I-7565-H1 / I-7565-H2
High Speed 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 speed 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 structure for these two USB/CAN modules **:**

(1) **I-7565-H1:** High Speed intelligent USB to 1- port CAN bus Converter.
(2) **I-7565-H2:** High Speed intelligent USB to 2- port CAN bus Converter.

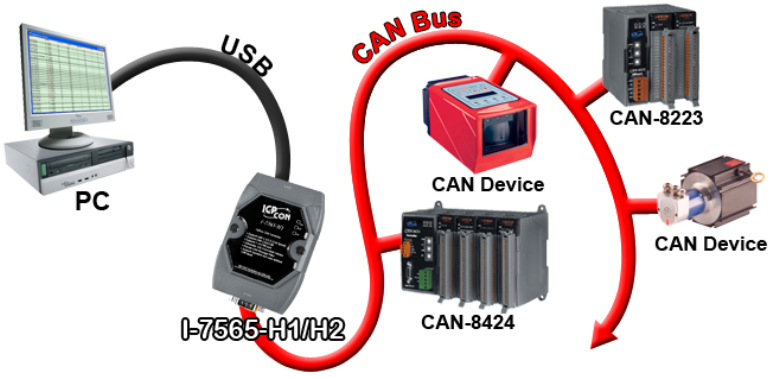


Figure 1-1**:** Application of I-7565-H1/H2

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
- 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 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 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 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

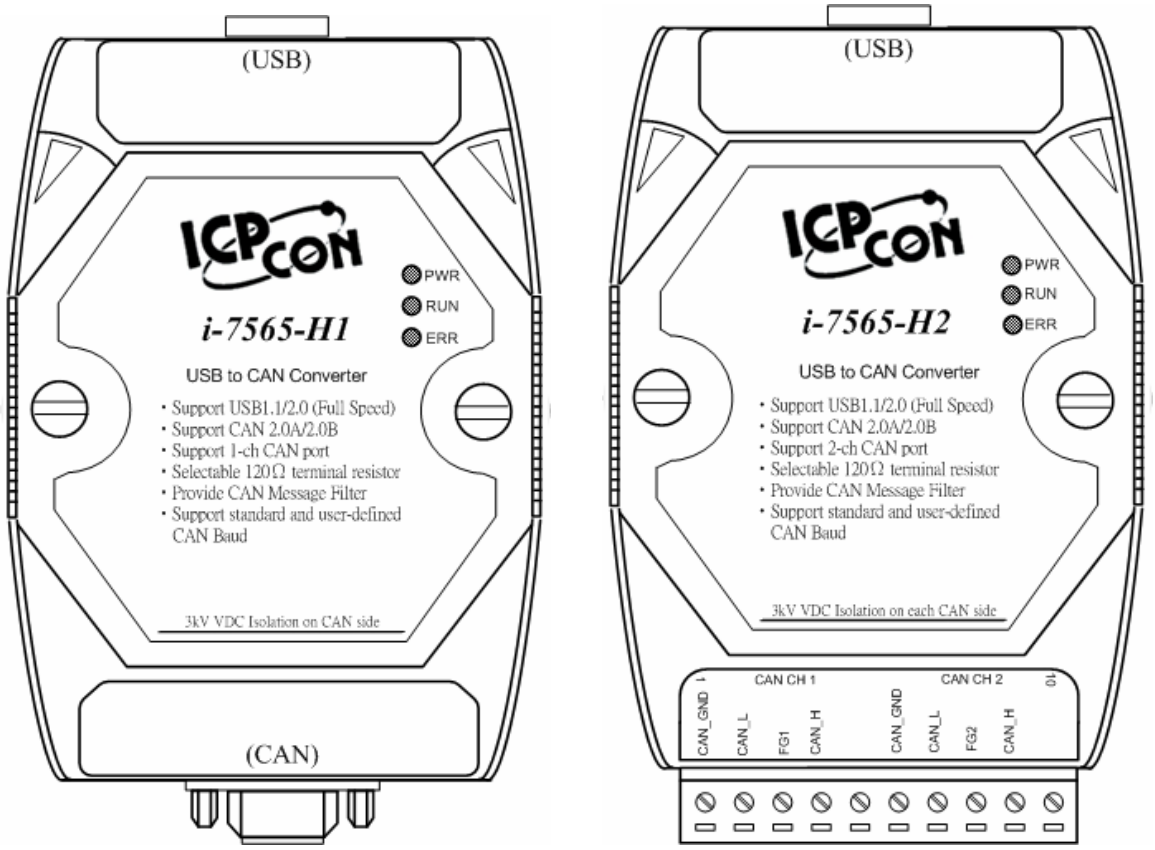


Figure 2-1: Hardware externals of I-7565-H1/H2

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.

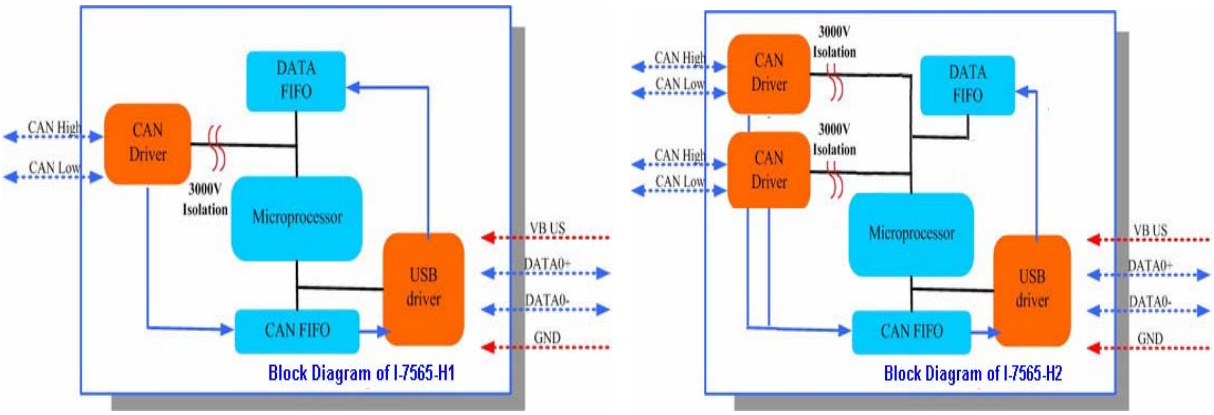
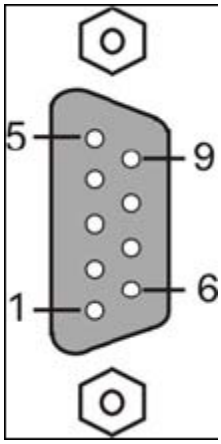


Figure 2-2: Block diagram of I-7565-H1 / I-7565-H2

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	



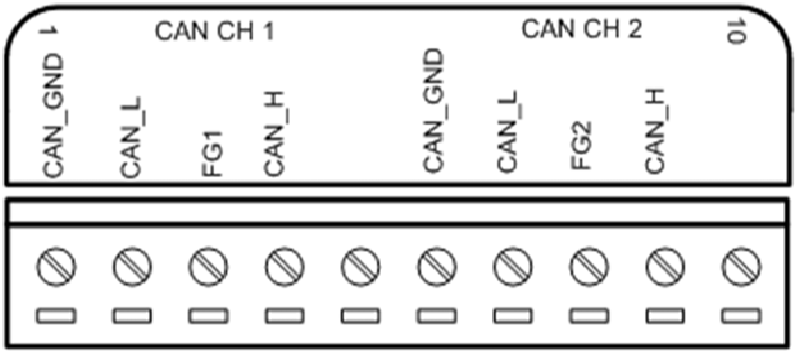


Figure 2-3: Pin Assignment on I-7565-H2

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.

