The i-7540D CAN-Ethernet Gateway

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

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1. Introduction

"Embedded Internet" and "Embedded Ethernet" are hot topics today. Nowadays the Ethernet protocol becomes the de-facto standard for local area network. Via Internet, connectivity is occurring everywhere, from home appliances to vending machines to testing equipment to UPS…etc. Using Ethernet for network in industrial area is appealing because the required cabling is already installed. The i-7540D from ICP DAS is a solution that enables CAN networks to be coupled together over the Internet/Ethernet, whereby remote monitoring and control is possible. The i-7540D controls networked communication and makes a transparent CAN-based application interface available to the user.

The device supports a transparent, protocol-independent transfer of the CAN messages, thus allowing its implementation into a wide range of possible applications. Furthermore, the i-7540D can be used with various higher layer CAN protocols (e.g. CANopen, DeviceNet or other proprietary protocols). The following figure shows the application architecture for the i-7540D.

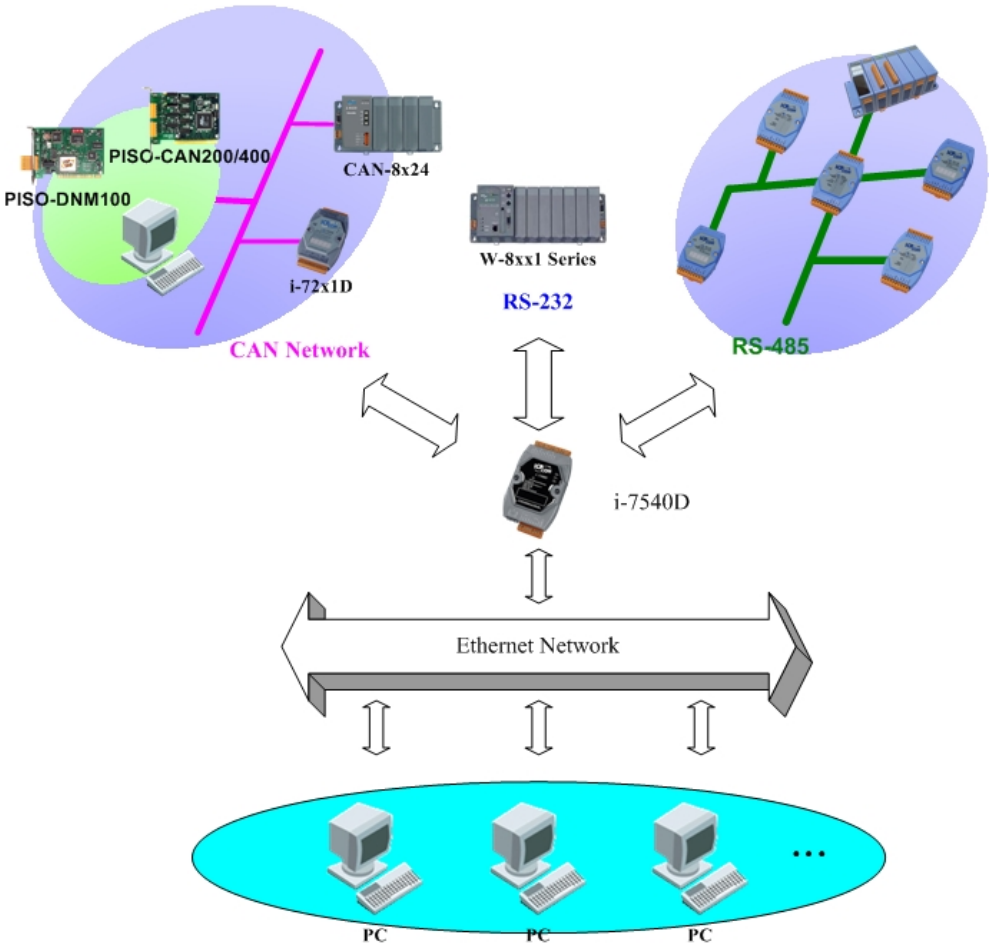


Figure 1-1: Application of i-7540D

The main features and specification of this are described as below:

1.1 Features

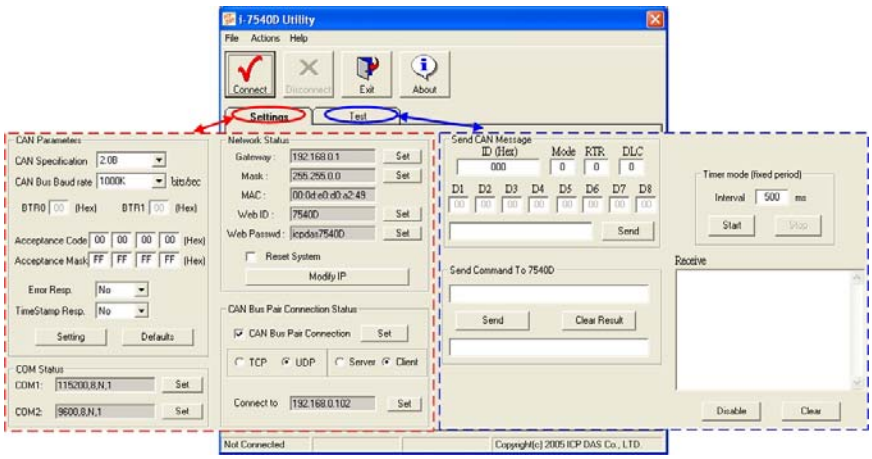
- RDC 80186-80 Embedded CPU, or compatible
- Ethernet Protocol, TCP,UDP, IP, ICMP, ARP, HTTP
- Reloadable Operating Software
- Remote Configuration
- Data transmitted by using TCP protocol
- Diagnostics
- COM driver support interrupt & 1K QUEUE Input & Output buffer
- 10/100 Base-TX Ethernet Controller
  (Auto-negotiating, Auto_MDIX, LED indicator)
- Support one RS-232 port, one RS-485 port and one CAN port
- 2500Vrms photo-isolation protection on CAN side.
- Jumper select 120Ω terminator resistor for CAN channel
- Phillip 82C250/251CAN Transceiver
- Support both CAN specification 2.0A and 2.0B.
- Max transmission speed up to 1M bps for CAN and 115.2K bps for RS-232 & RS-485
- Max transmission distance of CAN over 1000m (follow CAN specification)
- Built-in self-tuner ASIC controller on RS-485 port
- 7-segment LED display.
- Software configurable CAN and Ethernet communication parameters
- Program download port: COM1 or Ethernet Port
- Support CAN bus pair connection
- Provide the transparent communication between the CAN devices via Ethernet network.

1.2 Specifications

CPU	
CPU	80186, 80MHz or compatible
SRAM	512K Bytes
Flash	512K Bytes
EEPROM	16K Bytes
NVRAM	31 Bytes (battery backup, data valid up to 10 year)
RTC (Real Time Clock)	Yes
64-bit Hardware Serial Number	Yes
Build-in Watchdog Timer	Yes
Communication Interface	
COM1	RS-232 (TXD, RXD, RTS, CTS, GND)
COM2	RS-485 (D2+, D2-)
CAN	One CAN port with two CAN bus connector interfaces (CAN_H, CAN_L)
Ethernet Port	10/100 Base-TX Ethernet Controller (Auto-negotiating, Auto_MDIX, LED indicator)
COM Port Formats	
Data bit	7, 8
Parity	Even, Odd, None
Stop bit	1
Baud-rate	115.2Kbps max.
CAN Port Formats	
CAN Controller	Phillip SJA1000T CAN Controller
CAN Transceiver	Phillip 82C250 CAN Transceiver
Isolated	2500Vrms on CAN side
Baud-rate	1Mbps max.
Dimensions	
i-7540D	123 x 72 x 33 mm
Operating Environment	
Operating Temperature	-25°C to +75°C
Storage Temperature	-40°C to +80°C
Power	
Protection	Power reverse polarity protection
Frame Ground for ESD Protection	Yes
Required Supply Voltage	+10 to +30VDC (non-regulated)
Power consumption	2.5W

i-7540D Software Utility tool:

- CAN bus Baud Rate configuration;
- CAN acceptance filter configuration;
- CAN 2.0A or 2.0B specific selection;
- Setting the IP, Gateway and Mask of the network status;
- Setting the Web ID and password
- RS-232/RS-485 baud rate and data bit setting;
- CAN bus pair connection parameters configuration.
- Provides a quick testing function for transmitting/receiving CAN messages;



Application:

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

1.3 VxComm Technology

The i-7540D is designed as a RS-232/RS-485/CAN to Ethernet Gateway. So it follows that they can be used to link these RS-232/RS-485/CAN devices to central computer as follows:

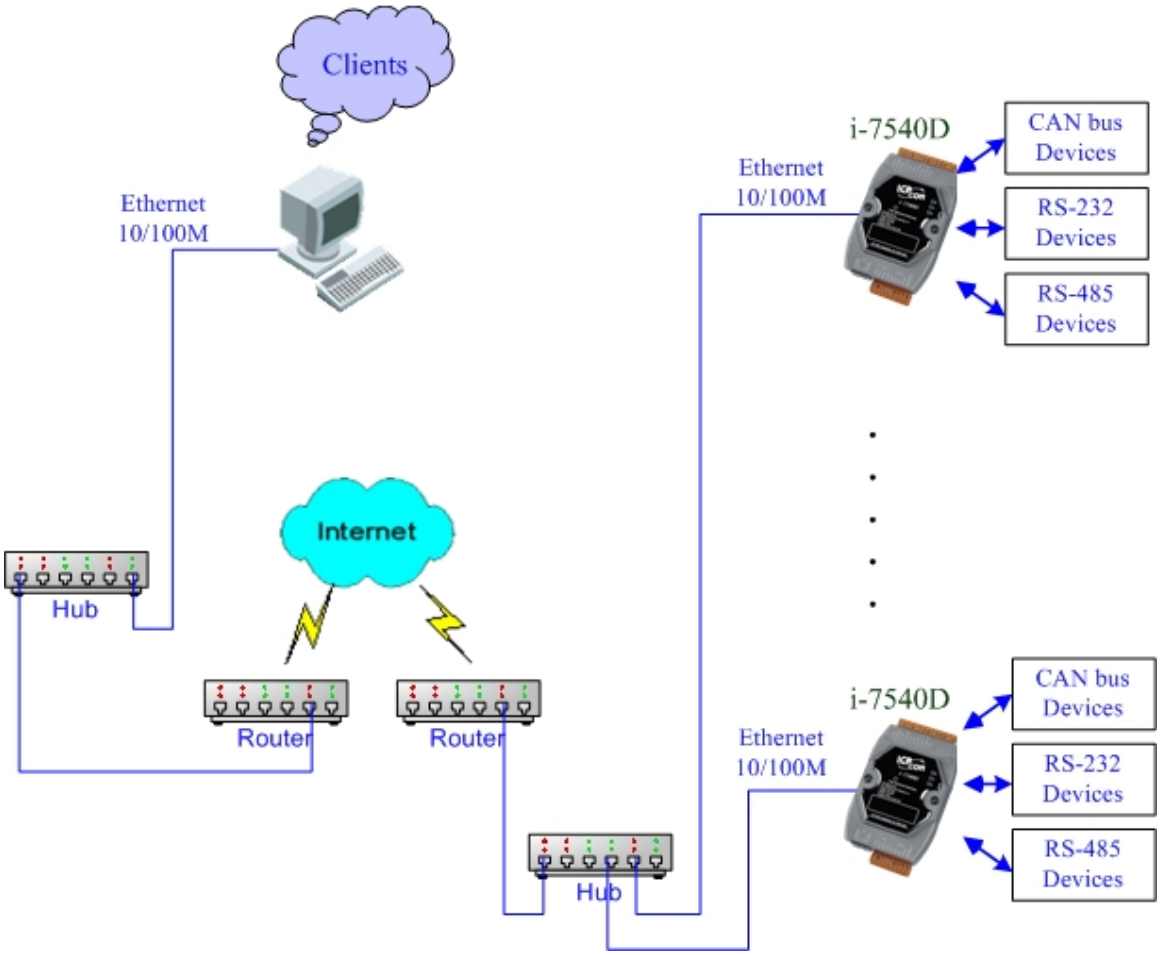


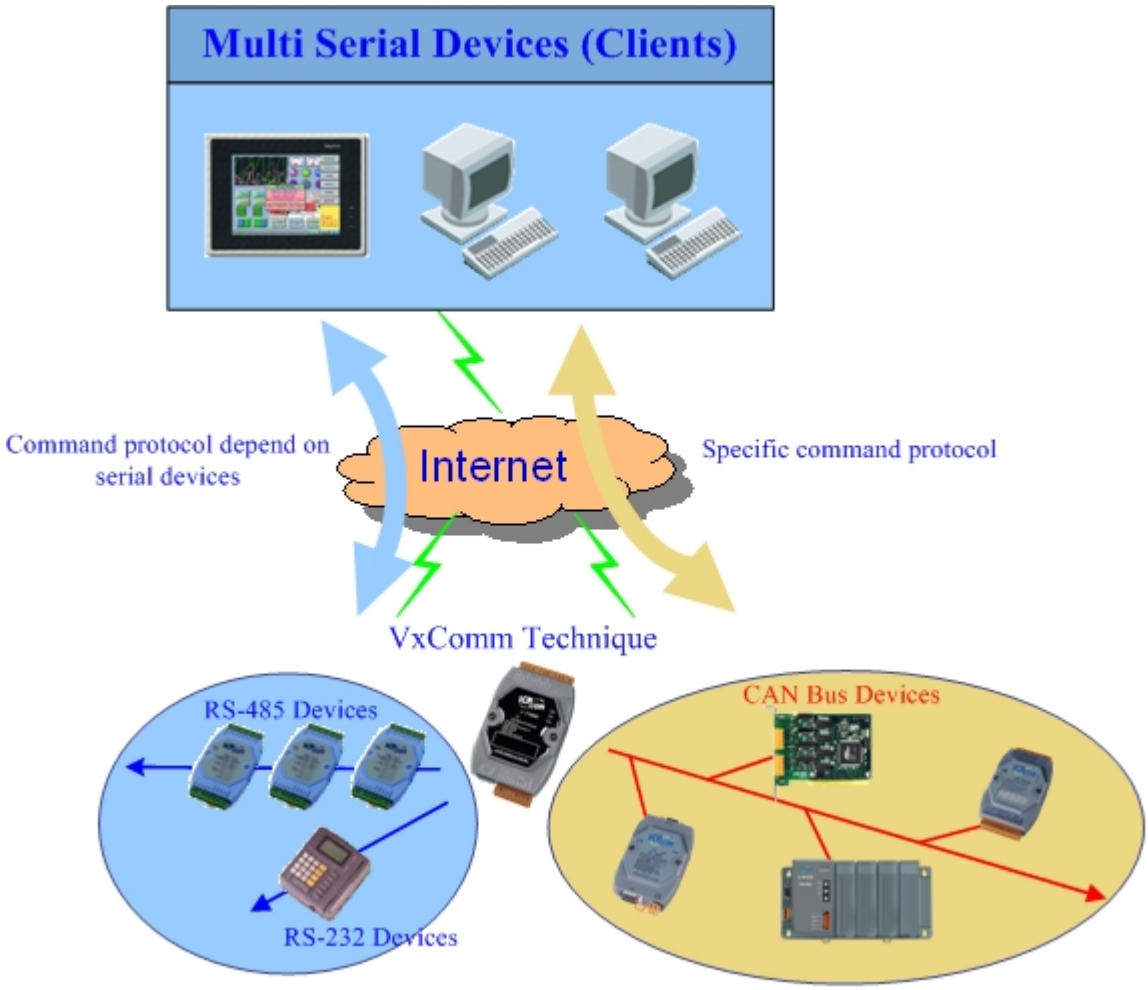
Figure 1-2: Application of i-7540D

Compared to the RS-485 network, these Ethernet network hubs are already in existence for system network. Therefore, the RS-232 devices can find the closest hub and link to the central computer with the help of the i-7540D. The Ethernet network is extremely popular and already existing for most applications, hence, this approach is a very successful. In general, it is more difficult to write a TCP/IP program than a COM 1/2 program. **Therefore**, **the VxComm technology is developed to simulate COM-ports of the i-7540D to become COM 3/4/5…/256 of the central computer.** Then users can write a COM port program to link these RS-232/RS-485/CAN devices and need not to concern themselves with any TCP/IP problem.

In some factories, there are old systems still running and in case. These old systems only support COM port applications. Therefore, the Vxcomm technology can be used to upgrade these old systems to support Ethernet network.
To recap, the VxComm technology is useful as follows:

- **Provides a much easier interface for software programmers.**
- **Keeps the old systems going without program modification**

The block diagram of VxComm technology for the i-7540D is given as follows:



The VxComm technology can be used to simulate COM/CAN ports of the i-7540D to become a COM port of PC. With the help of VxComm driver, users can access the remote COM/CAN ports of the i-7540D just as them would access the PC's COM port.

2. Hardware

2.1 Block Diagram

Figure 2-1 is a block diagram illustrating the functions on the i-7540D module. It provides the 2500Vrms Isolation in the CAN interface site. And hardware media in RS-232 interface is only adopted 5-wire connection.

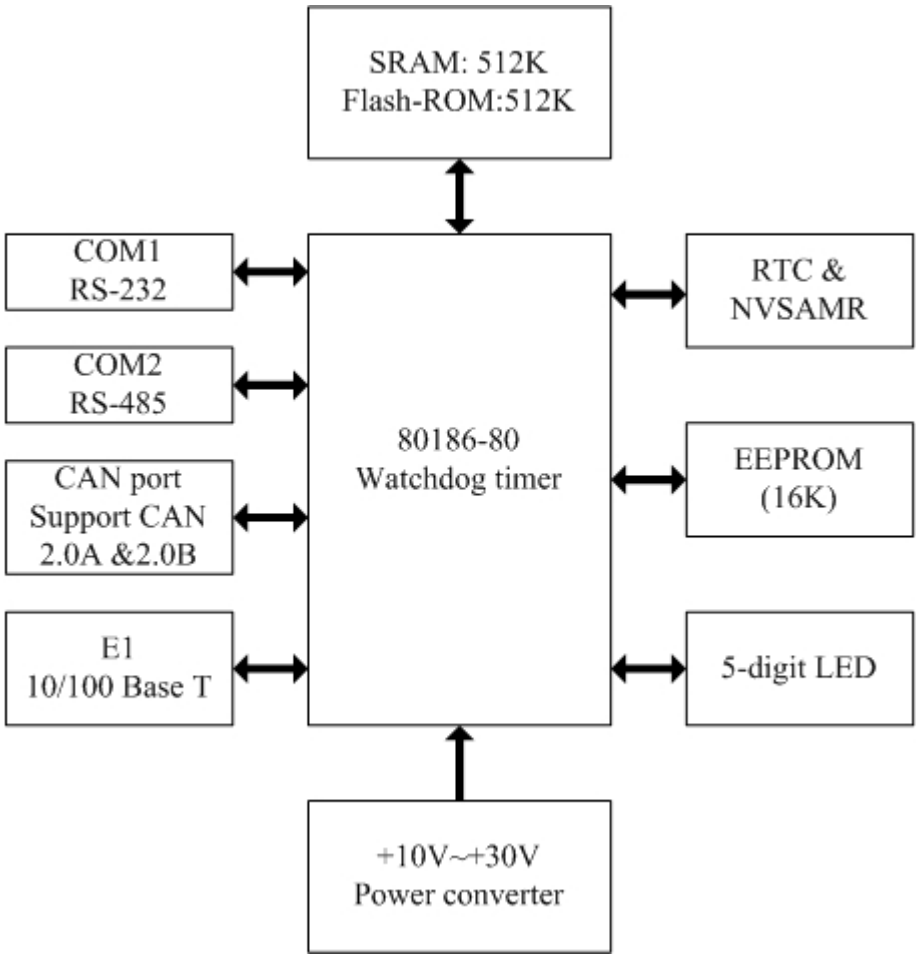


Figure 2-1: Block diagram of i-7540D

2.2 Pin Assignment

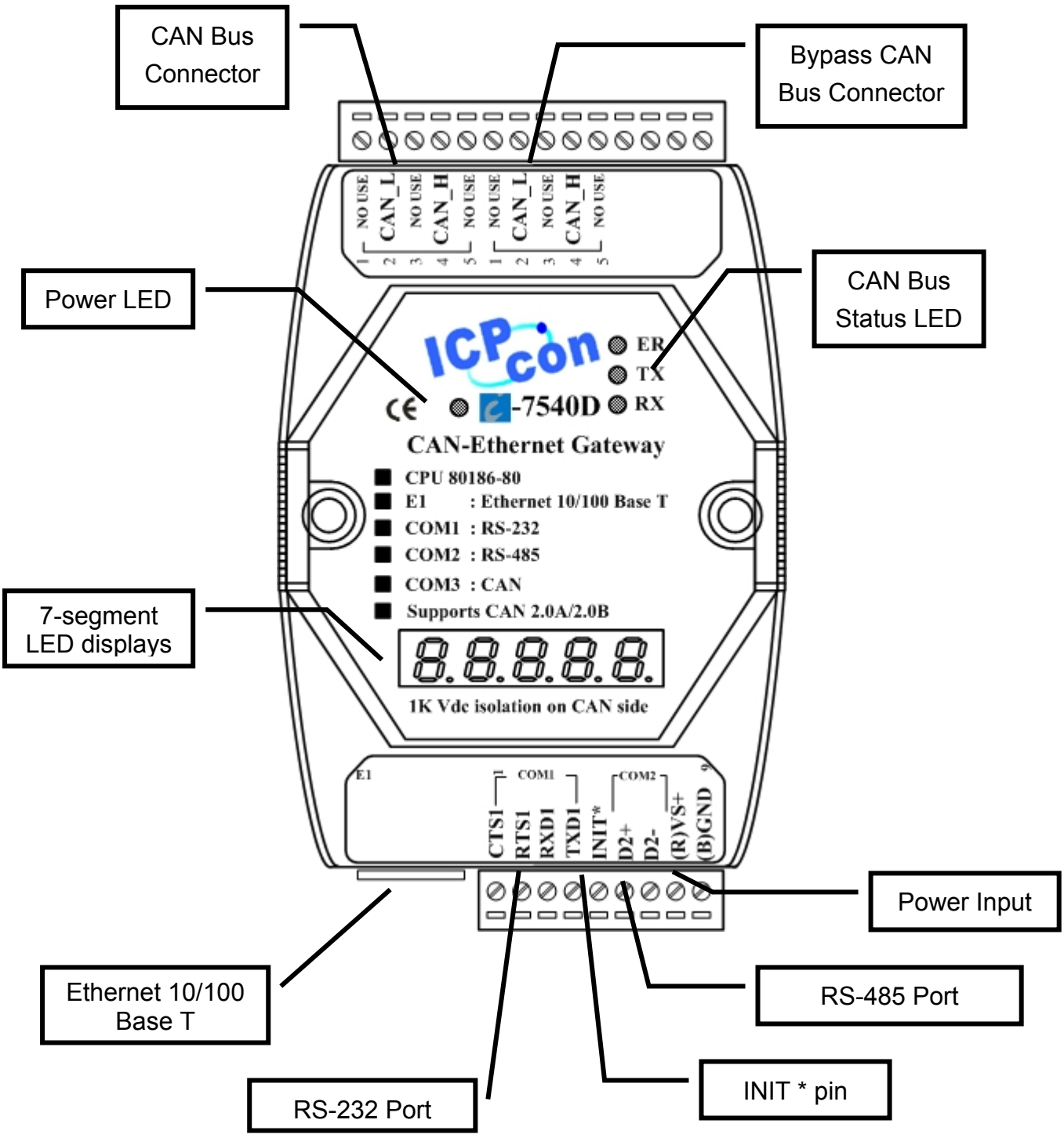


Figure 2-2: Pin assignment on the i-7540D

2.2.1 RS-232 & RS-485 & Power supply Interface

The I-7540D provides one RS-232 interface and one RS-485 interface with hardware flow control. The GND-signal of COM1 is shared with pin-9, GND. The pin assignment is shown in table 2-1.

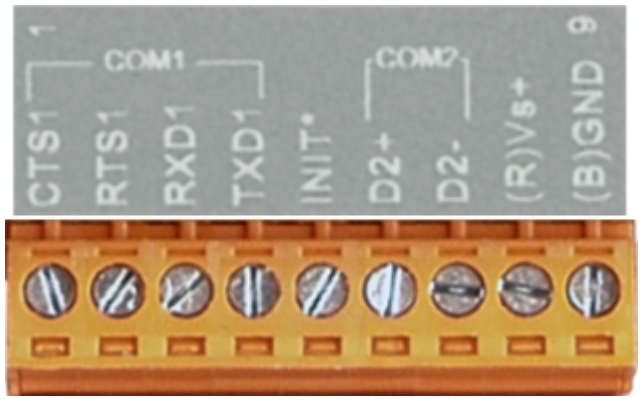


Table 2-1: COM Connector Pin Assignment

Pin	Name	Description
1	CTS1	CTS pin of COM1 (RS-232)
2	RTS1	RTS pin of COM1 (RS-232)
3	RXD1	RXD pin of COM1 (RS-232)
4	TXD1	TXD pin of COM1 (RS-232)
5	INIT*	Initial pin for enable/disable AUTOEXEC.BAT
6	D2+	Data+ pin of COM2 (RS-485)
7	D2-	Data- pin of COM2 (RS-485)
8	VS+	V+ of power supply (+10V to +30V DC unregulated)
9	GND	GND of power supply

2.2.2 Connect to CAN Bus

In order to provide an easy CAN bus wiring, the i-7540D supplies one CAN port with two CAN bus connector interfaces. Each connecter built on the i-7540D looks like as figure 2-3 and table 2-2.

