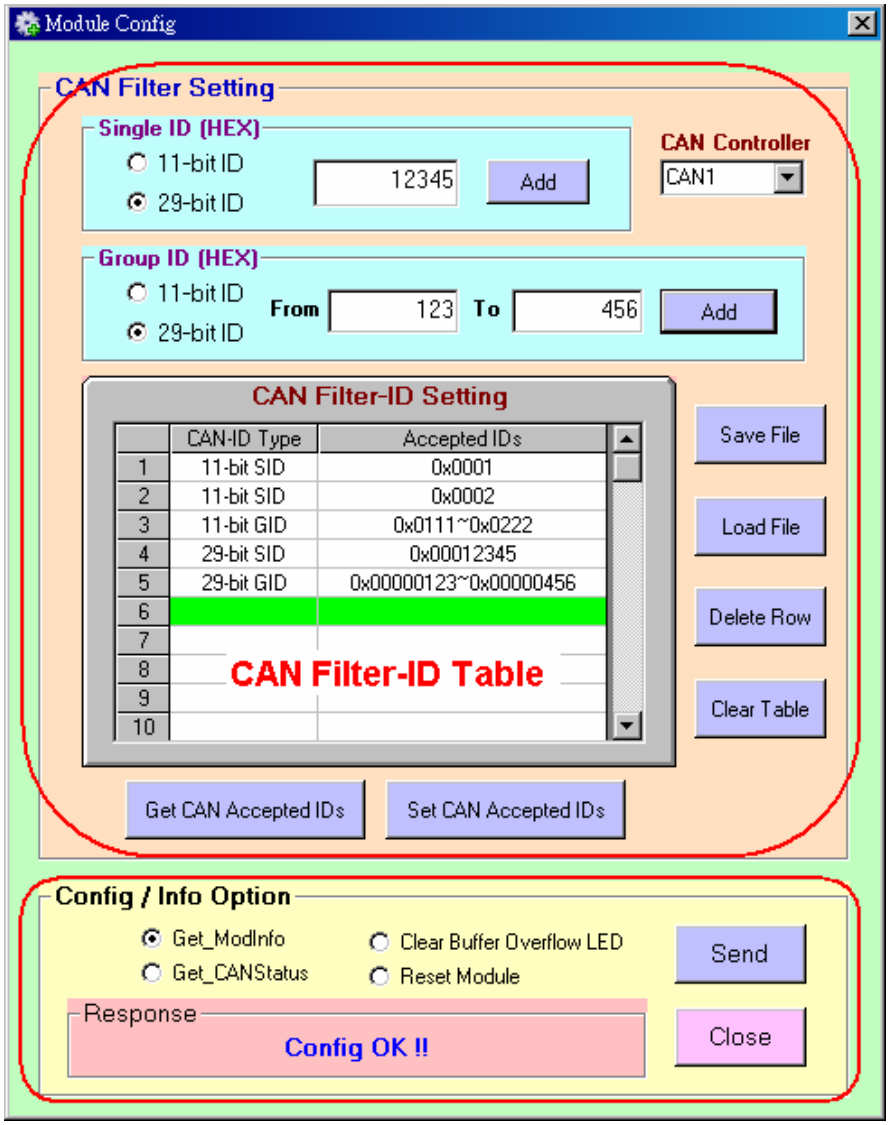


Figure 4-8**:** Module Config Screen of I-7565-H1/H2 Utility

[1] For "CAN Filter Setting" block **:**

If users don't set the CAN Filter function, then all CAN messages will be able to be received in default. In "CAN Filter Setting" block, users can set which CAN ID able to be received by I-7565-H1/H2 module.

<1> "**Single ID**" frame **:**

By clicking "Add" button to add the assigned single CAN ID to "CAN Filter-ID Table" to set these assigned single CAN ID able to be received.

<2> "**Group ID**" frame **:**

By clicking "Add" button to add the assigned group CAN ID to "CAN Filter-ID Table" to set these assigned group CAN ID able to be received.

<3> "**CAN Controller**" combobox **:**

It is used to choose which CAN port that users want to configure currently.

<4> "**Get CAN Accepted IDs**" button **:**

It is used to get CAN Filter-ID data of the assigned CAN port and showed in the "CAN Filter-ID Table". The command result also returns in the "Response" frame of "Config / Info Option" block.

<5> "**Set CAN Accepted IDs**" button **:**

It is used to set CAN Filter-ID data of the assigned CAN port according to the "CAN Filter-ID Table" content. The command result also returns in the "Response" frame of "Config / Info Option" block.

<6> "**Save File**" button **:**

It is used to save the "CAN Filter-ID Table" content to file.

<7> "**Load File**" button **:**

It is used to load the CAN Filter-ID data from file to "CAN Filter-ID Table".

<8> "**Delete Row**" button **:**

It is used to delete the CAN Filter-ID data of the assigned green row in "CAN Filter-ID Table".

<9> "**Clear Table**" button **:**

It is used to clear all the contents in "CAN Filter-ID Table".

[2] For "Config / Info Option" block **:**

There are several option functions provided for I-7565-H1/H2. The following will illustrate all these functions.

<1> "**Get_ModInfo**" option **:**

It is used to get the related module info including "Module Name", "Firmware Version" and "Hardware Serial Number" like Figure 4-9.

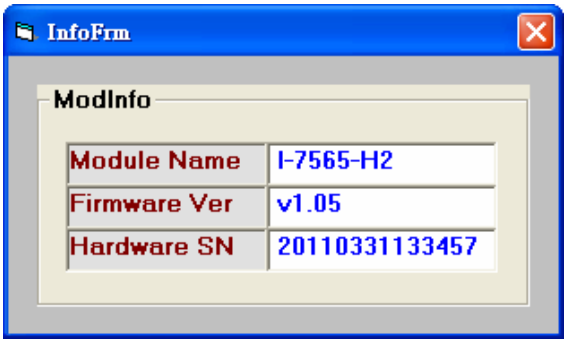


Figure 4-9: Module Info

[Note]

1. "Hardware Serial Number" function is supported by I-7565-H1/H2 v1.08 and firmware v1.04 or newer.

<2> "**Get_CANStatus**" option **:**

It is used to get the assigned CAN port status like Figure 4-10.

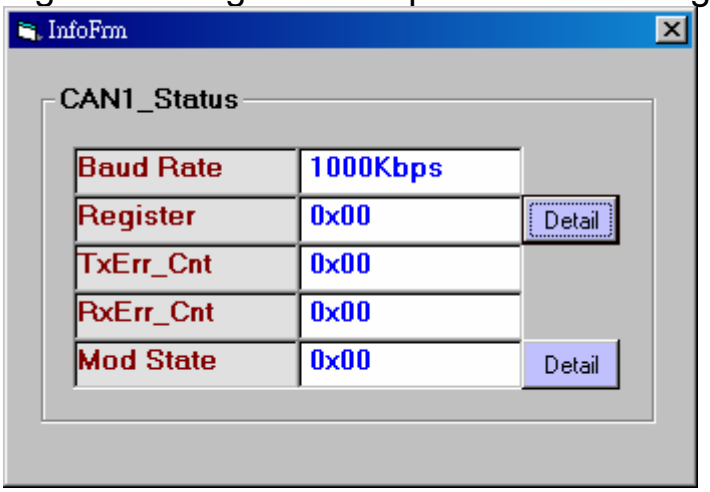


Figure 4-10: CAN Status

In "**Register**" item, clicking the "**Detail**" button it will show the more detailed CAN port register status like Figure 4-11. If the corresponding bit is 1, it means that the corresponding state happened.

Figure 4-11: CAN Register Detailed Information

In “**Mod State**” item, clicking the “**Detail**” button it will show the more detailed module status like Figure 4-12. If the corresponding bit is 1, it means that the corresponding state happened.

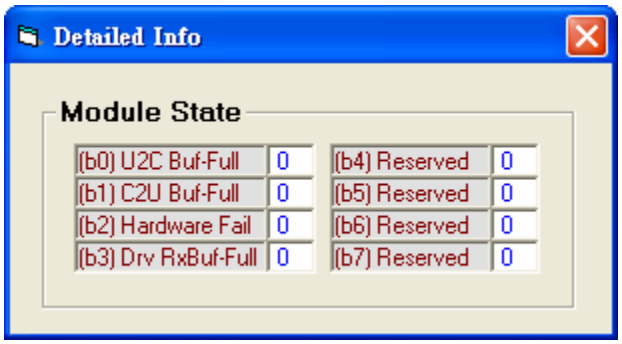


Figure 4-12**:** module state Detailed Information

(1) U2C Buf-Full **:**
USB to CAN hardware buffer overflow happened.

(2) C2U Buf-Full **:**
CAN to USB hardware buffer overflow happened.

(3) Hardware Fail **:**
Module hardware something breaks down.

(4) Drv RxBuf-Full **:**
Software buffer overflow of I-7565-H1/H2 Utility happened.

<3> “**Clear Buffer Overflow LED**” option **:**
When CAN/USB buffer overflows, then the ERR LED will flash one second permanently. The button is used to clear the ERR LED flash state.

<4> “**Reset Module**” option **:**
It is used to reset I-7565-H1/H2 remotely.

4.4.2 Advanced Config Function

The following is the illustration for “Advanced Config” screen like Figure 4-13 and Figure 4-14.

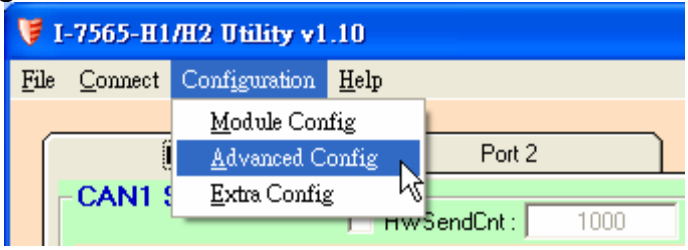


Figure 4-13**:** Configuration Function of I-7565-H1/H2 Utility

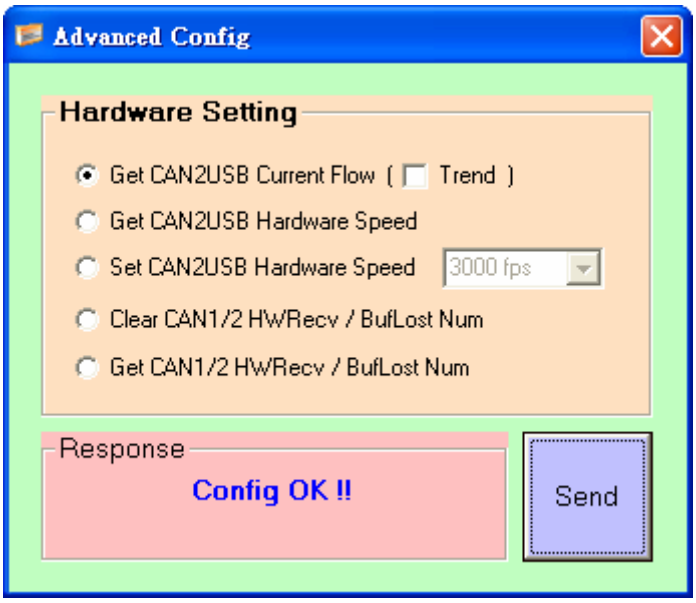


Figure 4-14: Advanced Config of I-7565-H1/H2

<1> "**Get CAN2USB Current Flow**" option **:**

It is used to get the current CAN message flow (unit: fps) in the CAN port of I-7565-H1/H2.

If the "**Trend**" option is checked, then it will open the CAN bus flow trend screen like Figure 4-14-1. This function is supported in Utility v1.09 or newer.

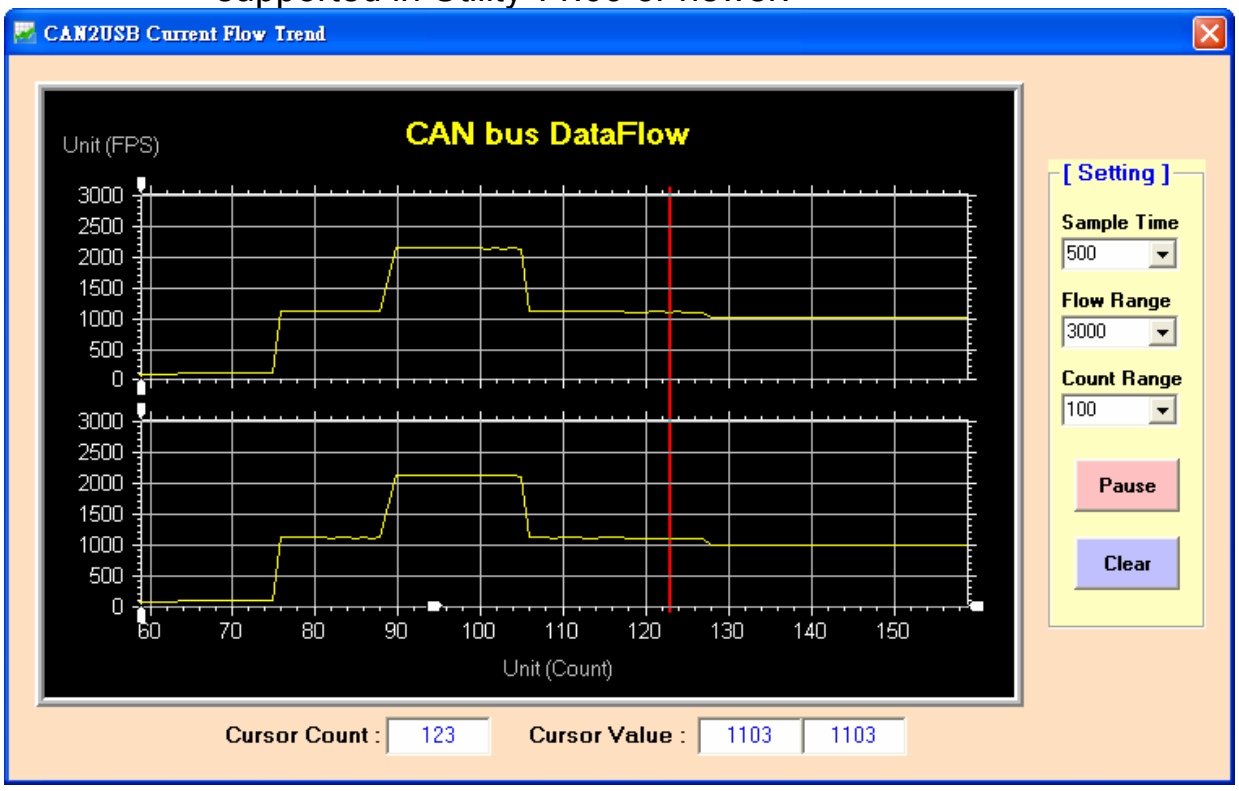


Figure 4-14-1: CAN bus Flow Trend

<2> “**Get CAN2USB Hardware Speed**” option **:**
It is used to get the current setting value for CAN to USB hardware transmission speed of I-7565-H1/H2.

<3> “**Set CAN2USB Hardware Speed**” option **:**
It is used to set CAN to USB hardware transmission speed of I-7565-H1/H2 module. Users can set the speed from 1000 fps ~ 3000 fps. The setting rule is that users can use “Get CAN2USB Current Flow” function first to know the current CAN message flow and then choose a setting value that is larger a little than that. Apply the rule and it will reduce the CAN message loss condition especially when the performance on users’ PC is not good.

<4> “**Clear CAN1/2 HWRecv / BufLost Num**” option **:**
It is used to clear the total received number and buffer lost number of CAN1 and CAN2 message in module hardware.

<5> “**Get CAN1/2 HWRecv / BufLost Num**” option **:**
It is used to get the total received number and buffer lost number of CAN1 and CAN2 message in module hardware.

4.4.3 Extra Config Function

The following is the illustration for “Extra Config” screen like Figure 4-15 and Figure 4-16.

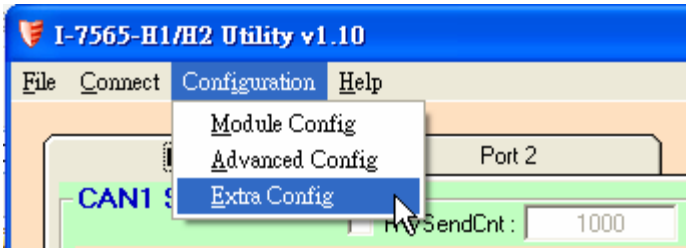


Figure 4-15**:** Configuration Function of I-7565-H1/H2 Utility

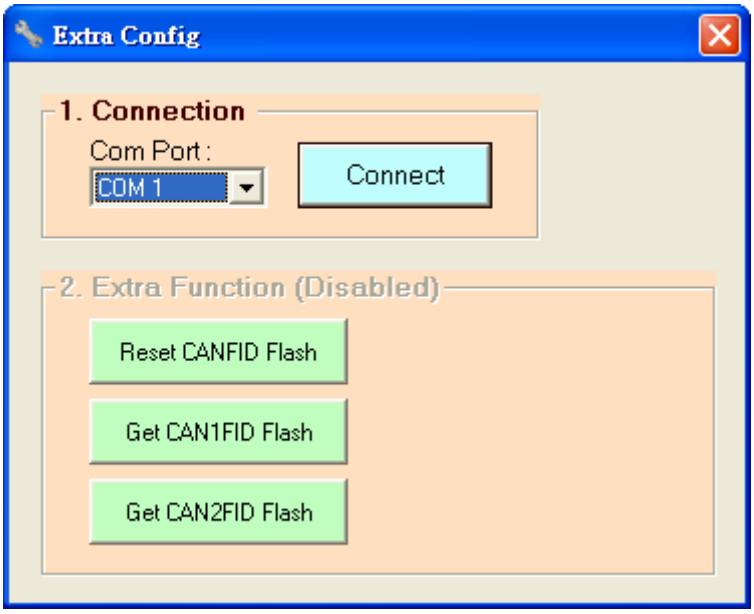


Figure 4-16: Extra Config of I-7565-H1/H2

Please follow the below steps

(1) Choose the Com Port number and click the “Connnect button.

(2) After connecting to I-7565-H1/H2 successfully, the “Extra Function” will be enabled. The following is the function description.

[1] “Reset CANFID Flash” button **: (For Debug)**

=> Clear Filter-ID Flash data of CAN1/2.

[2] “Get CAN1FID Flash” button **: (For Debug)**

=> Show the Filter-ID Flash data of CAN1.