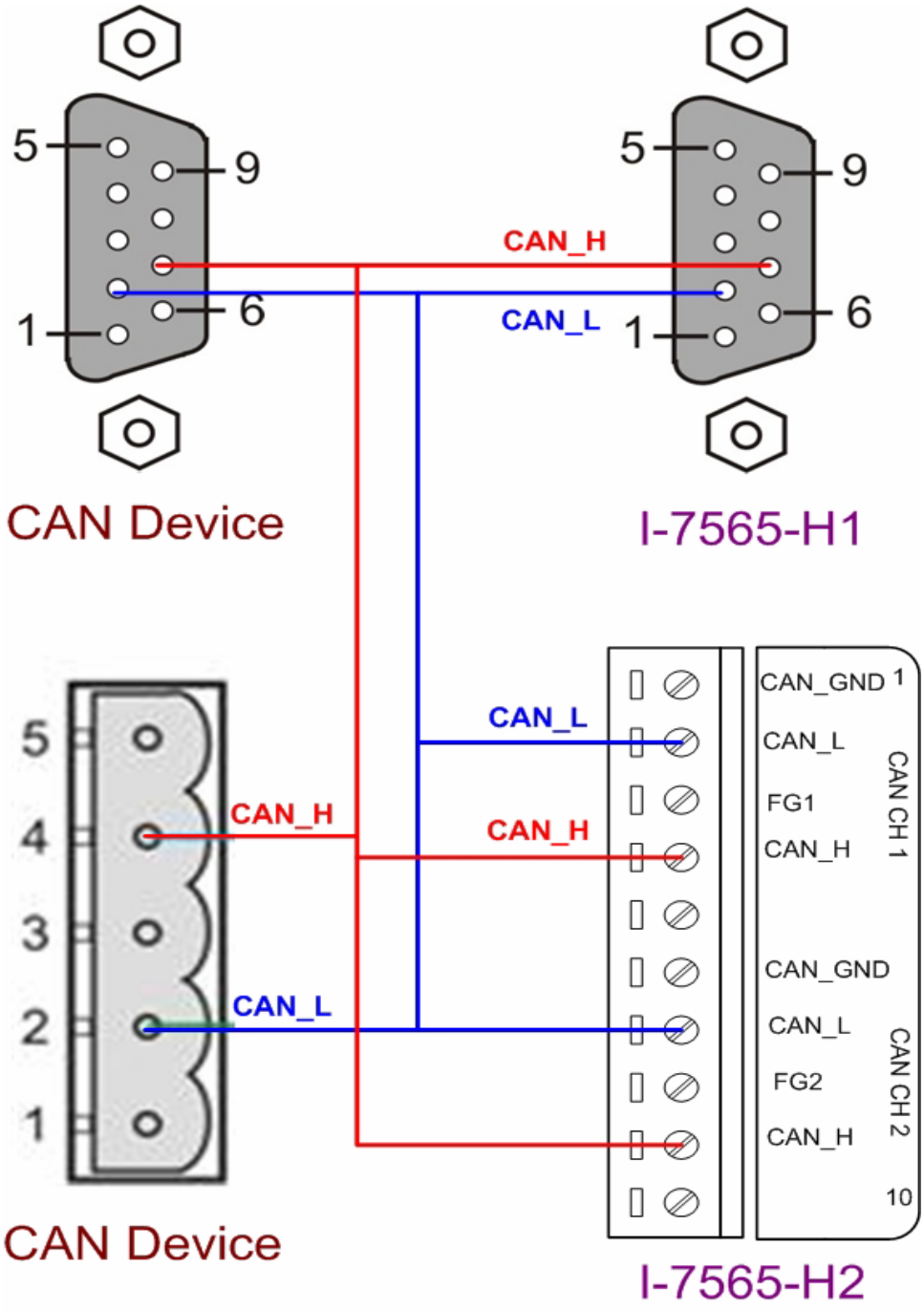


Figure 2-4: CAN Hardware Wire Connection

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.

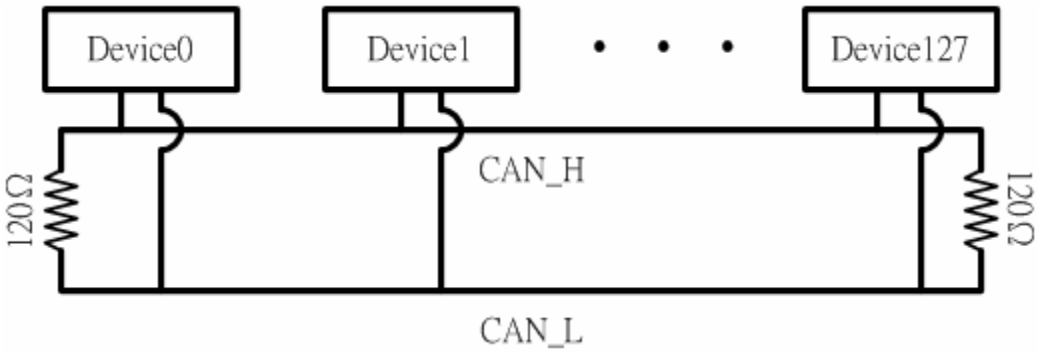


Figure 2-6: Terminal Resistor

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.

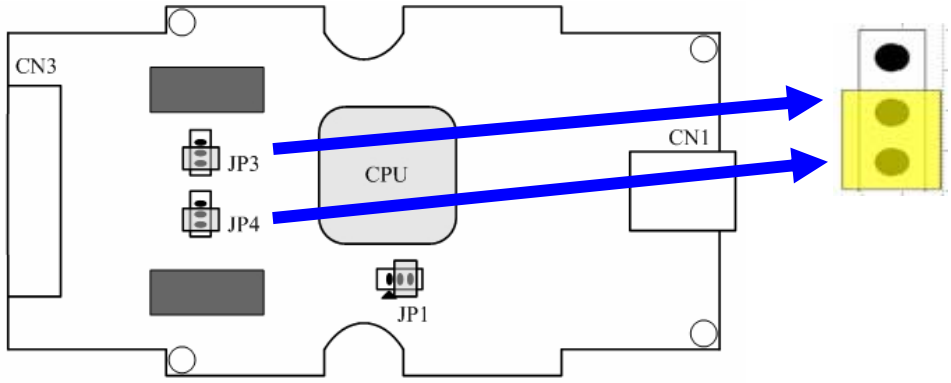
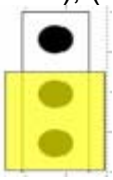


Figure 2-7: Terminal Resistor Jumper

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



Disable, (Position: 2-3)

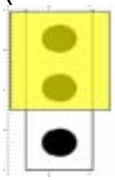


Figure 2-8: JP3/JP4 Jumper Position

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.