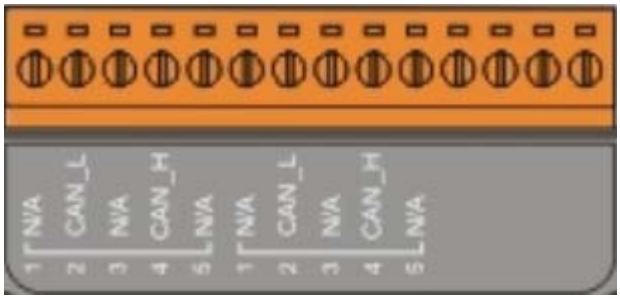


Table 2-2: CAN bus Connector Pin Assignment

Pin No.	Signal	Description
1	N/A	Not Connected
2	CAN_L	CAN_L bus line (dominant low)
3	N/A	Not Connected
4	CAN_H	CAN_H bus line (dominant high)
5	N/A	Not Connected

Note that the bypass CAN bus connector is not another CAN channel. It is designed for connecting to another CAN device conveniently. The structure of the inside electronic circuit is displayed as figure 2-4.

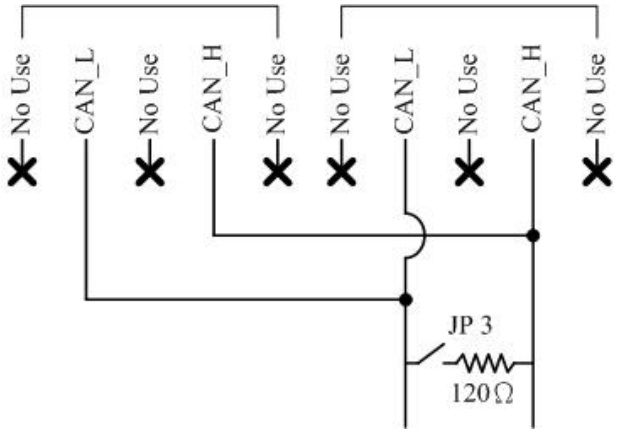


Figure 2-3 Electronic circuit of CAN bus connector

2.2.3 Ethernet Connect

The Ethernet (10/100 Base-TX) signals are routed to an RJ45 socket for easy connection using a standard CAT 3 or CAT 5 network cable. On power on of the i-7540D, it will auto-negotiate the network speed and connection.

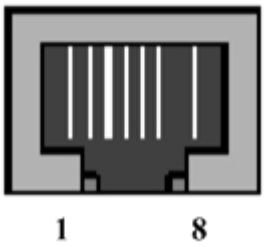


Table 2-3: Ethernet Connector Pin Assignment

Pin	Name	Description
1	TX+	Transmit Data +
2	TX-	Transmit Data -
3	RX+	Receive Data +
4	N.C.	Not Connected
5	N.C.	Not Connected
6	RX-	Receive Data -
7	N.C.	Not Connected
8	N.C.	Not Connected

2.3 Terminator resistor settings

In order to minimize reflection effects on the CAN bus line, the CAN bus lines have to be terminated at both ends by two terminal resistances. Based on the ISO 11898-2 spec, each terminal resistance is 120Ω (or between 108Ω~132Ω). The length related resistance should have 70 mΩ/m. Users should check the resistances of their CAN bus, before they install a new CAN network as figure 2-4.

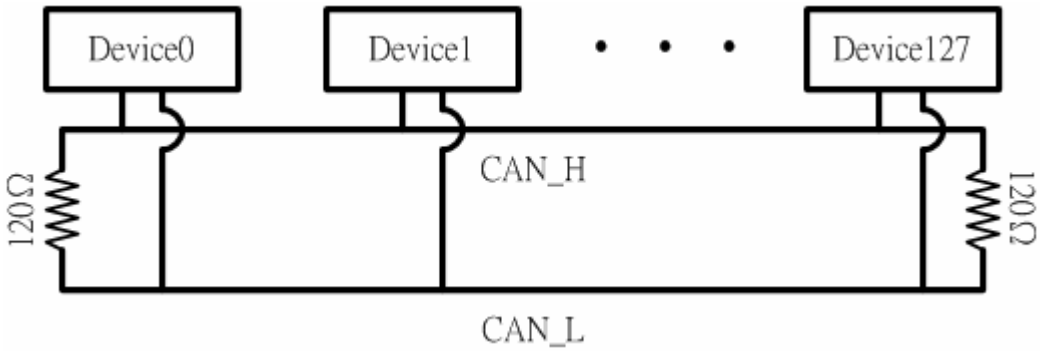


Figure 2-4: Terminator resistor

Moreover, to minimize the voltage drop on long distance, the terminal resistance should be higher than the value defined in the ISO 11898-2. Table 2-4 may be used as a reference.

Table 2-4: Relation between bus cable and length

Bus Length (meter)	**Bus Cable Parameters**		**Terminal Resistance (Ω)**
	Length Related Resistance (mΩ/m)	**Cross Section (Type)**	
0~40	70	0.25(23AWG)~ 0.34mm^2(22AWG)	124 (0.1%)
40~300	< 60	0.34(22AWG)~ 0.6mm^2(20AWG)	127 (0.1%)
300~600	< 40	0.5~0.6mm^2 (20AWG)	150~300
600~1K	< 20	0.75~0.8mm^2 (18AWG)	150~300

Therefore, the i-7540D module supplies a jumper for users to connect the terminator resistor or not. If users want to use this terminator resistor, please open the i-7540D cover and use the JP3 jumper to activate the 120Ω terminator resistor built in the system, as in the figure 2-5. Note that the default setting is active. And about the J3 jumper setting, please refer the table 2-5.

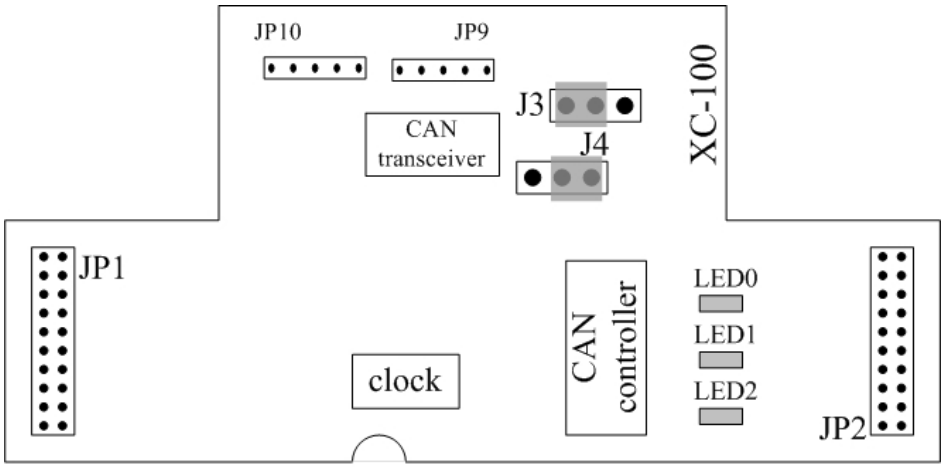
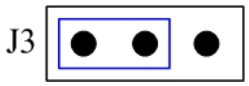
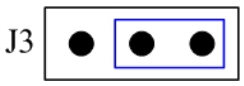


Figure2-5 XC100 I/O expansion board LAYOUT

Table 2-5 **J3** Jumper Selection

Apply the termination resistor(120Ω)	**Don't apply the termination resistor**
	

2.4 LED Indication

The i-7540D provides the Converter function between the Ethernet port and the RS-232 & RS485 & CAN port. It can handle both 11-bits and 29-bits ID format according to whether it is a CAN 2.0A or 2.0B. It also provides some LEDs to indicate to users what situation the i-7540D is in.

2.4.1 Power LED

There is a red indicator-LED in the i-7540D as follow:

- ✧ Firmware is running: **flashing red**

The default shipping of i-7540D will be firmware inside, so the red indicator-LED of i-7540D will be ON 0.5 second then OFF 0.5 second periodically.

2.4.2 CAN bus indicator LED

The i-7540D includes three single-color LED displays to indicate the status of module, network and I/O device. They are ER LED (it is red), TX LED (it is green), and RX LED (it is red). The Indicators assist maintenance personnel in quickly identifying a problem unit. The LED test is to be performed at power–up. When the CAN communication events occur, these indicators will be triggered to glitter with different conditions.

- ER LED

This LED provides device status and indicates whether or not the device is operating properly. Table 2-6 shows the conditions of ER status. Therefore, when the device is operated normally, the ER-LED must be turned off. If this led flashing red, users can use the "99S" command, in section 4.5, to read the status of the i-7540D.

Table 2-6 ER-LED conditions

Condition	**Description**
Off	Device is normal; no error occurs
Red	Device has unrecoverable fault
Flashing red	Device has recoverable fault. To recover: Reset device or perform error recovery

- TX LED

This LED indicates the status of message transmitted. Table 2-7 shows the conditions of TX status. Therefore, when the device transmits messages to the CAN bus, the TX-LED is normally flashing green.

Table 2-7 TX led conditions

Condition	**Description**
Off	No data is being transmitted to the CAN side
Flashing green	Data are transmitting to the CAN side
Solid green	Transmit data error

- RX LED

This LED indicates the status of message received. Table 2-8 shows the conditions for RX status. Therefore, when the device receives CAN messages, the RX-LED would be flashed.

Table 2-8 RX led conditions

Condition	**Description**
Off	No data is being received
Flashing red	Data is being received
Solid red	Receive error messages

2.4.3 5-digits 7-Segment LED Displays

The 5-digits 7-SEG LED will show as figure 2-6.

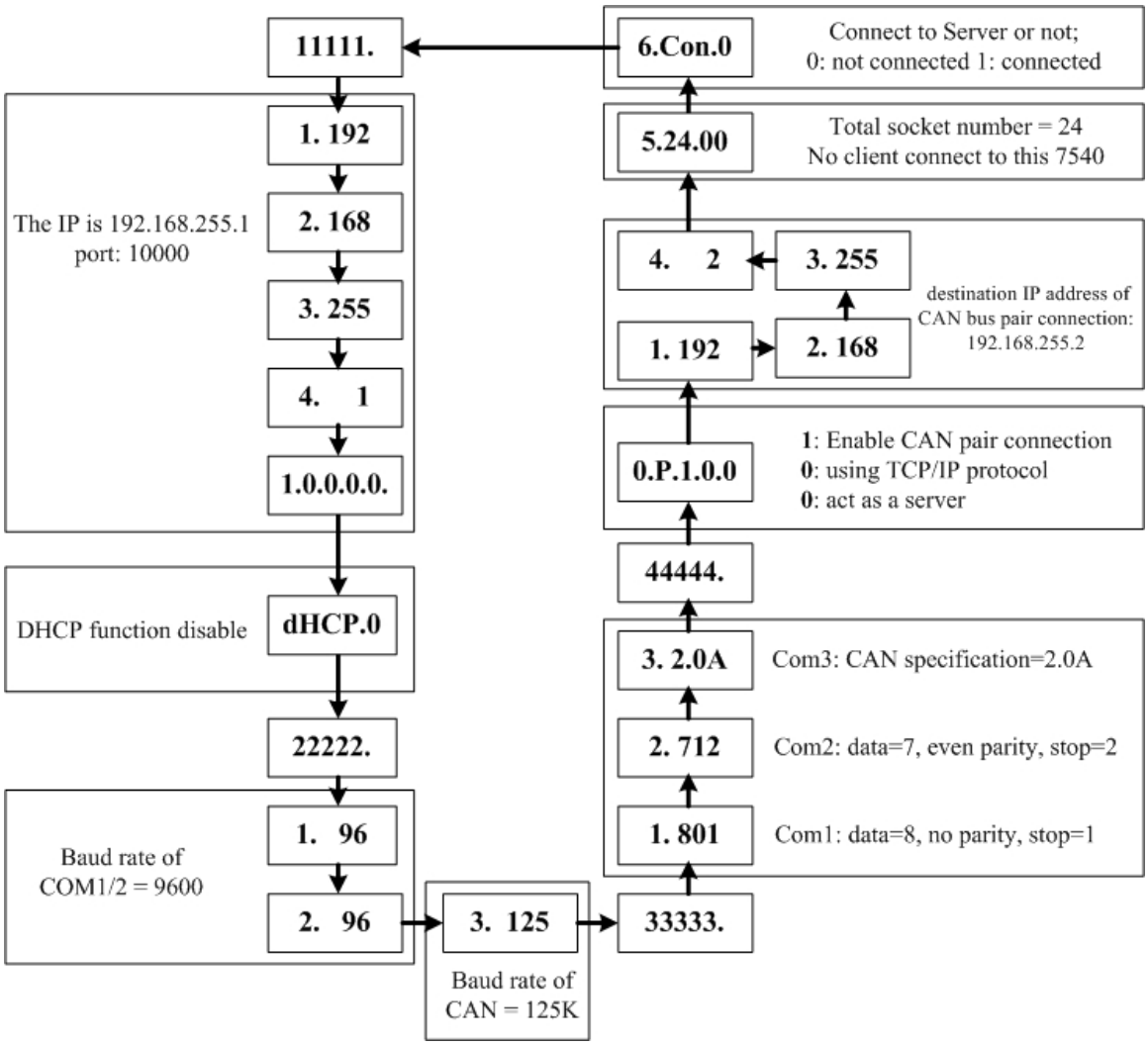


Figure 2-6 7-SEG LED Displays

The important information of i-7540D can be divided as follows:

- Group-ID 11111: IP information of this i-7540D
- Group-ID 22222: baud rate of all ports
- Group-ID 33333: configuration of all ports
- Group-ID 44444: CAN bus pair connection information and client-connected information of this i-7540D

The IP information format of i-7540D is given as follows:

- Group-ID of 5-digit LED: 11111.
- LED-1: indicator, can be 1 or 2 or 3 or 4

- LED-2~5: IP

The LED will show Group-ID first, and then show its IP as the above diagram indicates. If users change IP, the value shown will change immediately. The default shipping IP = 192.168.255.1 ➔ the LED-show sequence is given as above diagram.

The DHCP function formats are given as follows:

- dHCP.0 ➔ DHCP function disable
- dHCP.1 ➔ DHCP function enable and get an IP
- dHCP.2 ➔ DHCP function enable but not get an IP, using default setting
  If the DHCP function is enable, the i-7540D will get it's IP from the DHCP server. Otherwise, it will use the IP in the EEPROM.

The baud-rate format of COM ports are given as follows:

- Group-ID of 5-digit LED: 22222.
- LED-1: COM port number
- LED-2~5: value of (baud/100)

The baud-rate format of CAN port is given as follows:

- LED-1: CAN port number
- LED-2~5: value of (baud/1000)

The COM port and CAN port number are shown in LED-1 and their baud rate is shown in the LED-2~5. The COM port baud rate = (value of LED-2~5)*100. Therefore, shown-value=1. 96 means baud rate of COM1=9600BPS; shown-value= 2.1152 means baud rate of COM2= 115200 BPS. It's the same as the CAN port baud rate. The CAN port baud rate = (value of LED-2~5)*1000. Therefore, shown-value=3. 10 means baud rate of CAN=10KBPS; shown-value= 3.1000 means baud rate of CAN= 1MBPS. All baud rate of i-7540D's port will be shown one by one.

The configuration of COM ports are given as follows:

- Group-ID of 5-digit LED: 33333.
- LED-1: COM port number
- LED-3: data bit, 7 or 8
- LED-4: parity bit, 0=no parity, 1=even parity, 2=odd parity
- LED-5: stop bit, 1 or 2

The configuration of CAN port is given as follows:

- LED-1: CAN port number
- LED-2~5: CAN specification (2.0A or 2.0B)

The connection-client and CAN bus pair connection information are given as follows:

- Group-ID of 5-digit LED: 44444.
- LED-1: indicator, can be 0 or 1 or 2 or 3 or 4 or 5.

Indicator 0:

- LED-2: 'P' for CAN bus pair connection
- LED-3: "Enable CAN pair" parameter, 0: Enable, 1: Disable
- LED-4: "TCP or UDP" parameter, 0: TCP, 1: UDP.
- LED-5: "Server or Client" parameter, 0: act as a server, 1: act as a client

Indicator 1 or 2 or 3 or 4:
The CAN bus pair destination IP information format of i-7540D is given as follows:

- LED-2~5: IP

The LED will show Group-ID first, and then show its IP as the above diagram indicates. If users change can bus pair destination IP and reset the system, the value shown will change. The default shipping IP = 192.168.255.2 ➔ the LED-show sequence is given as above diagram.

Indicator 5:

- LED-2/3: numbers of free sockets are available, default 24.
- LED-4/5: numbers of sockets are used by clients, default 0.

If any one client connects to this i-7540D, free-sockets will be decreased and used-sockets will be increased. If the free-sockets number is reduced to 0, then no extra client can link to this i-7540D. The default number of free-sockets is 24. Therefore, the i-7540D allows 24 clients link to it.

Indicator 6:

- LED-2~4: "Con." for connect to server or not
- LED-5: 0: not connect to server; 1: already connect to server.

3. Software Utilities

We support some software utilities for users to set and test the status of the i-7540D.

1. i-7540D Utility

The i-7540D Utility tool can be used to configure the operation condition between the CAN and Ethernet communications. Also it can be used to transmit or receive a CAN message for simple testing of the module's functions.

2. MiniOS7 Utility

MiniOS7 Utility is a tool for configuring, uploading files to all products embedded with ICPDAS MiniOS7

3. VxComm Utility

Using the Virtual COM application, one PC can control 256 COM ports (including real COM ports). The i-7540D will become a RS-232/RS-485/CAN to Ethernet/Internet converter.

3.1 i-7540D Utility

The i-7540D Utility tool can be used to configure the operation condition between the CAN and Ethernet communications. Also it can be used to transmit or receive a CAN message for simple testing of the module's functions. To start the "i-7540D Utility", please install the i-7540D Utility setup file and run the i-7540D.exe file. The screenshot of the startup screen for this Utility is given in the below figure. Connect the i-7540D's Ethernet port with the PC's Ethernet port via a standard CAT 3 or CAT 5 network cable. Then the user can connect the CAN interface into the CAN network based on the CAN specifications. For further information related to this, please refer to section 2.2.2 and 2.2.3 of this manual on how to make a hardware connection.

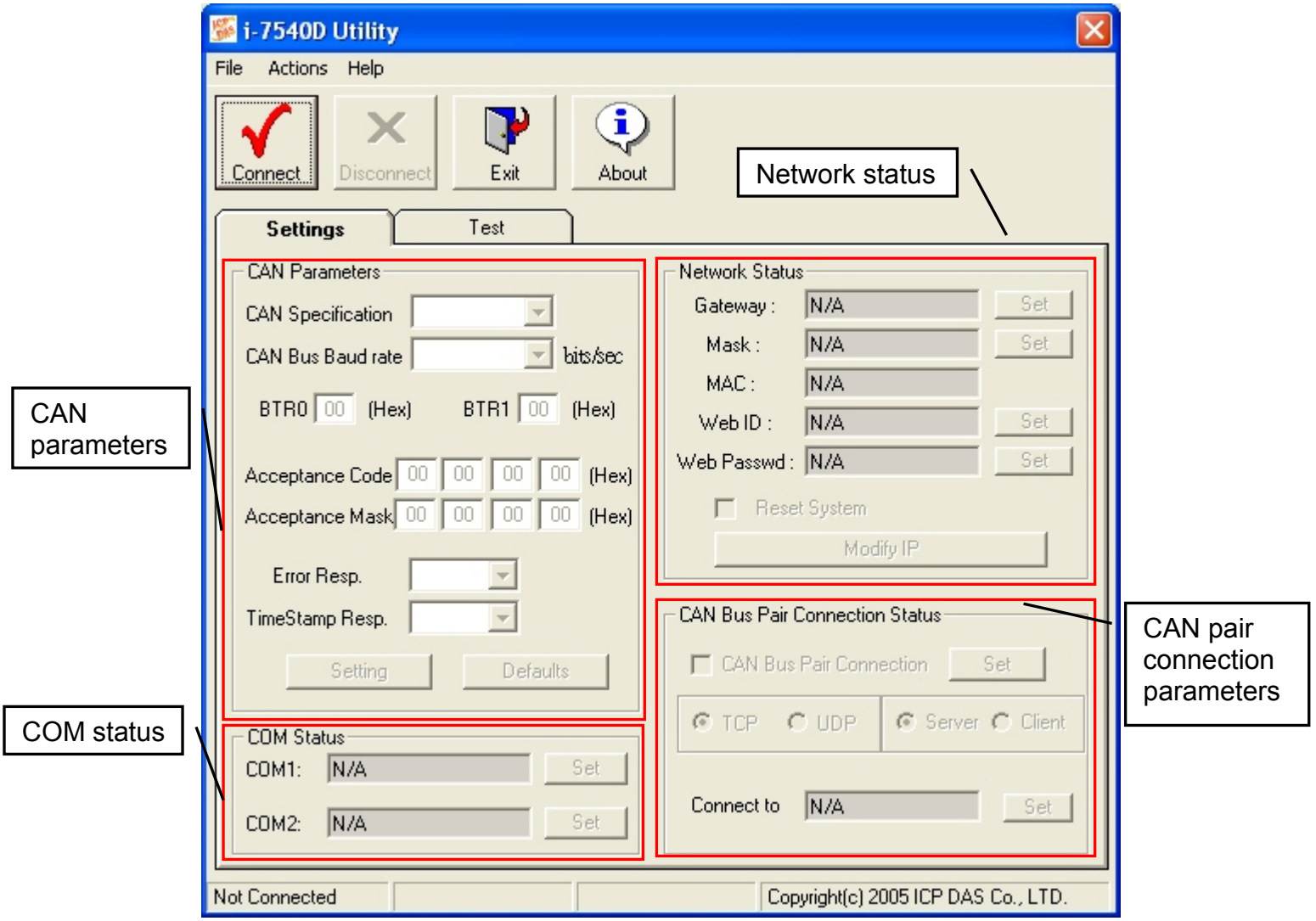


Figure 3-1: i-7540D Utility

3.1.1 Install & uninstall the i-7540D Utility

Install i-7540D Utility

Step1: Download the i-7540D Utility setup file from the web site http://www.icpdas.com/products/Remote_IO/can_bus/i-7540.htm or the CD-ROM disk following the path of "Fieldbus_CD:\\CAN\ Converter\i-7540D\Utility

Step 2: Execute the setup.exe file to install i-7540D Utility.

Step 3: A "Welcome" window pops up to prompt user to begin the installation. See figure 3-2.

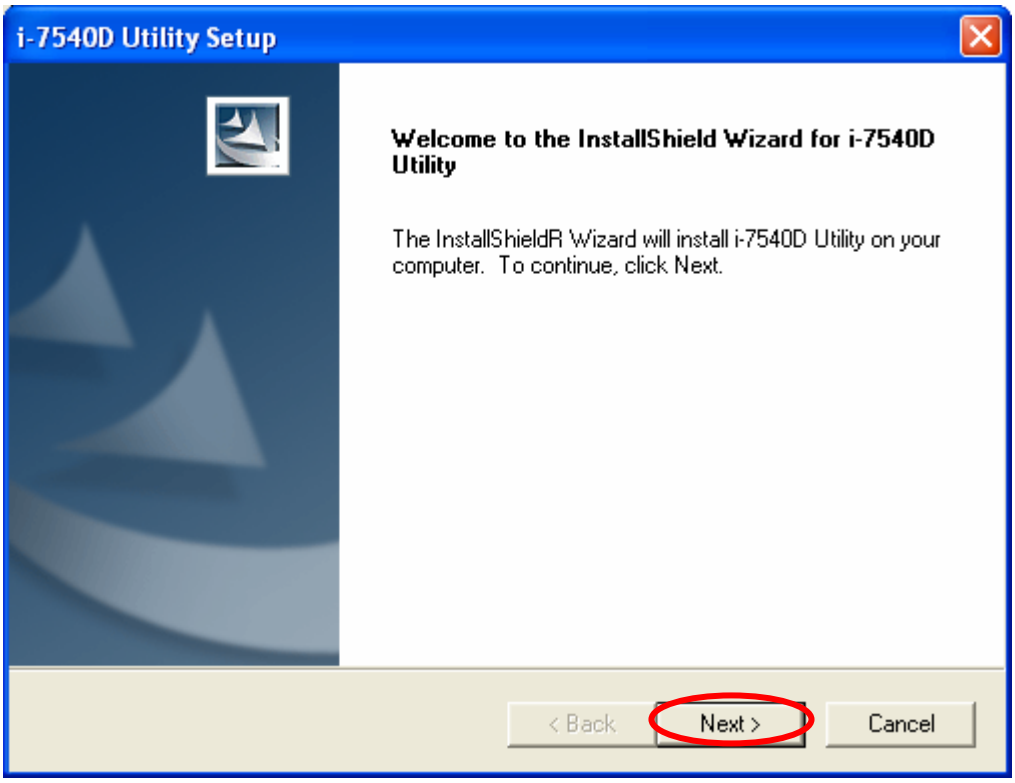


Figure 3-2: Welcome dialog

Step 4: Click the “Next” button and a “Choose Destination Location” window will pop up for deciding the installation path.