[3] “Get CAN2FID Flash” button **: (For Debug)**

=> Show the Filter-ID Flash data of CAN2.

4.5 Data Log Function

By clicking “File” item in the menu bar to execute the related data log function. The following is the illustration like Figure 4-15.

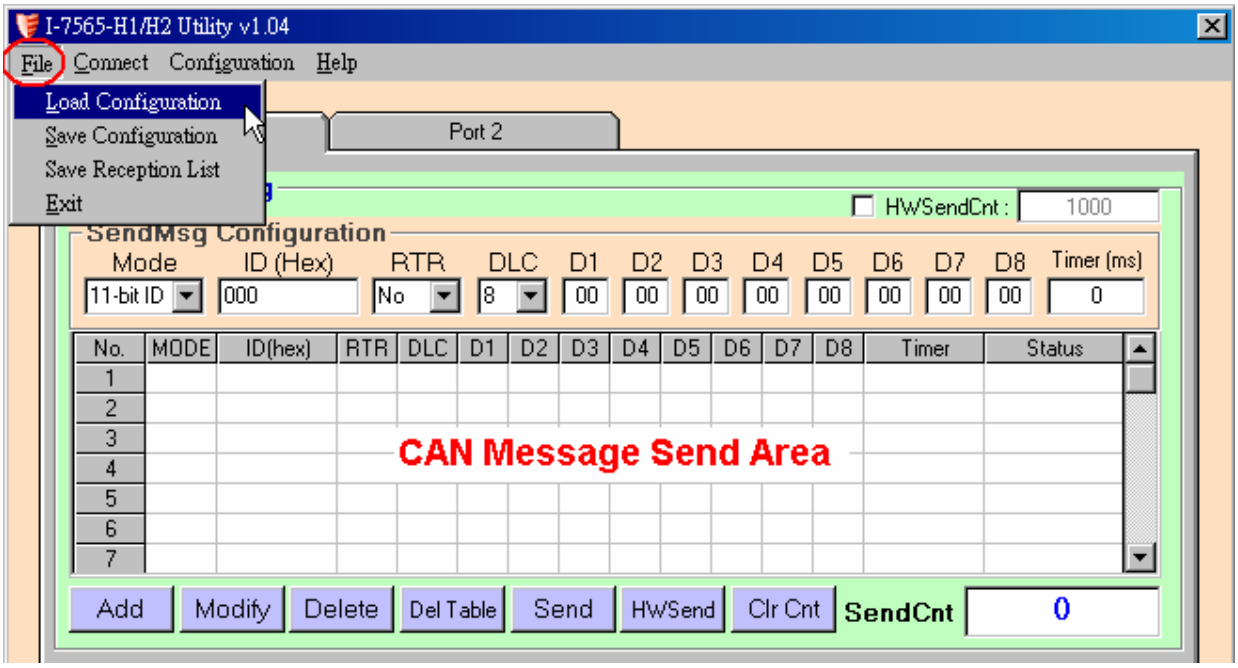


Figure 4-15: Advanced Config of I-7565-H1/H2

<1> "**Load Configuration**" function :

It is used to load the previous "CAN Send Message Configuration" to "CAN Message Send Area" from the assigned "TXT" file like Figure 4-16.

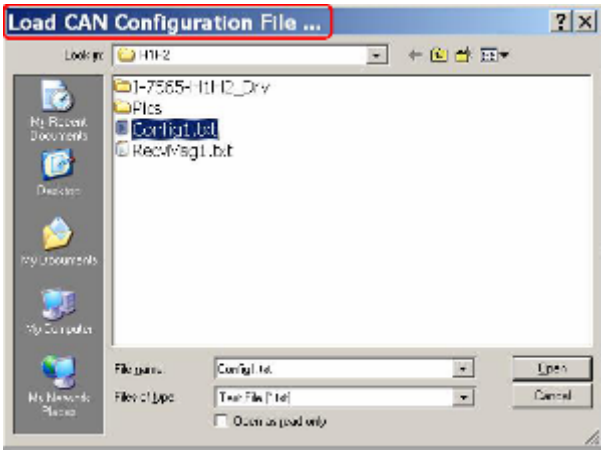


Figure 4-16: Load Configuration

<2> "**Save Configuration**" function :

It is used to save the current "CAN Send Message Configuration" in the "CAN Message Send Area" to the assigned "TXT" file like Figure 4-17.

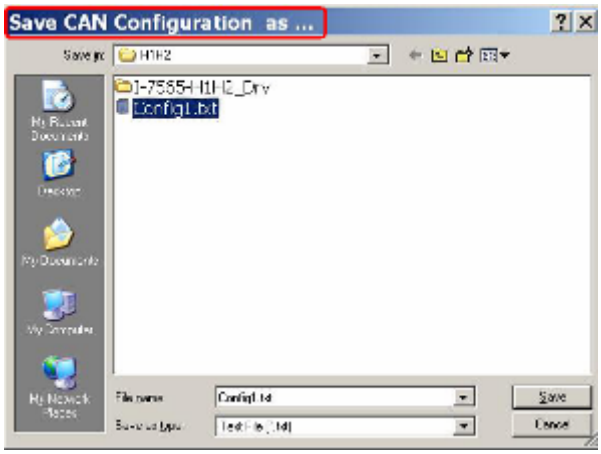


Figure 4-17**:** Save Configuration

<3> "**Save Reception List**" function **:**

It is used to save the current all CAN received messages in "CAN Message Receive Area" to the assigned "TXT" file as ASCII text like Figure 4-18.

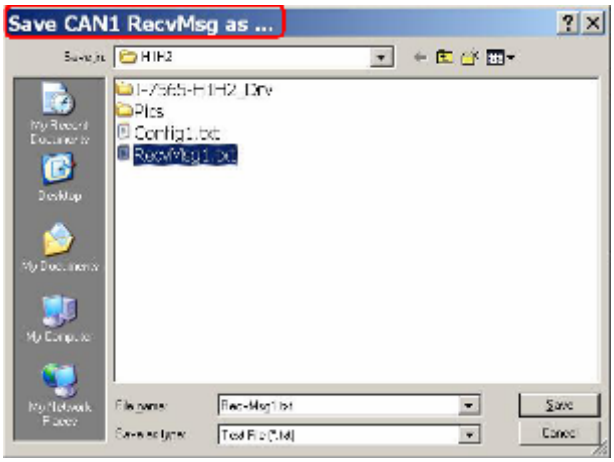


Figure 4-18**:** Save Reception List

<4> "**Load Symbol File**" function **:**

It is used to load the Symbolic CANID Name Data from the assigned symbol file (*.ini) to utility like Figure 4-18-1.

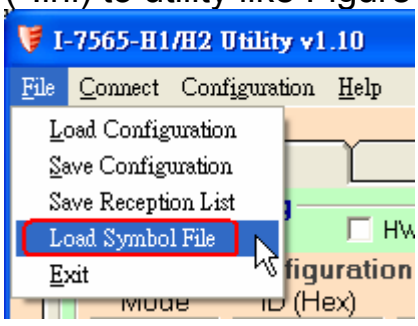


Figure 4-18-1**:** Load Symbol File

4.6 Status Bar Function

It is used to indicate the current module connection and each CAN port status. The following is detailed illustration for status bar of I-7565-H1/H2 Utility.

If the connection to I-7565-H1/H2 is not built, the status bar information is showed as Figure 4-19.

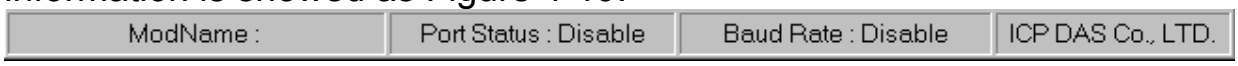


Figure 4-19**:** Status Bar of I-7565-H1/H2 Utility for disconnection

When the connection to I-7565-H1/H2 is successful, the status bar information is showed as Figure 4-20 and it can be divided for four blocks.

(1) **Module Name** => Indicate the connected module name and the virtual com port which is in use.
(2) **Port Status** => Indicate the CAN port enabled or not.
(3) **Baud Rate** => Indicate the CAN port baud rate.
(4) **Company** => ICP DAS Co., LTD

Figure 4-20**:** Status Bar of I-7565-H1/H2 Utility for disconnection

5. API Library -- VCI_CAN.dll

Users can develop own CAN bus program by I-7565-H1/H2 API library, VCI_CAN.dll, quickly and easily. The VCI_CAN library and demos can be downloaded from the ICP DAS web site **:** http://ftp.icpdas.com/pub/cd/fieldbus_cd/can/converter/i-7565-h1h2/software/library.

5.1 API Library Overview

All the functions provided by VCI_CAN library can be separated into five groups shown in Figure 5-1.

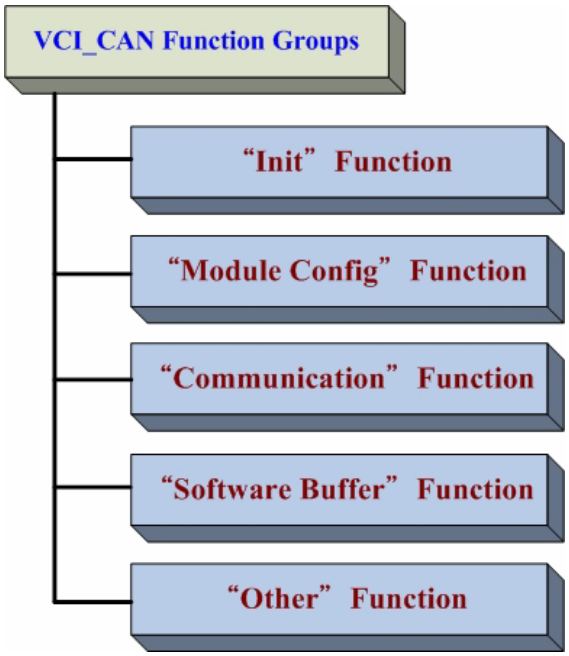


Figure 5-1**:** Five Function Groups of VCI_CAN Library

[Init Function]

These functions are used to enable / disable CAN port function of I-7565-H1/H2.

[Module Config Function]

These functions are used to set / get the parameters or information of I-7565-H1/H2.

[Communication Function]

These functions are used to send / receive CAN message through I-7565-H1/H2.

[Software Buffer Function]

When “VCI_OpenCAN” function is successful, the received CAN messages will be saved in software buffer provided by VCI_CAN library first and users need to use “VCI_RecvCANMsg” function to get them. The software buffer size is **65536** for each CAN port. These related functions are used to operate the software buffer of VCI_CAN library.

[Other Function]

These functions are used to get the VCI_CAN library information or helpful for users’ program.

5.2 API Library Function Table

All the functions provided in the VCI_CAN.dll are listed in the following table.

Table 5-1: “Init” Function Table

No.	Function Name	Description
1	VCI_OpenCAN	Enable CAN port function of I-7565-H1/H2
2	VCI_CloseCAN	Disable CAN port function of I-7565-H1/H2

Table 5-2: “Module Config” Function Table

No.	Function Name	Description
1	VCI_Set_CANFID	Set CAN Filter-ID in the assigned CAN port
2	VCI_Get_CANFID	Get CAN Filter-ID in the assigned CAN port
3	VCI_Get_CANStatus	Get the assigned CAN port status
4	VCI_Clr_BufOverflowLED	Clear buffer overflow ERR LED state in the assigned CAN port
5	VCI_Get_MODInfo	Get the module information
6	VCI_Rst_MOD	Reset module

Table 5-3: “Communication” Function Table

No.	Function Name	Description
1	VCI_SendCANMsg	Send CAN message in the assigned CAN port
2	VCI_RecvCANMsg	Receive CAN message in the assigned CAN port
3	VCI_EnableHWCyclicTxMsg	Send CAN message in the assigned CAN port by using module hardware timer
4	VCI_DisableHWCyclicTxMsg	Stop sending CAN message by module hardware timer

Table 5-4: “Software Buffer” Function Table

No.	Function Name	Description
1	VCI_Get_RxMsgCnt	Get the count of the received CAN messages saved in software buffer that are not received by users’ program in the assigned CAN port
2	VCI_Get_RxMsgBufIsFull	Get the software buffer state whether it is full or not in the assigned CAN port
3	VCI_Clr_RxMsgBuf	Clear the software buffer in the assigned CAN port

Table 5-5: “Other” Function Table

No.	Function Name	Description
1	VCI_Get_DllVer	Get the version of VCI_CAN library.
2	VCI_DoEvents	Release CPU resource temporarily

5.3 Flow Chart for Users' Program Development by Using API

The following is the basic control flow chart of users' CAN bus program development by using API Library – VCI_CAN.dll shown in Figure 5-2.

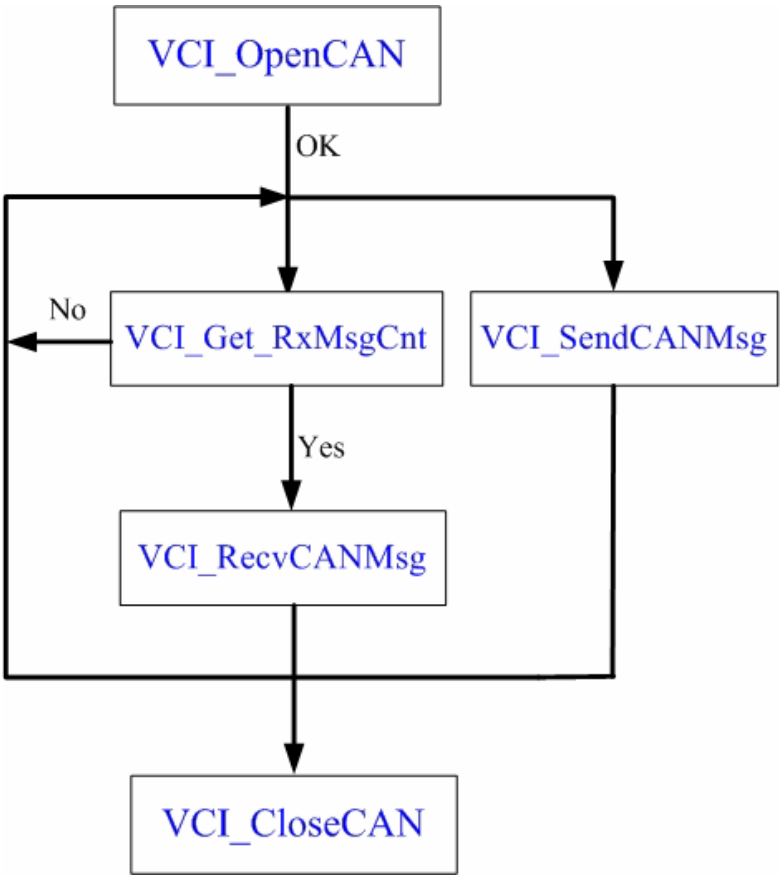


Figure 5-2: Flow Chart of API Library – VCI_CAN.dll

5.4 Init Function

These functions are used to enable / disable CAN port function of I-7565-H1/H2.

5.4.1 VCI_OpenCAN

This function is used to enable the assigned CAN port function of I-7565-H1/H2. After the CAN port function is enabled, users can use "Communication" functions to send / receive CAN messages.

Syntax :

```
int VCI_OpenCAN (
    PVCI_CAN_PARAM pCANPARAM
);
```

Parameter :

pCANPARAM**:**

[in] A structure pointer of _VCI_CAN_PARAM is used to set the CAN port communication parameters shown as below.

```
typedef  struct  _VCI_CAN_PARAM{
    BYTE   DevPort;
    BYTE   DevType;
    DWORD    CAN1_Baud;
    DWORD    CAN2_Baud;
} _VCI_CAN_PARAM, *PVCI_CAN_PARAM;
```

DevPort : The virtual com port number
DevType : The module type (1: I-7565-H1; 2: I-7565-H2)
CAN1_Baud : CAN1 port baud rate
(0 : Disable CAN1 port
Others: Enable CAN1 port)
CAN2_Baud : CAN2 port baud rate
(0 : Disable CAN2 port
Others: Enable CAN2 port)

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
_VCI_CAN_PARAM pCANPARAM;

pCANPARAM.DevPort = 1;                    // Virtual com port = 1
```

```
pCANPARAM.DevType = 1;                  // I-7565-H1
pCANPARAM.CAN1_Baud = 250000;           // 250 Kbps
pCANPARAM.CAN2_Baud = 1000000;          // 1000K bps
Ret = VCI_OpenCAN(&pCANPARAM);          // Enable CAN port
```

5.4.2 VCI_CloseCAN

This function is used to disable all CAN port function of I-7565-H1/H2. After the CAN port function is disabled, it will not interfere the communication of CAN bus network even if I-7565-H1/H2 is power on.

Syntax :

```
int VCI_CloseCAN (
    BYTE DevPort
);
```

Parameter :

DevPort**:**

[in] The virtual com port number

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE ComPort;

ComPort = 1;
Ret = VCI_CloseCAN(ComPort);                    // Disable CAN port
```

5.5 Module Config Function

These functions are used to set / get the parameters or information of I-7565-H1/H2.

5.5.1 VCI_Set_CANFID

This function is used to set CAN Filter-ID in the assigned CAN port.