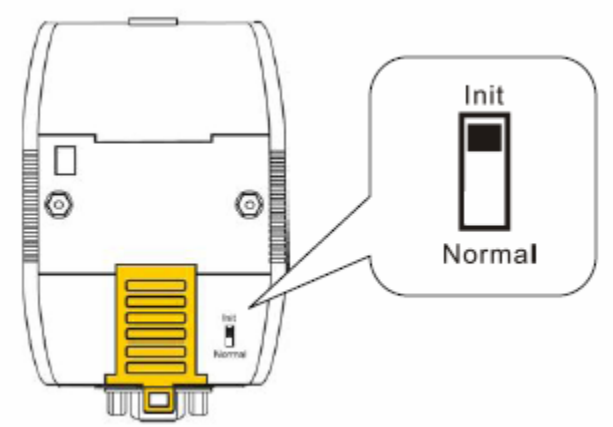


Figure 2-9: Init Position of Dip-Switch

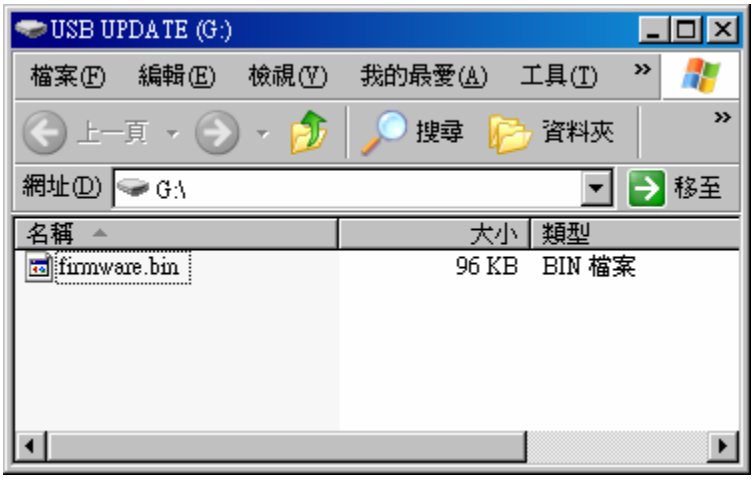


Figure 2-10: USB Mass Storage Device

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.

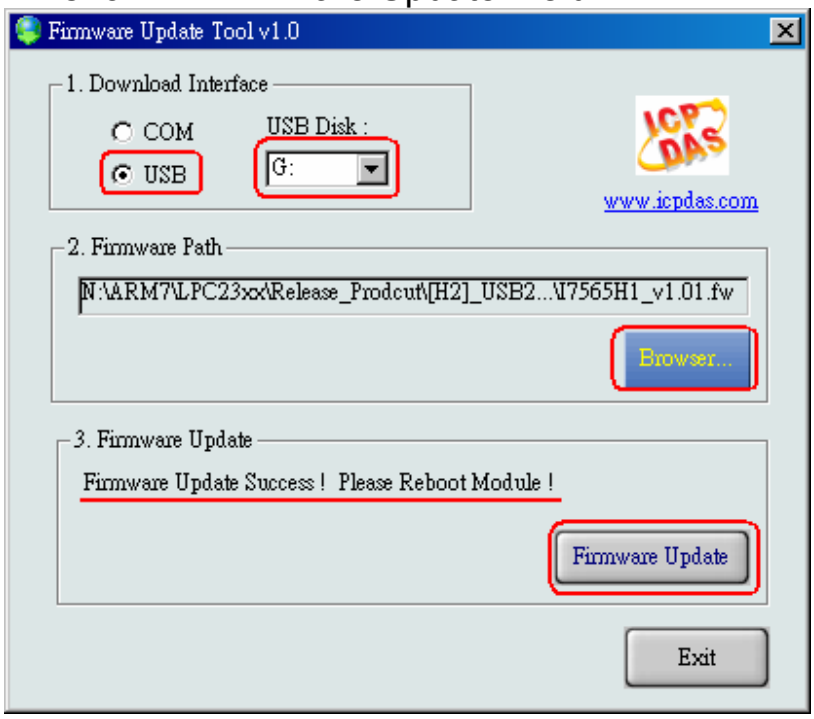


Figure 2-11: Normal Position of Dip-Switch

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.

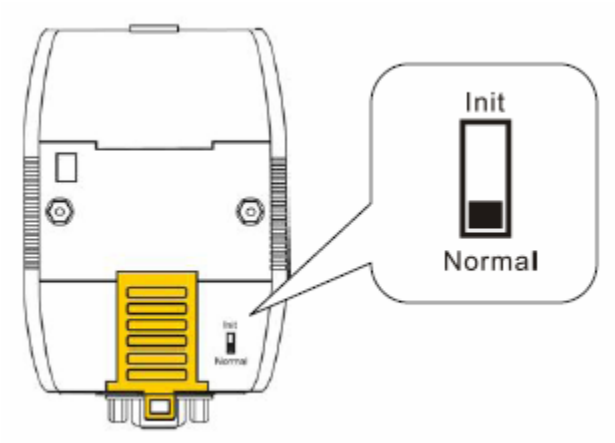


Figure 2-12: Normal Position of Dip-Switch

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 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:

[Step - 1]

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 3-1.

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

[Step - 2]

Please select "install from a list or specific location (Advanced)" option and click "Next" button like Figure 3-2.

Figure 3-2: New Hardware Wizard (2)

[Step - 3]

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 and then click “Next” button like Figure 3-3.

Figure 3-3: New Hardware Wizard (3)

[Step - 4]

Please click “Continue Anyway” button like Figure 3-4 .

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

[Step - 5]

Please click “Finish” button to complete I-7565-H1/H2 device driver installation like Figure 3-5.

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

3.2 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 3-6.

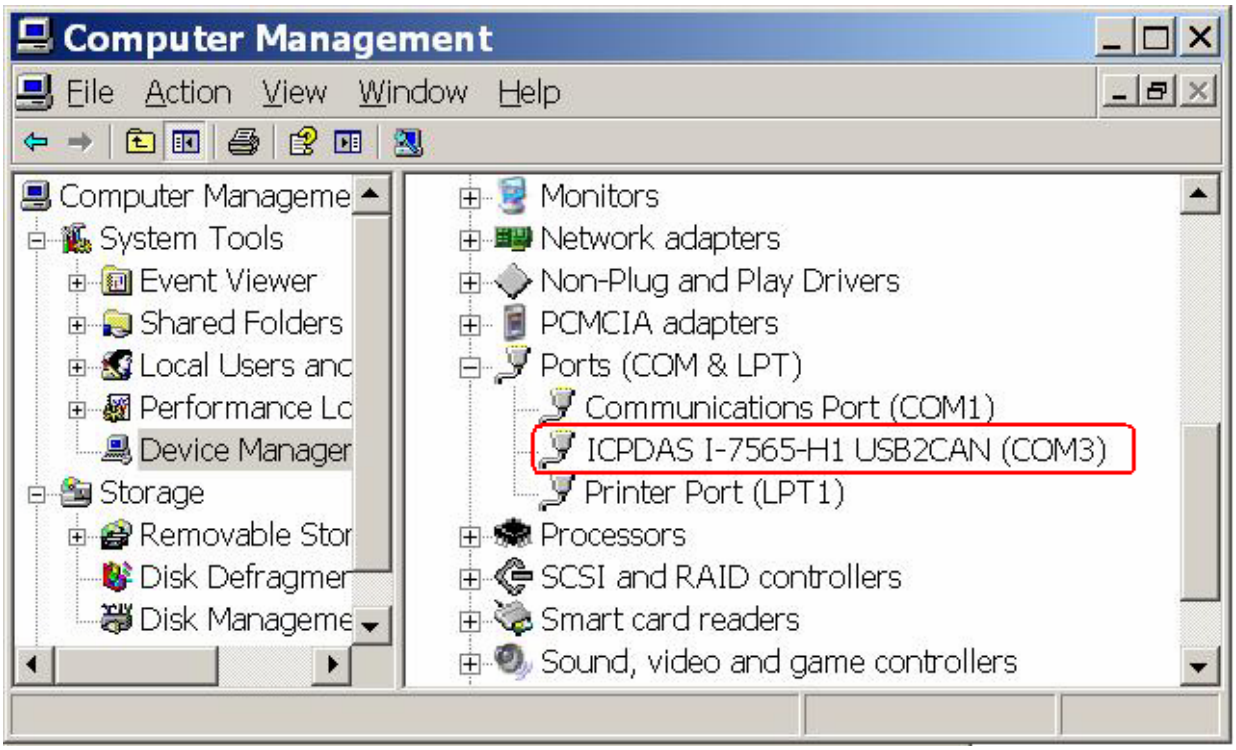


Figure 3-6: Virtual COM Port Number

3.3 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 3-7.