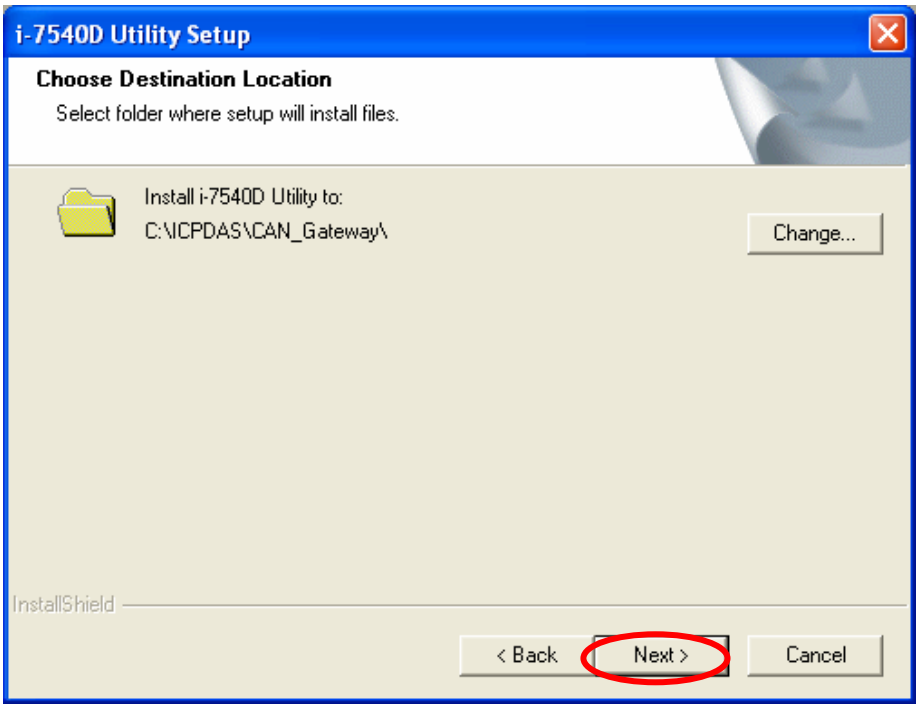


Figure 3-3: “Choose Destination Location” dialog

Step 5: Click “Next” button and a “Ready to Install the Program” window will pop up to prompt user that the wizard is ready to begin the installation See figure 3-4.

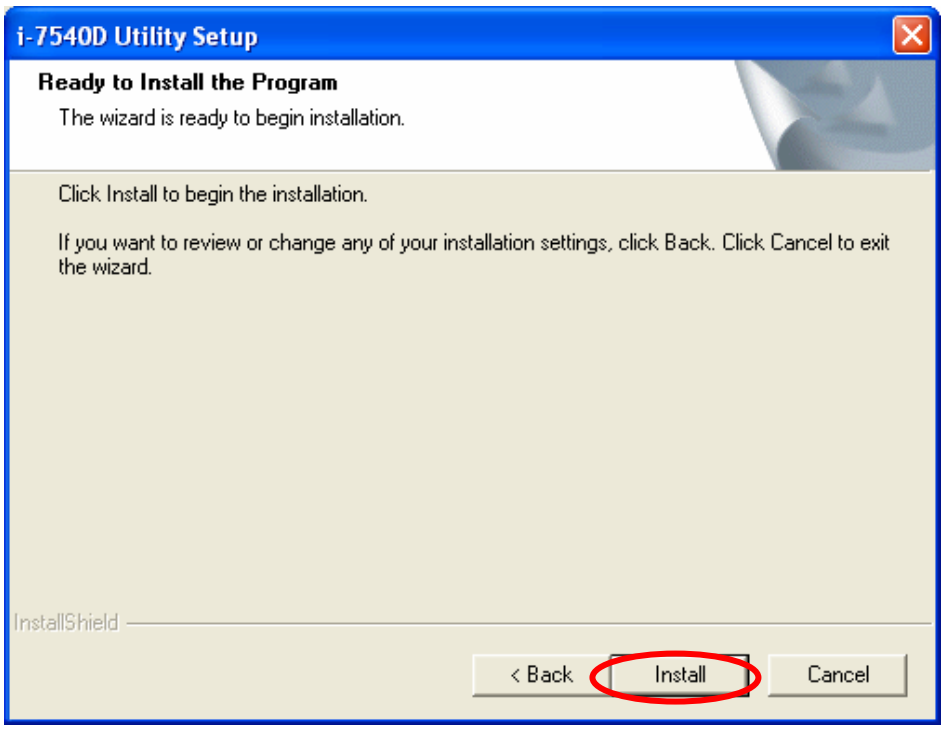


Figure 3-4: “Ready to Install the Program” dialog

Step 6: Click “Install” button and start to install the i-7540D Utility to the system. After finishing the process, a “Complete” window will pop up to prompt users that the successful completion of the installation. And click “Finish” button to exit. See figure 3-5.

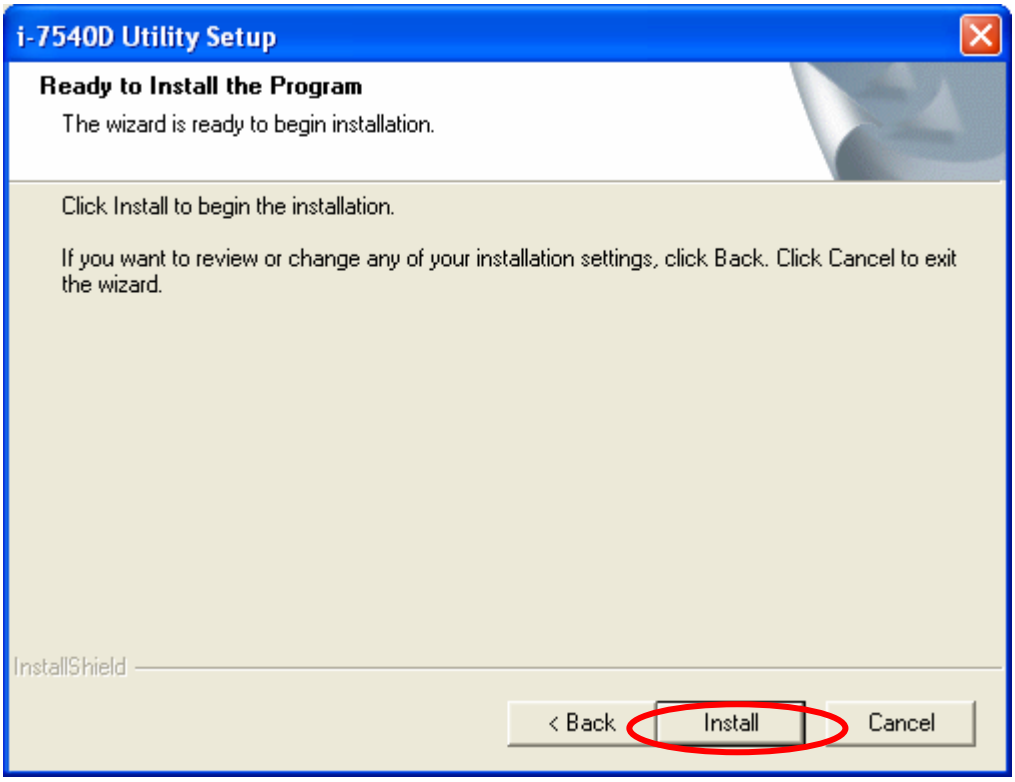


Figure 3-5: “Successful Completion of the Installation” dialog

Step 7: After finishing the installation of the i-7540D Utility, users can find it as shown in figure 3-6.

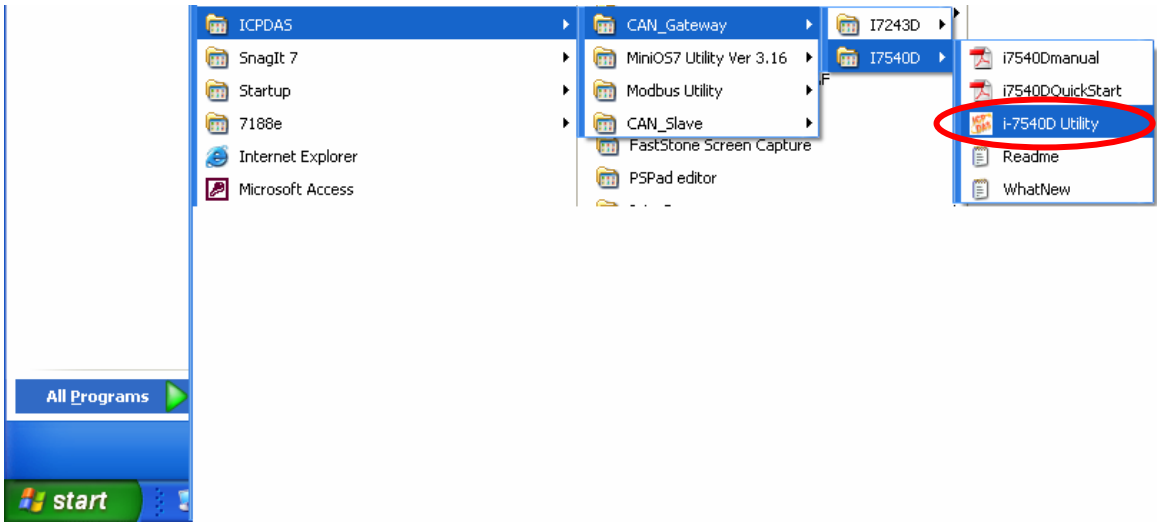


Figure 3-6: You can find “i-7540D Utility“ at the “Start” in the task bar

Uninstall i-7540D Utility

You can uninstall i-7540D Utility software by the following means described below:

Step 1: Click “Start” in the task bar, then click the “Control Panel” as shown in figure 3-7.

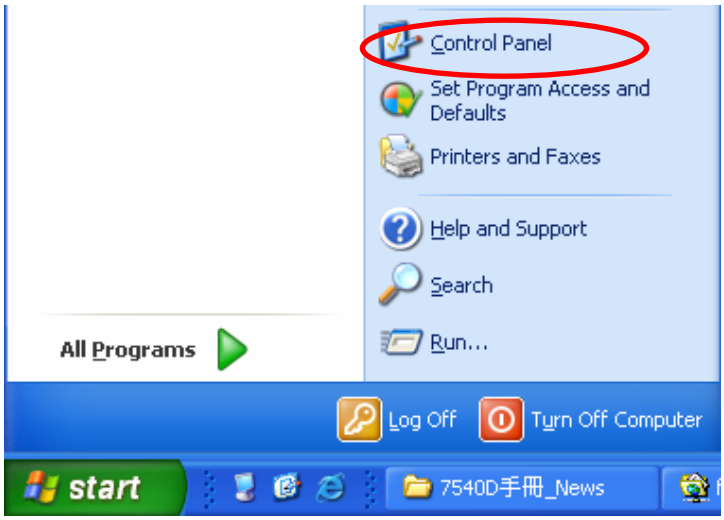


Figure 3-7: Select settings

Step 2: Click the “Add or Remove Programs” button icon to open the dialog. See figure 3-8.

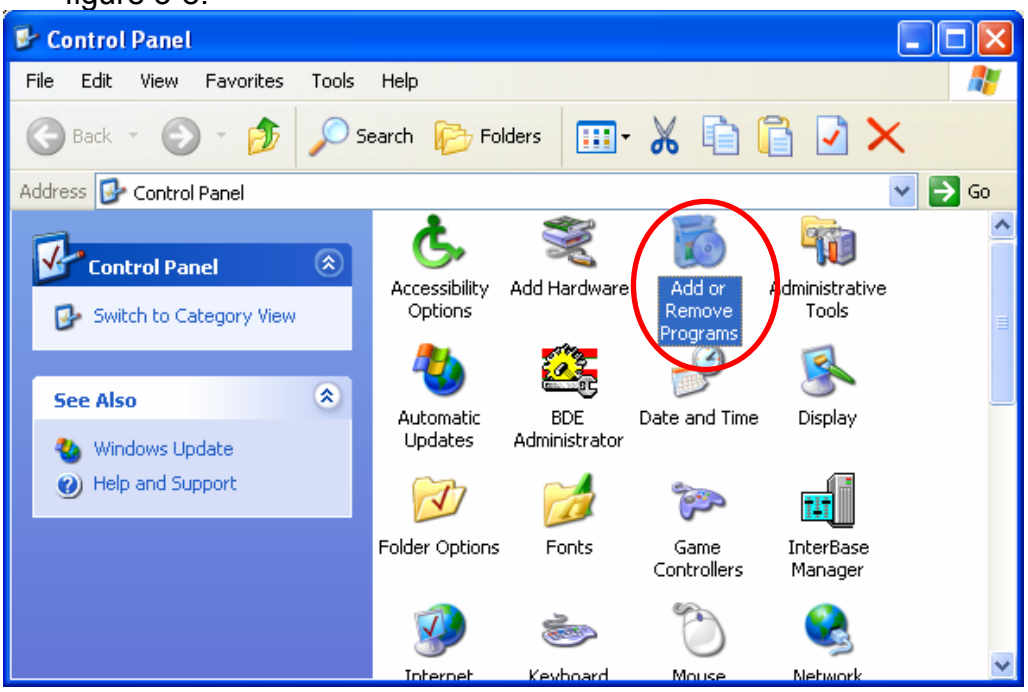


Figure 3-8: “Add/Remove Programs”

Step 3: Find out the i-7540D Utility, and click the Change/Remove button. See figure 3-9.

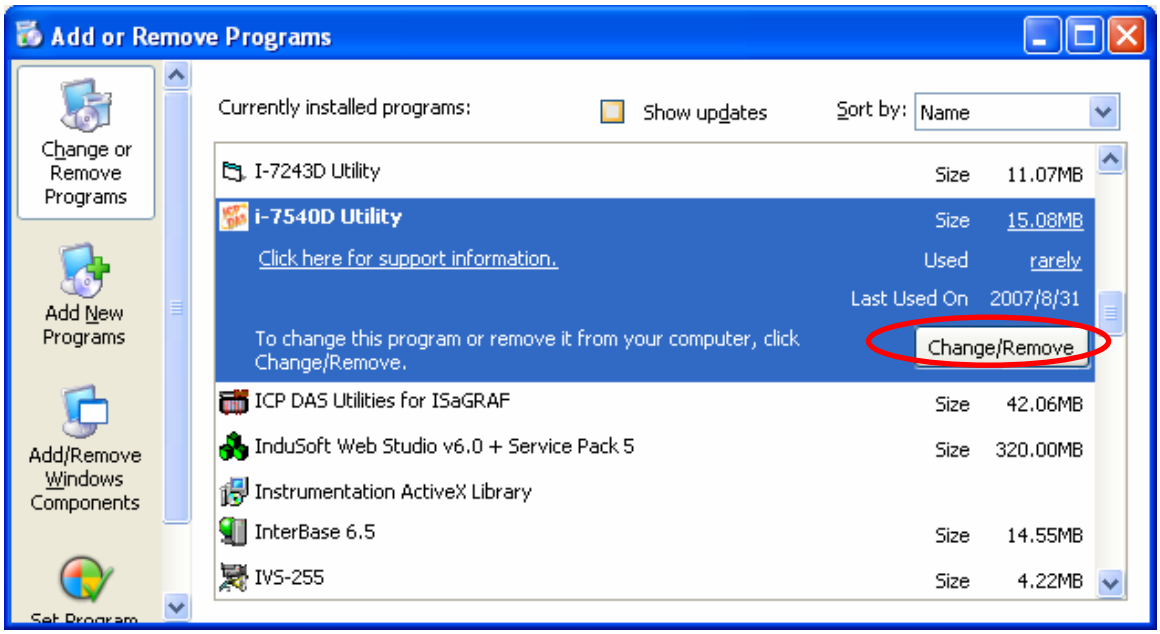


Figure 3-9: Click “Add/Remove Programs”

Step 4: Select the “Remove” option button, and press the “Next” button to remove i-7540D Utility. See figure 3-10.

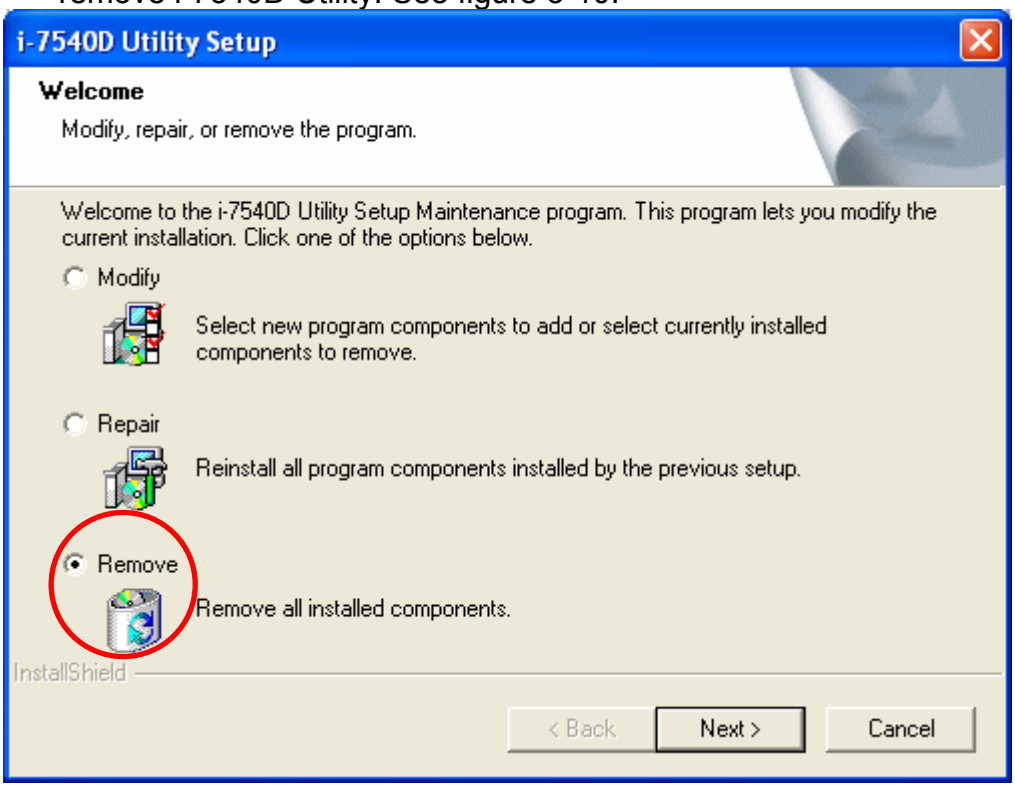


Figure 3-10: “Modify, repair, or remove the program” dialog

Step 5: Click the button “Yes” to remove the software as shown in figure 3-11.

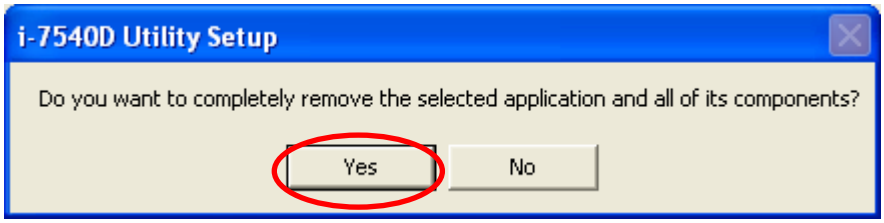


Figure 3-11: Click the button “Yes” to remove the software

Step 6: Finally, click the “Finish” button to finish the uninstall process.

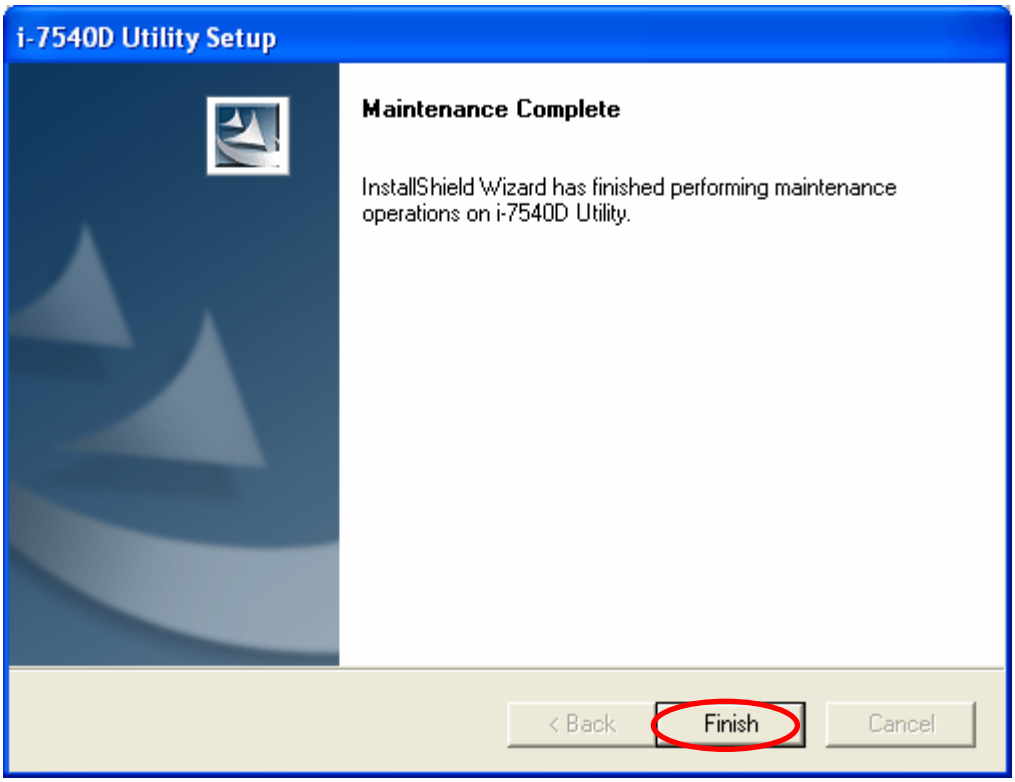


Figure 3-12: “Maintenance Complete” dialog.

3.1.2 How to configure the module parameters

The following procedure will guide you on how to configure the communication parameters for the CAN and Ethernet interface. The configuration steps are depicted as below:

1. Connect the power source (the 10~30 DC volts) into the i-7540D module.
2. The i-7540D module's Power LED will flash approximately once per second. And the 5-digits 7-segment LED will scroll to display some messages, please refer to section 2.4.3. That means the i-7540D module is working normally.
3. The user must run the i-7540D's Utility software after they have made a wire connection between the PC and the i-7540D via the network cable
4. Click the "Connect" icon on the i-7540D Utility tool bar. The setting frame will be popped up. Key-in the IP of the i-7540D and press the "Connect" button in order to connect with it. As shown in the following figure.

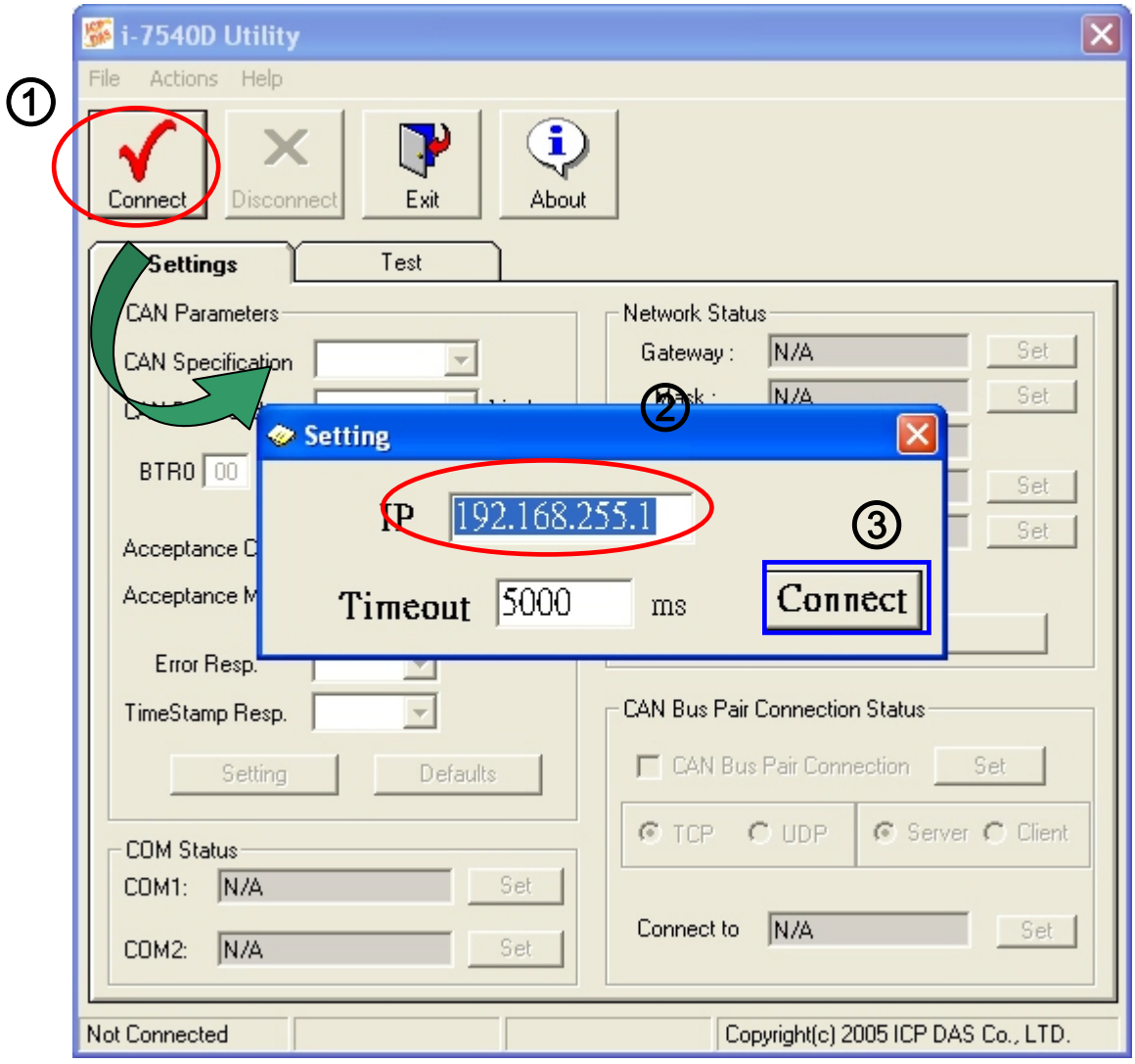


Figure 3-13: i-7540D's IP setting

5. Then the i-7540D configuration window will be brought out. The i-7540D Utility will show the communication information from the i-7540D module in the window, as shown in the following figure.