Syntax :

```
int VCI_Set_CANFID (
    BYTE CAN_No,
    PVCI_CAN_FID pCANFID
);
```

Parameter :

CAN_No:

[in] The assigned CAN port number.

pCANFID:

[in] A structure pointer of _VCI_CAN_FilterID is used to set the CAN Filter-ID data shown as below.

```
typedef  struct  _VCI_CAN_FilterID{
    WORD SSFF_Num;
    WORD GSFF_Num;
    WORD SEFF_Num;
    WORD GEFF_Num;
    WORD SSFF_FID[512];
    DWORD    GSFF_FID[512];
    DWORD    SEFF_FID[512];
    DWORD    GEFF_FID[512];
} _VCI_CAN_FilterID, *PVCI_CAN_FID;
```

SSFF_Num	: Single 11-bit CAN Filter-ID number
GSFF_Num	: Group 11-bit CAN Filter-ID number
SEFF_Num	: Single 29-bit CAN Filter-ID number
GEFF_Num	: Group 29-bit CAN Filter-ID number
SSFF_FID[512]	: Single 11-bit CAN Filter-ID data array
GSFF_FID[512]	: Group 11-bit CAN Filter-ID data array
SEFF_FID[512]	: Single 29-bit CAN Filter-ID data array
GEFF_FID[512]	: Group 29-bit CAN Filter-ID data array

Return Values :
Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;
_VCI_CAN_FilterID pCANFID1;
//Single 11-bit Fitler-ID
WORD  SSFID[3]={0x0003, 0x0002, 0x0001};
//Group 11-bit Fitler-ID
DWORD GSFID[2]={0x00300040, 0x00100020};
//Single 29-bit Fitler-ID
DWORD SEFID[3]={0x00000013, 0x00000012, 0x00000011};
//Group 29-bit Fitler-ID
DWORD GEFID[4]={0x00000300, 0x00000400, 0x00000100, x00000200};

CAN_No=1;
pCANFID1.SSFF_Num = sizeof(SSFID)/sizeof(WORD);
pCANFID1.GSFF_Num = sizeof(GSFID)/sizeof(DWORD);
pCANFID1.SEFF_Num = sizeof(SEFID)/sizeof(DWORD);
pCANFID1.GEFF_Num = sizeof(GEFID)/sizeof(DWORD);
memcpy(pCANFID1.SSFF_FID, SSFID, pCANFID1.SSFF_Num*2);
memcpy(pCANFID1.GSFF_FID, GSFID, pCANFID1.GSFF_Num*4);
memcpy(pCANFID1.SEFF_FID, SEFID, pCANFID1.SEFF_Num*4);
memcpy(pCANFID1.GEFF_FID, GEFID, pCANFID1.GEFF_Num*4);

Ret = VCI_Set_CANFID(CAN_No, &pCANFID1);        // Set CAN Filter-ID
```

5.5.2 VCI_Get_CANFID

This function is used to get CAN Filter-ID in the assigned CAN port.

Syntax :

```
int VCI_Get_CANFID (
    BYTE CAN_No,
    PVCI_CAN_FID pCANFID
);
```

Parameter :

CAN_No**:**

[in] The assigned CAN port number.

pCANFID**:**

[out] A structure pointer of _VCI_CAN_FilterID is used to receive the CAN Filter-ID data shown as below.

```
typedef  struct  _VCI_CAN_FilterID{
    WORD SSFF_Num;
    WORD GSFF_Num;
    WORD SEFF_Num;
    WORD GEFF_Num;
    WORD SSFF_FID[512];
    DWORD    GSFF_FID[512];
    DWORD    SEFF_FID[512];
    DWORD    GEFF_FID[512];
} _VCI_CAN_FilterID, *PVCI_CAN_FID;
```

SSFF_Num	**:** Single 11-bit CAN Filter-ID number
GSFF_Num	**:** Group 11-bit CAN Filter-ID number
SEFF_Num	**:** Single 29-bit CAN Filter-ID number
GEFF_Num	**:** Group 29-bit CAN Filter-ID number
SSFF_FID[512]	**:** Single 11-bit CAN Filter-ID data array
GSFF_FID[512]	**:** Group 11-bit CAN Filter-ID data array
SEFF_FID[512]	**:** Single 29-bit CAN Filter-ID data array
GEFF_FID[512]	**:** Group 29-bit CAN Filter-ID data array

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;
_VCI_CAN_FilterID pCANFID;
WORD SID11_EndNum=0, GID11_EndNum=0;
WORD SID29_EndNum=0, GID29_EndNum=0;

CAN_No=1;
Ret = VCI_Get_CANFID(CAN_No, &pCANFID);          // Get CAN Filter-ID
SID11_EndNum = CANFID.SSFF_Num;
GID11_EndNum = CANFID.GSFF_Num;
SID29_EndNum = CANFID.SEFF_Num;
GID29_EndNum = CANFID.GEFF_Num;
```

5.5.3 VCI_Get_CANStatus

This function is used to get the assigned CAN port status.

Syntax :

```
int VCI_Get_CANStatus (
    BYTE CAN_No,
    PVCI_CAN_STATUS pCANStatus
);
```

Parameter :

CAN_No**:**

[in] The assigned CAN port number.

pCANStatus:

[out] A structure pointer of _VCI_CAN_STATUS is used to receive the CAN port status shown as below.

```
typedef struct _VCI_CAN_STATUS{
    DWORD    CurCANBaud;
    BYTE   CANReg;
    BYTE   CANTxErrCnt;
    BYTE   CANRxErrCnt;
    BYTE   MODState;
    DWORD    Reserved;
} _VCI_CAN_STATUS, *PVCI_CAN_STATUS;
```

CurCANBaud **:** Return the assigned CAN port baud rate
CANReg **:** Return the assigned CAN port register value
CANTxErrCnt **:** Return the assigned CAN port Tx error count
CANRxErrCnt **:** Return the assigned CAN port Rx error count
MODState **:** Return the module state

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No, Module_State;
_VCI_CAN_STATUS CANSTA;

CAN_No=1;
Ret = VCI_Get_CANStatus(CAN_No, &CANSTA);   // Get CAN port status
Module_State = CANSTA.MODState;
```

5.5.4 VCI_Clr_BufOverflowLED

This function is used to clear buffer overflow ERR LED state (flash per second) in the assigned CAN port.

Syntax :

```
int VCI_Clr_BufOverflowLED (
    BYTE CAN_No,
);
```

Parameter :

CAN_No**:**

[in] The assigned CAN port number.

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;

CAN_No=1;
Ret = VCI_Clr_BufOverflowLED(CAN_No);   // Clear Buffer Overflow LED
```

5.5.5 VCI_Get_MODInfo

This function is used to get module information.

Syntax :

```
int VCI_Get_MODInfo (
    PVCI_MOD_INFO pMODInfo
);
```

Parameter :

pMODInfo:

[out] A structure pointer of _VCI_MODULE_INFO is used to receive the module information shown as below.

```
typedef  struct  _VCI_MODULE_INFO{
    char     Mod_ID[12];
    char     FW_Ver[12];
    char     HW_SN[16];
} _VCI_MODULE_INFO, *PVCI_MOD_INFO;
```

Mod_ID[12] : Return the module name string

FW_Ver[12] : Return the module firmware version string

HW_SN[16] : Return the module hardware serial number string

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
char Module_ID[12], Firmware_Ver[12], Hardware_SN[16];
_VCI_MODULE_INFO CAN_ModInfo;

Ret = VCI_Get_MODInfo(&CAN_ModInfo);       // Get module information
sprintf(Module_ID, “%s”, CAN_ModInfo.Mod_ID);
sprintf(Firmware_Ver, “%s”, CAN_ModInfo.FW_Ver);
sprintf(Hardware_SN, “%s”, CAN_ModInfo.HW_SN);
```

5.5.6 VCI_Rst_MOD

This function is used to reset module.

Syntax :

```
int VCI_Rst_MOD (
    void
);
```

Parameter :

None

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;

Ret = VCI_Rst_MOD();    // Reset Module
```

5.6 Communication Function

These functions are used to send / receive CAN messages.

5.6.1 VCI_SendCANMsg

This function is used to send CAN messages in the assigned CAN port.

Syntax :

```
int VCI_SendCANMsg (
    BYTE CAN_No,
    PVCI_CAN_MSG pCANMsg
);
```

Parameter :

CAN_No:

[in] The assigned CAN port number.

pCANMsg:

[in] A structure pointer of _VCI_CAN_MSG is used to set the CAN message parameters shown as below.

```
typedef  struct  _VCI_CAN_MSG{
    BYTE   Mode;
    BYTE   RTR;
    BYTE   DLC;
    BYTE   Reserved;
    DWORD    ID;
    DWORD    TimeL;
    DWORD    TimeH;
    BYTE   Data[8];
} _VCI_CAN_MSG, *PVCI_CAN_MSG;
```

Mode	: CAN message Mode (0: 11-bit; 1: 29-bit)
RTR	: CAN message RTR (0: No RTR; 1: RTR)
DLC	: CAN message Data Length (0~8)
ID	: CAN message ID
TimeL	: CAN message Time-Stamp (Lo-DWORD)
TimeH	: CAN message Time-Stamp (Hi-DWORD)
Data[8]	: CAN message Data Array

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;
_VCI_CAN_MSG CAN_SendMsg;

CAN_No=1;
CAN_SendMsg.Mode  = 1;
CAN_SendMsg.RTR   = 0;
CAN_SendMsg.ID    = 0x1;
CAN_SendMsg.DLC   = 8;
CAN_SendMsg.Data[0]= 0x12;
CAN_SendMsg.Data[1]= 0x34;
CAN_SendMsg.Data[2]= 0x56;
CAN_SendMsg.Data[3]= 0x78;
CAN_SendMsg.Data[4]= 0x90;
CAN_SendMsg.Data[5]= 0xAB;
CAN_SendMsg.Data[6]= 0xCD;
CAN_SendMsg.Data[7]= 0xEF;
Ret = VCI_SendCANMsg(CAN_No, &CAN_SendMsg);  // Send CAN Msg
```

5.6.2 VCI_RecvCANMsg

This function is used to receive CAN messages that are saved in software buffer in the assigned CAN port.

Syntax :

```
int VCI_RecvCANMsg (
    BYTE CAN_No,
    PVCI_CAN_MSG pCANMsg
);
```

Parameter :

CAN_No:

[in] The assigned CAN port number.

pCANMsg:

[out] A structure pointer of _VCI_CAN_MSG is used to receive the CAN message shown as below.

```
typedef  struct  _VCI_CAN_MSG{
    BYTE   Mode;
    BYTE   RTR;
    BYTE   DLC;
    BYTE   Reserved;
    DWORD    ID;
    DWORD    TimeL;
    DWORD    TimeH;
    BYTE   Data[8];
} _VCI_CAN_MSG, *PVCI_CAN_MSG;
```

Mode	: CAN message Mode (0: 11-bit; 1: 29-bit)
RTR	: CAN message RTR (0: No RTR; 1: RTR)
DLC	: CAN message Data Length (0~8)
ID	: CAN message ID
TimeL	: CAN message Time-Stamp (Lo-DWORD)
TimeH	: CAN message Time-Stamp (Hi-DWORD)
Data[8]	: CAN message Data Array

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret, i;
BYTE CAN_No;
BYTE CANMsg_Mode, CANMsg_RTR, CANMsg_DLC, CANMsg_Data[8];
DWORD CANMsg_ID, CANMsg;
Double CANMsg_Time;
_VCI_CAN_MSG CAN_RecvMsg;

CAN_No=1;
Ret = VCI_RecvCANMsg(CAN_No, &CAN_RecvMsg);  // Recv CAN Msg
CANMsg_Mode = CAN_RecvMsg.Mode;
CANMsg_RTR = CAN_RecvMsg.RTR;
CANMsg_ID = CAN_RecvMsg.ID;
CANMsg_DLC = CAN_RecvMsg.DLC;
CANMsg_Time =
(double)(CAN_RecvMsg.TimeH*pow(2.0,32.0))+(double)((double)CAN_R
ecvMsg.TimeL/10000));
For(i=0; i< CANMsg_DLC; i++){
     CANMsg_Data[i] = CAN_RecvMsg.Data[i]
}
```

5.6.3 VCI_EnableHWCyclicTxMsg

This function is used to send CAN messages in the assigned CAN port by using module hardware timer and it will be more precise than PC software timer.

In FW v1.05 or newer, five HWSendTimer number (No:0~4) supported. This function will use HWSendTimer No.0 by default for CAN messages sending.

Syntax :

```
int VCI_EnableHWCyclicTxMsg (
    BYTE CAN_No,
    PVCI_CAN_MSG pCANMsg,
    DWORD TimePeriod,
    DWORD TransmitTimes
);
```

Parameter :

CAN_No:

[in] The assigned CAN port number.

pCANMsg:

[in] A structure pointer of _VCI_CAN_MSG is used to set the CAN message parameters shown as below.

```
typedef  struct  _VCI_CAN_MSG{
    BYTE   Mode;
    BYTE   RTR;
    BYTE   DLC;
    BYTE   Reserved;
    DWORD    ID;
    DWORD    TimeL;
    DWORD    TimeH;
    BYTE   Data[8];
} _VCI_CAN_MSG, *PVCI_CAN_MSG;
```

Mode	: CAN message Mode (0: 11-bit; 1: 29-bit)
RTR	: CAN message RTR (0: No RTR; 1: RTR)
DLC	: CAN message Data Length (0~8)
ID	: CAN message ID
TimeL	: CAN message Time-Stamp (Lo-DWORD)
TimeH	: CAN message Time-Stamp (Hi-DWORD)
Data[8]	: CAN message Data Array

TimePeriod**:**

[in] The time period of module hardware timer for sending CAN message. If the value is zero, this function doesn't work.

TransmitTimes**:**

[in] The count for sending CAN message. If the value is zero, it means that CAN message will be sent periodically and permanently.

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;
_VCI_CAN_MSG CAN_SendMsg;

CAN_No=1;
CAN_SendMsg.Mode  = 1;
CAN_SendMsg.RTR   = 0;
CAN_SendMsg.ID    = 0x1;
CAN_SendMsg.DLC   = 8;
CAN_SendMsg.Data[0]= 0x12;
CAN_SendMsg.Data[1]= 0x34;
CAN_SendMsg.Data[2]= 0x56;
CAN_SendMsg.Data[3]= 0x78;
CAN_SendMsg.Data[4]= 0x90;
CAN_SendMsg.Data[5]= 0xAB;
CAN_SendMsg.Data[6]= 0xCD;
CAN_SendMsg.Data[7]= 0xEF;

//Send 200 CANMsg with 10ms period and then stop
Ret = VCI_EnableHWCyclicTxMsg(CAN_No, &CAN_SendMsg, 10, 200);

//Send CANMsg with 10ms period permanently
//Ret = VCI_EnableHWCyclicTxMsg(CAN_No, &CAN_SendMsg, 10, 0);
```

5.6.4 VCI_DisableHWCyclicTxMsg

This function is used to stop sending CAN messages by module hardware timer (HWSendTimer No.0 by default).

Syntax :

```
int VCI_DisableHWCyclicTxMsg (
    void
);
```

Parameter :

None

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;

Ret = VCI_DisableHWCyclicTxMsg();   // Disable module hardware timer
```

5.6.5 VCI_EnableHWCyclicTxMsgNo

This function is used to send CAN messages in the assigned CAN port by using module hardware timer and it will be more precise than PC software timer.

In FW v1.05 or newer, five HWSendTimer number (No:0~4) supported. This function can be used to assign the HWSendTimer No.0~4 for CAN messages sending.

Syntax :

```
int VCI_EnableHWCyclicTxMsgNo (
    BYTE CAN_No,
    BYTE Mode,
    BYTE RTR,
    BYTE DLC,
    DWORD ID,
    BYTE Data[8],
    DWORD TimePeriod,
    DWORD TransmitTimes,
    BYTE  HW_TimerNo
);
```

Parameter :

CAN_No:
[in] The assigned CAN port number.

Mode : [in] CAN message Mode (0: 11-bit; 1: 29-bit)
RTR : [in] CAN message RTR (0: No RTR; 1: RTR)
DLC : [in] CAN message Data Length (0~8)
ID : [in] CAN message ID
Data[8] : [in] CAN message Data Array

TimePeriod:
[in] The time period of module hardware timer for sending CAN message. If the value is zero, this function doesn't work.

TransmitTimes:
[in] The count for sending CAN message. If the value is zero, it means that CAN message will be sent periodically and permanently.

HW_TimerNo:
[in] The assigned HWSendTimer No. (0~4)

Return Values :
Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;
BYTE Mode, RTR, DLC, Data[8], HW_TimerNo;
DWORD ID;

CAN_No =1;
Mode   = 1;
RTR    = 0;
ID     = 0x1;
DLC    = 8;
Data[0]= 0x12;
Data[1]= 0x34;
Data[2]= 0x56;
Data[3]= 0x78;
Data[4]= 0x90;
Data[5]= 0xAB;
Data[6]= 0xCD;
Data[7]= 0xEF;

//Send 200 CANMsg with 10ms period and Stop by using HWSendTimer-1
HW_TimerNo = 1;
Ret = VCI_EnableHWCyclicTxMsgNo(CAN_No, Mode, RTR, DLC, ID,
Data, 10, 200, HW_TimerNo);
```

5.6.6 VCI_EnableHWCyclicTxMsgNo_Ex

This function is used to send CAN messages in the assigned CAN port by using module hardware timer and it will be more precise than PC software timer.

In FW v1.05 or newer, five HWSendTimer number (No:0~4) supported. This function can be used to assign the HWSendTimer No.0~4 and adjust CAN Data value for CAN messages sending.

Syntax :

```
int VCI_EnableHWCyclicTxMsgNo_Ex (
    BYTE CAN_No,
    BYTE Mode,
    BYTE RTR,
    BYTE DLC,
    DWORD ID,
    BYTE Data[8],
    DWORD TimePeriod,
    DWORD TransmitTimes,
    BYTE  HW_TimerNo,
    BYTE AddMode,
    DWORD DLAddVal,
    DWORD DHAddVal
);
```

Parameter :

CAN_No:

[in] The assigned CAN port number.

Mode : [in] CAN message Mode (0: 11-bit; 1: 29-bit)
RTR : [in] CAN message RTR (0: No RTR; 1: RTR)
DLC : [in] CAN message Data Length (0~8)
ID : [in] CAN message ID
Data[8] : [in] CAN message Data Array

TimePeriod:

[in] The time period of module hardware timer for sending CAN message. If the value is zero, this function doesn't work.

TransmitTimes:

[in] The count for sending CAN message. If the value is zero, it means that CAN message will be sent periodically and permanently.

HW_TimerNo**:**
[in] The assigned HWSendTimer No. (0~4)

AddMode **:** [in] CAN Data Value Addition Mode (0**:**Addition**;** 1**:**Multiple)
DLAddVal **:** [in] CANL Data Addition Value every time
DHAddVal **:** [in] CANH Data Addition Value every time

Return Values :
Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;
BYTE Mode, RTR, DLC, Data[8], HW_TimerNo;
DWORD ID;

CAN_No =1;
Mode   = 1;
RTR    = 0;
ID     = 0x1;
DLC    = 8;
Data[0]= 0x0;
Data[1]= 0x0;
Data[2]= 0x0;
Data[3]= 0x0;
Data[4]= 0x0;
Data[5]= 0x0;
Data[6]= 0x0;
Data[7]= 0x0;

//Send 200 CANMsg with 10ms period and Stop by using HWSendTimer-1
//CANL_Data Value will be added by 1 every time
//CANH_Data Value will be added by 2 every time
HW_TimerNo = 1;
Ret = VCI_EnableHWCyclicTxMsgNo_Ex(CAN_No, Mode, RTR, DLC, ID,
Data, 10, 200, HW_TimerNo, ADDITION_MODE, 1, 2);
```

5.6.7 VCI_DisableHWCyclicTxMsgNo

This function is used to stop sending CAN messages for the assigned HWSendTimer No. 0~4.