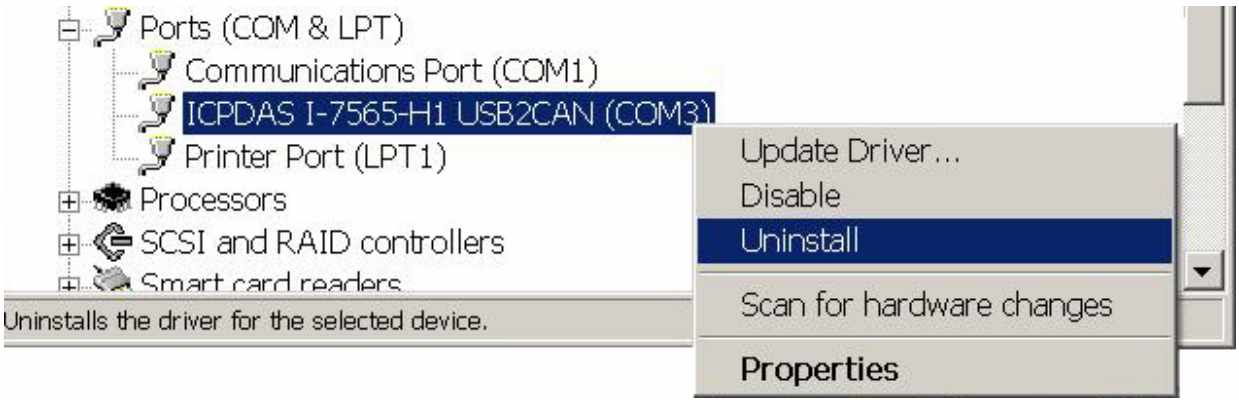


Figure 3-7**:** Uninstall I-7565-H1/H2 Driver (1)

[Step - 2]

Click "**OK**" button to complete I-7565-H1/H2 device driver un-installation like Figure 3-8. After that, the "ICPDAS I-7565-H1 USB2CAN" or "ICPDAS I-7565-H2 USB2CAN" device listing will disappear on **Ports (COM & LPT)** item.

Figure 3-8**:** 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)

Figure 4-1**:** Connection Screen 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)
[4] **CAN Baud Rate** **:** CAN bus Baud Rate Setting.

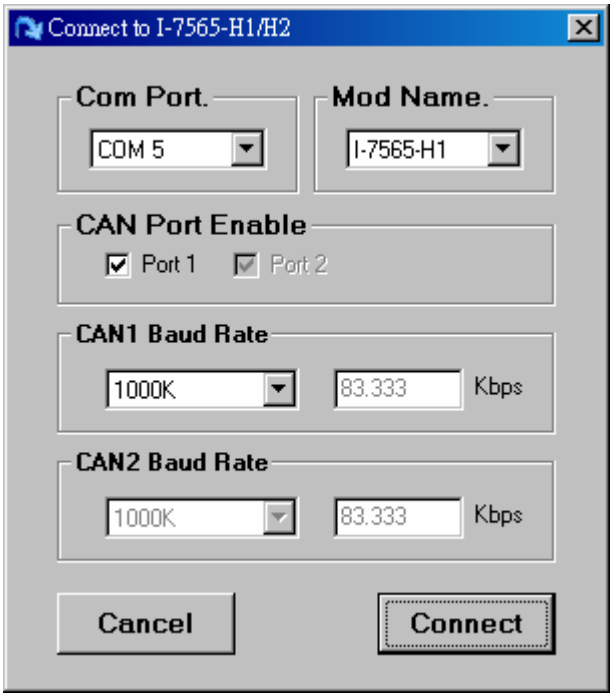


Figure 4-2: Connection Screen of I-7565-H1/H2 Utility

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.

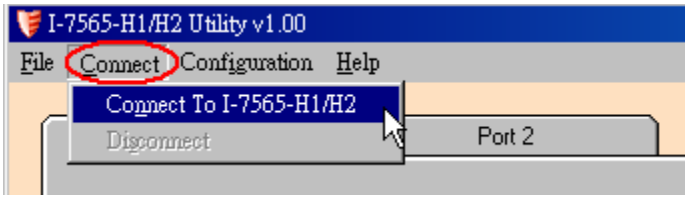


Figure 4-3: "Connect To I-7565-H1/H2" function

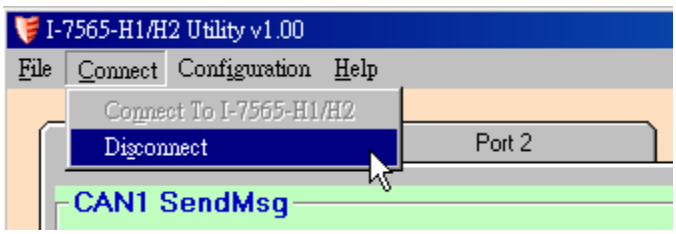


Figure 4-4: "Disconnect" function

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.