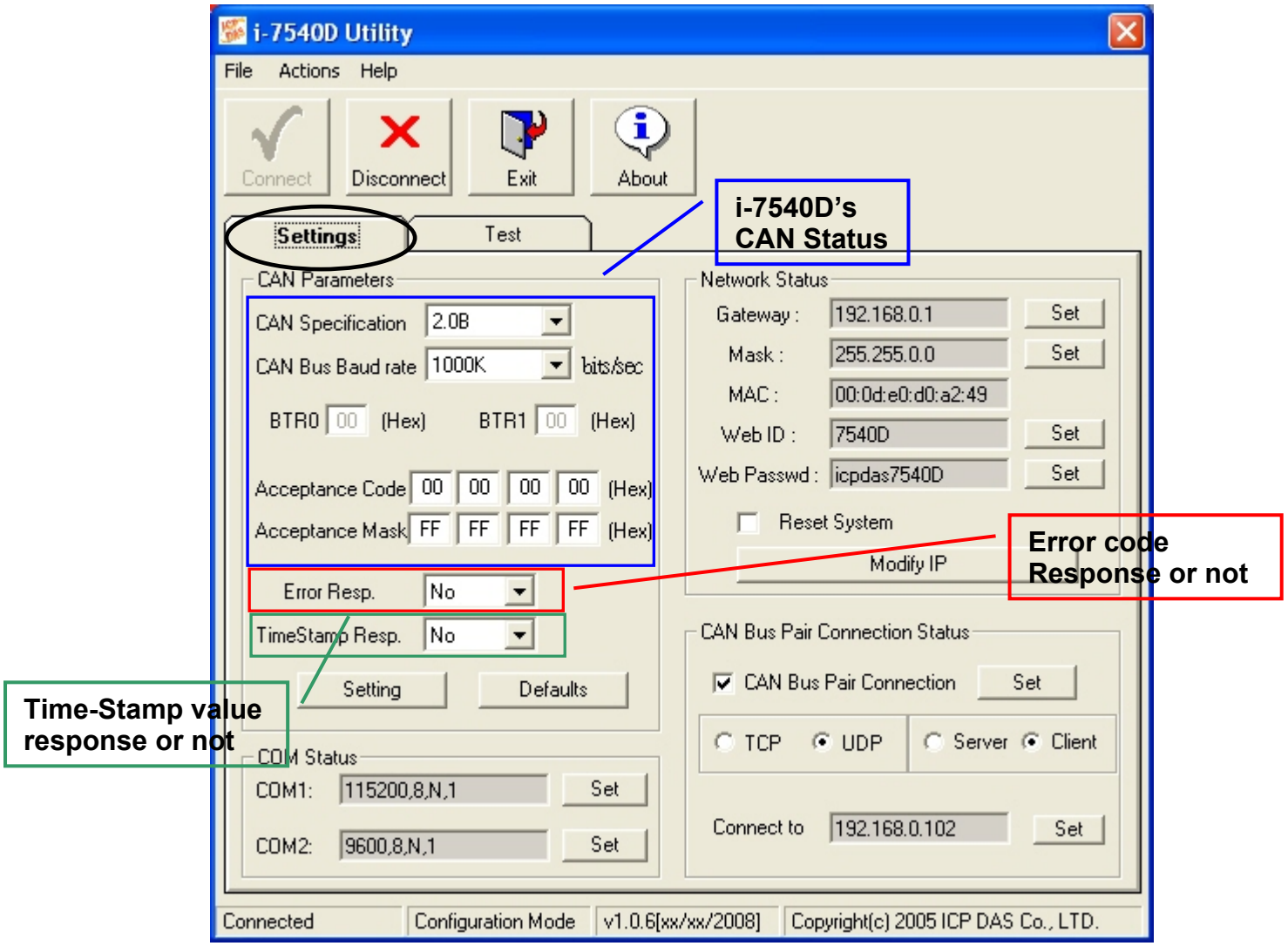


Figure 3-14: Connect to the configuration mode of the i-7540D

6. Choose the "Settings" tab to open the configuration window for the CAN and the Network status parameters of the i-7540D. Once users have finished changing the CAN parameter settings, please click the "Setting" button, on the "CAN Parameters" frame, to store the communication parameters into the EEPROM on the i-7540D.

Note: If users click the “Defaults” icon, all of the CAN communication parameters in the i-7540D will be set to the default values, which are:

CAN Specification = 2.0B
CAN bus Baud rate = 1Mbps
BTR0 = 00 BTR1 = 00
Acceptance Code = 00 00 00 00
Acceptance Mask = FF FF FF FF
Error Response = No
Timestamp Response = No

7. The “Network Status” frame displayed the IP, Gateway, Mask and MAC address of the i-7540D. Users can change these network parameters by click the “Set” button and “Modify IP” button. And the “Reset System” checkbox is used to reset the system of i-7540D.

Note: After modify the network status of the i-7540D, the setting value will become effective after resetting the system.

8. The “COM Status” frame showed the parameters of RS-232 and RS485 ports. User also can modify it by click the “Set” button.

9. The “CAN Bus Pair Connection Status” frame showed the parameters of CAN pair connection.

Note: After modify the CAN bus pair connection status of the i-7540D, the setting value will become effective after resetting the system.

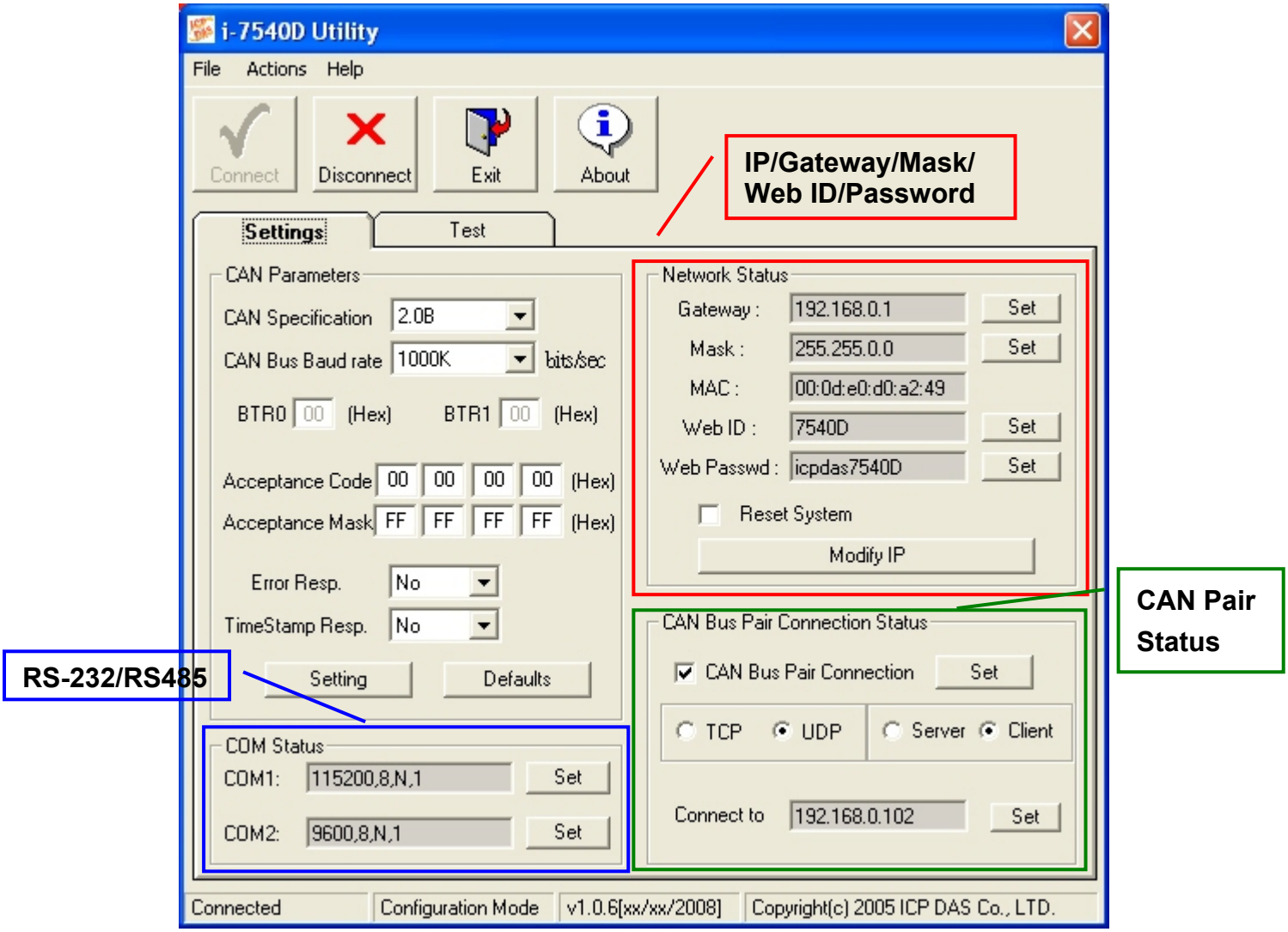


Figure 3-15: Network status, COM status and CAN pair status

3.1.3 How to set the Bus Timing Registers

BTR0, BTR1: Set the special user-defined baud rate.

Users can set arbitrary baud with these parameters. But users need to have the background of SJA1000 CAN controller and 82C251 CAN transceiver, and calculate the values of BT0 and BT1 by themselves (The clock frequency of CAN controller is 16MHz.).

3.1.4 How to set the Acceptance Code and Mask

Acceptance Code (AC): The CAN ID bits that you want to get.
Acceptance Mask (AM): The CAN ID bits that you want to filter.

In the acceptance code, the bit value ‘1’ means that you want to get this CAN ID bit. And in the acceptance mask, the bit value ‘0‘ means that you want to filter this CAN ID bit.

For 11-bit ID Message:

Register	bits of register	Filter Target
AccCode[0] and AccMask[0]	bit7~bit0	bit10 ~ bit3 of ID
AccCode[1] and AccMask[1]	bit7~bit5	bit2 ~ bit0 of ID
AccCode[1] and AccMask[1]	bit4	RTR
AccCode[1] and AccMask[1]	bit3~bit0	no use
AccCode[2] and AccMask[2]	bit7~bit0	bit7 ~ bit0 of 1st byte data
AccCode[3] and AccMask[3]	bit7~bit0	bit7 ~ bit0 of 2nd byte data

For 29-bit ID Message:

Register	bits of register	Filter Target
AccCode[0] and AccMask[0]	bit7~bit0	bit28 ~ bit21 of ID
AccCode[1] and AccMask[1]	bit7~bit0	bit20 ~ bit13 of ID
AccCode[2] and AccMask[2]	bit7~bit0	bit12 ~ bit5 of ID
AccCode[3] and AccMask[3]	bit7~bit3	bit4 ~ bit0 of ID
AccCode[3] and AccMask[3]	bit2	RTR
AccCode[3] and AccMask[3]	bit1~bit0	no use

Note:

1. AccCode[0] means the most significant byte of AccCode and AccCode[3] means the least significant byte of AccCode.
2. AccMask[0] means the most significant byte of AccMask and AccMask[3] means the least significant byte of AccMask.
3. Bit10 is most significant bit and Bit0 is least significant bit.

For example (In 29 bit ID message):

AccCode: 00h 00h 00h A0h

AccMask: 00h 00h 00h 1Fh

ID Value : ?? ?? ?? Ah and Bh will be accepted. (??: don't care)

(Note: The mark “h” behind the value means hex format.)

3.1.5 Enable Error Response

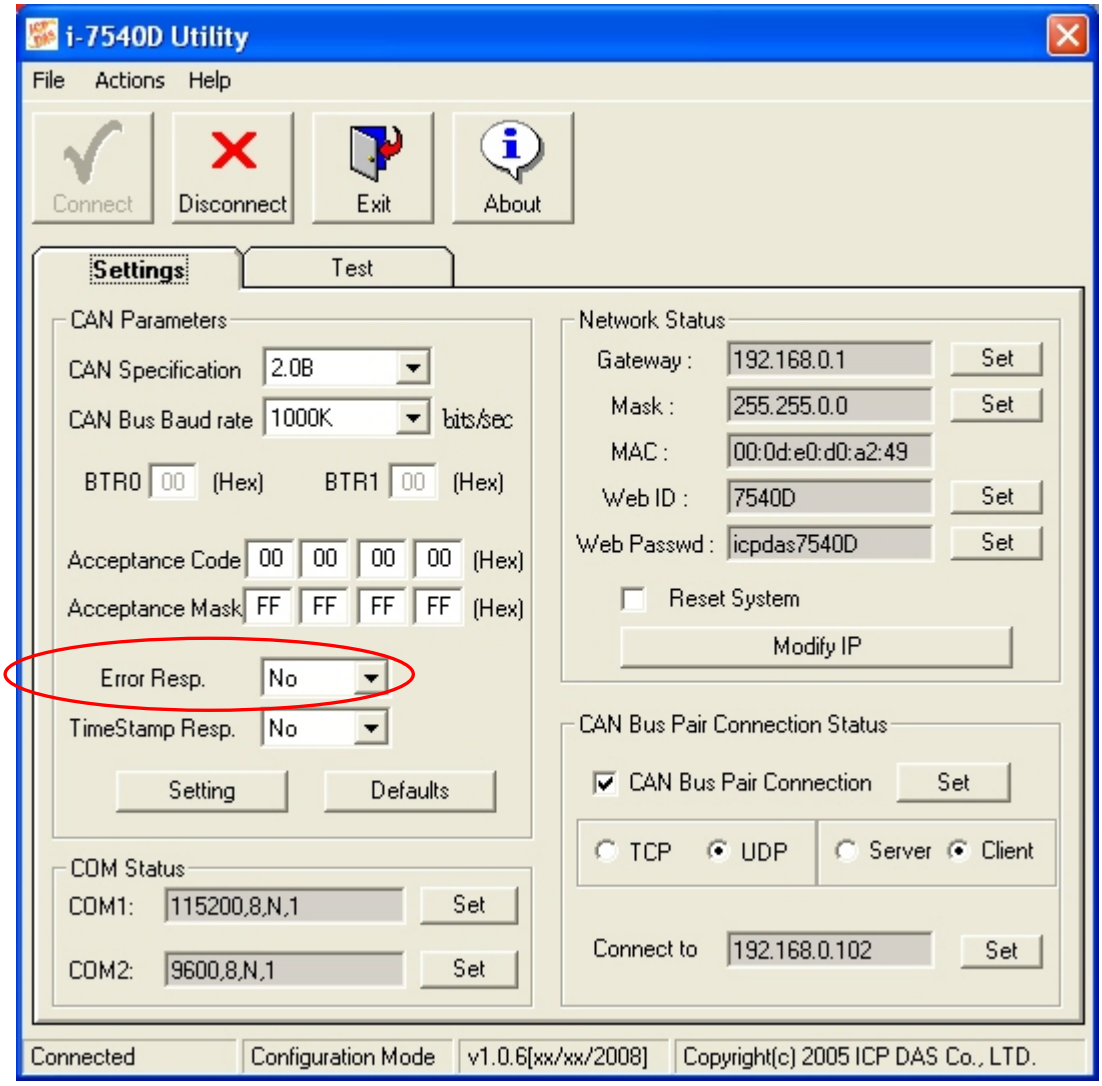


Figure 3-16: Error Response

When the i-7540D receives a command that it doesn't accept, it will response syntax and/or communication error information to the host. These general error codes are shown in below table.

AsciiToHex (Error code)	Description
1	The head character of the command string is invalid.
2	The length of the command string is invalid.
3	The value of CAN identifier is invalid.
4	The value of CAN data length is invalid.
5	Reserved

3.1.6 Enable Time-stamp Response

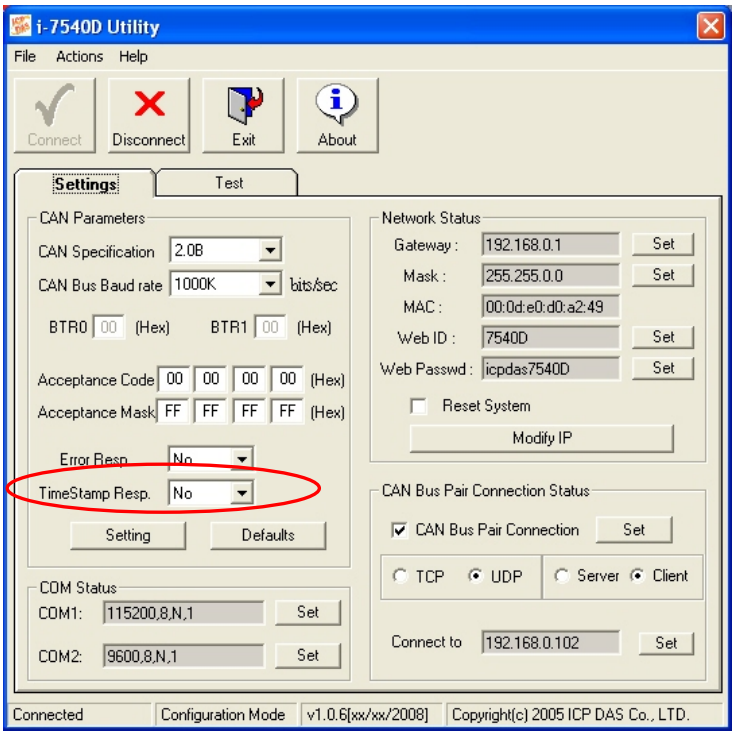
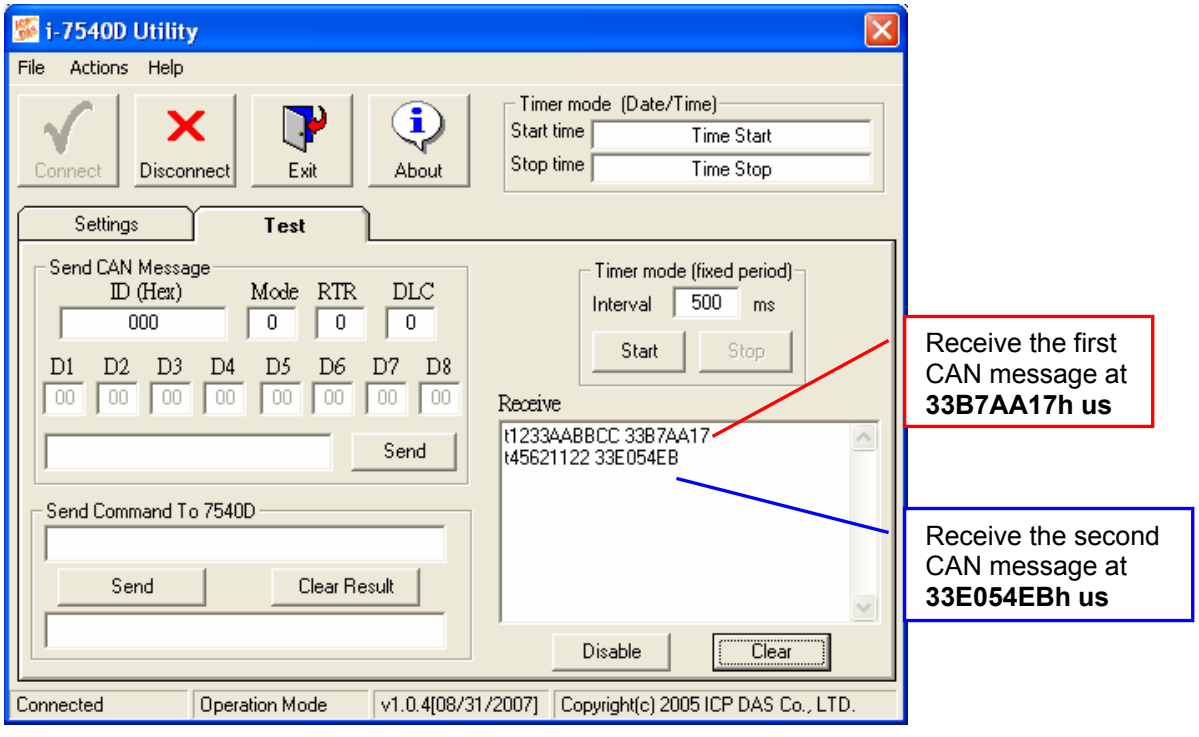


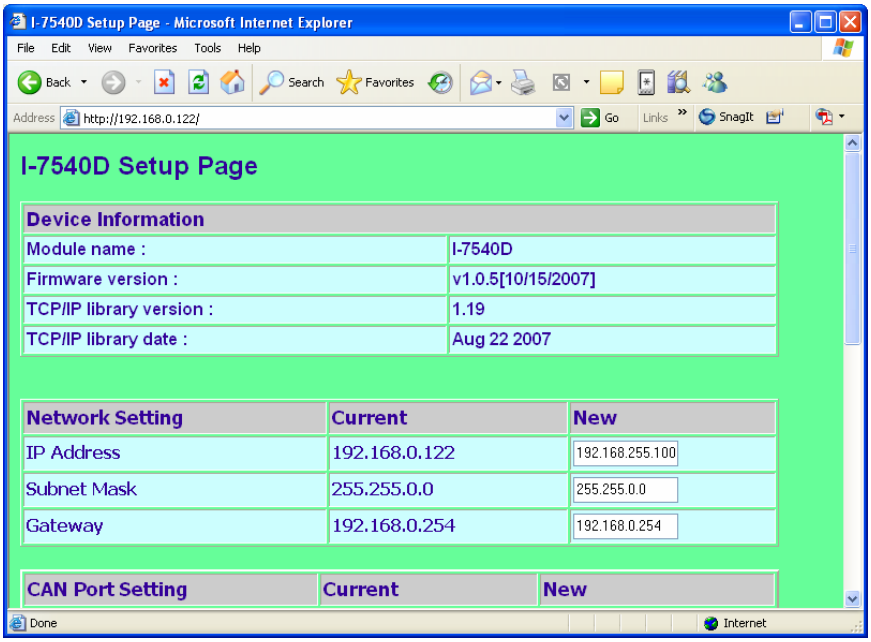
Figure 3-17: Time-Stamp Response

When the time-stamp response is enabled, the i-7540D will send CAN message with it's time-tick vale, hexadecimal eight ASCII chars for a unit of microsecond, to the host as it receive a CAN message. For example:

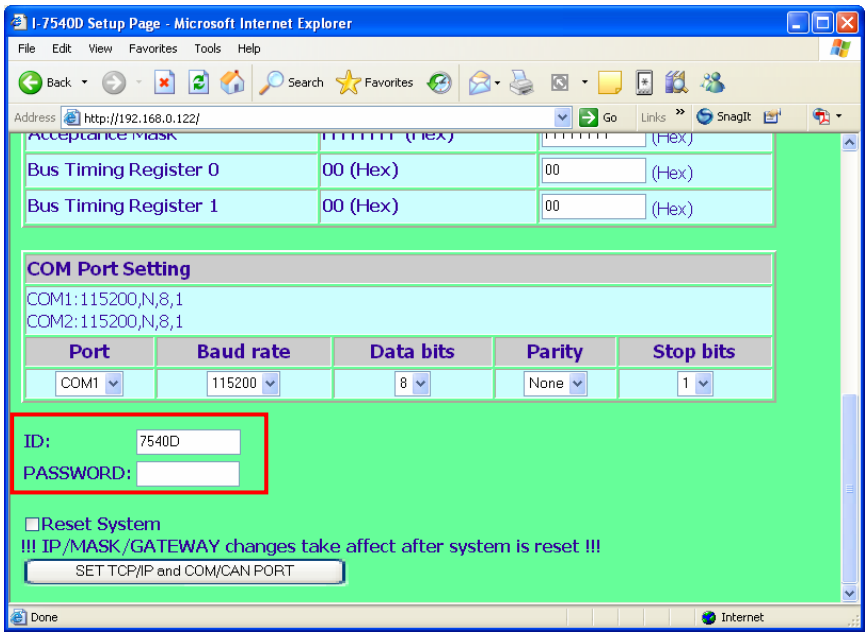


3.1.7 How to change web ID/PASSWORD configuration

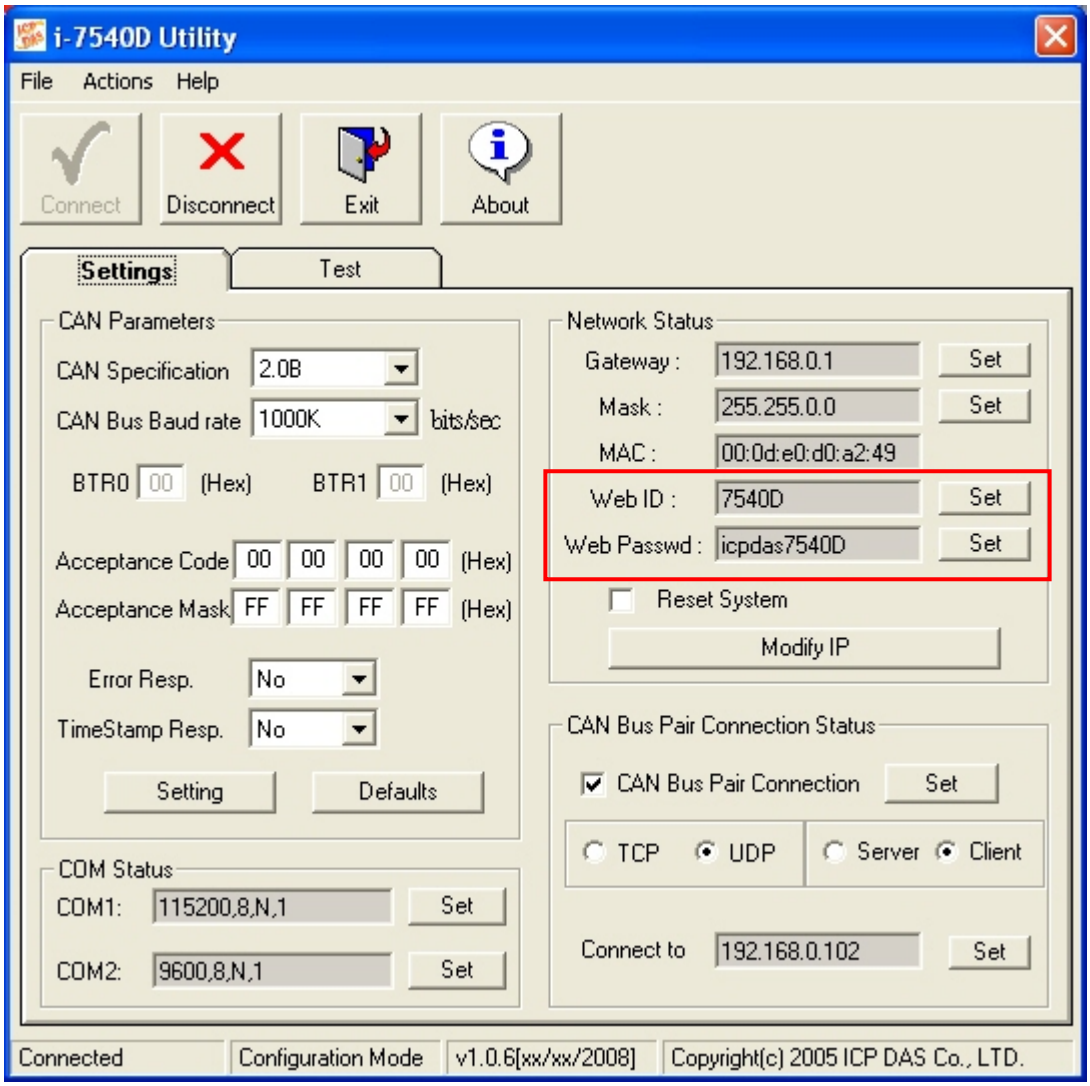
The i-7540D module has a built-in web server that allows user to easily configure the module from a remote location using a regular web browser.



When users want to modify the configuration of i-7540D via Setup web page, they need to fill these two fields, ID and PASSWORD, with correct values. Or they can view the configuration of i-7540D, and can't modify the configuration.



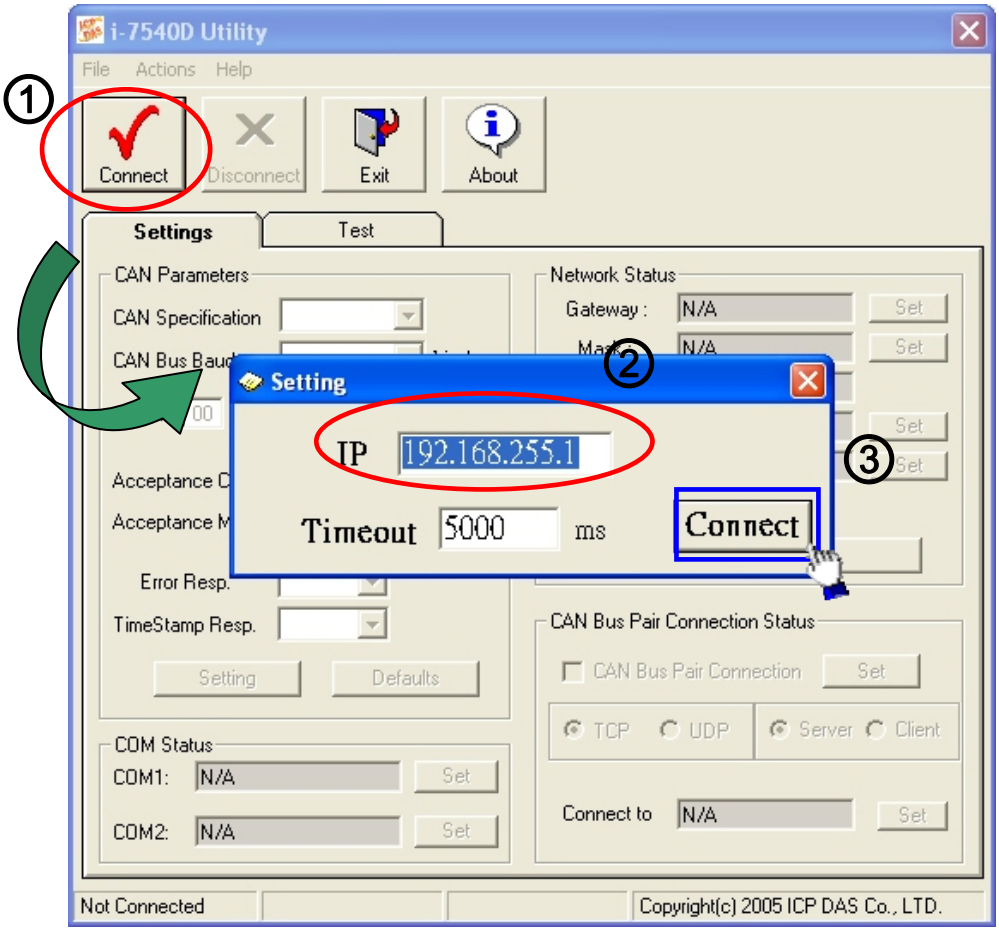
If users want to change the ID and PASSWORD, they need to modify these two parameters by using Utility tool. The default setting of ID is “7540D”, and default PASSWORD is “icpdas7540D”.



3.1.8 How to test the module transmission performance

The following procedure will guide you to learning how to transmit/receive CAN messages to/from other devices/PCs by using the i-7540D converter.

1. Connect the i-7540D's CAN port into the CAN network, which must at least have one CAN device on the network.
2. Supply the 10~30 volts DC source into the i-7540D module through the power terminal.
3. The i-7540D module's Power LED will flash approximately once per second. And the 5-digits 7-segment LED will scroll to display some messages. That means the i-7540D is working in the operation mode.
4. Run the i-7540D Utility software after they have made a wire connection between the PC and the i-7540D via the network cable
5. Click the "Connect" icon on the i-7540D Utility tool bar. The setting frame will be popped up. Key-in the IP of the i-7540D and press the "Connect" button in order to connect with it. As shown in the following figure.



6. Select the “Test” tab in order to test the function of transmission and reception via the i-7540D module. In “Send CAN Message” frame, user can send the necessary CAN message to Ethernet port 10003 of 7540D. Then 7540D will transfer and transmit this message to CAN bus. In the “Send Command to 7540D” frame, users can send command to 7540D for getting or setting the status or parameters of 7540D.

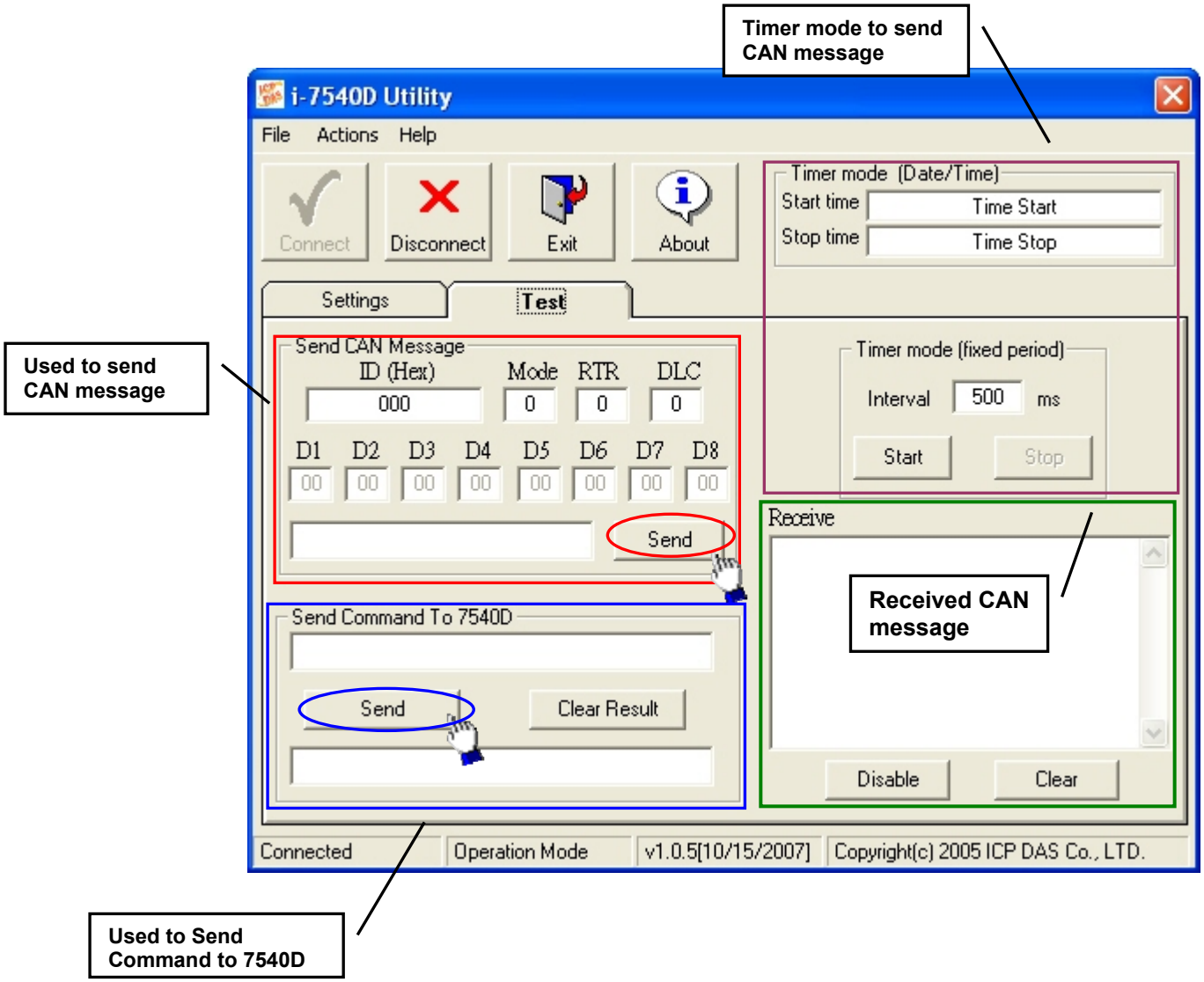


Figure 3-18: Send and receive CAN messages

7. Users also can use the timer mode to send CAN message in fixed period. And the start/stop time would be displayed in Date/Time format. And when receiving correct CAN message, these CAN message will be displayed on the “Receive” box.

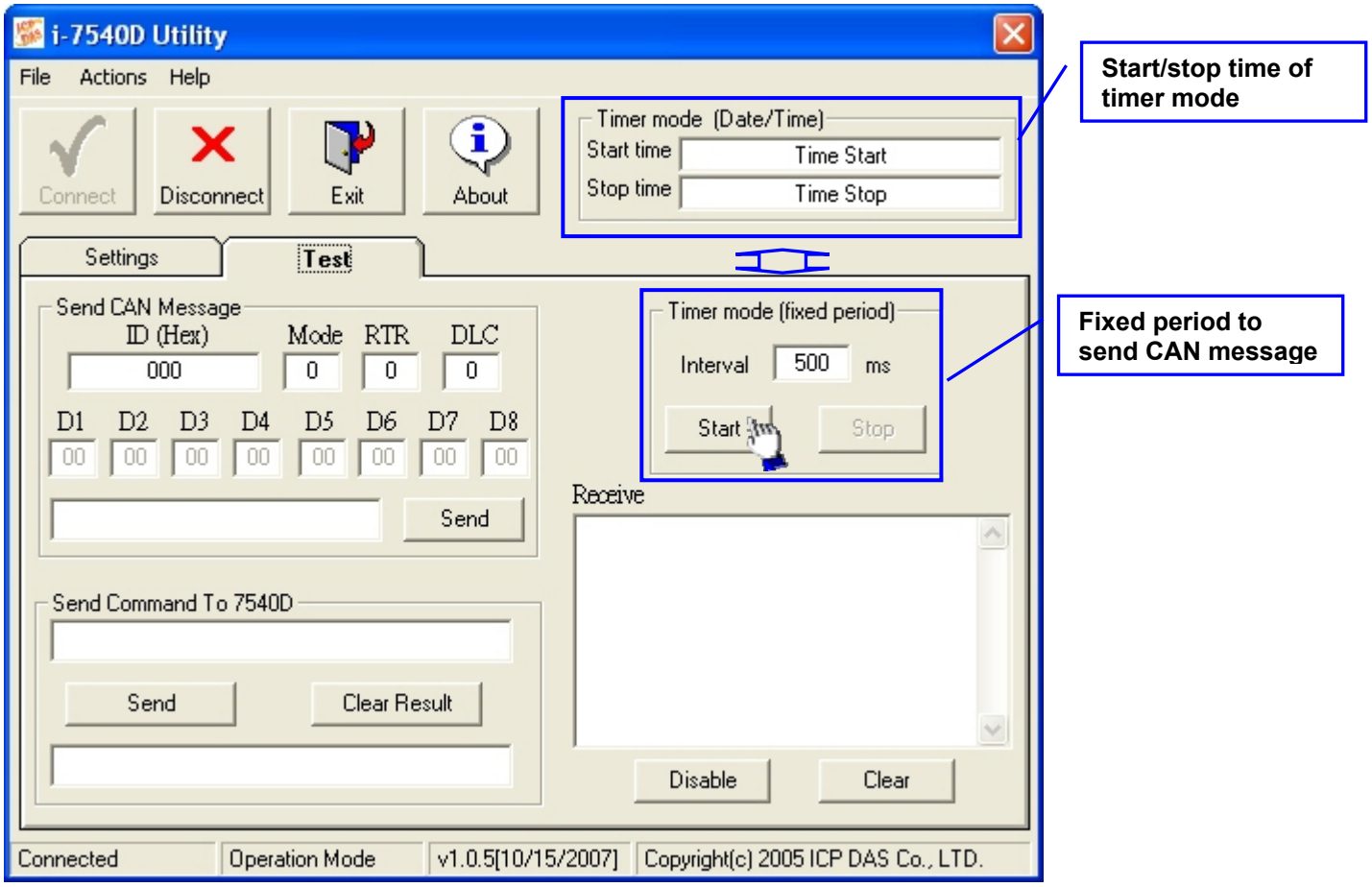


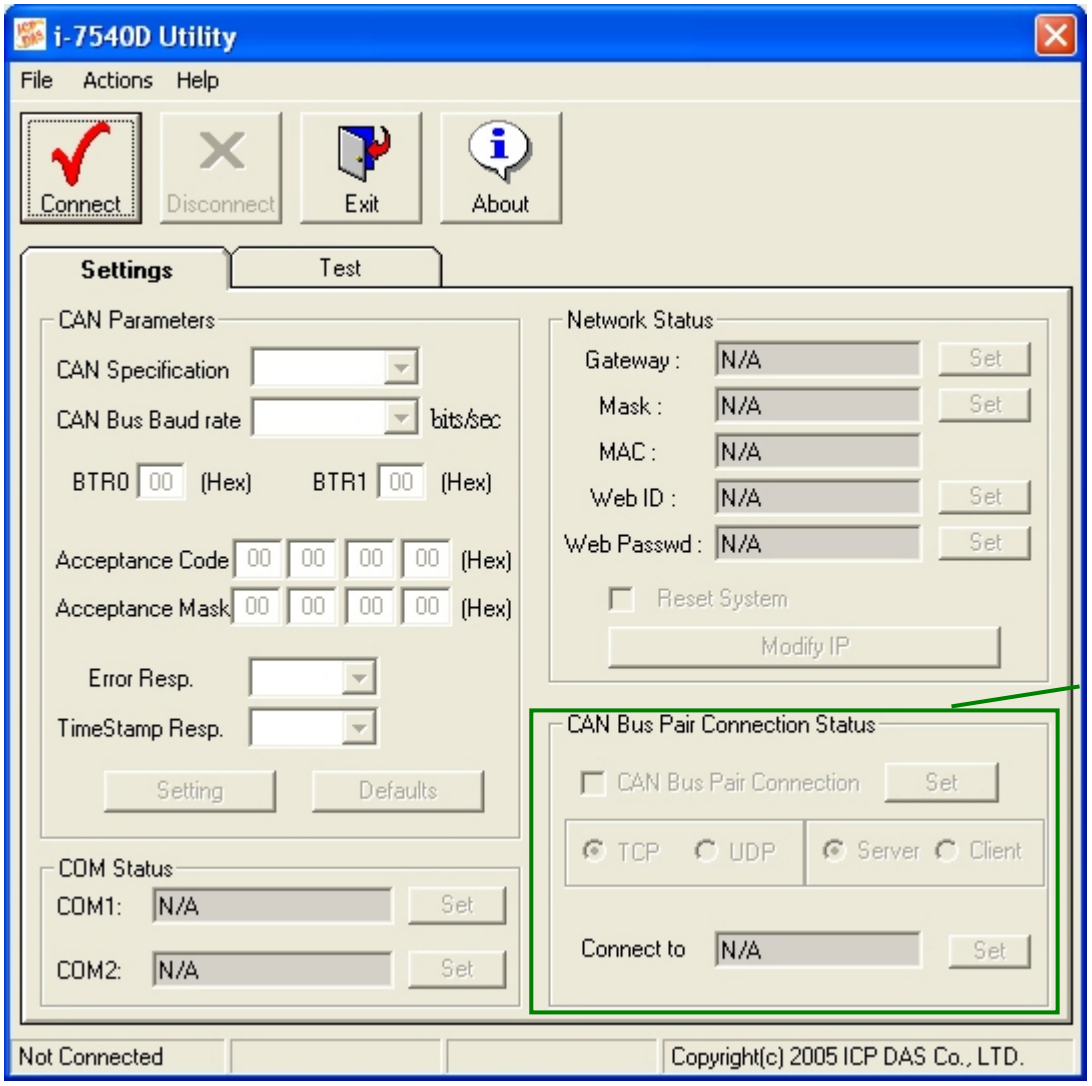
Figure 3-19: Timer mode to send CAN message

3.1.9 How to use CAN Bus Pair Connection

The firmware v1.06 or later and Utility v1.04 or later support CAN bus pair connection UDP/TCP function. User can refer the following application to use this function.

Note:

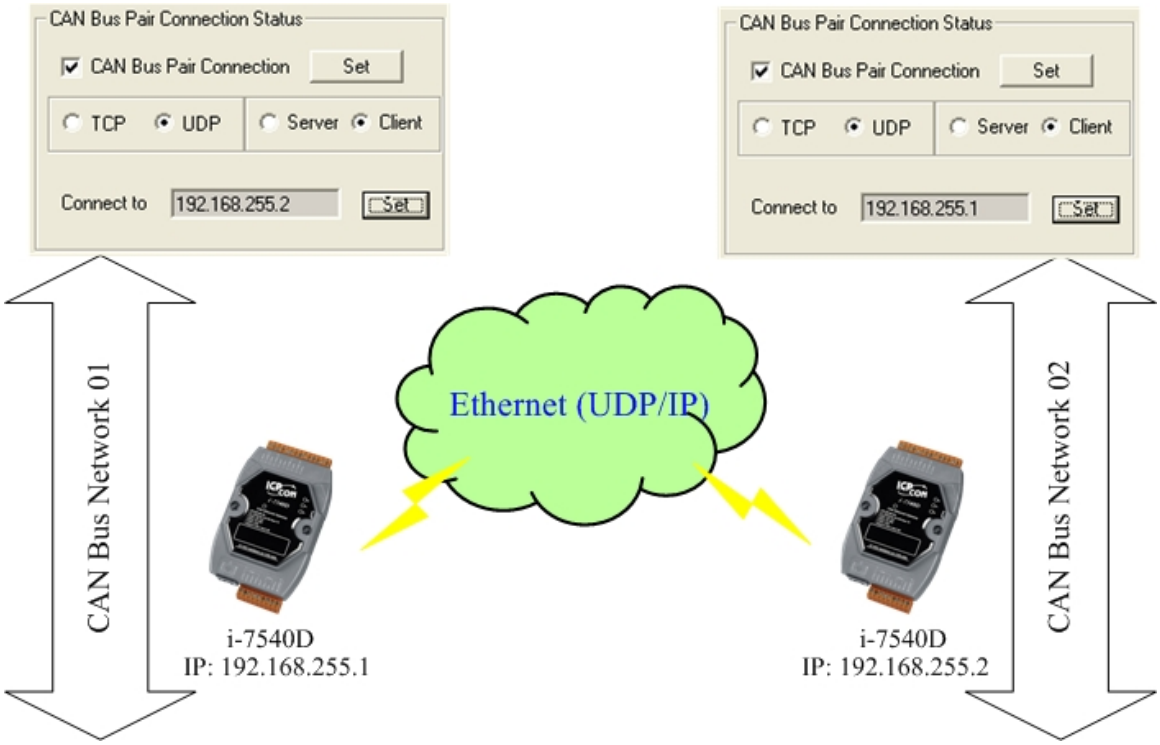
After setting “Enable CAN Bus Pair Connection”, all data send to this i-7540D via Ethernet port 10003 will become no effective. And the VxComm port of 7540D’s COM3(CAN port) will become no effective.



CAN Pair Status

Application 01: one-to-one communication

CAN Bus Pair Connection by using UDP method (port: 57540).