Syntax :

```
int VCI_DisableHWCyclicTxMsgNo (
    BYTE  HW_TimerNo
);
```

Parameter :

HW_TimerNo**:**

[in] The assigned HWSendTimer No. (0~4)

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE HW_TimerNo;

//Stop HWSendTimer-01
HW_TimerNo = 1;
Ret = VCI_DisableHWCyclicTxMsgNo(HW_TimerNo);
```

5.7 Software Buffer Function

When users' program receives CAN messages, these received CAN messages will be saved in software buffer provided by VCI_CAN library first and users need to use "VCI_RecvCANMsg" function to get these received CAN messages saved in software buffer. The software buffer size is **65536** for each CAN port.

5.7.1 VCI_Get_RxMsgCnt

This function is used to get the count of these received CAN messages saved in software buffer that are not received by users' program in the assigned CAN port.

Syntax :

```
int VCI_Get_RxMsgCnt (
    BYTE CAN_No,
    DWORD* RxMsgCnt
);
```

Parameter :

CAN_No:

[in] The assigned CAN port number.

RxMsgCnt:

[out] The pointer is used to receive the CAN message count saved in software buffer.

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;
DWORD RxMsgCnt;

CAN_No=1;
Ret = VCI_Get_RxMsgCnt(CAN_No, &RxMsgCnt);   // Recv RxMsg count
```

5.7.2 VCI_Get_RxMsgBufIsFull

This function is used to get the software buffer state whether it is full or not in the assigned CAN port. If the software buffer is full, it means that some CAN messages are lost.

Syntax :

```
int VCI_Get_RxMsgBufIsFull (
    BYTE CAN_No,
    BYTE* Flag
);
```

Parameter :

CAN_No**:**

[in] The assigned CAN port number.

Flag**:**

[out] The pointer is used to receive the state of software buffer. If the value is zero, the software buffer is not full. If not, it means that the software buffer is full.

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;
BYTE RxSoftBufFull_Flag;

CAN_No=1;
Ret = VCI_Get_RxMsgBufIsFull(CAN_No, &RxSoftBufFull_Flag);
```

5.7.3 VCI_Clr_RxMsgBuf

This function is used to clear the software buffer in the assigned CAN port.

Syntax :

```
int VCI_Clr_RxMsgBuf (
    BYTE CAN_No,
);
```

Parameter :

CAN_No**:**

[in] The assigned CAN port number.

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
BYTE CAN_No;

CAN_No=1;
Ret = VCI_Clr_RxMsgBuf(CAN_No);
```

5.8 User Defined ISR Function

These functions are used to execute user-defined function when receiving the assigned CAN-ID message.

5.8.1 VCI_Set_UserDefISR

This function is used to set the user-defined ISR function and the assigned port number, mode and ID of the received CAN message. When receiving the CAN message which is matched with the assigned port number, mode and ID, the corresponding user-defined function will be executed once right now.

Syntax :

```
int VCI_Set_UserDefISR (
    BYTE ISRNo,
    BYTE CAN_No,
    BYTE Mode,
    DWORD CANID,
    void (*UserDefISR)()
);
```

Parameter :

ISRNo:
[in] The assigned ISR No. (Valid: 0 ~ 7)

CAN_No:
[in] The assigned CAN port number. (0: for all CAN port)

Mode:
[in] The assigned CAN message Mode (2: for all CAN Mode).

CANID:
[in] The assigned CAN message ID. (0: for all CAN-ID)

*UserDefISR:
[in] The assigned user-defined function pointer.

Return Values :
Return 0 means success, others means failure.

Examples :
Int Ret;

/* The UserDefISR (MyTestISR0) will be trigged when receiving any one CANMsg */
Ret=VCI_Set_UserDefISR(ISRNO_0, ISR_CANPORT_ALL, ISR_CANMODE_ALL, ISR_CANID_ALL, MyTestISR0);

/* The UserDefISR (MyTestISR1) will be trigged when only CAN1 receiving 11-bit CANMsg with CANID=0x100 */
Ret=VCI_Set_UserDefISR(ISRNO_1, CAN1, MODE_11BIT, 0x100, MyTestISR1);

[Note]
1. The code of user-defined function should be the more simple the better (means the execution time the shorter the better) and the frequency of the matched CAN message should be the slower the better. Or it could cause the execution lost of user-defined function.

5.8.2 VCI_Clr_UserDefISR

This function is used to disable the user-defined ISR function.

Syntax :

```
int VCI_Clr_UserDefISR (
    BYTE ISRNo,
);
```

Parameter :

ISRNo**:**

[in] The assigned ISR No. (Valid**:** 0 ~ 7)

Return Values :

Return 0 means success, others means failure.

Examples :

```
/* Disable UserDefFunction of ISRNO_0 and ISRNO_1 */
VCI_Clr_UserDefISR(ISRNO_0);
VCI_Clr_UserDefISR(ISRNO_1);
```

5.8.3 VCI_Get_ISRCANData

This function is used to get the CAN message data when user-defined ISR function is trigged.

Syntax :

```
int VCI_Get_ISRCANData (
    BYTE ISRNo,
    BYTE* DLC,
    BYTE Data[8],
);
```

Parameter :

ISRNo:

[in] The assigned ISR No. (Valid: 0 ~ 7)

DLC:

[out] The pointer is used to receive the CAN message data length.

Data:

[out] The data buffer is used to receive the CAN message data.

Return Values :

Return 0 means success, others means failure.

Examples :

```
BYTE ISR1_CANDataLen;
BYTE ISR1_CANData[8]={0};

VCI_Get_ISRCANData(ISRNO_1, &ISR1_CANDataLen, ISR1_CANData);
```

5.9 Other Function

These functions are used to get the VCI_CAN library information or helpful for users' program.

5.9.1 VCI_Get_DllVer

This function is used to get the version of VCI_CAN library.

Syntax :

```
DWORD VCI_Get_DllVer (
    void
);
```

Parameter :

None

Return Values :

Return the VCI_CAN library version. Hi-byte is the major version and lo-byte is the minor version.

Examples :

```
DWORD DllVer;
char VCI_DllVer[10];

DllVer = VCI_Get_DllVer();
sprintf(VCI_DllVer, "v%lu.%02lu", (DllVer>>8)&0xFF, DllVer&0xFF);
```

5.9.2 VCI_DoEvents

This function is used to release CPU resource temporarily.

Syntax :

```
void VCI_DoEvents (
    void
);
```

Parameter :

None

Return Values :

None

Examples :

```
VCI_DoEvents() ;
```

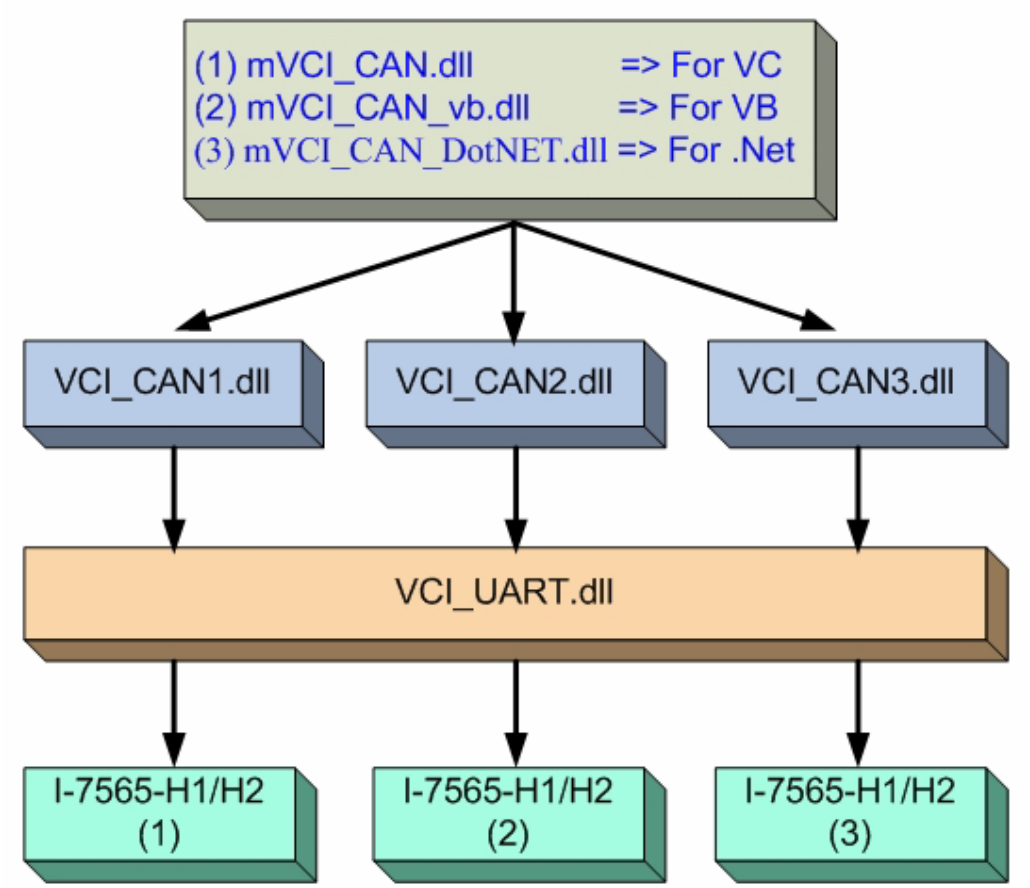
5.10 Return Code

The return value is used to show the result of executing VCI_CAN library functions. The following is the all return codes.

Error Code	Error ID	Error String
0	**No_Err**	OK (No Error)
1	**DEV_ModName_Err**	The module name is error
2	**DEV_ModNotExist_Err**	The module doesn't exist in this port
3	**DEV_PortNotExist_Err**	The port doesn't exist
4	**DEV_PortInUse_Err**	The port is in use
5	**DEV_PortNotOpen_Err**	The port doesn't open
6	**CAN_ConfigFail_Err**	CAN ConfigCmd Fail
7	**CAN_HARDWARE_Err**	CAN hardware init Fail
8	**CAN_PortNo_Err**	The device doesn't support this CAN port
9	**CAN_FIDLength_Err**	The CAN filter-ID number exceeds the max number
10	**CAN_DevDisconnect_Err**	The device is disconnected.
11	**CAN_TimeOut_Err**	The ConfigCmd is timeout
12	**CAN_ConfigCmd_Err**	The ConfigCmd doesn't support
13	**CAN_ConfigBusy_Err**	The ConfigCmd is busy
14	**CAN_RxBufEmpty**	The CAN receive buffer is empty
15	**CAN_TxBufFull**	The CAN send buffer is full

6. API Library -- mVCI_CAN.dll

The mVCI_CAN library is used to control **multi-modules of I-7565-H1/H2** simultaneously in the same program. The below picture is the structure of I-7565-H1/H2 library **:**



Structure of I-7565-H1/H2 Library

It adopts the Object-Oriented Program (OOP) concept and every object built means one I-7565-H1/H2 module. The following are basic steps for usage of mVCI_CAN library to control multi-modules of I-7565-H1/H2.

6.1 For VC Project

(1) Necessary Files for VC project **:**

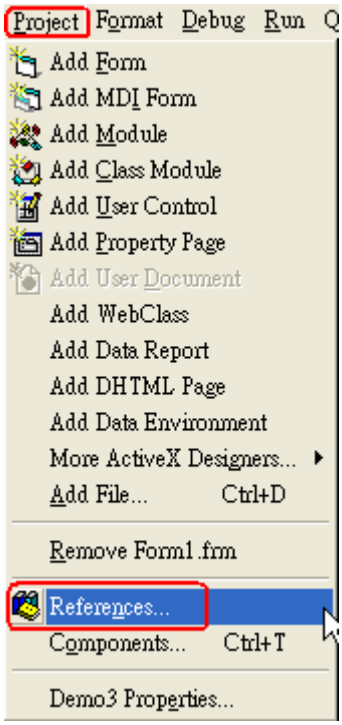
[1] Copy "**mVCI_CAN.h**" and "**mVCI_CAN.lib**" files in VC project folder. (Without using VCI_CAN.h and VCI_CAN.lib)
[2] Copy these three files - "**mVCI_CAN.dll**", "**VCI_CAN.dll**" and "**VCI_Uart.dll**" to Debug or Release folder of VC project.

(2) Program for VC project **:**
[1] Include "mVCI_CAN.h" and "mVCI_CAN.lib" to VC project.
[2] Declare global objects of "CMVCI_CAN" class defined in mVCI_CAN.h.
(Like: CMVCI_CAN I7565H1H2_Mod[2];)
[3] Execute InitDLL() function for every object of "CMVCI_CAN" class.
(Like: I7565H1H2_Mod[0].InitDLL();)
[4] After InitDLL() function executes successfully, every object will be one I-7565-H1/H2 module. Then users can use object to operate I-7565-H1/H2 module.
(Like: I7565H1H2_Mod[0].mVCI_OpenCAN();)
[5] Please refer to the VC demo3 of I-7565-H1/H2 for details.

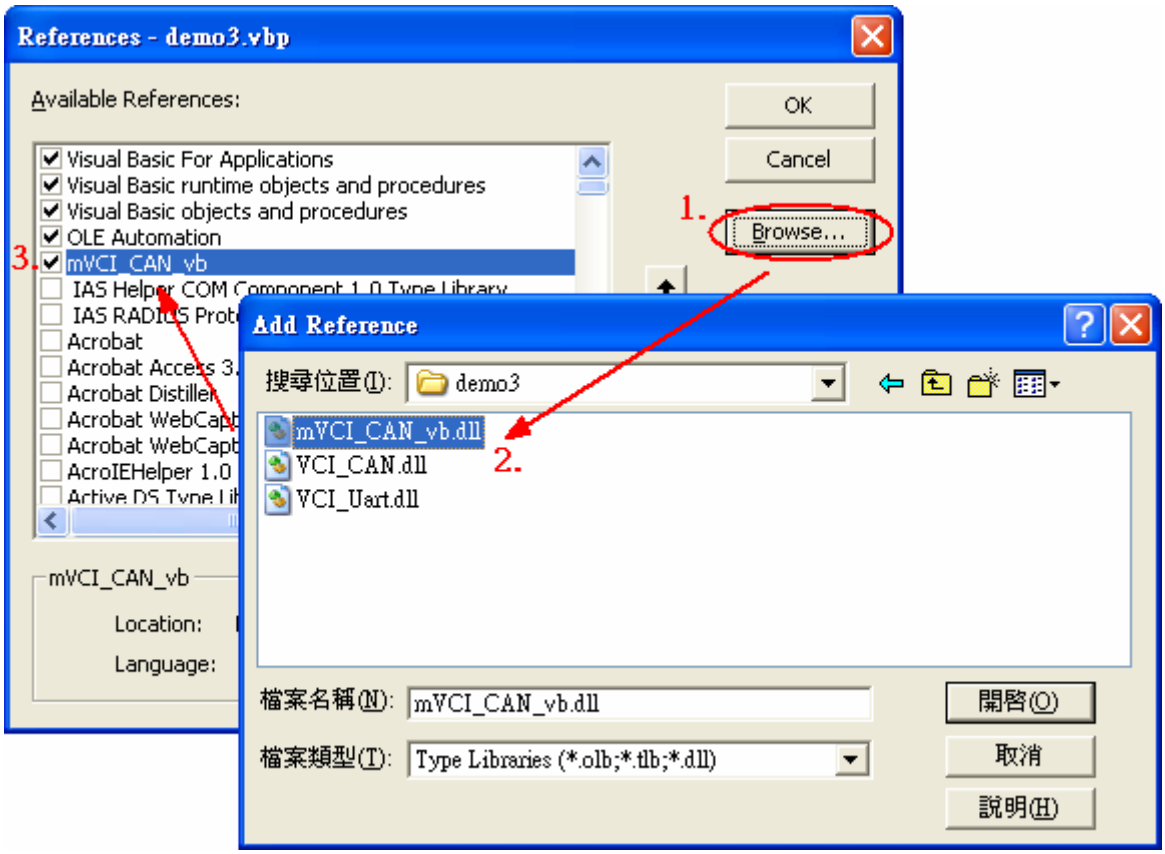
6.2 For VB Project

(1) Necessary Files for VC project **:**
[1] Copy these five files - "**mVCI_CAN_vb_Register.bat**", "**mVCI_CAN_vb.dll**", "**VCI_CAN.dll**", "**VCI_UART.dll**" and "**I-7565-H1H2_Lib.bas**" to VB project folder.
[2] Execute "mVCI_CAN_vb_Register.bat" file to register "mVCI_CAN_vb.dll" information to Windows system.

(2) Program for VB project **:**
[1] Add "mVCI_CAN_vb" reference to VB project by following below steps **:**
(1) Click "Project/References..." option.
(2) Click "Browser..." button and choose "mVCI_CAN_vb.dll" file. Then "mVCI_CAN_vb" reference will be added to VB



"Project/References..." option



"mVCI_CAN_vb" reference

[2] Declare two global variable of "CMVCI_CAN" class.
(Like: Private I7565H1H2_Mod(1) As CMVCI_CAN)

[3] Create every object of "MVCI_SDK" class and execute InitDLL() function.
(Like: Set I7565H1H2_Mod(0) = New CMVCI_CAN
I7565H1H2_Mod(0).InitDL())
[4] After InitDLL() function executes successfully, every object will be one I-7565-H1 or I-7565-H2 module. Then users can use object to operate I-7565-H1/H2 module.
(Like: I7565H1H2_Mod(0).mVCI_OpenCAN())
[5] Please refer to the VB demo3 of I-7565-H1/H2 for details.

6.3 For .Net Project

(1) Necessary Files for .Net project **:**

[1] Copy these files - "**mVCI_CAN_DotNET.dll**", "**VCI_CAN.dll**" and "**VCI_Uart.dll**" to Debug or Release folder of .Net project.