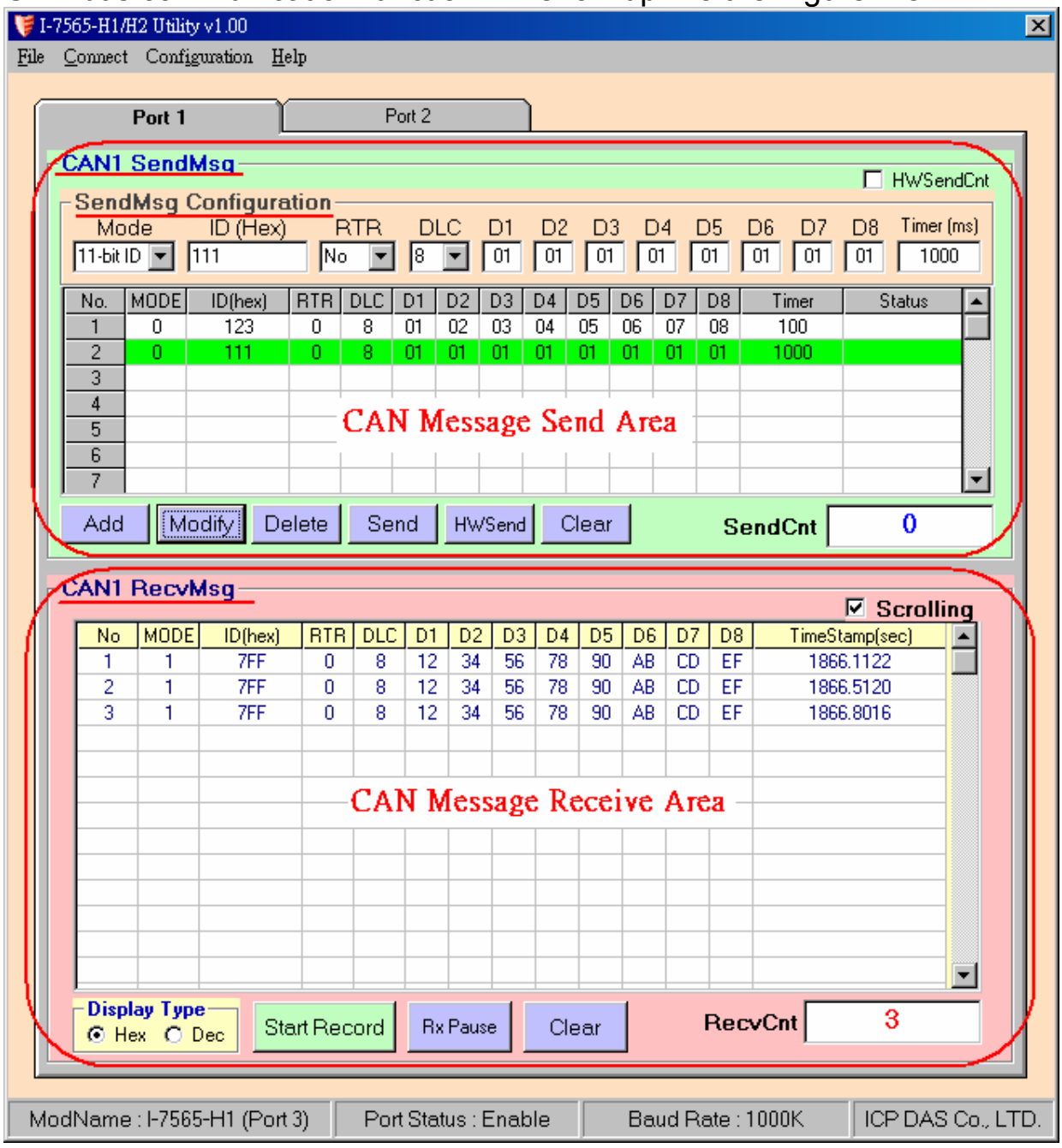


Figure 4-5**:** Communication Screen of I-7565-H1/H2 Utility

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.

[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> "**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.

<6> "**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 like Figure 4-6.

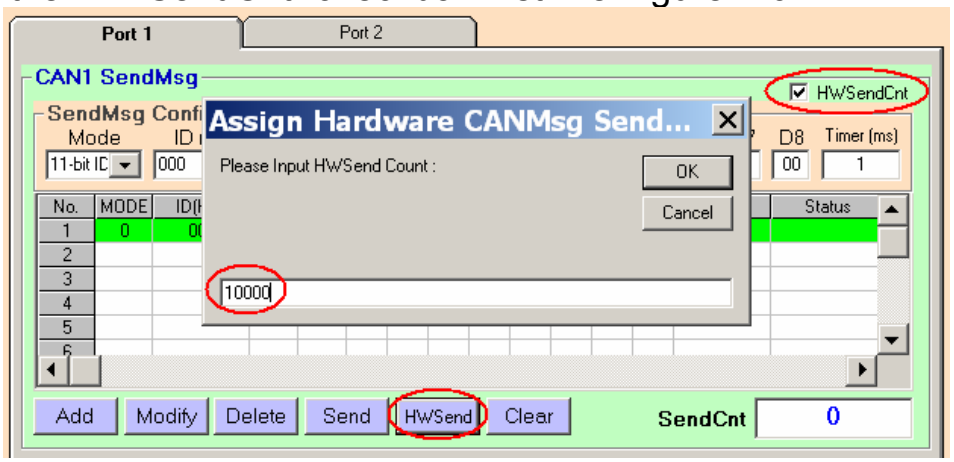


Figure 4-6**:** Send CAN Message by Hardware Timer

<7> "**Clear**" button **:**

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

<8> "**SendCnt**" field **:**

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

[2] For "CAN1/2 RecvMsg" block **:**

<1> "**Display Type**" option **:**

It is used to show the received CAN message data with "Decimal "or "Hex" format in "CAN Message Receive Area".

<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".

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.

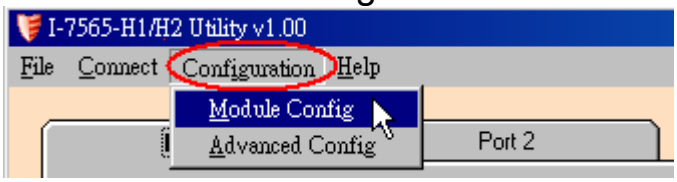


Figure 4-7: Configuration Function of I-7565-H1/H2 Utility

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.

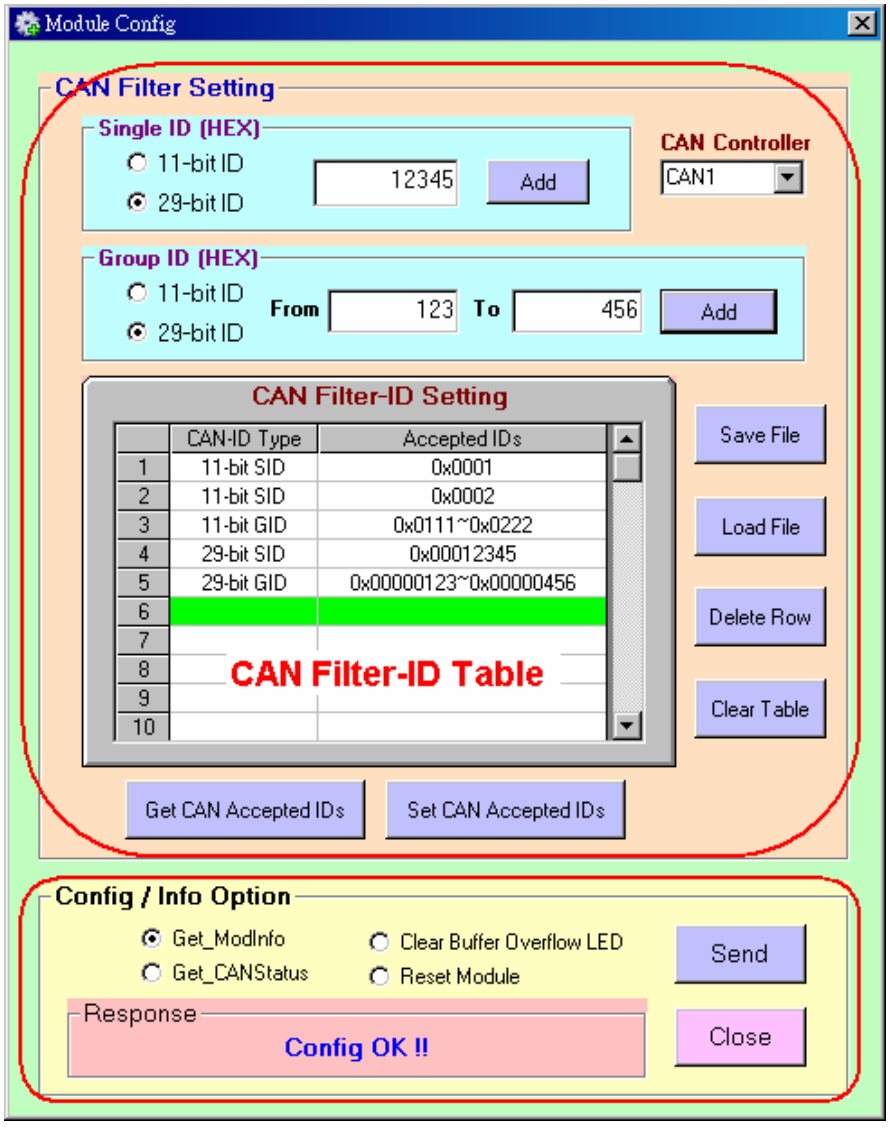


Figure 4-8**:** Module Config Screen of I-7565-H1/H2 Utility

[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” and “Firmware Version” like Figure 4-9.