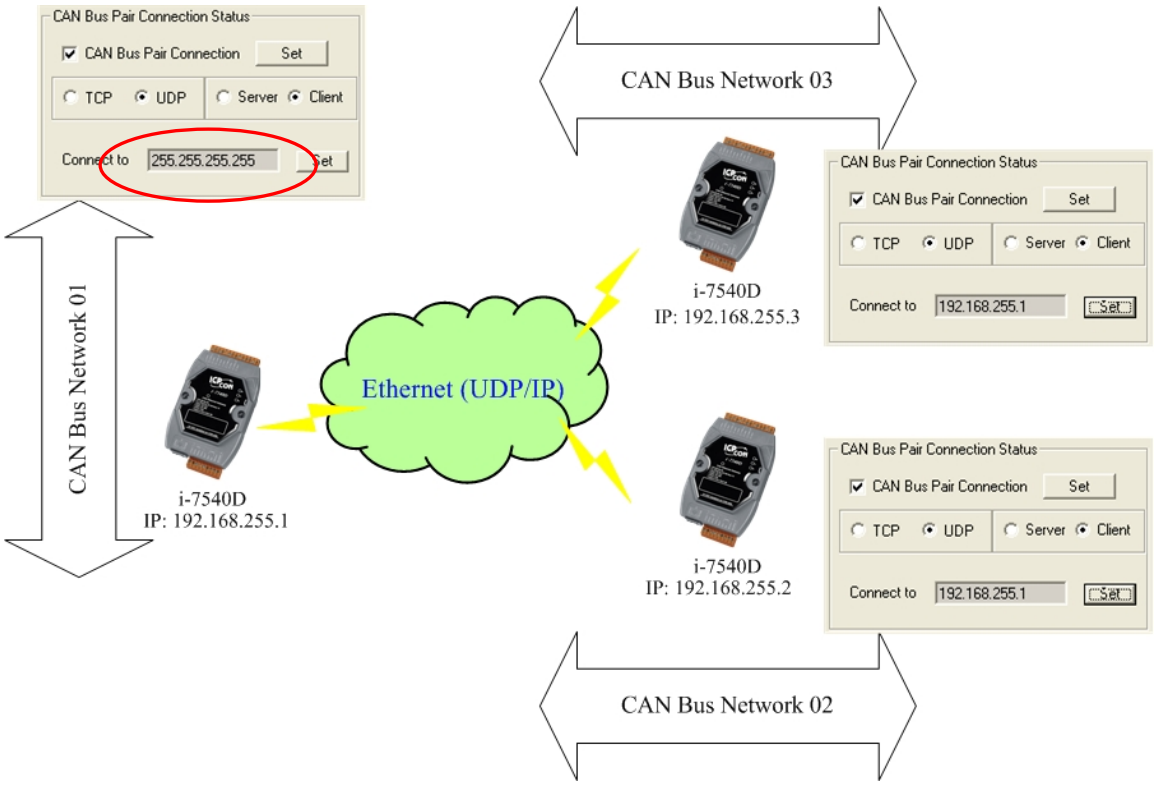
After setting “CAN Bus Pair connection Status” of the two i-7540D and re-start the system of them, CAN messages between “CAN Network 01” and “CAN Network 02” can be exchanged by UDP/IP protocol through Ethernet network.

Note:

When setting to use UDP method, the “Server/Client” parameters will be no effective.

Application 02: one-to-many communication (broadcast)

CAN Bus Pair Connection by using UDP method (port: 57540).



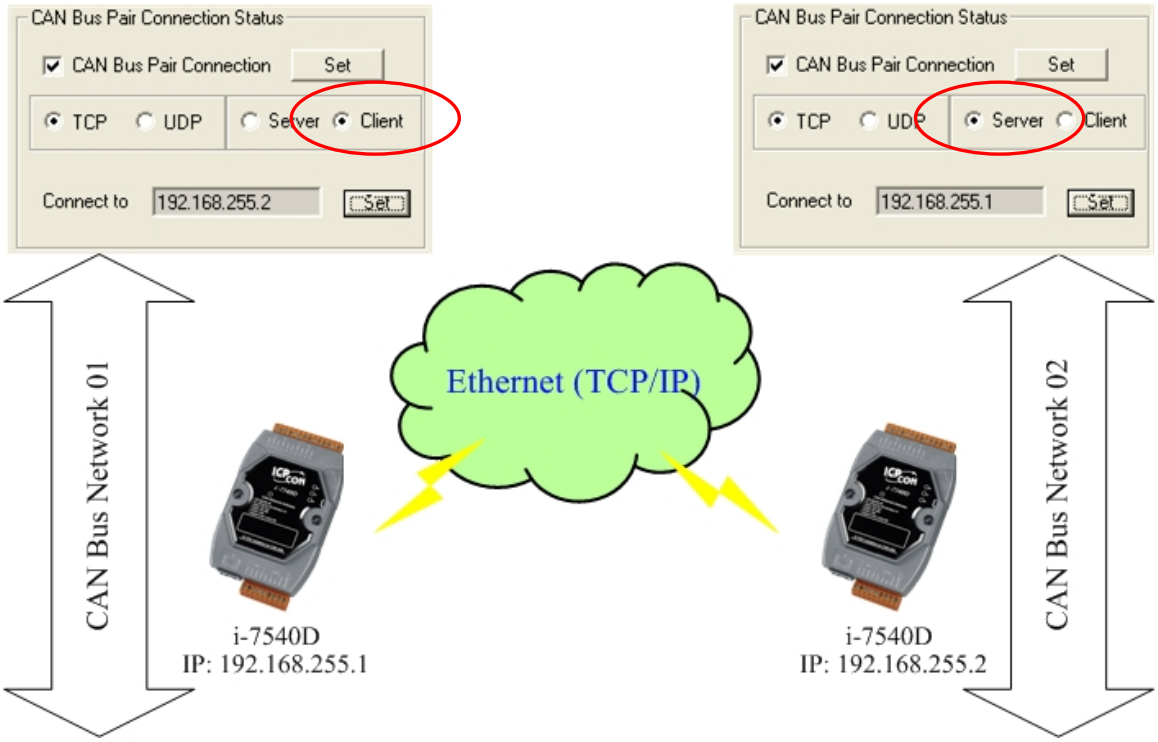
1. After setting “CAN Bus Pair connection Status” of these i-7540D and re-start the system of them, CAN messages on “CAN Network 01” will be sent to “CAN Network 02“ and “CAN Network 03“ by using UDP/IP protocol via Ethernet network.
2. All CAN message on “CAN Network 02“ will sent to “CAN Network 01“ by using UDP/IP protocol via Ethernet network.
3. All CAN message on “CAN Network 03“ will sent to “CAN Network 01“by using UDP/IP protocol via Ethernet network.
4. By using this broadcast method, users need to know how to set the network mask of the i-7540D.

Note:

When setting to use UDP method, the “Server/Client” parameters will be no effective.

Application 03: One acts as a server, the other acts as a client.

CAN Bus Pair Connection by using TCP method (port: 10003).



After setting “CAN Bus Pair connection Status” of the two i-7540D and re-start the system of them, CAN messages between CAN Network 01 and CAN Network 02 can be exchanged by TCP/IP protocol through Ethernet network.

Note:

When setting to act as a TCP server, the “Connect to (Destination IP)” will be no effective.

3.2 MiniOS7 Utility

MiniOS7 Utility is a tool for configuring, uploading files to all products embedded with ICPDAS MiniOS7. And it provides some PC diagnostic tools which can help users to diagnose the status of the i-7540D and other controllers.

Supported connection ways

- COM Port Connection
- Ethernet UDP & TCP Connection

Maintenance

- Upload file(s)
- Update MiniOS7 image
- Delete file(s)

Configure

- Date & Time
- IP Address
- COM port

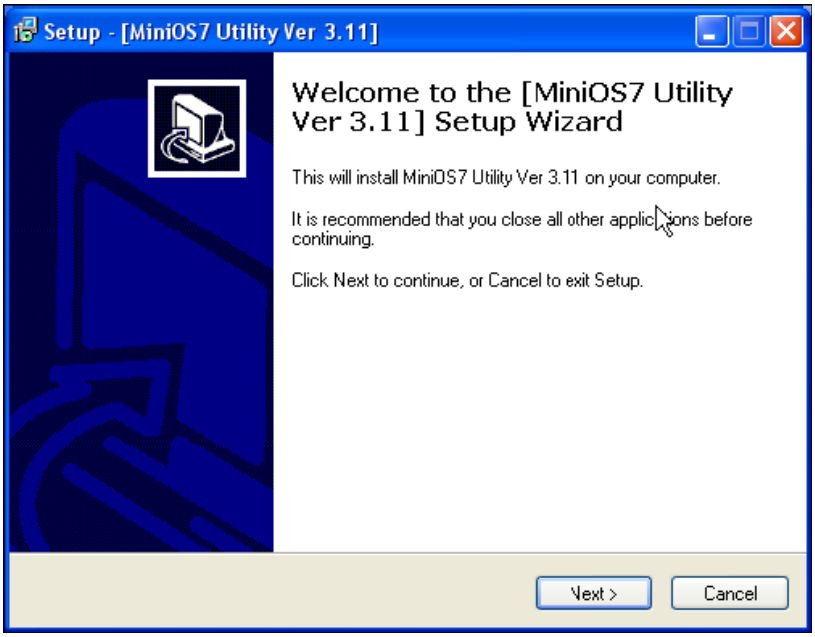
Check

- Product information

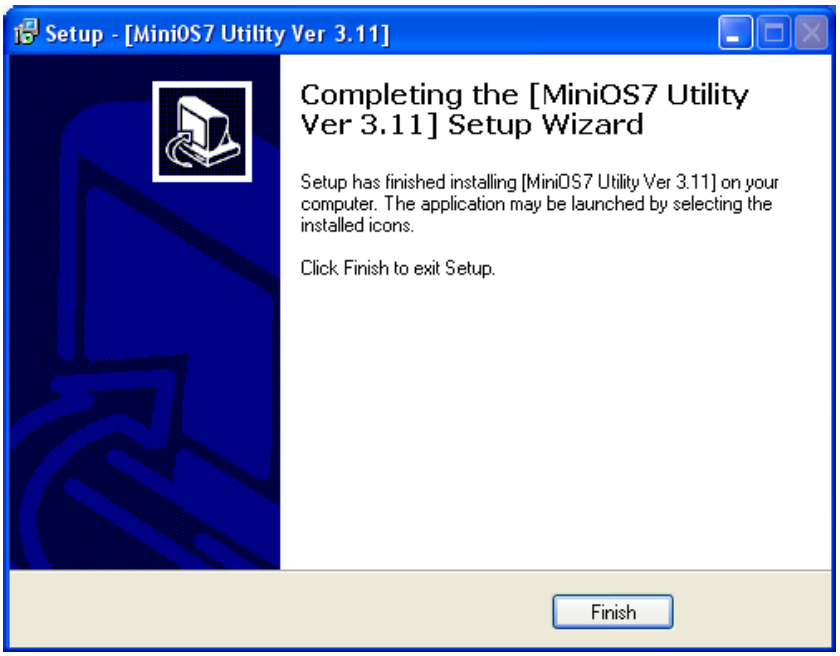
3.2.1 Install the MiniOS7 Utility

Step 1: The installation software can be obtained from the following location.
8000cd:\\Napdos\MiniOS7\utility\MiniOS7_utility\ or
http://ftp.icpdas.com/pub/cd/8000cd/napdos/minios7/utility/minios7_utility/

Step 2: Go to where you downloaded the file, and double-click on the installation file in Windows to execute it.

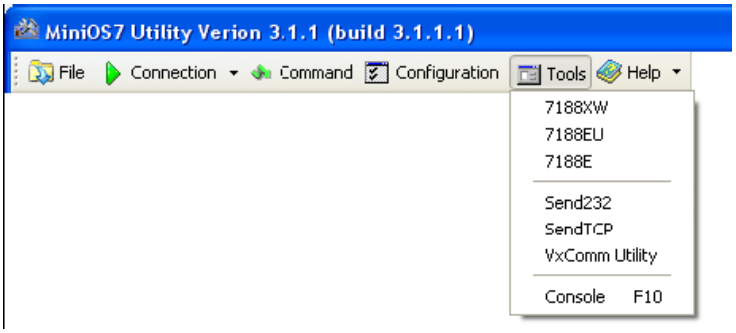


Step 3: To finish the installation of the MiniOS7 Utility, click the Finish button to exit the setup process.



3.2.2 PC Diagnostic tools

The MiniOS7 Utility provides serial PC diagnostic tools. These PC diagnostic tools can be opened from the Tools menu of MiniOS7 Utility.



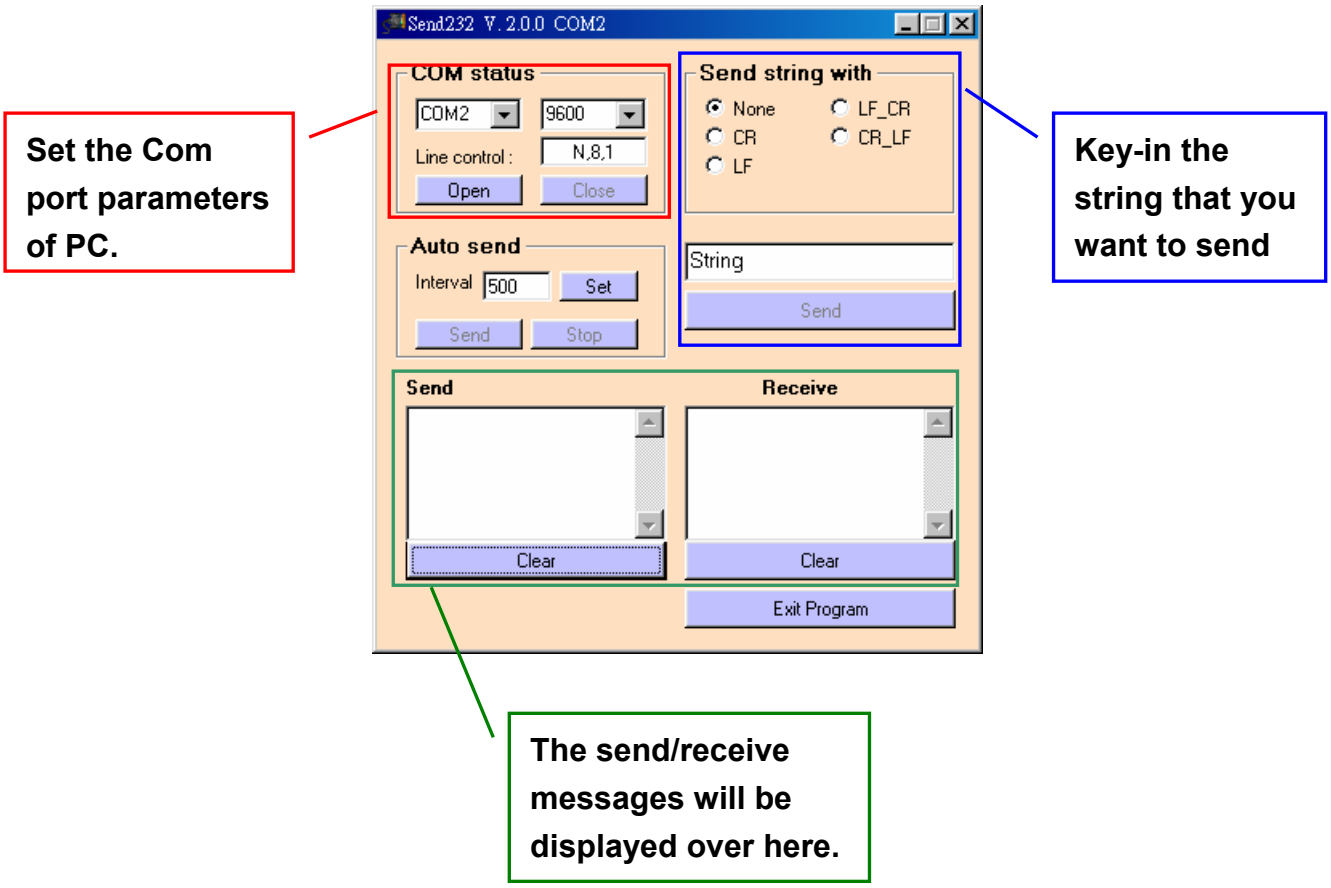
The PC Diagnostic tools include:

- **7188XW**: is the PC side utility for modules using the ICPDAS MiniOS7. It is the Win32 version of 7188x.exe. For 7188x.exe just can use the standard COM PORT(RS-232) of PC, But on Win32 systems (WIN95/98/ME/NT/2K/XP) also have RS-232 port use PCMCIA or USB interface, 7188x.exe can not use these devices, so need the program 7188xw.exe. Using RS-232 ports of PC link to the modules using MiniOS7. 7188xw.exe in basically is a terminal program. It send out the data that user key-in to COM port, and show the data received from COM port on the screen of PC. The main function for 7188xw.exe is to DOWNLOAD files to the MiniOS7 system.

  Please download related files from our FTP site
  http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/minios7/utility/

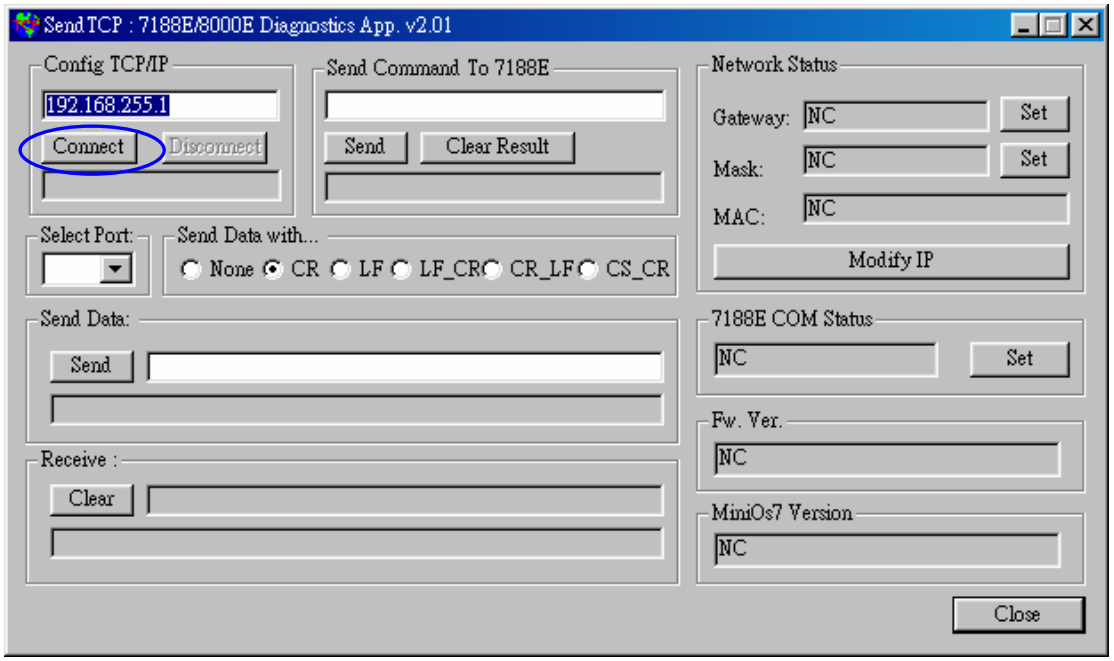
  7188XW command List
  http://ftp.icpdas.com/pub/cd/8000cd/napdos/minios7/utility/document/

- **Send232**: uses serial port (RS-232) interface to communicate with devices. And it can be used to test the Virtual COM technology.

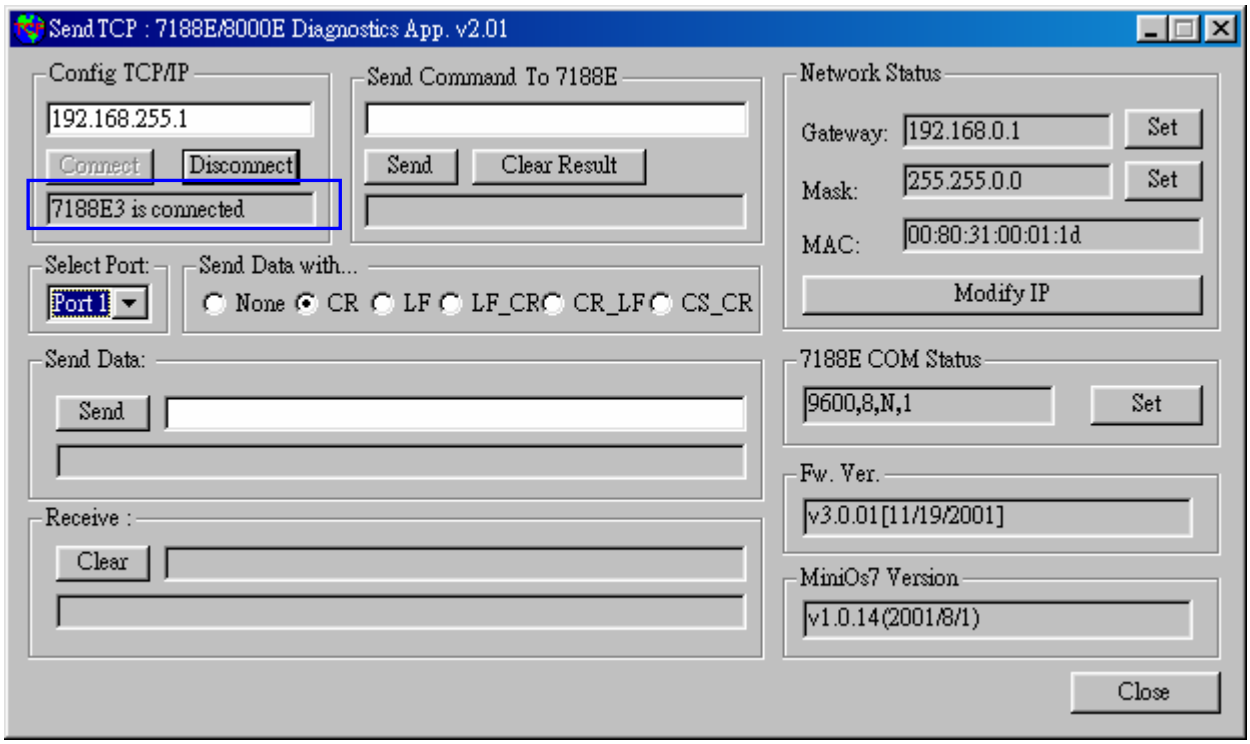


- **SendTCP**: uses TCP protocol to communicate with the 7188E/8000E/7540D and other devices from Ethernet.

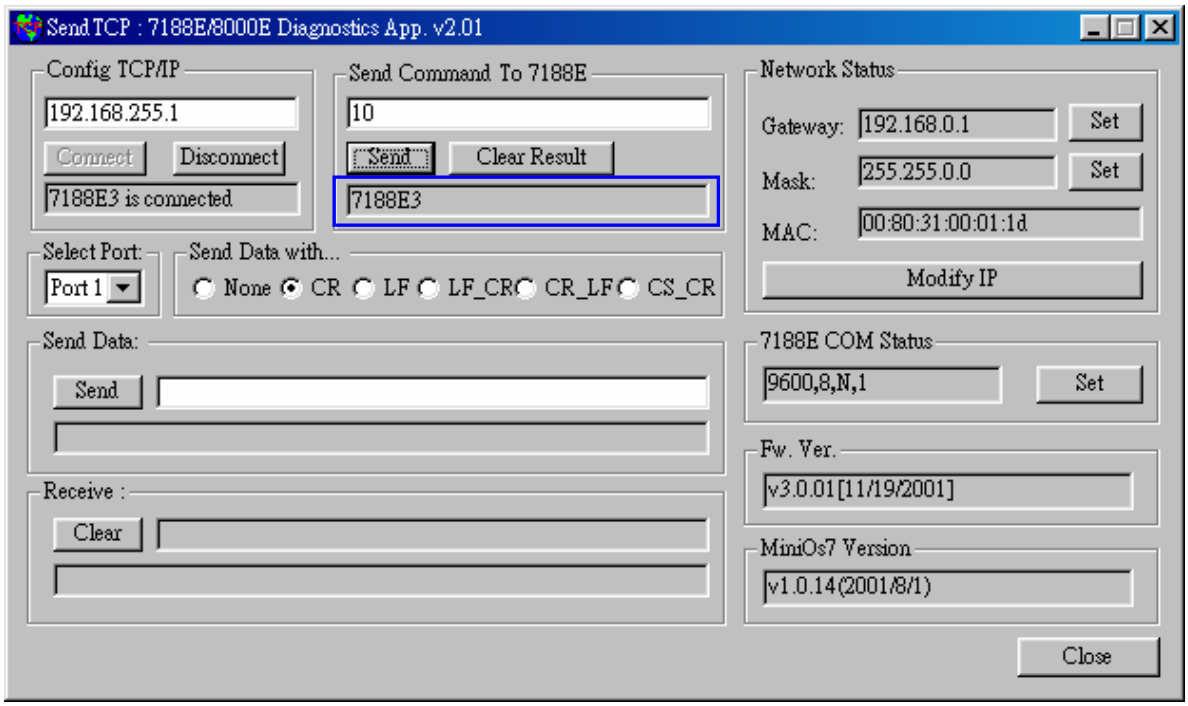
Step 1: Run SendTCP in host-PC.