(2) Progarm for .Net project **:**

[1] Add "**mVCI_CAN_DotNET.dll**" file to reference of .Net project.
[2] Type "**using mVCI_CAN_DotNET;**" in the head of .Net project
[3] Declare global variable of "MVCI_SDK" class.
(Like: MVCI_SDK[] I7565H1H2_Mod = new MVCI_SDK[2];)
[4] Create every object of "MVCI_SDK" class and execute InitDLL() function.
(Like: I7565H1H2_Mod[0] = New MVCI_SDK();
I7565H1H2_Mod[0].InitDLL();)
[5] After InitDLL() function executes successfully, every object will be one I-7565-H1 or I-7565-H2 module. Then users can use object to operate I-7565-H1/H2 module.
(Like: I7565H1H2_Mod[0].mVCI_OpenCAN_NoStruct();)
[6] Please refer to the .Net demo2 of I-7565-H1/H2 for details.

7. Troubleshooting

7.1 The Connection Issue

If the driver installation of I-7565-H1/H2 is successful, the virtual com port will be assigned by Windows automatically. Then users can use “I-7565-H1/H2 Utility” to connect to I-7565-H1/H2 module via the virtual com port for CAN bus communication.

[Q1] When users open the virtual com port, if it shows the below error message like Figure 6-1-1, there are two conditions for that.

(1) This com port is not existed in system and please check the com port number again.

(2) If the virtual com port number is bigger than COM16, then users need to copy the new version “**MSCOMM32.OCX**” file in I-7565-H1H2 utility folder to “C:\WINDOWS\system32\” to replace the old version file and then register MSCOMM32.ocx again.

If it still failed, please check that the driver installation is completed or the virtual com port is correct for I-7565-H1/H2.

Figure 6-1-1: Invalid port number

[Q2] When users open the virtual com port, if it shows the below error message like Figure 6-1-2, it means that the com port is occupied by other programs like VxComm Utility. Please “UnMap” the same com port used in VxComm Utility and then click “Restart Driver” function like Figure 6-1-3. After that, reset I-7565-H1/H2 and try to connect to I-7565-H1/H2 again.

Figure 6-1-2: The device is not open

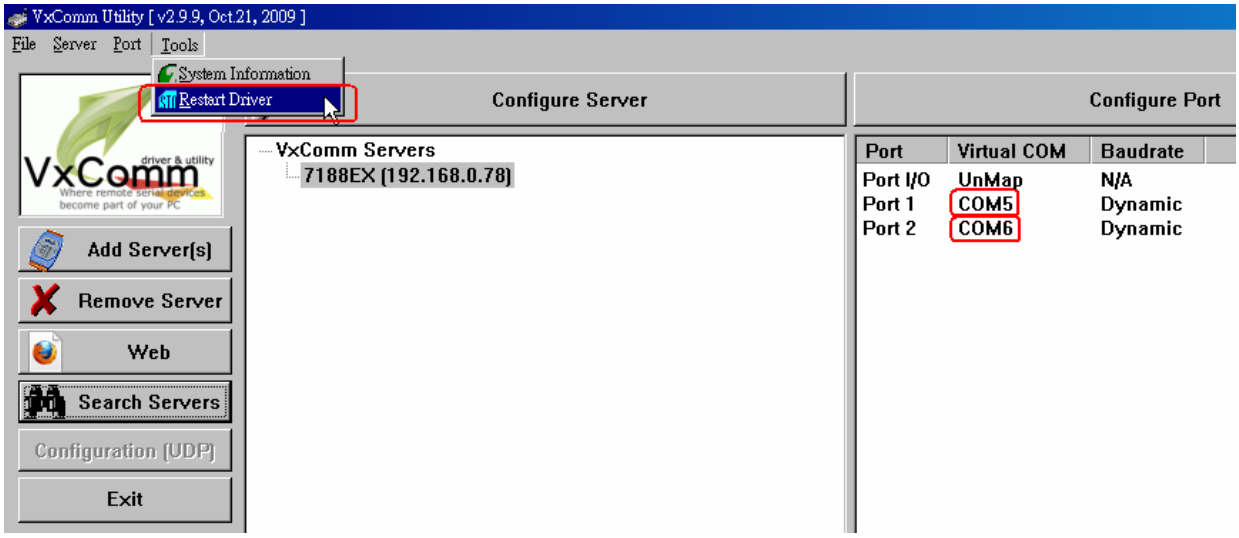


Figure 6-1-3: Virtual COM of VxComm Utility

7.2The CAN Baud Rate Issue

(1) The CAN baud rate mismatch:

If the I-7565-H1/H2 CAN baud rate is not the same as the CAN baud rate on the CAN bus network, the RUN LED on the I-7565-H1/H2 will flash per 100ms because the I-7565-H1/H2 cannot send any CAN message to the CAN bus network. Users can get the CAN status of I-7565-H1/H2 by using “I-7565-H1/H2 Utility” to help users understand what is going in the module.

(2) The user-defined CAN baud rate setting:

If users want to use the user-defined CAN baud rate, in the “Connect to I-7565-H1/H2” screen of “I-7565-H1/H2 Utility”, users can choose the “**Defined**” item and input the user-defined CAN baud rate value (for example: 83.333) in the right field of the “Baud Rate” frame like Figure 6-2. Then click “Connect” button to connect to I-7565-H1/H2.

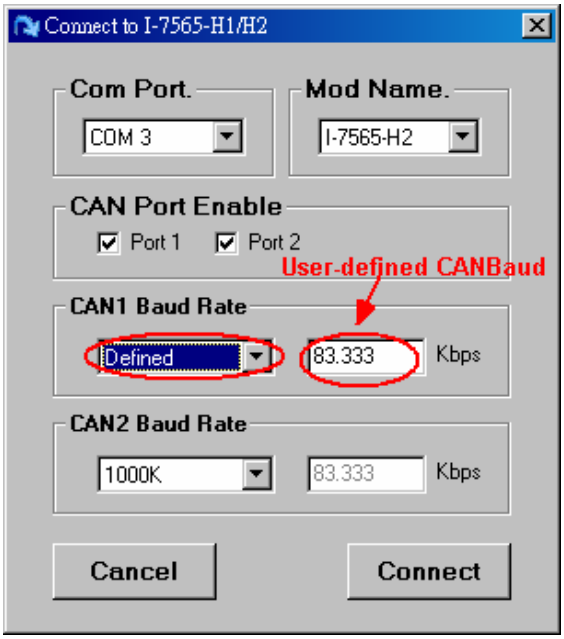


Figure 6-2**:** User-defined CAN Baud Rate for I-7565-H1/H2

(3) <u>The rule of user-defined CAN baud rate setting in the SJA1000 CAN devices for communication compatible with I-7565-H1/H2</u>**:**

If users use I-7565-H1/H2 to communicate with SJA1000 CAN devices and CAN baud rate is user-defined CAN baud rate. Then in SJA1000 CAN devices, users need to choose a set of proper CAN parameter (**BTR0** & **BTR1**) for communication compatible with I-7565-H1/H2 and the rule is as follows**:**

(1) The "**Samples**" value is 1.

(1) The "**SJW**" value is as small as possible. (1 is the best).

(2) The "**Tseg2**" value is as small as possible. (1 is the best)

(3) The "**Tseg1**" value is as large as possible.

According to the above four rules, users can choose the proper BTR0 and BTR0. For example, if uses want to use the CAN baud rate is 83.333 Kbps, according to the above rules, users should choose <u>BTR0=05</u> and <u>BTR1=1C</u> for the CAN parameter of SJA1000 CAN devices like Figure 6-3.

BTR0(hex)	BTR1(hex)	Samples	Spl%	TSEG1	TSEG2	BRP	SJW	Max.Bus(m)	Kbps	Osc.Tol(%)
0F	12	1	66	3	2	16	1	516	83.3333	.2809
0B	14	1	75	5	2	12	1	652	83.3333	.2101
07	18	1	83	9	2	8	1	788	83.3333	.1397
05	1C	1	87	13	2	6	1	856	83.3333	.1046
0B	23	1	62	4	3	12	1	516	83.3333	.211
4B	23	1	62	4	3	12	2	379	83.3333	.4219
07	27	1	75	8	3	8	1	697	83.3333	.1401
47	27	1	75	8	3	8	2	606	83.3333	.2801

Figure 6-3**:** User-defined CAN Baud Rate for SJA1000 Device

7.3 The Same CAN-ID Conflict Issue

If the same CAN-ID conflict condition in CAN bus network happened frequently, it may cause CAN bus communication failed in I-7565-H1/H2 module. Users should solve the CAN-ID conflict condition and reset I-7565-H1/H2 module for the later CAN bus communication.

7.4 The PC Rebooting Issue

If using I-7565-H1/H2 for a while, the PC reboots automatically. Please update the newest "Service Pack of Windows" to your PC platform. For example, if users use Windows XP, please update the service pack to SP3 or newer version to solve this problem.

7.5 The Max Data Transfer Rate (fps) Issue

The max CAN bus data transfer rate in I-7565-H1/H2 is up to 3000 fps and it can be adjusted by I-7565-H1/H2 Utility. If users' PC performance is not good enough, the data loss condition may happen. In this time, users can use "Advanced Config" function to adjust hardware transfer rate of "CAN to USB" in I-7565-H1/H2 and it may improve the data loss problem. Remember that hardware data transfer rate can not be lower than the current CAN bus flow, or the data loss will happen in I-7565-H1/H2 module.

7.6 The Data Loss Issue

There are two possible causes for the data loss problem. They are described as follows:

(1) **Software receiving buffer provided by API library overflow**.
It means that the users' program could not receive the CAN messages from software buffer in time. Therefore, users should optimize the communication strategy.

(2) **Hardware receiving buffer overflow**.
A large delay of the interrupt happened in the receiving-end PC and it can be solved by enhancing the PC hardware performance or properly slowing down the transmitting speed for the other CAN bus nodes.

7.7 The Module Number Applied to One PC Issue

In theory, there is no the limitation. It supports synchronous operation in a PC with more than one I-7565-H1/H2 modules but the total communication efficiency depends on the PC hardware performance.

7.8 The Long Driver Installation Time Issue

If users install the driver of I-7565-H1/H2 followed by the steps of chapter 3 and it takes more than 2 minutes, please follow the below steps to solve this problem.

(1) Copy "**I-7565-H1H2.inf**" file to C:\WINDOWS\inf\ folder.

(2) Copy the file, "**usbser.sys**", to the path: C:\WINDOWS\system32\drivers\.

(3) Please follow the steps in chapter 3 to install the I-7565-H1/H2 driver by manual again. In the below step like Figure 6-4, please choose "Don't search. I will choose the driver to install" option and then click "Next" button.

Figure 6-4**:** Driver Installation of I-7565-H1/H2 (1)

(4) When the Figure 6-5 shows, click "Next" button and the other steps are the same with those in chapter 3.

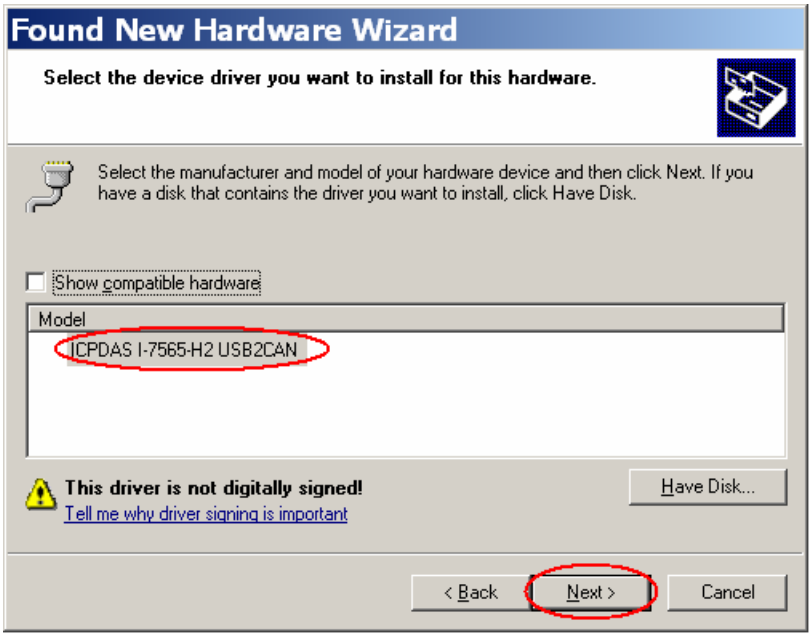


Figure 6-5: Driver Installation of I-7565-H1/H2 (2)

7.9 The Supported CAN Filter-ID Number Issue

The total capacity for CAN Filter-ID provided by I-7565-H1/H2 is 440 WORD. The following table describes the size of every different type CAN Filter-ID.

	Size (Unit: WORD)
11-bit Single ID	1
11-bit Group ID	2
29-bit Single ID	2
29-bit Group ID	4

Table 6-1: Size of Every Different Type CAN Filter-ID

According to the Table 6-1, the following table describes the supported CAN Filter-ID number of I-7565-H1/H2.

	I-7565-H1 (CAN Port)	**I-7565-H2 (Each CAN Port)**
11-bit Single ID	440/1 = **440**	**220**
11-bit Group ID	440/2 = **220**	**110**

29-bit Single ID	440/2 = **220**	**110**
29-bit Group ID	440/4 = **110**	**55**

Table 6-2**:** size of every different type CAN ID

7.10 Other Issue

In general, the following errors could also occur. For example, CAN media connection problem, terminal resistor problem, different baud rate configuration with CAN network and so on.

7.11 Windows 7 Issues

7.11.1 In Windows 7 64-bit (x64) OS, how to install I-7565-H1/H2 Driver and run I-7565-H1/H2 Utility correctly ?

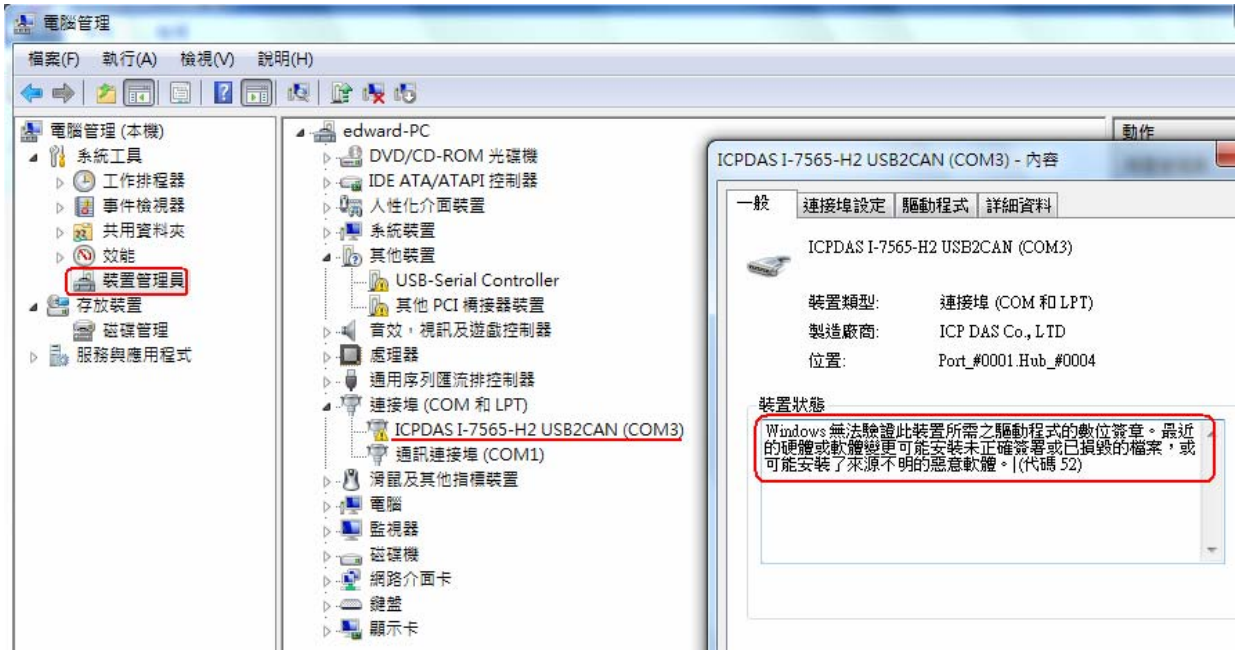
(1) In Windows 7 64-bit (x64) OS, users must install I-7565-H1/H2 driver by manual. Please follow the below steps **:**

[1] Execute "**ICPUsbConverter_DrvInst_v1.2.exe**" (**driver signature certificate** is supported in v1.2 or newer) to install necessary files to "C:\WINDOWS\inf".

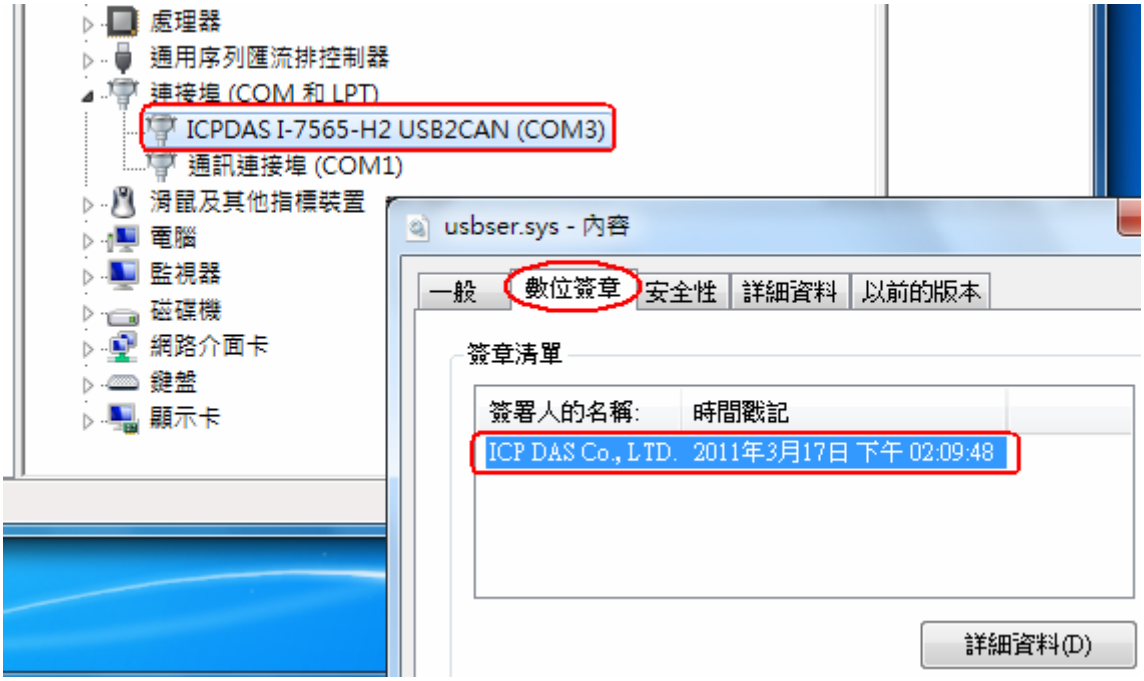
[2] Connect I-7565-H1/H2 module to PC and follow the steps in chapter 3.2 to install driver by manual.