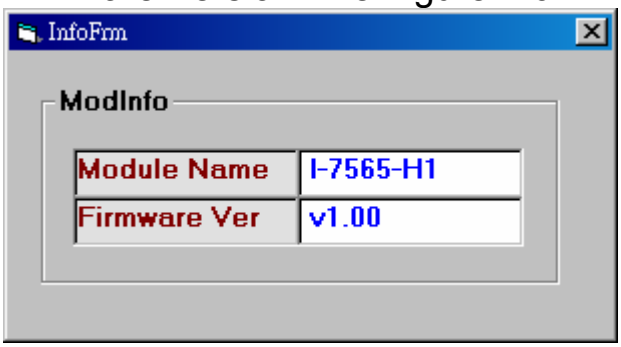


Figure 4-9**:** Module Info

<2> “**Get_CANStatus**” option **:**

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

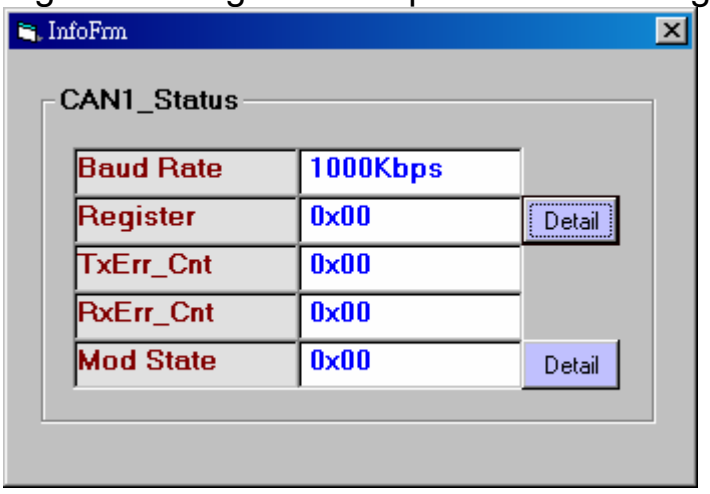


Figure 4-10**:** CAN Status

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.

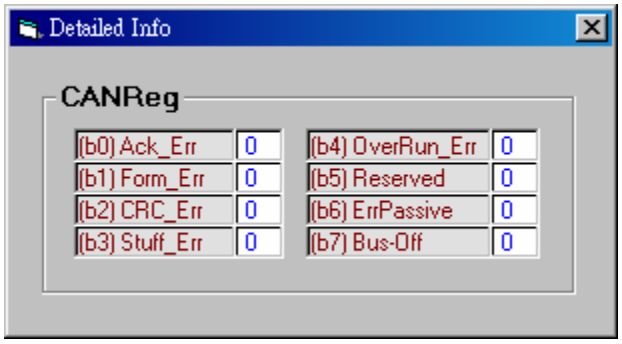


Figure 4-11**:** CAN Register Detailed Information

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.

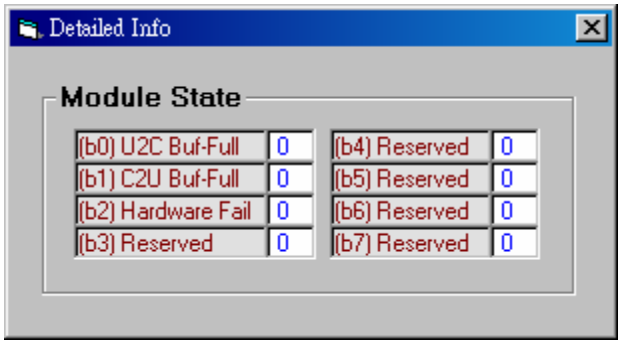


Figure 4-12**:** module state Detailed Information

<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.

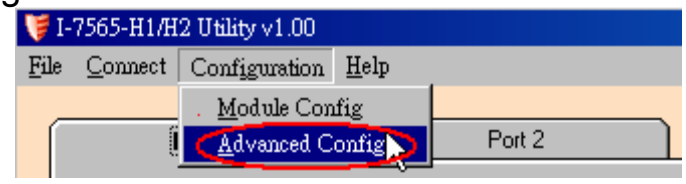


Figure 4-13**:** Configuration Function of I-7565-H1/H2 Utility

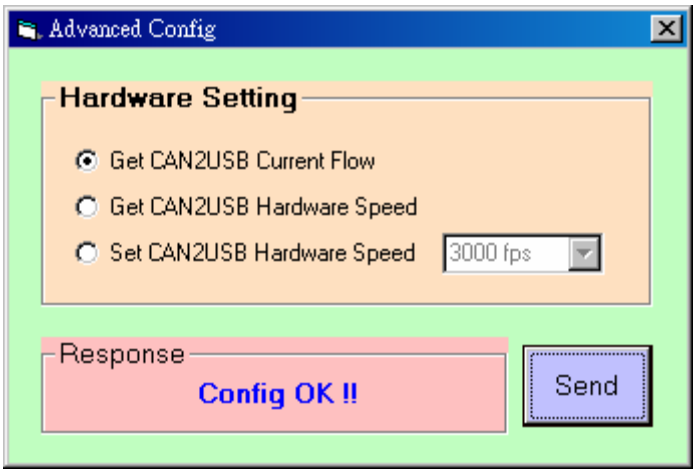


Figure 4-14: Advanced Config of I-7565-H1/H2

<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.

<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.

4.5 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.

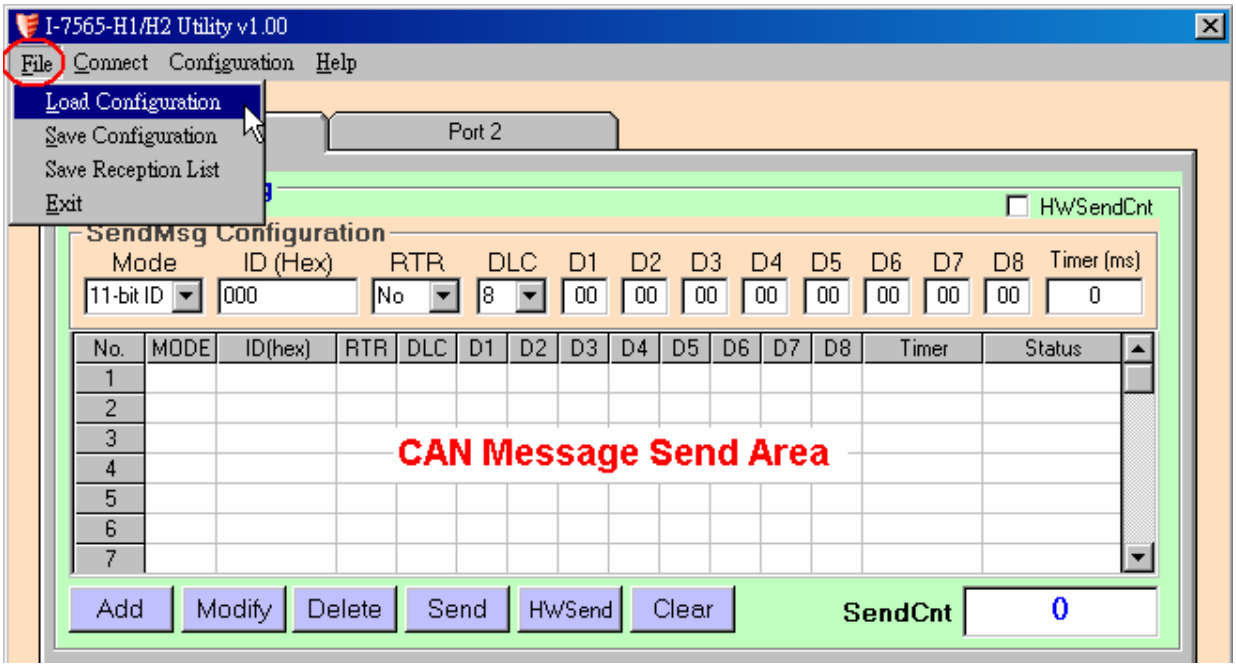


Figure 4-15: Advanced Config of I-7565-H1/H2

<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.