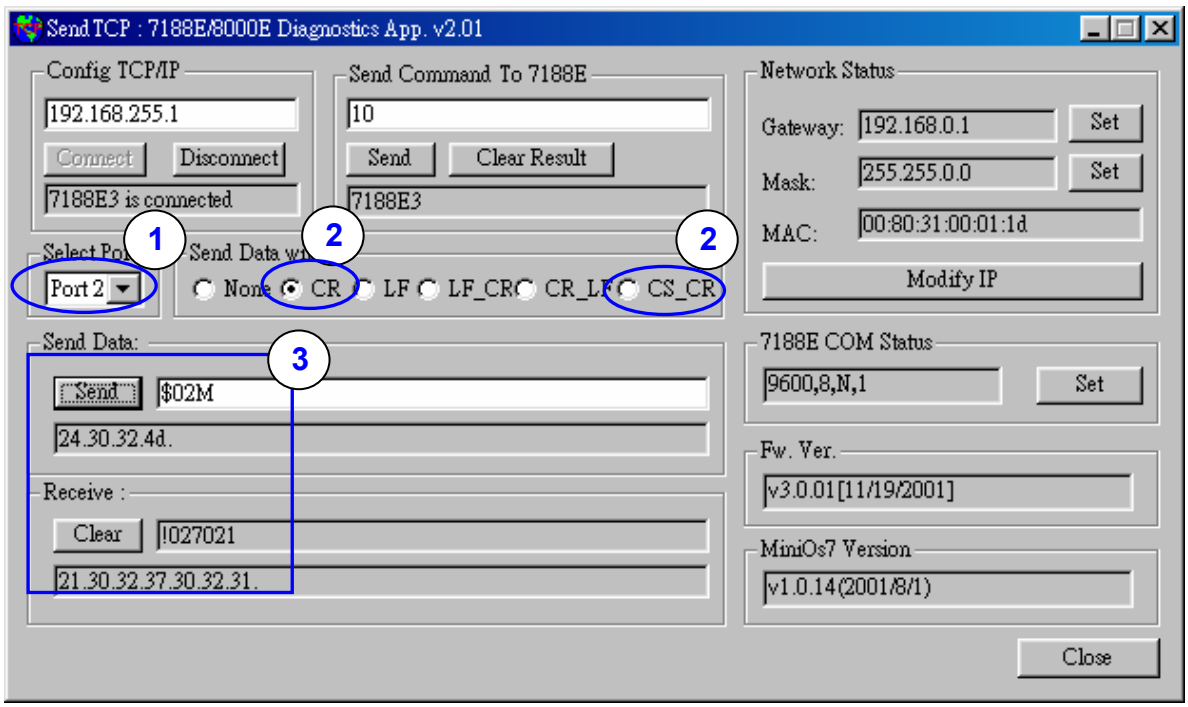
Step 2: Input the IP of i-7540D and press the "**Connect**" button to connect with i-7540D. And then it will display "7188E3 is connected".



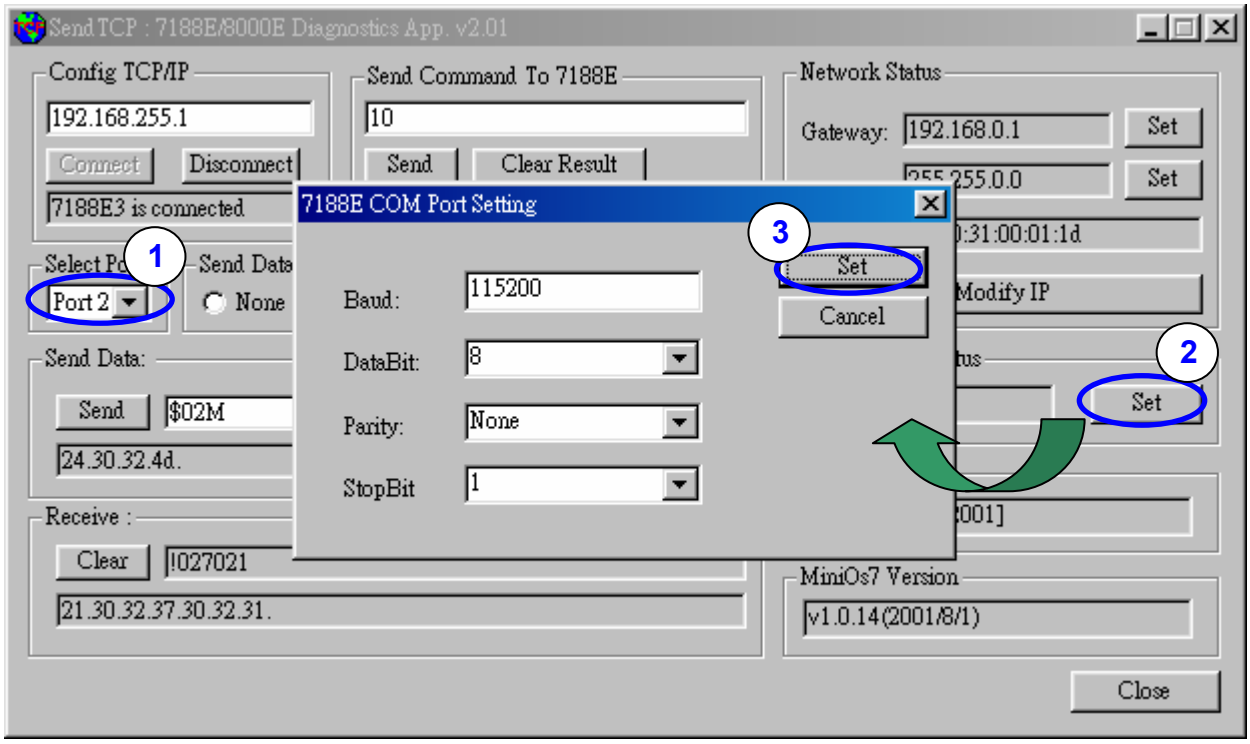
Step 3: Send command "**10**" to the i-7540D. And it will response "7188E3 message.



Step 4: Select "**Port 2**" and "**CR**". Then send "**$02M**" to read 7000 module's ID which is connected to i-7540D's COM2. If you enable 7000 module's checksum function, select "**CS_CR**". The "**CS_CR**" option will add two checksum bytes, then adds "**CR**".



Step 5: If you want to change the 7540D's COM ports settings, click "**Set**" to change them. The 7540D's COM port that you want to configure is specified by "**Select Port**" combo list. Port 2 means you want to configure the 7188E's COM2.



- **7188E**: Command-prompt mode program, used to send data to specific machines using TCP protocol.

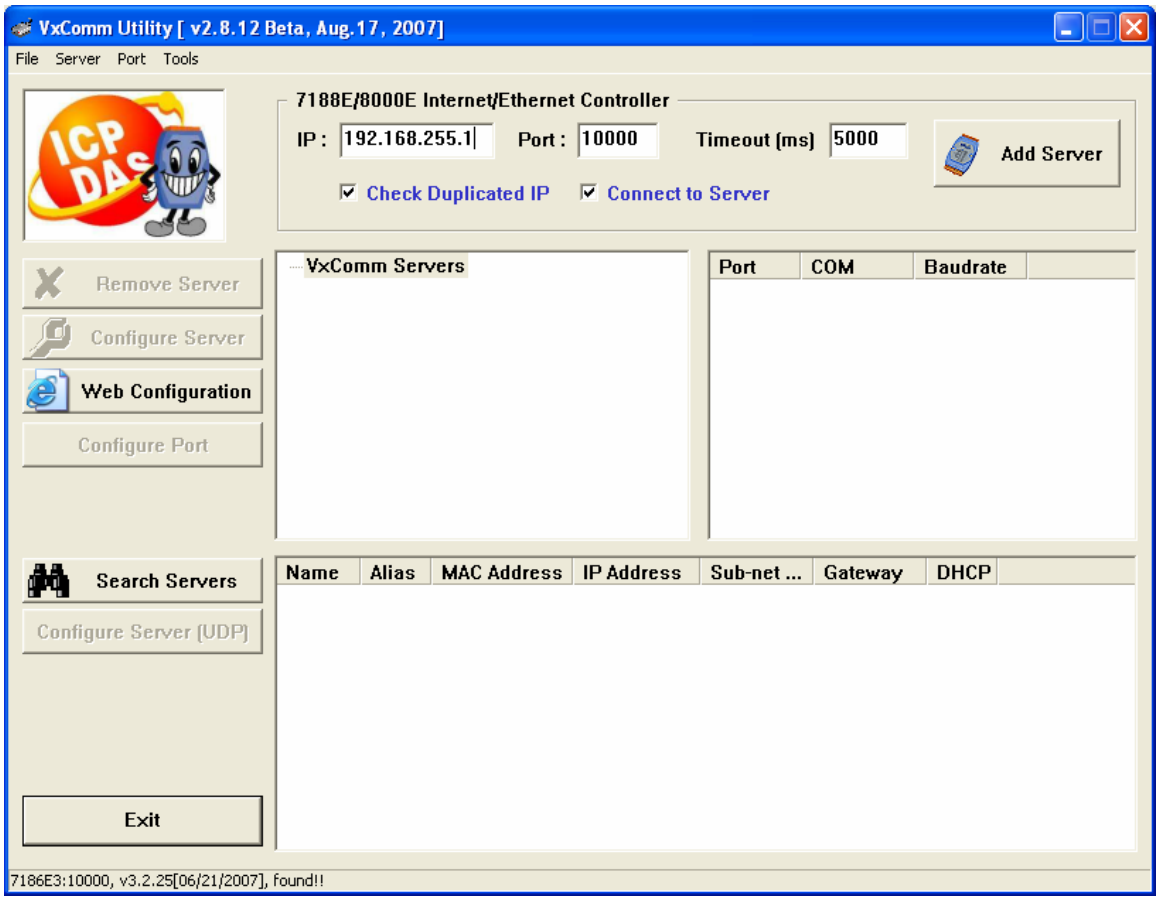
  Usage:
  7188e [-S:IP] [-P:Port]: Connect to a device by using TCP protocol.
  ***Q**: Quit program and disconnect.

```
C:\Program Files\7188E\PCDiag>7188e -s:192.168.30.24 -p:10000
Connect to 192.168.30.24:10000
01
v3.0.01[11/19/2001]
10
7188E2
*q

C:\Program Files\7188E\PCDiag>
```

3.3 VxComm Utility

The VxComm (Virtual Comm) Driver and VxComm Utility are very easy to install and use. This document shows how to install and configure the driver correctly. For more information, please refer to section 5, VxComm application.



4. Support Command List

For easy application, we provide 4 command strings to allow users to send specific commands from i-7540D's Ethernet port10003 to CAN bus. And receiving response message form CAN bus. Also, we provide several commands for i-7540D's Ethernet port10000 to set and get the status of 7540D. It can cover most applications of different requests. The general format of the i-7540D's commands are given below:

Port 10003 Command Format: <Command><CR>

<Command> : The commands of the i-7540D.

<CR> : All commands from this port must end with the character "<CR>" (The ASCII value is 13).

Table 4-1: Command list table (port 10003)

Command	Description
tIIILDD…<CR>	Send or receive a standard data frame.
TIIIL<CR>	Send or receive a standard remote frame.
eIIIIIIIILDD…<CR>	Send or receive an extended data frame.
EIIIIIIIIL<CR>	Send or receive an extended remote frame.

Note: The i-7540D's COM3 (CAN port) can only accept these 4 commands.

Port 10000 Command Format: 99<Command>

99 : Specific command for getting or setting the status of the 7540D

Table 4-2: Command list table (port 10000)

Command	Description
S	Read the status value of i-7540D
C	Clear CAN error flag and FIFO
RA	Reboot the i-7540D module.
#P01	Read the RS-232 configuration
#P02	Read the RS-485 configuration
#P1	Read the CAN configuration
#P1B	Read the BTR0 and BTR1 configuration
$P0105BBDSP	Change the RS-232 configuration
$P0205BBDSP	Change the RS-485 configuration
$P114PBCC…MM…ET	Change the CAN configuration
$P1B04TTRR	Change the BTR0 and BTR1 configuration
#PWID	Read Web ID configuration
#PWPW	Read Web Password configuration
$PWIDLLxxxxx…	Change Web ID configuration
$PWPWLLxxxxx…	Change Web Password configuration
#PPC	Read CAN Pair Connection configuration
#PPIP	Read CAN Pair Destination IP
$PPCLLABC	Change CAN Pair Connection configuration
$PPIPxxx…	Change CAN Pair Destination IP

Note:

1. More detailed information related to of the each command will be described in the following sub sections.
2. The #P1B and $P1B04TTRR commands just can be used on the firmware version v1.04 or later.
3. The #PWID, #PWPW, $PWIDLLxxxxx…, $PWPWLLxxxxx…commands just can be used on the firmware version v1.05 or later.
4. The #PPC, #PPIP, $PPCLLABC, $PPIPxxx…commands just can be used on the firmware version v1.06 or later.

4.1 tIIILDD…<CR>

Description: Send or receive a standard CAN data frame.

- **Syntax: tIIILDD…<CR>**

t	Represent a standard (2.0A) data frame.
III	11 bits Identifier (000~7FF)
L	Data length (0~8)
DD…	Input data frame value according to the data length (00~FF)

- **Response:**

  Valid command: No response

  Invalid command: ?<Error Code><CR>

- **Note:**

  It is necessary to enable the “Error Response” function in the i-7540D Utility, in order to receive Syntax and/or communication error information at the host PC.

- **Example:**

  Command: t03F6112233445566<CR>

  Send a CAN message with a standard data frame. **ID**=03F, **DLC**=6, **data1**=11, **data2**=22, **data3**=33, **data4**=44, **data5**=55 and **data6**=66

Note: This command can only be accepted by 7540D’s port 10003

4.2 TIIIL<CR>

Description: Send or receive a standard CAN remote frame.

- **Syntax: TIIIL<CR>**

T	Represents a standard (2.0A) remote frame.
III	11 bits Identifier (000~7FF)
L	Data length (0~8)

- **Response:**

  Valid command: No response

  Invalid command: ?<Error Code><CR>

- **Note:**

  It is necessary to enable the “Error Response” function in the i-7540D Utility, in order to receive Syntax and/or communication error information at the host PC.

- **Example:**

  Command: T2E88<CR>

  Send a CAN message with a standard remote frame. **ID**=2E8, **DLC**=8.

Note: This command can only be accepted by 7540D’s port 10003

4.3 eIIIIIIIILDD…<CR>

Description: Send or receive an extended CAN data frame.

- **Syntax: eIIIIIIIILDD…<CR>**

e	Stands for the extended (2.0B) data frame.
IIIIIIII	29 bits Identifier (00000000~1FFFFFFF)
L	Data length (0~8)
DD…	Input data frame value according to the data length (00~FF)

- **Response:**

  Valid command: No response

  Invalid command: ?<Error Code><CR>

- **Note:**

  It is necessary to enable the “Error Response” function in the i-7540D Utility, in order to receive Syntax and/or communication error information at the host PC.

- **Example:**

  Command: e123456785112233445 5<CR>

  Send a CAN message with an extended data frame. **ID**=12345678, **DLC**=5, **data1**=11, **data2**=22, **data3**=33, **data4**=44 and **data5**=55.

Note: This command can only be accepted by 7540D’s port 10003

4.4 EIIIIIIIIL<CR>

Description: Send or receive an extended CAN remote frame.

- **Syntax: EIIIIIIIIL<CR>**

E	Stands for the extended (2.0B) CAN remote frame.
IIIIIIII	29 bits Identifier (00000000~1FFFFFFF)
L	Data length (0~8)

- **Response:**

  Valid command: No response

  Invalid command: ?<Error Code><CR>

- **Note:**

  It is necessary to enable the “Error Response” function in the i-7540D Utility, in order to receive Syntax and/or communication error information at the host PC.

- **Example:**

  Command: E010156786<CR>

  Send a CAN message with an extended remote frame. **ID**=01015678, **DLC**=6.

Note: This command can only be accepted by 7540D’s port 10003

4.5 99S

Description: Read the i-7540D CAN Baud Rate and error flag message.

- **Syntax: 99S**

  99S Command character.

- **Response:**

  Valid Command: !CFFTTRRO<CR>
  Invalid command: ERROR

  ! Delimiter for valid command
  C current baud rate setting of CAN
  FF CAN register
  TT CAN transmit error counter
  RR CAN receive error counter
  O CAN FIFO Overflow flag

- **Note:**

  Furthermore, all response results are shown in the ASCII format. Users need to make an ASCII to hex format transformation in order to understand what the meaning is based on the 4-2, 4-3, 4-4 tables.

Table 4-3: CAN baud rate list

AsciiToHex(**C**)	Description
0	10K baud rate of CAN
1	20K baud rate of CAN
2	50K baud rate of CAN
3	100K baud rate of CAN
4	125K baud rate of CAN
5	250K baud rate of CAN
6	500K baud rate of CAN
7	800K baud rate of CAN
8	1000K baud rate of CAN
9	User defined

Table 4-4: CAN status register list

AsciiToHex(**FF**)	Name	Value	Function
Bit 7 (MSB)	Bus Status	1	Bus-off; the SJA100 is not involved in bus activities
		0	Bus-on; the SJA1000 is involved in bus activities
Bit 6	Error Status	1	Error; at least one of the error counter has reached or exceeded the CPU warning limit
		0	Ok; both error counters are below the warning limit
Bit 5	Transmit Status	1	Transmit; the SJA1000 is transmitting a message
		0	Idle; no transmit message is in progress
Bit 4	Receive Status	1	Receive; the SJA1000 is receiving a message
		0	Idle; no receive message is in progress
Bit 3	Transmission Complete Status	1	Complete; the previously requested transmission is not yet completed
		0	Incomplete; the previously requested transmission is not yet complement
Bit 2	Transmit Buffer Status	1	Released; the CPU may write a message into the transmit buffer
		0	Locked; a message is waiting for transmission or is already in process
Bit 1	Data Overrun Status	1	Overrun; a message was lost
		0	Absent; no data overrun has occurred
Bit 0 (LSB)	Receive Buffer Status	1	Full; one or more messages are available in the RXFIFO
		0	Empty; no message is available

Table 4-5: CAN Error flag list

AsciiToHex(**O**)	Description
Bit 3 =1	CAN Transmit Error
Bit 2 = 1	CAN Receive Error
Bit 1 =1	CAN FIFO Overflow
Bit 0 =1	Initial CAN Chip Error

- **Example:**

  Command: 99S

  Receive: !40C00000<CR>

  Obtain some current information on the i-7540D module. The response will show the following results: CAN baud rate=125K, CAN status register= transmission complete and transmit buffer is released, CAN transmit error counter=0, CAN receive error counter=0 and CAN FIFO= normal.

Note: This command can only be accepted by 7540D's port 10000

4.6 99C

Description: Clear the CAN error flag and FIFO on the module.

- **Syntax: 99C**

  99C Command character.

- **Response:**

  Valid Command: No response.

  Invalid command: ERROR

- **Note:**

  After sending this command, the CAN receive and transmit FIFO will be clear. The error counter of reception and transmission will be set to zero. And the TX and RX LEDs will turn OFF.

- **Example:**

  Command: 99C

Note: This command can only be accepted by 7540D's port 10000

4.7 99RA

Description: Reboot the i-7540D module. Users can use this command to reboot the module in order to allow it to work in order again.

- **Syntax: 99RA**

  99RA Command character

- **Response:**

  Valid Command: Reboot the i-7540D module.

  Invalid command: ERROR

- **Example:**

  Command: 99RA

  The i-7540D module will reboot after it had received this command.

Note: This command can only be accepted by 7540D's port 10000

4.8 99#P01

Description: Read the RS-232 configuration

- **Syntax: 99#P01**

  99#P01 Command character

- **Response:**

  Valid Command: 061BBDSP

  Invalid command: ERROR

  061 Delimiter for valid command

  BB RS-232 Baud rate

  D Data bit

  0 = 7 bits data formation

  1 = 8 bits data formation

  S Stop bit

  0 = 1 stop bit

  1 = 2 stop bits

  P Parity bits

  0 = None

  1 = Even

  2 = Odd

RS-232 Baud rate list

BB	Description
00	110 bps baud rate of RS-232
01	150 bps baud rate of RS-232
02	300 bps baud rate of RS-232
03	600 bps baud rate of RS-232
04	1200 bps baud rate of RS-232
05	2400 bps baud rate of RS-232
06	4800 bps baud rate of RS-232
07	9600 bps baud rate of RS-232
08	19200 bps baud rate of RS-232
09	38400 bps baud rate of RS-232
0A	57600 bps baud rate of RS-232
0B	115200 bps baud rate of RS-232

- **Example:**

  Command: 99#P01

  Response: 0610B100

  The response will show the following results: RS-232 baud rate=115.2K bps, data bits=8, stop bits=1, none parity.

Note: This command can only be accepted by 7540D's port 10000

4.9 99#P02

Description: Read the RS-485 configuration

- **Syntax: 99#P02**

  99#P02 Command character

- **Response:**

  Valid Command: 062BBDSP

  Invalid command: ERROR

  062 Delimiter for valid command

  BB RS-485 Baud rate

  D Data bit

  0 = 7 bits data formation

  1 = 8 bits data formation

  S Stop bit

  0 = 1 stop bit

  1 = 2 stop bits

  P Parity bits

  0 = None

  1 = Even

  2 = Odd

RS-485 Baud rate list

BB	Description
00	110 bps baud rate of RS-485
01	150 bps baud rate of RS-485
02	300 bps baud rate of RS-485
03	600 bps baud rate of RS-485
04	1200 bps baud rate of RS-485
05	2400 bps baud rate of RS-485
06	4800 bps baud rate of RS-485
07	9600 bps baud rate of RS-485
08	19200 bps baud rate of RS-485
09	38400 bps baud rate of RS-485
0A	57600 bps baud rate of RS-485
0B	115200 bps baud rate of RS-485

- **Example:**

  Command: 99#P02

  Response: 06207111

  The response will show the following results: RS-485 baud rate=9600 bps, data bits=8, stop bits=2, even parity.

Note: This command can only be accepted by 7540D's port 10000

4.10 99#P1

Description: Read the CAN configuration

- **Syntax: 99#P1**

  99#P1 Command character

- **Response:**

  Valid Command: 14PBCCCCCCCCMMMMMMMMET

  Invalid command: ERROR

  14 Delimiter for valid command

  P CAN specification

  0 = 2.0A

  1 = 2.0B

  B CAN Baud rate

  CCCCCCCC 32 bits Acceptance Code Register (00000000~FFFFFFFF)

  MMMMMMMM 32 bits Acceptance Mask Register (00000000~FFFFFFFF)

  E Error response or not

  0 = Disable

  1 = Enable

  T Timestamp response or not

  0 = Disable

  1 = Enable

CAN baud rate list

B	Description
0	10K baud rate of CAN
1	20K baud rate of CAN
2	50K baud rate of CAN
3	100K baud rate of CAN
4	125K baud rate of CAN
5	250K baud rate of CAN
6	500K baud rate of CAN
7	800K baud rate of CAN
8	1000K baud rate of CAN
9	User Defined

- **Example:**

  Command: 99#P1

  Response: 140400000000FFFFFFFF00

  The response will show the following results: CAN specification=2.0A, CAN baud rate=125Kbps, acceptance code register=00000000, acceptance mask register=FFFFFFFF, disable error response, disable timestamp response.

Note: This command can only be accepted by 7540D's port 10000

4.11 99#P1B

Description: Read the CAN Bus Timing Register

- **Syntax: 99#P1**

  99#P1B Command character

- **Response:**

  Valid Command: 06PBTTRR

  Invalid command: ERROR

  06 Delimiter for valid command

  P CAN specification

  0 = 2.0A

  1 = 2.0B

  B CAN Baud rate

  TT CAN Bus Timing Register 0 (00~FF)

  RR CAN Bus Timing Register 1 (00~FF)

CAN baud rate list

B	Description
0	10K baud rate of CAN
1	20K baud rate of CAN
2	50K baud rate of CAN
3	100K baud rate of CAN
4	125K baud rate of CAN
5	250K baud rate of CAN
6	500K baud rate of CAN
7	800K baud rate of CAN
8	1000K baud rate of CAN
9	User Defined

- **Example:**

  Command: 99#P1B

  Response: 06090014

  The response will show the following results: CAN specification=2.0A, CAN baud rate=User defined, BTR0=00, BTR1=14.

Note:

1. **This command can only be accepted by 7540D's port 10000**
2. **Supported by the firmware v1.04 or later.**

4.12 99$P0105BBDSP

Description: Change the RS-232 configuration of the i-7540D

- **Syntax: 99$P0105BBDSP**

99$P0105 Command character
BB RS-232 Baud rate
D Data bit
0 = 7 bits data formation
1 = 8 bits data formation
S Stop bit
0 = 1 stop bit
1 = 2 stop bits
P Parity bits
0 = None
1 = Even
2 = Odd

RS-232 Baud rate list

BB	Description
00	110 bps baud rate of RS-232
01	150 bps baud rate of RS-232
02	300 bps baud rate of RS-232
03	600 bps baud rate of RS-232
04	1200 bps baud rate of RS-232
05	2400 bps baud rate of RS-232
06	4800 bps baud rate of RS-232
07	9600 bps baud rate of RS-232
08	19200 bps baud rate of RS-232
09	38400 bps baud rate of RS-232
0A	57600 bps baud rate of RS-232
0B	115200 bps baud rate of RS-232

- **Response:**

Valid Command: OK
Invalid command: ERROR

- **Example:**

  Command: 99$P01050B100

  Response: OK

  Set the setting of RS-232 baud rate= 115.2Kbps, data bits=8, stop bit=1, none parity bit into the i-7540D and the 7540D response “OK” command to mean that the configuration of RS-232 has been changed.

Note: This command can only be accepted by 7540D’s port 10000

4.13 99$P0205BBDSP

Description: Change the RS-485 configuration of the i-7540D

- **Syntax: 99$P0205BBDSP**

99$P0105 Command character
BB RS-485 Baud rate
D Data bit
0 = 7 bits data formation
1 = 8 bits data formation
S Stop bit
0 = 1 stop bit
1 = 2 stop bits
P Parity bits
0 = None
1 = Even
2 = Odd

RS-485Baud rate list

BB	Description
00	110 bps baud rate of RS-485
01	150 bps baud rate of RS-485
02	300 bps baud rate of RS-485
03	600 bps baud rate of RS-485
04	1200 bps baud rate of RS-485
05	2400 bps baud rate of RS-485
06	4800 bps baud rate of RS-485
07	9600 bps baud rate of RS-485
08	19200 bps baud rate of RS-485
09	38400 bps baud rate of RS-485
0A	57600 bps baud rate of RS-485
0B	115200 bps baud rate of RS-485

- **Response:**

Valid Command: OK
Invalid command: ERROR

- **Example:**

  Command: 99$P02050B100

  Response: OK

  Set the setting of RS-485 baud rate= 115.2Kbps, data bits=8, stop bit=1, none parity bit into the i-7540D and the 7540D response “OK” command to mean that the configuration of RS-485 has been changed.