(2) After driver installation successfully, if without driver signature certificate, there will be an "**!**" icon on I-7565-H1/H2 Virtual COM driver like Fig 7.11-1. If users install I-7565-H1/H2 driver version older than v1.2, then this problem will happen. Please uninstall driver first, then install the v1.2 or newer driver again. After that, the I-7565-H1/H2 driver will work well like Fig 7.11-2.

(3) When execute "I-7565-H1/H2 Utility" first, remember to execute it by "System Administrator" authority like Fig 7.11-3. Or there will be an error message – "Component not correctly registered" shown like Fig 7.11-4.

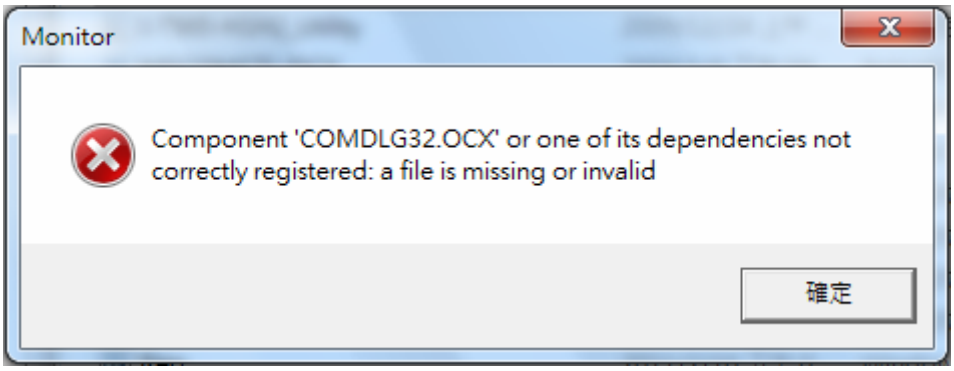


(Fig 7.11-1 Error Without Driver Signature Certificate)



(Fig 7.11-2 With Driver Signature Certificate)

(Fig 7.11-3 Execute by ”System Administrator” Authority)



(Fig 7.11-4 Component not correctly registered)

7.12 “Could not set comm state“ Error Message Issue

When connecting to I-7565-H1/H2 via I-7565-H1/H2_Utility, it shows the “Could not set comm state” error message like Fig 7.12-1. Please execute the ”Reset CANFID Flash” function in ”Extra Config” function screen (refer to section 4.4.3) to clear the Filter-ID Flash data of CAN1/2. Then the problem will be resolved.

(Fig 7.12-1 “Could not set comm state” Error Message)

8. History of Version

Version	Author	Date	Description of changes
1.0	Edward	22-Sep-2009	The First Version
1.1	Edward	25-Nov-2009	1. Modify the connection screen of Utility. 2. Add connection issue content. 3. Provide Firmware Update Tool.
1.2	Edward	7-Apr-2010	1. Modify the Utility to be v1.04. 2. Add automatic driver installation function. 3. Provide API functions without structure (For VCI_CAN Lib v1.04)
1.3	Edward	29-Nov-2010	1. Add multi-modules control API library – "mVCI_CAN" v1.00 2. Update the Utility to be v1.07 3. Update VCI_CAN.dll to be v1.06
1.4	Edward	08-Dec-2010	1. Provide "mVCI_CAN_vb.dll" for multi-modules control in VB.
1.5	Edward	17-Mar-2011	1. Provide "**User Defined ISR**" Function 2. Provide "**Hardware Serial Number**" Function. (For VCI_CAN Lib v1.07) 3. Driver update to v1.2 (Add **Driver Signature Certificate**) and modify driver installation file name to be ICPUsbConverter_DrvInst (Integrate I-7567 module). 4. **Utility** update to v1.08 5. **VCI_Get_ISRCANData** function is added in VCI_CAN Lib v1.073.
1.6	Edward	25-May-2011	The following functions provided in FW**:** v1.05 / Utility**:** v1.09 / APILib**:** v1.08 1. Provide "**Listen Only Mode**" function. 2. Increase **HWSendTimer Number** from 1 set to 5 sets. 3. Add "**AddMode**" and "**AddVal**" parameter for HWSendTimer. 4. Provide "**CAN bus Flow Trend**" function in Utility. 5. Provide "**Scroll**" and "**OverWrite**" mode for CAN RecvMsg Table in Utility.

1.7	Edward	19-Aug-2011	The following functions provided in FW: v1.06 / Utility: v1.10 1. Add “**Arbitration Lost**” error field in Utility. 2. Add “**Extra Config**” function page in Utility. 3. Add “**Load SymbolFile**” function in Utility. 4. Add “**Sym**” mode of Display Type for CAN RecvMsg Table in Utility.

I7565H1H2 Linux Software Manual

User Manual

Warranty

All products manufactured by ICP DAS are warranted against defective materials for a period of one year from the date of delivery to the original purchaser.

Warning

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Tables of Contents

1. i-7565-H1/H2 Linux Driver Installation

The I-7565-H1/H2 can be used in linux. For Linux O.S, the recommended installation and uninstall steps are given in Sec 1.1 ~ 1.2

1.1 Linux Driver Installing Procedure

(1) LinPAC-8x41

- Type below command to install linux driver

  I-7565-H1 module:

  #**cd /lib/modules/2.6.19**
  #**insmod usbserial vendor=0x1b5c product=0x0201**

  I-7565-H2 module:

  #**cd /lib/modules/2.6.19**
  #**insmod usbserial vendor=0x1b5c product=0x0202**

- Type command “dmesg” to check I-7565-H1/H2 device file(please refer to Figure 1-1)

  #**dmesg**

(2) LinPAC-8x81 or **Linux PC(x86)**

- Type below command to install linux driver

  I-7565-H1 module:

  #**modprobe usbserial vendor=0x1b5c product=0x0201**

  I-7565-H2 module:

#**modprobe usbserial vendor=0x1b5c product=0x0202**

- Type command “dmesg” to check I-7565-H1/H2 device file(please refer to Figure 1-1)

#**dmesg**

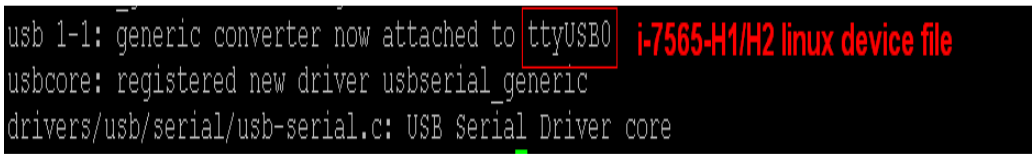


Figure 1-1

1.2 Linux Driver Uninstalling Procedure

(1) LinPAC-8x41

- Type below command to remove i-7565-H1/H2 linux driver.

#**rmmod usbserial**

(2) LinPAC-8x81 or **Linux PC(x86)**

- Type below command to remove i-7565-H1/H2 linux driver
#**modprobe –r usbserial**

2. i-7565-H1/H2 Static Library Function Description

The static library is the collection of function calls of the i-7565-H1/H2 for linux kernel 2.6.x system. The application structure is presented as below figure "Figure 2-1". The user application program developed by C (C++) language can call library "libI7565H1H2.a" for LinPAC-8x81(or x86 linux PC) or "libI7565H1H2_arm.a" for LinPAC-8x41 in user mode. And then static library will call the module command to access the hardware system.

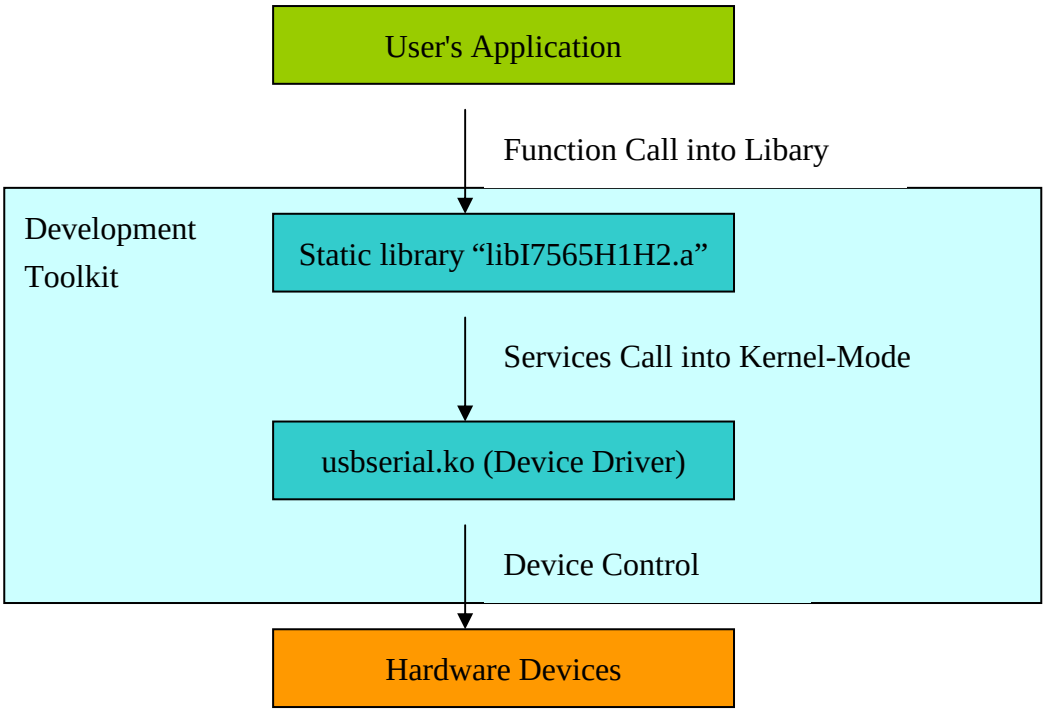


Figure 2-1

2.1 Table of ErrorCode and ErrorString

Table 2.1

Error Code	Error ID	Error String
0	No_Err	OK (No error !)
1	DEV_ModName_Err	Getting the modules name error
2	DEV_ModNotExist_Err	The module doesn't exist in this port
3	DEV_PortNotOpen_Err	The port doesn't open
4	DEV_PortClose_Err	Closing i-7565-H1/H2 error
5	DEV_Reset_Err	Resetting i-7565-H1/H2 error
6	CAN_ConfigureFail_Err	CAN hardware configure fail
7	CAN_Hardware_Err	CAN hardware Init fail
8	CAN_PortNo_Err	The CAN port of Device over range
9	CAN_FIDLength_Err	The CAN Filter-ID number exceed max number
10	CAN_DevDisconnect_Err	The connection of device is broken
11	CAN_TimeOut_Err	The configure command is timeout
12	CAN_ConFigureCmd_Err	The configure command doesn't support
13	CAN_ConFigureBusy_Err	The configure command is busy
14	CAN_RxBufEmpty	The CAN receive buffer is empty
15	CAN_TxBufFull	The CAN send buffer is full
16	CAN_EnableHWCyclicTxMsg_Err	To enable hardware cyclic fail
17	CreateRxThread_Err	Creating Rx thread error
18	RestartRxThread_Err	Restarting Rx thread error

2.2 Function Descriptions

Table 2.2

NO	Init Function
1	VCI_OpenCAN
2	VCI_CloseCAN

No	Module Configure Function
1	VCI_Set_CANFID
2	VCI_Get_CANFID
3	VCI_Clr_CANFID
4	VCI_Get_CANStatus
5	VCI_Clr_BufOverflowLED
6	VCI_Get_MODInfo
7	VCI_Rst_MOD
NO	Communication Function
1	VCI_SendCANMsg
2	VCI_RecvCANMsg
3	VCI_EnableHWCyclicTxMsg
4	VCI_DisableHWCyclicTxMsg
NO	Software Buffer Function
1	VCI_Get_RxMsgCnt
2	VCI_Get_RxMsgBufIsFull
3	VCI_Clr_RxMsgBuf
NO	Other Function
1	VCI_Get_DllVer

2.3 Init FUNCTIONS

2.3.1 VCI_OpenCAN

- **Description:**
  To enable the assigned CAN port function of I-7565-H1/H2. After the CAN port function is enabled, users can use “Communication” functions to send / receive CAN messages.

- **Syntax:**

  int VCI_OpenCAN(PVCI_CAN_PARAM pCANPARAM)

- **Parameter:**
  pCANPARAM**:**
  A structure pointer of _VCI_CAN_PARAM is used to set the CAN port communication parameters shown as below.

  ```
  typedef struct _VCI_CAN_PARAM
  {
      BYTE DevPort;
  ```

```
    BYTE DevType;
    DWORD CAN1_Baud;
    DWORD CAN2_Baud;
} _VCI_CAN_PARAM, *PVCI_CAN_PARAM;
```

DevPort**:** The virtual com port number.
DevType**:** The module type (1**:** I-7565-H1; 2**:** I-7565-H2).
CAN1_Baud**:** CAN1 port baud rate.
(0**:** Disable CAN1 port Others**:** Enable CAN1 port)
CAN2_Baud**:** CAN2 port baud rate.
(0**:** Disable CAN2 port Others**:** Enable CAN2 port)

- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.3.2 VCI_CloseCAN

- **Description:**
  To disable all CAN port function of I-7565-H1/H2. After the CAN port function is disabled, it will not interfere the communication of CAN bus network even if I-7565-H1/H2 is power on.
- **Syntax:**
  int VCI_CloseCAN(PVCI_CAN_PARAM pCANPARAM)
- **Parameter:**
  DevPort**:** The virtual com port number.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.4 Module ConFigureure FUNCTIONS

2.4.1 VCI_Set_CANFID

- **Description:**
  To set CAN Filter-ID in the assigned CAN port.
- **Syntax:**
  int VCI_Set_CANFID(BYTE DevPort, BYTE CAN_No, PVCI_CAN_FID pCANFID)
- **Parameter:**
  DevPort**:** The i-7565-H1/H2 device index.
  CAN_No **:** The assigned CAN port number.

pCANFID**:**
A structure pointer of _VCI_CAN_FilterID is used to set the CAN Filter-ID data shown as below.

```
typedef struct _VCI_CAN_FilterID
{
    WORD SSFF_Num;
    WORD GSFF_Num;
    WORD SEFF_Num;
    WORD GEFF_Num;
    WORD SSFF_FID[512];
    DWORD GSFF_FID[512];
    DWORD SEFF_FID[512];
    DWORD GEFF_FID[512];
} _VCI_CAN_FilterID, *PVCI_CAN_FID;
```

SSFF_Num**:** Single 11-bit CAN Filter-ID number
GSFF_Num**:** Group 11-bit CAN Filter-ID number
SEFF_Num**:** Single 29-bit CAN Filter-ID number
GEFF_Num**:** Group 29-bit CAN Filter-ID number
SSFF_FID[512]**:** Single 11-bit CAN Filter-ID data array
GSFF_FID[512]**:** Group 11-bit CAN Filter-ID data array

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.4.2 VCI_Get_CANFID

- **Description :**
  To get CAN Filter-ID in the assigned CAN port.
- **Syntax :**
  int VCI_Get_CANFID(BYTE DevPort, BYTE CAN_No, PVCI_CAN_FID pCANFID)
- **Parameter :**
  DevPort**:** The i-7565-H1/H2 device index.
  CAN_No**:** The assigned CAN port number.
  pCANFID**:**
  A structure pointer of _VCI_CAN_FilterID is used to receive the CAN Filter-ID data shown as below.

```
typedef struct _VCI_CAN_FilterID
{
    WORD SSFF_Num;
    WORD GSFF_Num;
    WORD SEFF_Num;
```

```
    WORD GEFF_Num;
    WORD SSFF_FID[512];
    DWORD GSFF_FID[512];
    DWORD SEFF_FID[512];
    DWORD GEFF_FID[512];
} _VCI_CAN_FilterID, *PVCI_CAN_FID;
```

SSFF_Num**:** Single 11-bit CAN Filter-ID number
GSFF_Num**:** Group 11-bit CAN Filter-ID number
SEFF_Num**:** Single 29-bit CAN Filter-ID number
GEFF_Num**:** Group 29-bit CAN Filter-ID number
SSFF_FID[512]**:** Single 11-bit CAN Filter-ID data array
GSFF_FID[512]**:** Group 11-bit CAN Filter-ID data array
SEFF_FID[512]**:** Single 29-bit CAN Filter-ID data array
GEFF_FID[512]**:** Group 29-bit CAN Filter-ID data array

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.4.3 VCI_Clr_CANFID

- **Description :**

  To clear CAN Filter-ID in the assigned CAN port.

- **Syntax :**

  int VCI_Clr_CANFID(BYTE DevPort, BYTE CAN_No)

- **Parameter :**

  DevPort**:** The i-7565-H1/H2 device index.

  CAN_No**:** The assigned CAN port number.

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.4.4 VCI_Get_CANStatus

- **Description :**
  To get the assigned CAN port status

- **Syntax :**

  int VCI_Get_CANStatus(BYTE DevPort, BYTE CAN_No,
  PVCI_CAN_STATUS pCANStatus)

- **Parameter :**

DevPort**:** The i-7565-H1/H2 device index.

CAN_No**:** The assigned CAN port number.

pCANStatus:

A structure pointer of _VCI_CAN_STATUS is used to receive the CAN port status shown as below.

```
typedef struct _VCI_CAN_STATUS
{
   DWORD CurCANBaud;
   BYTE CANReg;
   BYTE CANTxErrCnt;
   BYTE CANRxErrCnt;
   BYTE MODState;
   DWORD Reserved;
} _VCI_CAN_STATUS, *PVCI_CAN_STATUS;
```

CurCANBaud**:** Return the assigned CAN port baud rate.

CANReg**:** Return the assigned CAN port register value.

CANTxErrCnt **:** Return the assigned CAN port Tx error count.

CANRxErrCnt **:** Return the assigned CAN port Rx error count.