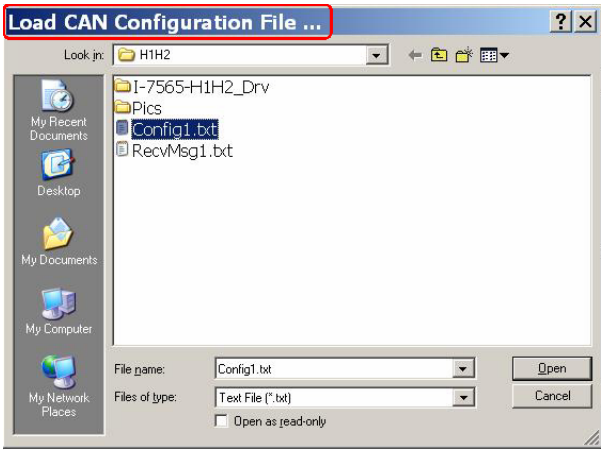


Figure 4-16: Load Configuration

<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.

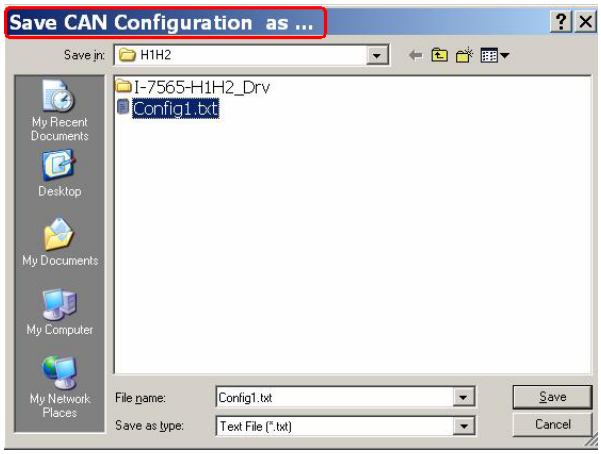


Figure 4-17**:** Save Configuration

<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.

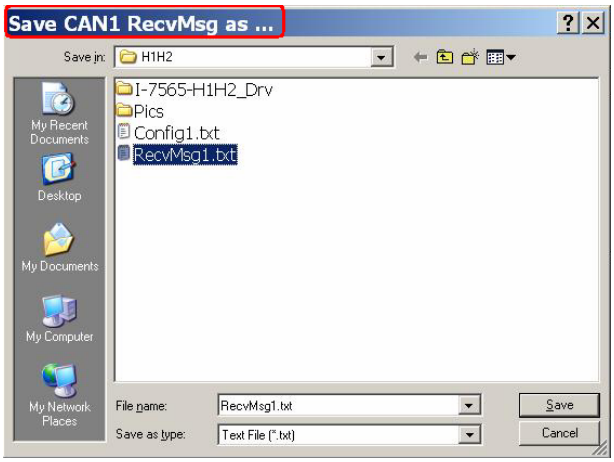


Figure 4-18**:** Save Reception List

4.6 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.

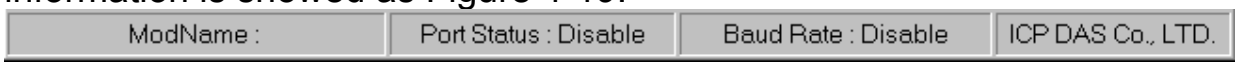


Figure 4-19**:** Status Bar of I-7565-H1/H2 Utility for disconnection

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.

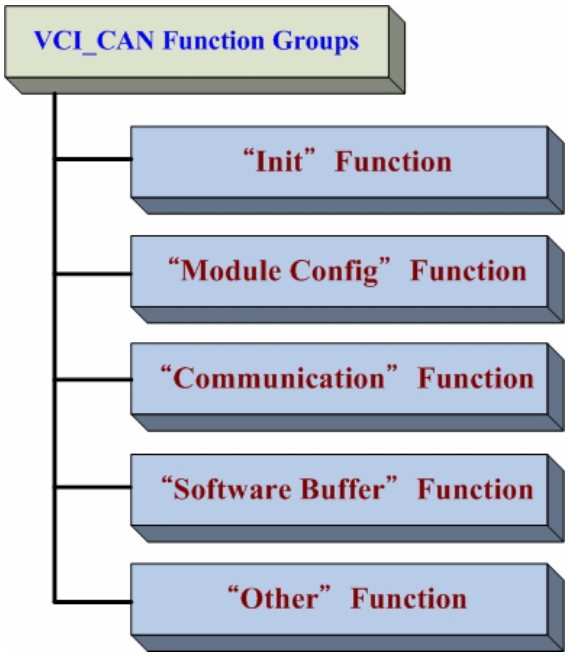


Figure 5-1**:** Five Function Groups of VCI_CAN Library

[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.

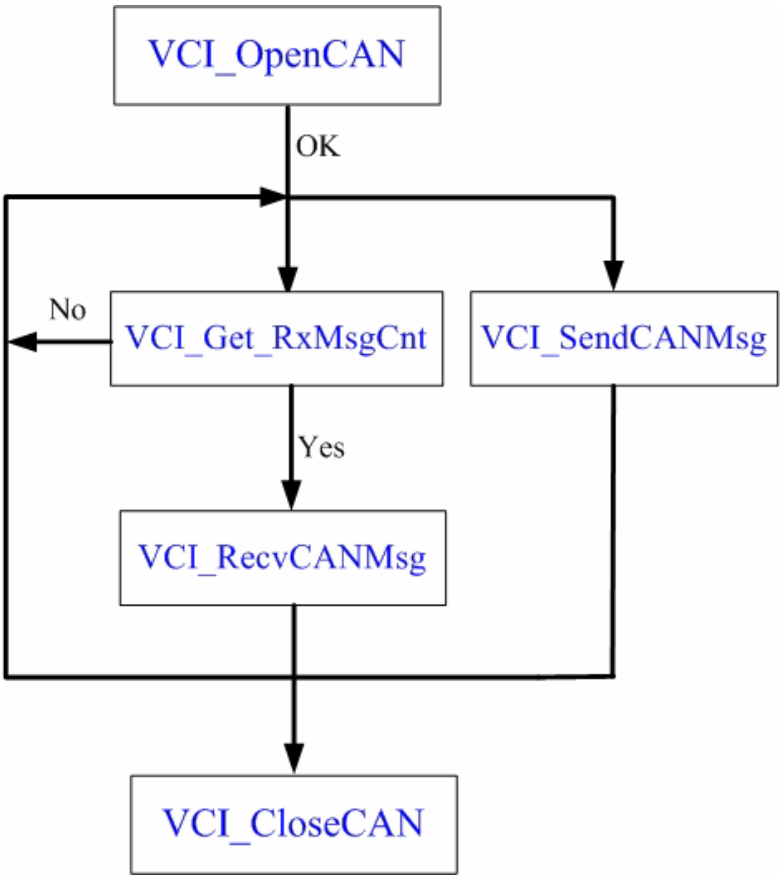


Figure 5-2: Flow Chart of API Library – VCI_CAN.dll

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];
} _VCI_MODULE_INFO, *PVCI_MOD_INFO;
```

Mod_ID[12] : Return the module name string

FW_Ver[12] : Return the module firmware version string

Return Values :

Return 0 means success, others means failure.

Examples :