MODState **:** Return the module state.

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.4.5 VCI_Clr_BufOverflowLED

- **Description :**

  To clear buffer overflow ERR LED state (flash per second) in the assigned CAN port.

- **Syntax :**

  int VCI_Clr_BufOverflowLED(BYTE DevPort, BYTE CAN_No)

- **Parameter :**

  DevPort**:** The i-7565-H1/H2 device index.

  CAN_No**:** The assigned CAN port number.

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.4.6 VCI_Get_MODInfo

- **Description :**
  To get the information of module.
- **Syntax :**
  int VCI_Get_MODInfo(BYTE DevPort, PVCI_MOD_INFO pMODInfo)
- **Parameter :**
  DevPort**:** The i-7565-H1/H2 device index.
  pMODInfo:
  A structure pointer of _VCI_MODULE_INFO is used to receive the module information shown as below.

```
typedef struct _VCI_MODULE_INFO
{
    char Mod_ID[12];
    char FW_Ver[12];
} _VCI_MODULE_INFO, *PVCI_MOD_INFO;
```

  Mod_ID[12]**:** Return the module name string.
  FW_Ver[12]**:** Return the module firmware version string.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.4.7 VCO_Rst_MOD

- **Description :**
  To reset module.
- **Syntax :**
  int VCI_Rst_MOD(PVCI_CAN_PARAM pCANPARAM)
- **Parameter :**
  None.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.5 Communication FUNCTIONS

2.5.1 VCI_SendCANMsg

- **Description :**
  To send CAN messages in the assigned CAN port.
- **Syntax :**
  int VCI_SendCANMsg(BYTE DevPort, BYTE CAN_No,
  PVCI_CAN_MSG pCANMsg)
- **Parameter :**
  DevPort**:** The i-7565-H1/H2 device index.
  CAN_No**:** The assigned CAN port number.
  pCANMsg:
  A structure pointer of _VCI_CAN_MSG is used to set the CAN message parameters shown as below.

```
typedef struct _VCI_CAN_MSG
{
    BYTE Mode;
    BYTE RTR;
    BYTE DLC;
    BYTE Reserved;
    DWORD ID;
    DWORD TimeL;
    DWORD TimeH;
    BYTE Data[8];
} _VCI_CAN_MSG, *PVCI_CAN_MSG;
```

  Mode**:** CAN message Mode (0**:** 11-bit**;** 1**:** 29-bit).
  RTR**:** CAN message RTR (0**:** No RTR**;** 1**:** RTR).
  DLC**:** CAN message Data Length (0~8).
  ID**:** CAN message ID.
  TimeL**:** CAN message Time-Stamp (Lo-DWORD).
  TimeH**:** CAN message Time-Stamp (Hi-DWORD).
  Data[8]**:** CAN message Data Array.

- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.5.2 VCI_RecvCANMsg

- **Description :**
  To receive CAN messages that are saved in software buffer in the assigned CAN port.

- **Syntax :**

  int VCI_RecvCANMsg(BYTE DevPort, BYTE CAN_No,
  PVCI_CAN_MSG pCANMsg)

- **Parameter :**

  DevPort**:** The i-7565-H1/H2 device index.

  CAN_No**:** The assigned CAN port number.
  pCANMsg:
  A structure pointer of _VCI_CAN_MSG is used to receive the CAN message shown as below.

```
typedef struct _VCI_CAN_MSG
{
    BYTE Mode;
    BYTE RTR;
    BYTE DLC;
    BYTE Reserved;
    DWORD ID;
    DWORD TimeL;
    DWORD TimeH;
    BYTE Data[8];
} _VCI_CAN_MSG, *PVCI_CAN_MSG;
```

  Mode**:** CAN message Mode (0**:** 11-bit**;** 1**:** 29-bit).
  RTR**:** CAN message RTR (0**:** No RTR**;** 1**:** RTR).
  DLC**:** CAN message Data Length (0~8).
  ID**:** CAN message ID.
  TimeL**:** CAN message Time-Stamp (Lo-DWORD).
  TimeH**:** CAN message Time-Stamp (Hi-DWORD).
  Data[8]**:** CAN message Data Array.

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.5.3 VCI_EnableHWCyclicTxMsg

- **Description :**
  To send CAN messages in the assigned CAN port by using module hardware timer and it will be more precise than PC software timer.

- **Syntax :**

  int VCI_EnableHWCyclicTxMsg(BYTE DevPort, BYTE CAN_No,
  PVCI_CAN_MSG pCANMsg, DWORD TimePeriod, DWORD
  TransmitTimes)

- **Parameter :**

  DevPort**:** The i-7565-H1/H2 device index.

  CAN_No**:** The assigned CAN port number.
  pCANMsg:
  A structure pointer of _VCI_CAN_MSG is used to set the CAN message parameters shown as below.

```
typedef struct _VCI_CAN_MSG
{
    BYTE Mode;
    BYTE RTR;
    BYTE DLC;
    BYTE Reserved;
    DWORD ID;
    DWORD TimeL;
    DWORD TimeH;
    BYTE Data[8];
} _VCI_CAN_MSG, *PVCI_CAN_MSG;
```

  Mode**:** CAN message Mode (0**:** 11-bit**;** 1**:** 29-bit).
  RTR**:** CAN message RTR (0**:** No RTR**;** 1**:** RTR).
  DLC**:** CAN message Data Length (0~8).
  ID**:** CAN message ID.
  TimeL**:** CAN message Time-Stamp (Lo-DWORD).
  TimeH**:** CAN message Time-Stamp (Hi-DWORD).
  Data[8]**:** CAN message Data Array.

  TimePeriod**:** The time period of module hardware timer for sending CAN message. If the value is zero, this function doesn't work.

  TransmitTimes**:** The count for sending CAN message. If the value is zero, it means that CAN message will be sent periodically and permanently.

- **Return:**

  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.5.4 VCI_DisableHWCyclicTxMsg

- **Description :**
  To stop sending CAN messages by module hardware timer.
- **Syntax :**

  int VCI_DisableHWCyclicTxMsg(PVCI_CAN_PARAM pCANPARAM);

- **Parameter :**
  pCANPARAM**:**
  A structure pointer of _VCI_CAN_PARAM is used to set the CAN port communication parameters shown as below.

```
typedef struct _VCI_CAN_PARAM
{
    BYTE DevPort;
    BYTE DevType;
    DWORD CAN1_Baud;
    DWORD CAN2_Baud;
} _VCI_CAN_PARAM, *PVCI_CAN_PARAM;
```

  DevPort**:** The virtual com port number
  DevType**:** The module type (1**:** I-7565-H1; 2**:** I-7565-H2)
  CAN1_Baud**:** CAN1 port baud rate
  (0 **:** Disable CAN1 port Others**:** Enable CAN1 port)
  CAN2_Baud**:** CAN2 port baud rate
  (0 **:** Disable CAN2 port Others**:** Enable CAN2 port)

- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.6 Software Buffer FUNCTIONS

2.6.1 VCI_Get_RxMsgCnt

- **Description :**
  To get the count of these received CAN messages saved in software buffer that are not received by users' program in the assigned CAN port.
- **Syntax :**
  int VCI_Get_RxMsgCnt(BYTE DevPort, BYTE CAN_No, DWORD* RxMsgCnt)
- **Parameter :**
  DevPort**:** The i-7565-H1/H2 device index.
  CAN_No**:** The assigned CAN port number.
  RxMsgCnt**:** The pointer is used to receive the CAN message count saved in software buffer.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.6.2 VCI_Get_RxMsgBufIsFull

- **Description :**
  To get the software buffer state whether it is full or not in the assigned CAN port. If the software buffer is full, it means that some CAN messages are lost.
- **Syntax :**
  int VCI_Get_RxMsgBufIsFull(BYTE DevPort, BYTE CAN_No, BYTE* Flag)
- **Parameter :**
  DevPort**:** The i-7565-H1/H2 device index.
  CAN_No**:** The assigned CAN port number.
  Flag**:** The pointer is used to receive the state of software buffer. If the value is zero, the software buffer is not full. If not, it means that the software buffer is full.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.6.3 VCI_Clr_RxMsgBuf

- **Description :**
  To clear the software buffer in the assigned CAN port.
- **Syntax :**
  int VCI_Clr_RxMsgBuf(BYTE DevPort, BYTE CAN_No)
- **Parameter :**
  DevPort**:** The i-7565-H1/H2 device index.
  CAN_No**:** The assigned CAN port number.
- **Return:**
  Return 0 means success, others means failure (Please refer to "Section 2.1 Error Code").

2.7 Other FUNCTIONS

2.7.1 VCI_Get_Library_Version

- **Description :**
  To get the version of VCI_CAN library.
- **Syntax :**
  char * VCI_Get_Library_Version (void)
- **Parameter :**
  None.
- **Return:**
  Return the VCI_CAN library version.
  .

3. i-7565-H1/H2 Demo Programs For Linux

All function of demo programs will not work normally if i-7565-H1/H2 linux driver would not be installed correctly.

Table 3.1

Directory Path	File Name	Description
Include	i7565H1H2.h	The header of i-7565-H1/H2 library.
lib	libI7565H1H2.a	The i-7565-H1/H2 library for LinPAC-8x81(or x86 Linux PC).
	libI7565H1H2_arm.a	The i-7565-H1/H2 library for LinPAC-8x41.
doc	i7565-Linux-Manual.pdf	The linux manual for i-7565-H1/H2.
examples	I7565H1H2.c	The i-7565-H1/H2 demo source code.
	i7565H1H2	A execution for LinPAC-8x81(or x86 Linux PC).
	i7565H1H2_arm	A execution for LinPAC-8x41.

3.1 Demo code “i7565H1H2”

This i-7565-H1/H2 demo program had provided below capability. Please follow below step to operate i-7565-H1 module in linux system.

Step 1: To choose the device file of i-7565 module (user could refer to page 3 to check the device file in linux system). Please refer to figure 3-1.

Step 2: To choose the device type of i-7565 module. Please refer to figure 3-1.

Step 3: To choose the baud rate of i-7565 CAN port. Please refer to figure 3-1

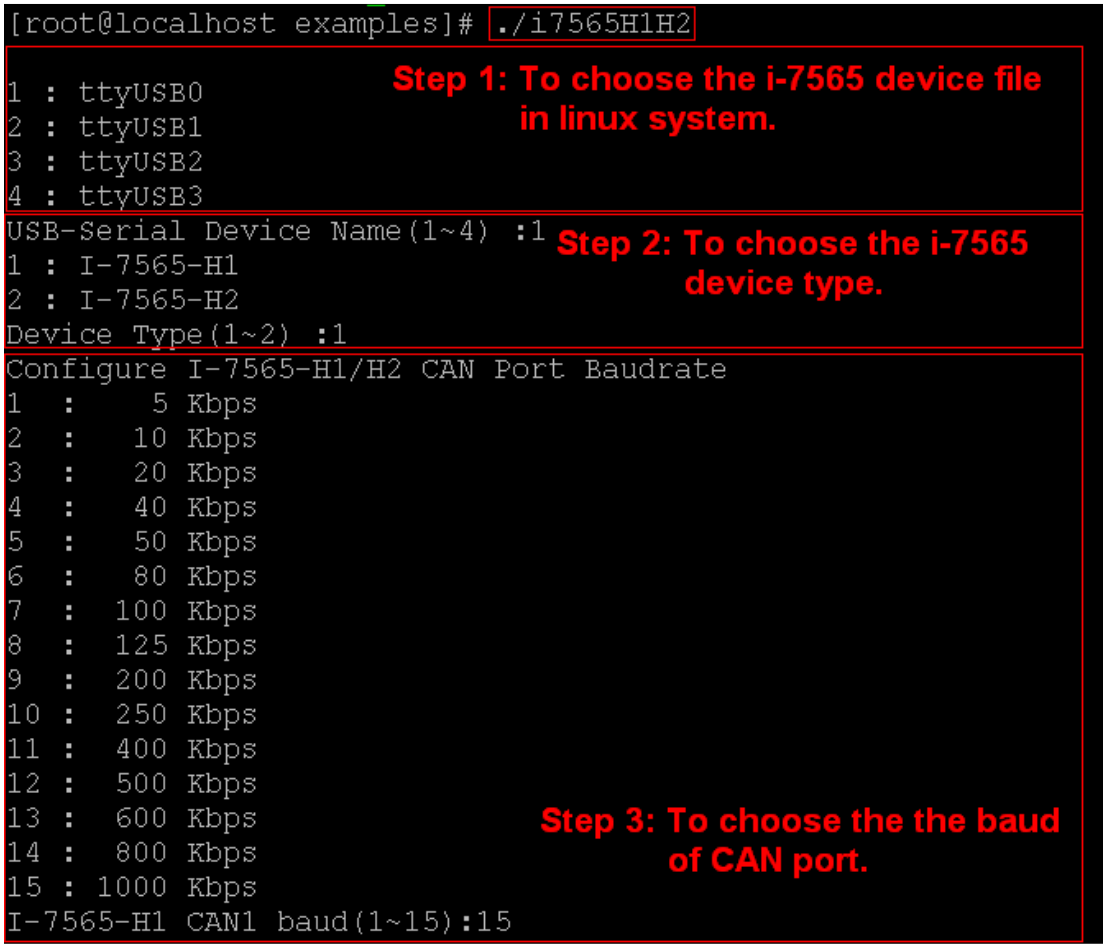


Figure 3-1

Step 4: After user initial i-7565-H1 module well, the demo would show all capability. Please refer to figure 3-2.

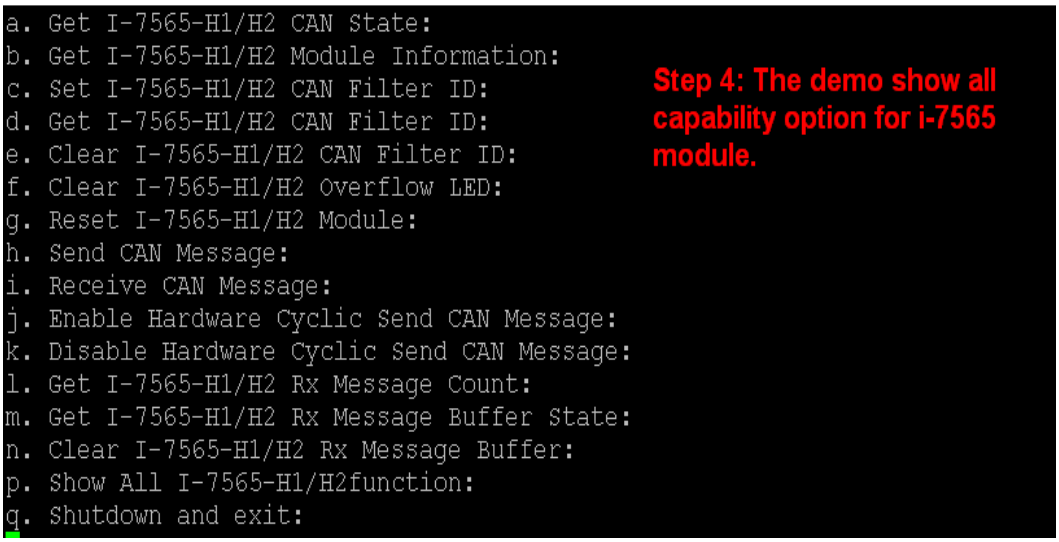


Figure 3-2

Step 5: To choose option ‘a’, ‘b’ to get the information of i-7565-H1 module. Please refer to figure 3-3.

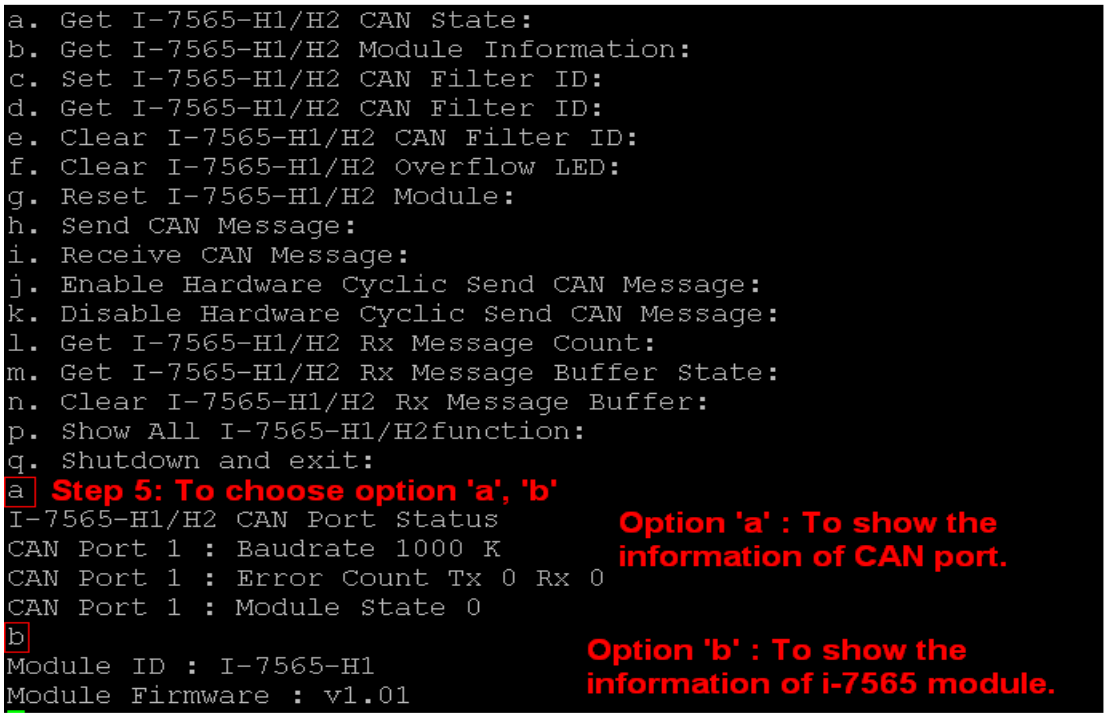


Figure 3-3

Step 6: To choose option ‘c’, ‘d’ and ‘e’ to configure the filter ID of i-7565-H1 module. Please refer to figure 3-4, 3-5.

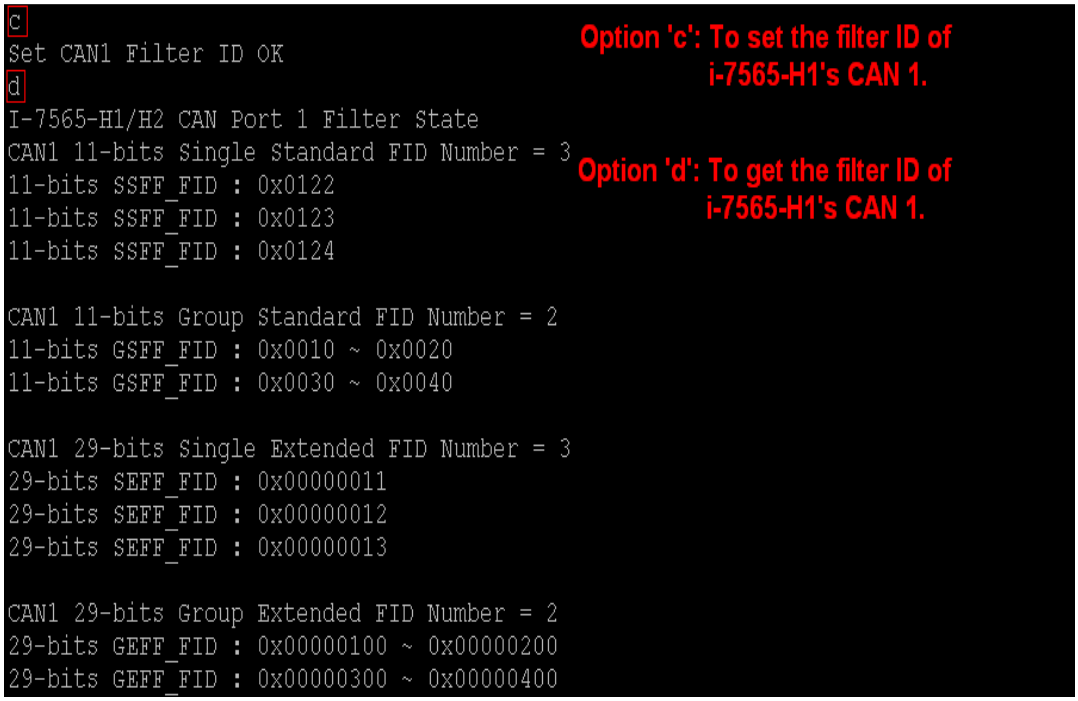


Figure 3-4

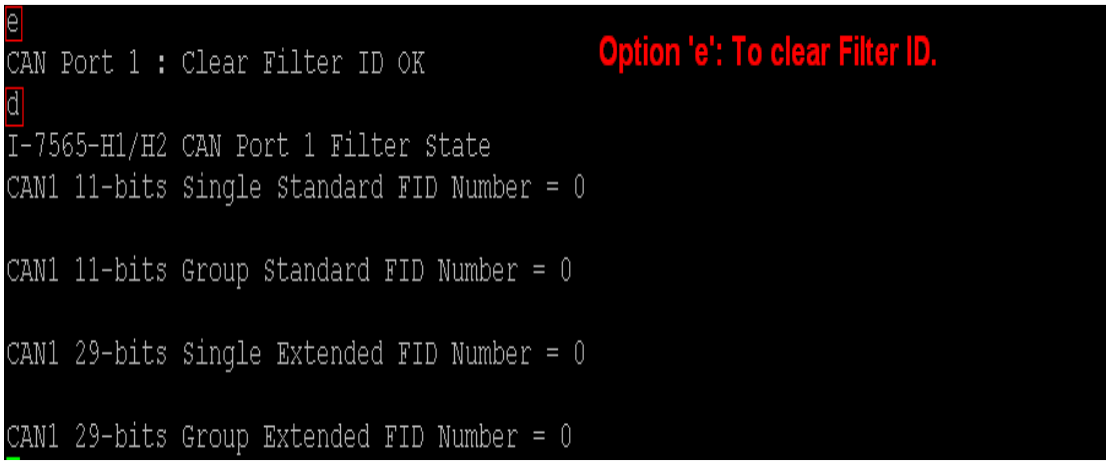
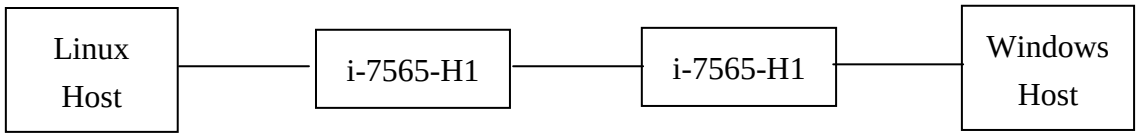


Figure 3-5

Step 7: Before choosing the option, user should build the test environment first. Please refer to below test environment.



To choose option ‘h’ to send a CAN message to another i-7565-H1 module that installing in Windows system. Please refer to figure 3-6, 3-7(Windows host use i-7565 utility to get CAN message).

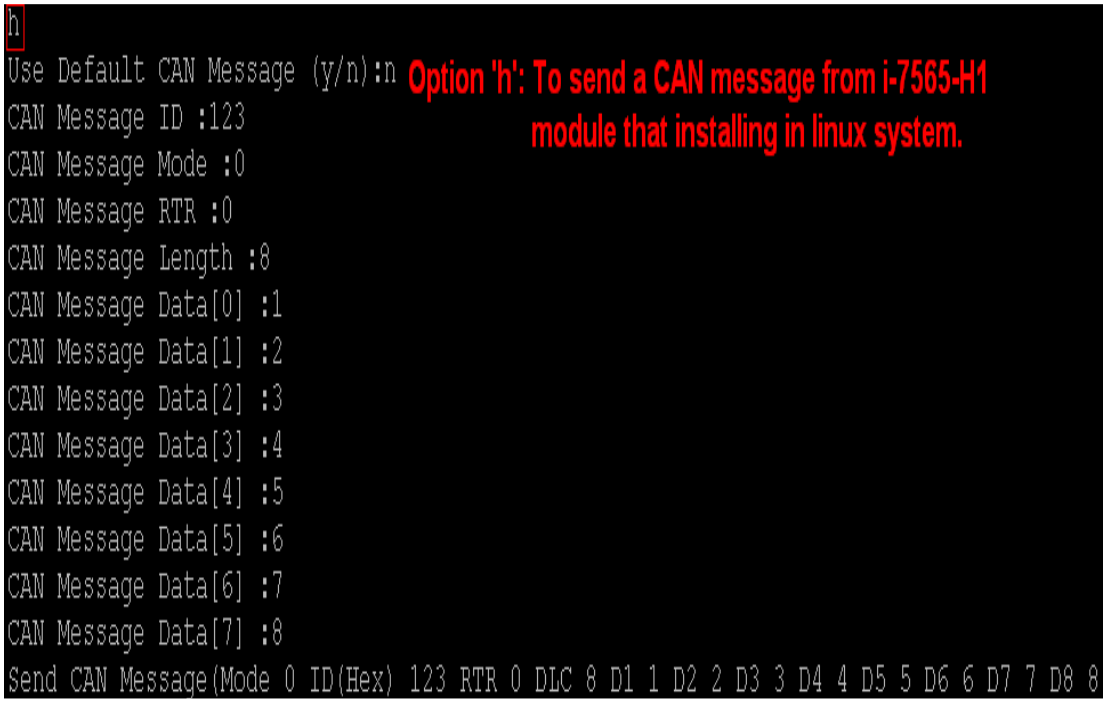


Figure 3-6

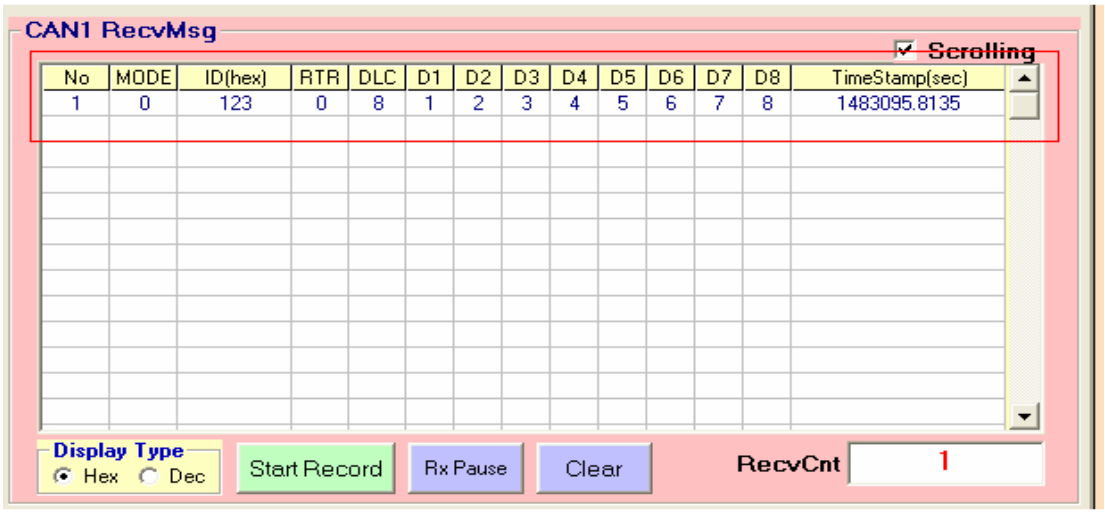
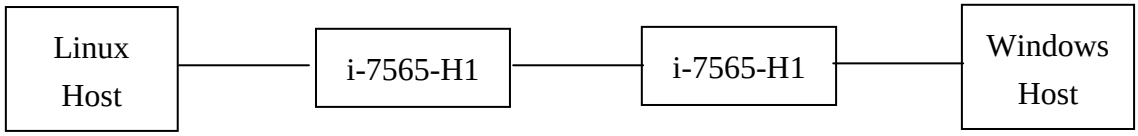


Figure 3-7

Step 8: Before choosing the option, user should build the test environment first. Please refer to below test environment.



To choose option ‘i’ to receive a CAN message from i-7565-H1 module that installing in Windows system. Please refer to figure 3-8(Windows host use i-7565 utility to send CAN message “Mode 0 ID(Hex) 110 RTR 0 DLC 8 D1 1 D2 2 D3 3 D4 4 D5 5 D6 6 D7 7 D8 8”), 3-9

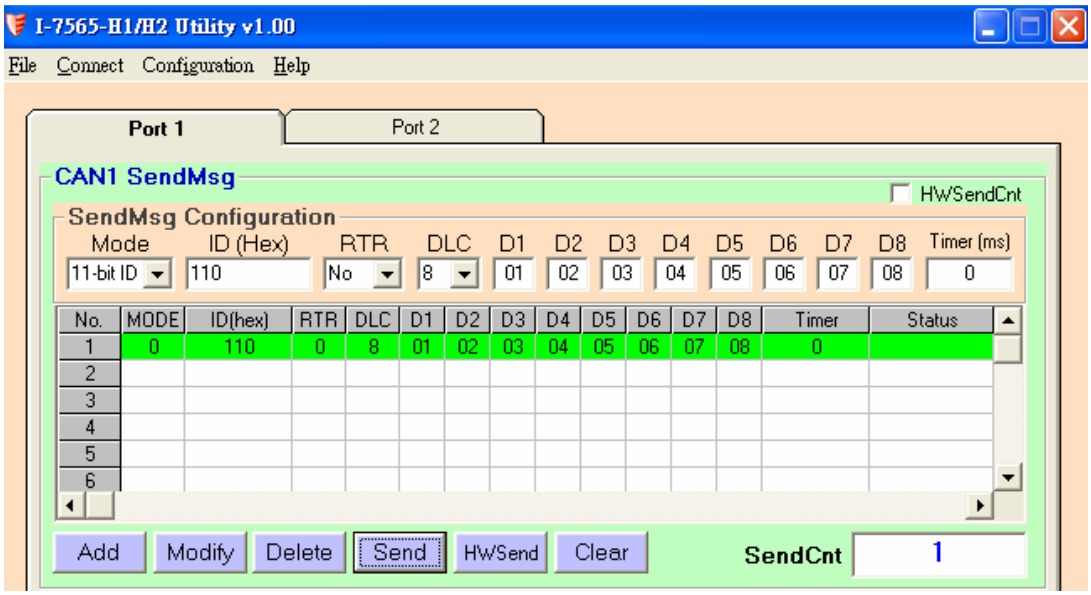
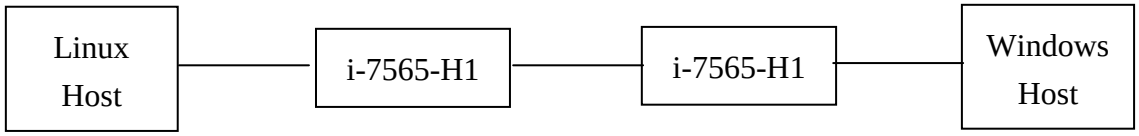


Figure 3-8

Figure 3-9

Step 9: Before choosing the option, user should build the test environment first. Please refer to below test environment.



To choose option ‘j’ to enable hardware timer to send CAN message. Please refer to figure 3-10, 3-11.

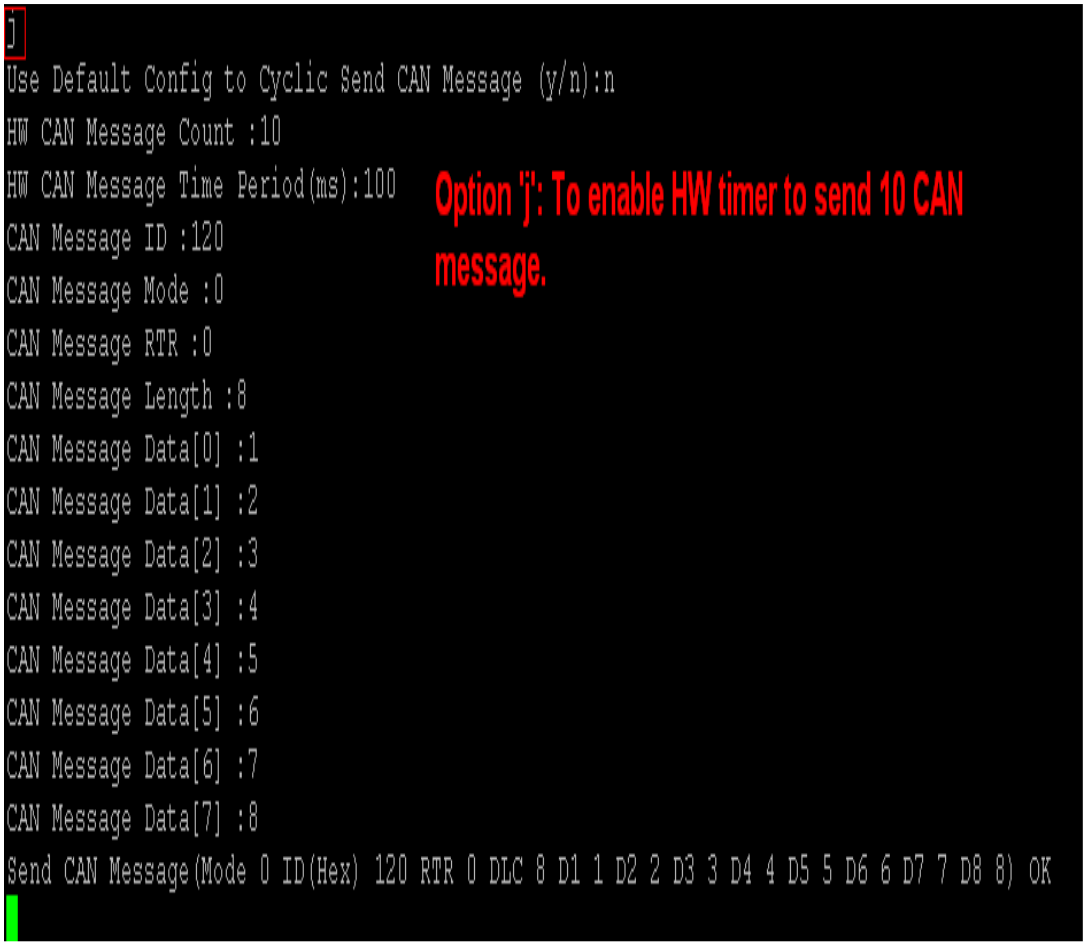


Figure 3-10

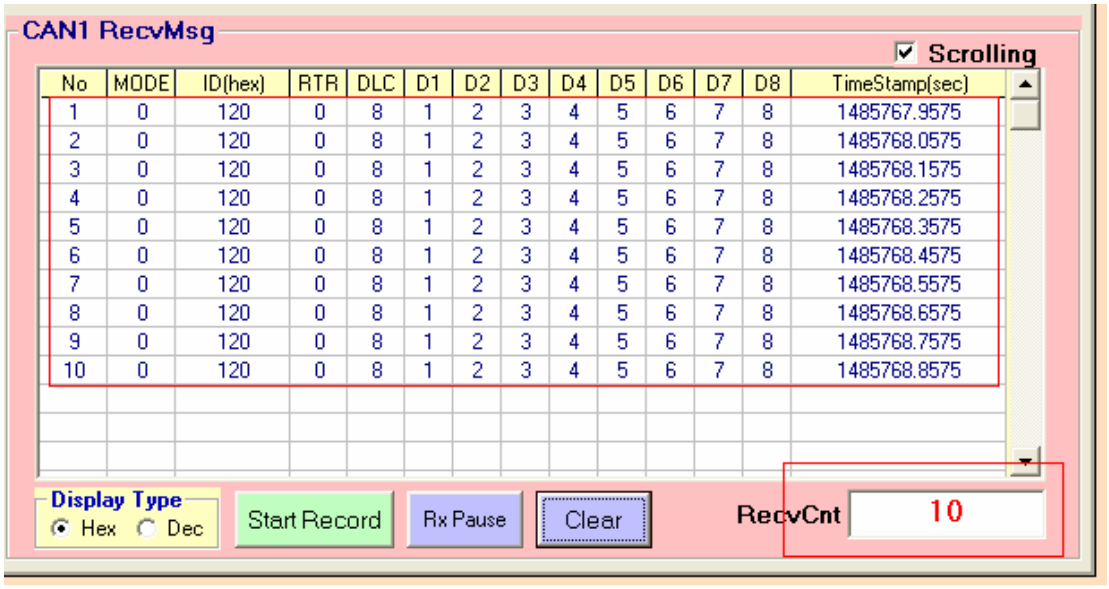


Figure 3-11

Step 10: To choose option ‘q’ to finish demo.