```
Int Ret;
char Module_ID[12], Firmware_Ver[12];
_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);
```

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.

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.

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
```

5.7 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 Other Function

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

5.8.1 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);
```

5.8.2 VCI_DoEvents

This function is used to release CPU resource temporarily.

Syntax :

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

Parameter :

None

Return Values :

None

Examples :

```
VCI_DoEvents() ;
```

5.9 Return Code

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

```
#define No_Err                    0   //No Error
#define DEV_ModName_Err           1   //The Module Name Error
#define DEV_ModNotExist_Err       2   //The Module doesn't exist in this
                                        Port
#define DEV_PortNotExist_Err      3   //The Port doesn't Exist
#define DEV_PortInUse_Err         4   //The Port is in Used
#define DEV_PortNotOpen_Err       5   //The Port doesn't Open
#define CAN_ConfigFail_Err        6   //CAN Hardware Init Fail
#define CAN_HARDWARE_Err          7   //CAN Hardware Init Fail
#define CAN_PortNo_Err            8   //The Device doesn't support this
                                        CAN Port
#define CAN_FIDLength_Err         9   //The CAN Filter-ID Number
                                        exceed Max Number
#define CAN_DevDisconnect_Err    10   //The Connection of device is
                                        broken
#define CAN_TimeOut_Err          11   //The Config Command Timeout
#define CAN_ConfigCmd_Err        12   //The Config Command doesn't
                                        support
#define CAN_ConfigBusy_Err       13   //The Config Command is busy
#define CAN_RxBufEmpty           14   //The CAN Receive Buffer is empty
#define CAN_TxBufFull            15   //The CAN Send Buffer is full
```

6. Troubleshooting

6.1 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

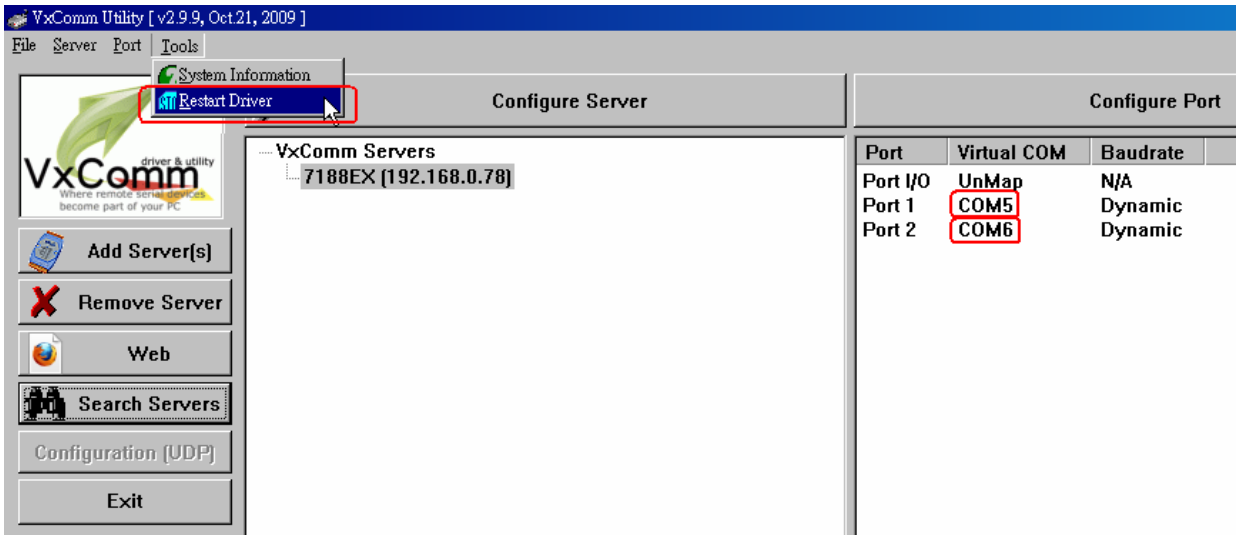


Figure 6-1-3: Virtual COM of VxComm Utility

6.2The 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.

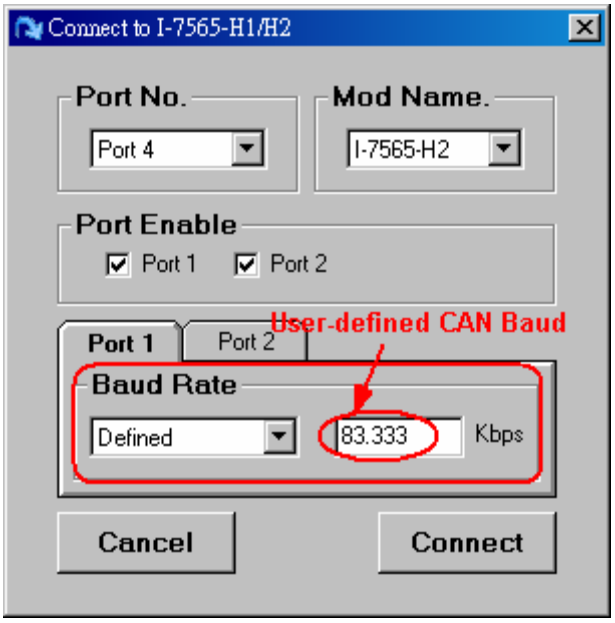


Figure 6-2**:** User-defined CAN Baud Rate for I-7565-H1/H2

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

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 BTR0=05 and BTR1=1C 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

6.3 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.

6.4 The PC Rebooting Issue

If users use I-7565-H1/H2 module 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.

6.5 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.

6.6 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.

6.7 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.

6.8 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 these two files, "**I-7565-H1.inf**" and "**I-7565-H2.inf**", to the path: C:\WINDOWS\inf\.

(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 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.

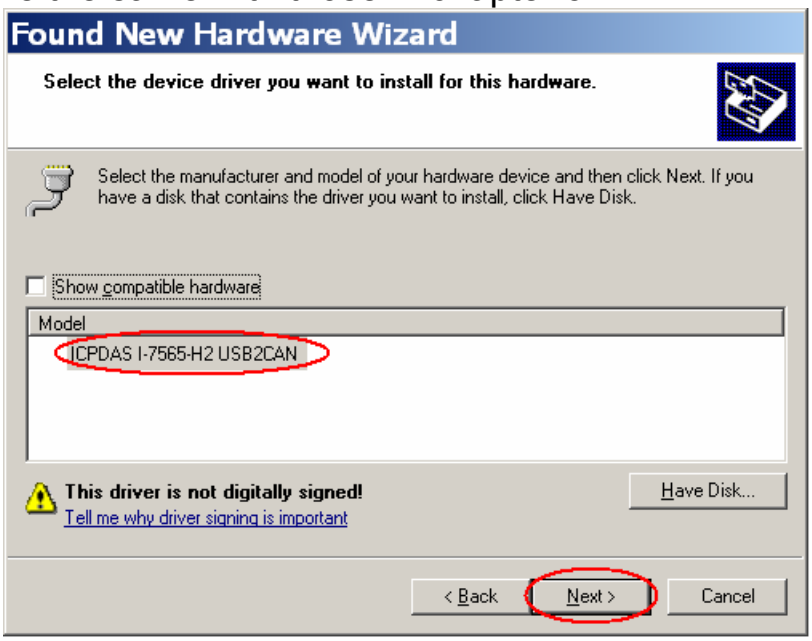


Figure 6-5: Driver Installation of I-7565-H1/H2 (2)

6.9 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

6.10 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. 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.