Note: This command can only be accepted by 7540D’s port 10000

4.14 99$P114PBCC…MM…ET

Description: Change the CAN configuration of the i-7540D

- **Syntax: 99$P114PBCCCCCCCCMMMMMMMMET**

99$P114	Command character
P	CAN specification
	0 = 2.0A
	1 = 2.0B
B	CAN Baud rate
CCCCCCCC	32 bits Acceptance Code Register (00000000~FFFFFFFF)
MMMMMMMM	32 bits Acceptance Mask Register (00000000~FFFFFFFF)
E	Error response or not
	0 = Disable
	1 = Enable
T	Timestamp response or not
	0 = Disable
	1 = Enable

CAN baud rate list

B	Description
0	10K baud rate of CAN
1	20K baud rate of CAN
2	50K baud rate of CAN
3	100K baud rate of CAN
4	125K baud rate of CAN
5	250K baud rate of CAN
6	500K baud rate of CAN
7	800K baud rate of CAN
8	1000K baud rate of CAN
9	User defined

- **Response:**

  Valid Command: OK

  Invalid command: ERROR

- **Example:**

  Command: 99$P1140400000000FFFFFFFF00

  Response: OK

  Set the setting of CAN specification=2.0A, CAN baud rate= 125 Kbps, acceptance code=00000000, acceptance mask=FFFFFFFF, disable error response, disable timestamp response into the i-7540D and the 7540D response “OK” command to mean that the configuration of CAN has been changed.

Note: This command can only be accepted by 7540D’s port 10000

4.15 99$P1B04TTRR

Description: Change the CAN Bus Timing Register of the i-7540D

- **Syntax: 99$P1B04TTRR**

99$P1B04	Command character
TT	Bus Timing Register 0 (00~FF)
RR	Bus Timing Register 1 (00~FF)

- **Response:**

  Valid Command: OK

  Invalid command: ERROR

Note:

1. **This command can only be accepted by 7540D's port 10000**
2. **Supported by the firmware v1.04 or later.**
3. **Users need to have the background of SJA1000 CAN controller and 82C251 CAN transceiver, and calculate the values of BT0 and BT1 by themselves (The clock frequency of CAN controller is 16MHz.).**

4.16 99#PWID

Description: Read the Wed ID configuration

- **Syntax: 99#PWID**

  99#PWID Command character

- **Response:**

  Valid Command: LLxxxxx…

  Invalid command: ERROR

  LL Web ID data length, in hexadecimal format.

  xxxxx… Web ID saved in the EEPROM, the default Web ID setting is “7540D”

- **Example:**

  Command: 99$PWID

  Response: 057540D

  Read the Web ID setting of the 7540D, and the 7540D responses the the Web ID setting is “7540D”.

Note:

1. **This command can only be accepted by 7540D’s port 10000.**
2. **Supported by the firmware v1.05 or later.**

4.17 99#PWPW

Description: Read the Wed Password configuration

- **Syntax: 99#PWID**

  99#PWPW Command character

- **Response:**

  Valid Command: LLxxxxx…

  Invalid command: ERROR

  LL Web password data length, in hexadecimal format.

  xxxxx… Web password saved in the EEPROM, the default Web password setting is “icpdas7540D”

- **Example:**

  Command: 99$PWPW

  Response: 0Bicpdas7540D

  Read the Web password setting of the 7540D, and the 7540D responses the Web password setting is “icpdas7540D”.

Note:

1. **This command can only be accepted by 7540D’s port 10000.**
2. **Supported by the firmware v1.05 or later.**

4.18 99$PWIDLLxxxxx…

Description: Change the Wed ID configuration

- **Syntax: 99$PWIDLLxxxxx…**

99$PWID	Command character
LL	Web ID data length, in hexadecimal format.
xxxxx…	Web ID data, at most 30 ASCII characters

- **Response:**

  Valid Command: OK

  Invalid command: ERROR

- **Example:**

  Command: 99$PWID047540

  Response: OK

  Change the Web ID data setting of the 7540D to “7540” and the 7540D responses “OK” command to mean that the configuration of Web ID data has been changed.

Note:

1. **This command can only be accepted by 7540D’s port 10000.**
2. **Supported by the firmware v1.05 or later.**

4.19 99$PWPWLLxxxxx…

Description: Change the Wed password configuration

- **Syntax: 99$PWPWLLxxxxx…**

99$PWPW	Command character
LL	Web password data length, in hexadecimal format.
xxxxx…	Web password data that you want to configure. At most 30 ASCII characters

- **Response:**

  Valid Command: OK

  Invalid command: ERROR

- **Example:**

  Command: 99$PWID0512345

  Response: OK

  Change the Web password data setting of the 7540D to “12345” and the 7540D responses “OK” command to mean that the configuration of Web ID data has been changed.

Note:

1. **This command can only be accepted by 7540D’s port 10000.**
2. **Supported by the firmware v1.05 or later.**

4.20 99#PPC

Description: Read the CAN bus pair connection configuration. Here support three parameters, “enable can pair”, “TCP or UDP” and “Server or Client”

- **Syntax: 99#PPC**

  99#PPC Command character

- **Response:**

  Valid Command: LLABC

  Invalid command: ERROR

  LL number of parameters

  A Enable CAN bus pair connection flag, 0: Disable, 1: Enable

  B Using TCP or UDP connection; 0: TCP, 1: UDP

  C Act as a server or client; 0: server, 1: client

- **Example:**

  Command: 99#PPC

  Response: 03100

  Read the CAN bus pair connection configuration of the 7540D, and the 7540D responses that enable can bus pair connection and act as a TCP server.

Note:

1. **This command can only be accepted by 7540D’s port 10000.**
2. **Supported by the firmware v1.06 or later.**

4.21 99#PPIP

Description: Read the destination IP of CAN bus pair connection.

- **Syntax: 99#PPIP**

  99#PPIP Command character

- **Response:**

  Valid Command: XXX.XXX.XXX.XXX

  Invalid command: ERROR

  XXX.XXX.XXX.XXX Destination IP address.

- **Example:**

  Command: 99#PPIP

  Response: 192.168.255.2

  Read the CAN bus pair connection destination IP of the 7540D, and the 7540D responses that destination IP address is “192.168.255.2”.

Note:

1. **This command can only be accepted by 7540D’s port 10000.**
2. **Supported by the firmware v1.06 or later.**

4.22 99$PPCLLABC

Description: Change the CAN bus pair connection configuration. After setting successfully, all parameters will take effective after system restart.

- **Syntax: 99$PPCLLABC**

99$PPC	Command character
LL	number of parameters, here fix to “03”
A	Enable CAN bus pair connection flag, 0: Disable, 1: Enable
B	Using TCP or UDP connection; 0: TCP, 1: UDP
C	Act as a server or client; 0: server, 1: client

Note:

1. When **A**=0, **B** and **C** take no effective
2. When using UDP connection(**B**=1), **C** take no effective
3. When acting as a TCP client or using UDP method, users need to set the destination IP address (section 4.23), so that the 7540D can work correctly.

- **Response:**

  Valid Command: OK

  Invalid command: ERROR

- **Example:**

  Command: 99$PPC03101

  Response: OK

  Change the CAN bus pair connection configuration of the 7540D to “enable CAN bus pair connection” and act as a TCP client.

Note:

1. **This command can only be accepted by 7540D’s port 10000.**
2. **Supported by the firmware v1.06 or later.**

4.23 99$PPIPxxx…

Description: Change the CAN bus pair connection destination IP address. After setting successfully, all parameters will take effective after system re-start

- **Syntax: 99$PPIPxxx…**

  99$PPIP Command character

  xxx… IP address, iii/ppp/III/PPP: 3 digits number

  Note:

  This IP address is effective when enable CAN bus pair connection and acting as TCP client or using UDP connection method.

- **Response:**

  Valid Command: OK

  Invalid command: ERROR

- **Example:**

  Command: 99$PPIP192168255002

  Response: OK

  Change the CAN bus pair connection destination IP of the 7540D.

Note:

1. **This command can only be accepted by 7540D's port 10000.**
2. **Supported by the firmware v1.06 or later.**

4.24 General Error codes for commands from port 10003

Table 4-6: Error code table

AsciiToHex (Error code)	Description
1	The head character of the command string is invalid.
2	The length of the command string is invalid.
3	The value of CAN identifier is invalid.
4	The value of CAN data length is invalid.
5	Reserved

5. VxComm Applications

- Overview
- Installing the VxComm Driver
- Adding a i-7540D and configuring the VxComm Driver
- Removing a i-7540D
- Uninstalling the VxComm Driver

5.1 Overview

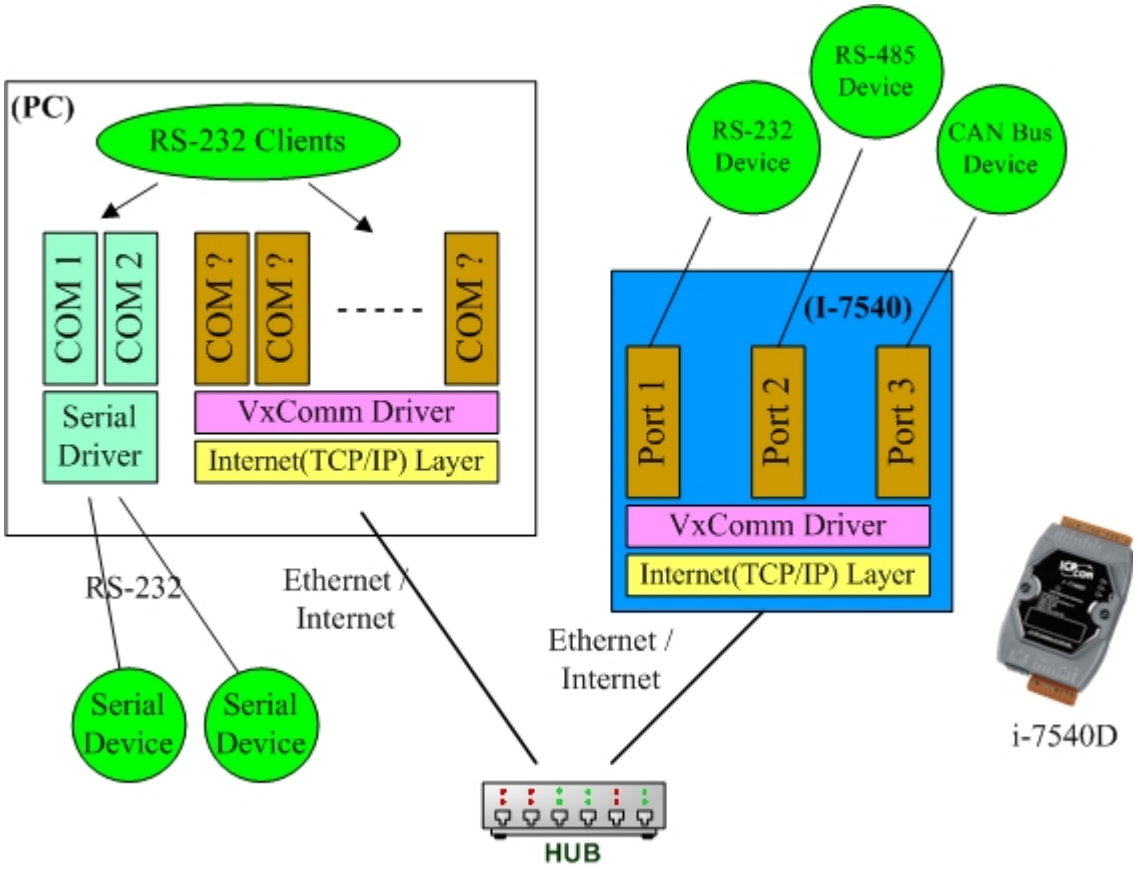
The VxComm (Virtual Comm) Driver and VxComm Utility are very easy to install and use. The first thing to do is to find the installation file in the included CD. The directory is:

- 8000cd:\\napdos\7188e\tcp\vxcomm\driver(pc)\nt\
  (for Windows NT 4.0) or
- 8000cd:\\napdos\7188e\tcp\vxcomm\driver(pc)\2k\
  (for Windows 2000, Windows XP).

This document shows how to install and configure the driver correctly. The first part instructs users how to install the software. The second part shows how to add an i-7540D server and configure a COM port. Finally, the third part teaches you how to remove an i-7540D.

5.1.1 Architecture

The VxComm Driver creates COM port(s) and maps them to the COM port(s) of the i-7540D. The user's RS-232 client programs need only to change to the different COM port to access the serial devices that are allocated to the Internet or Ethernet network via the i-7540D.



5.1.2 Ports mapping

Vxcomm Driver/Utility supports Port 1 to Port 3 in accessing COM1 to COM3 of the i-7540D. Another Port I/O is designed to access the I/O boards mounted on i-7540D, but it doesn't use now. With the help of the VxComm Driver/Utility, uses can map remote COM port to become a virtual COM port of PC. One PC can control maximum number of 256 COM ports (including COM1 and COM2).

Local COM Port (PC)	VxComm Driver/Utility (PC)	Remote COM port (i-7540D)
COM ?	Port 1	COM1
COM ?	Port 2	COM2
COM ?	Port 3	COM3 (CAN)
COM ?	Port I/O	Reserved

5.2 Installing the VxComm Driver

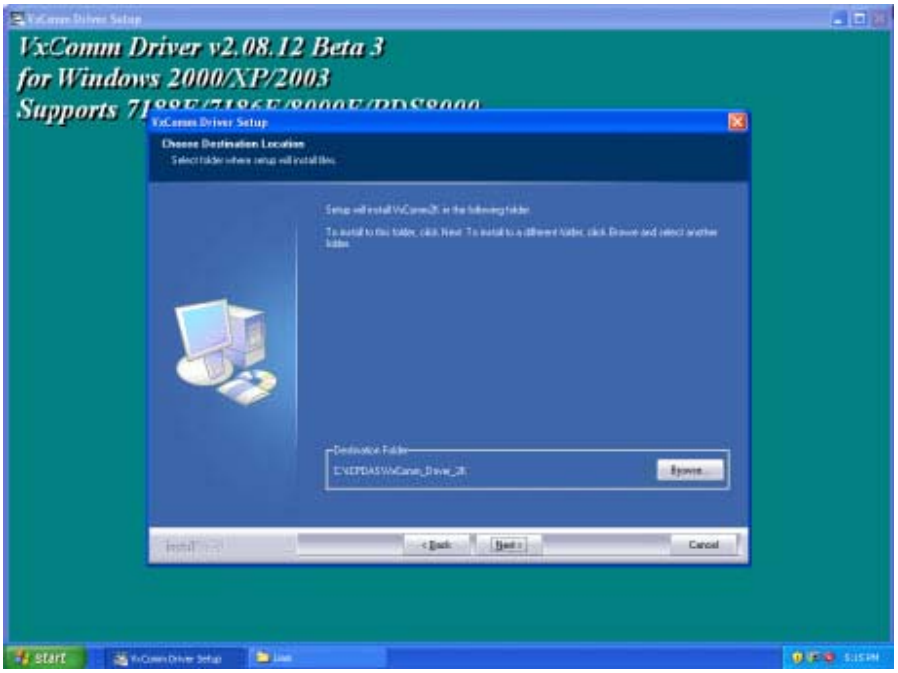
Step 1: The installation software can be obtained from the following location.

- http://ftp.icpdas.com/pub/cd/8000cd/napdos/7188e/tcp/vxcomm/driver(pc)/
- 8000cd:\\Napdos\7188e\TCP\vxcomm\driver(pc)\

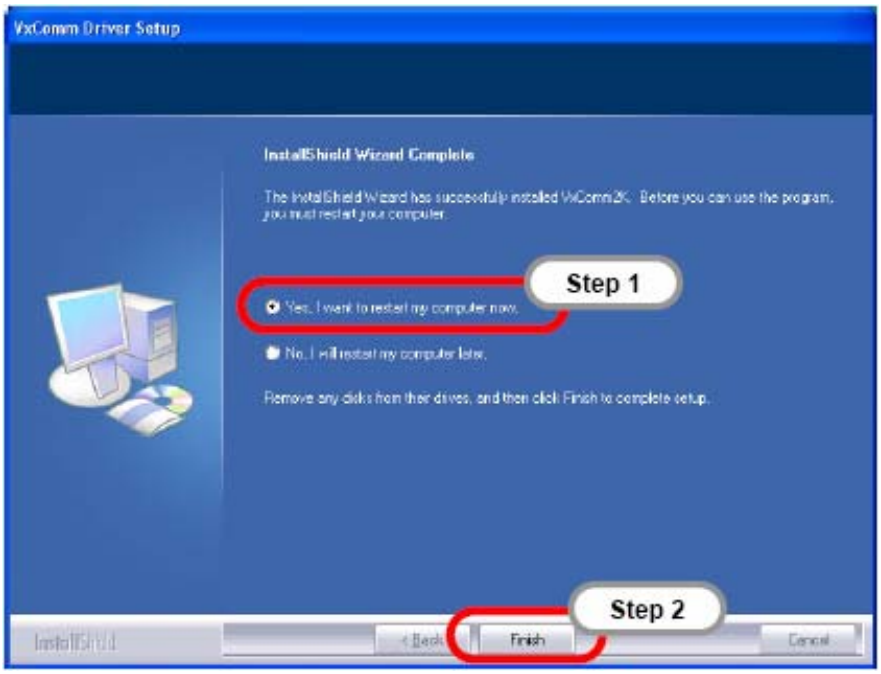
Please choose the version that suits your Windows operation system.

- vxcomm2K_vNNNNN.exe for Windows 2000/XP
- vxcommnt_vNNNNN.exe for Windows NT
- vxcomm98.exe for Windows 98

Step 2: Go the where you download the installation file, and then double-click the file in Windows to execute it.



Step 3: Select the “**Yes**, …” option and click the **Finish** button to restart your computer.



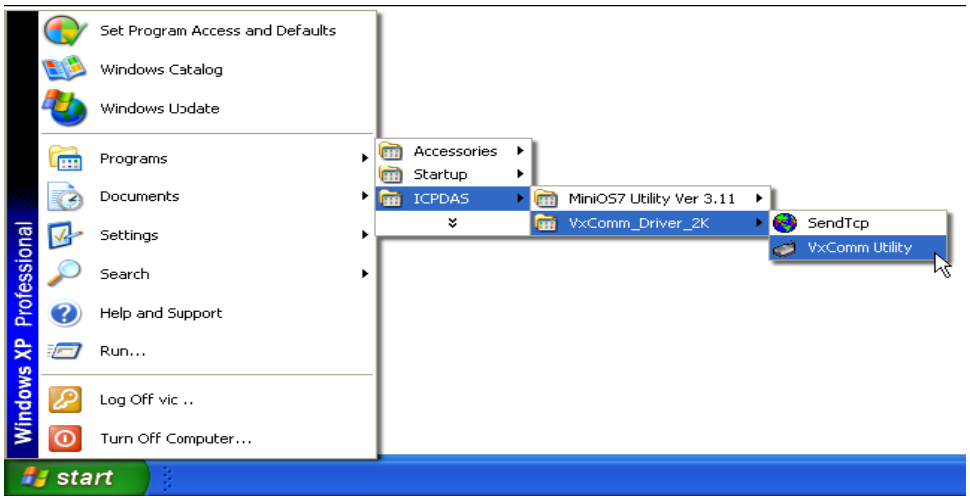
Step 4: After rebooting the computer, the VxComm Utility will ask you to configure the virtual COM port(s). Please refer to the next section (5.3) for more information.

5.3 Adding an i-7540D and configuring the VxComm Driver

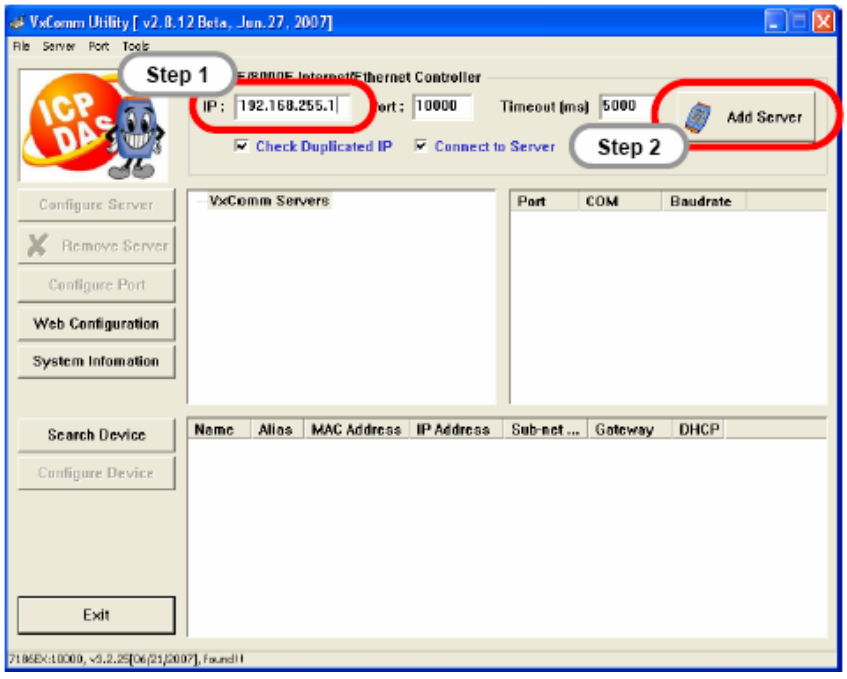
Step 1: Obtain the IP address of the i7540D. The MiniOS7 Utility can help you in obtaining the IP address of the i-7540D.

Note: The default IP address of the i-7540D is 192.168.255.1

Step 2: From the Winsows Start Menu, go to Program/7188e/Vxcomm2K/ and locate the VxComm Utility.



Step 3: Before adding an i-7540D, ensure that the **Check Duplicated IP** and **Connect to Server** options are both checked. Type the IP address of the i-7540D and then click the **Add Server** button to add a new server.



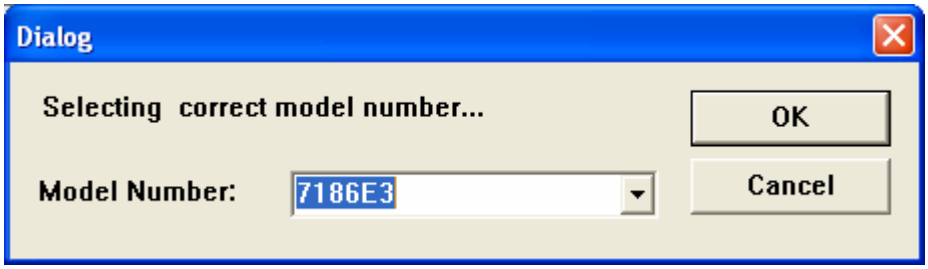
Note:

- **Check Duplicated IP option**

  This option checks whether the IP address is already listed in the server window (left hand window). It is automatically checked by default. The following alert will be displayed if an IP address is duplicated.

- **Connect to Server option**

  This option connects to the i-7540D and retrieves the name of device before adding it to the server window (left hand window). It is automatically checked by default. The following alert will be displayed if the **Connect to Server** option is not checked before clicking the **Add Server** button. Choose the correct i-7540D Model Number and then click the **OK** button (Here the i-7540D model number is 7186E3).



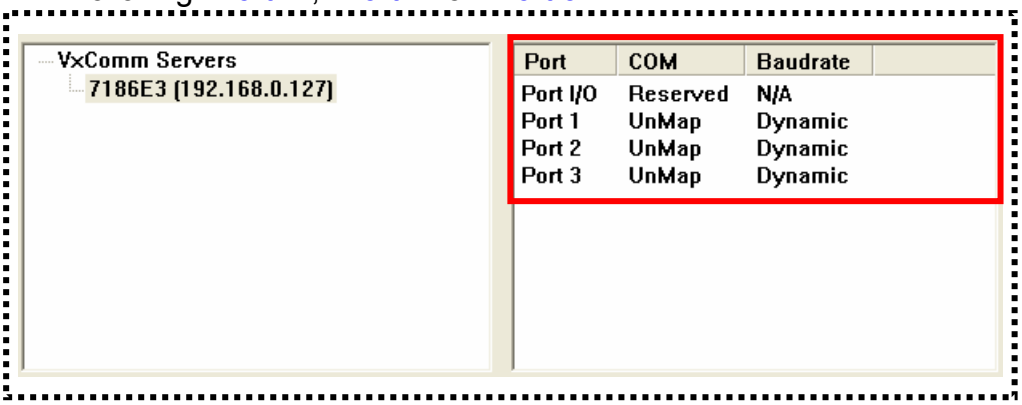
- **Timeout (ms) field**

  This timeout value is used for Connecting, disconnecting and sending/receiving data in the VxComm Utility, and is used for Connecting and Disconnecting in the VxComm Driver.

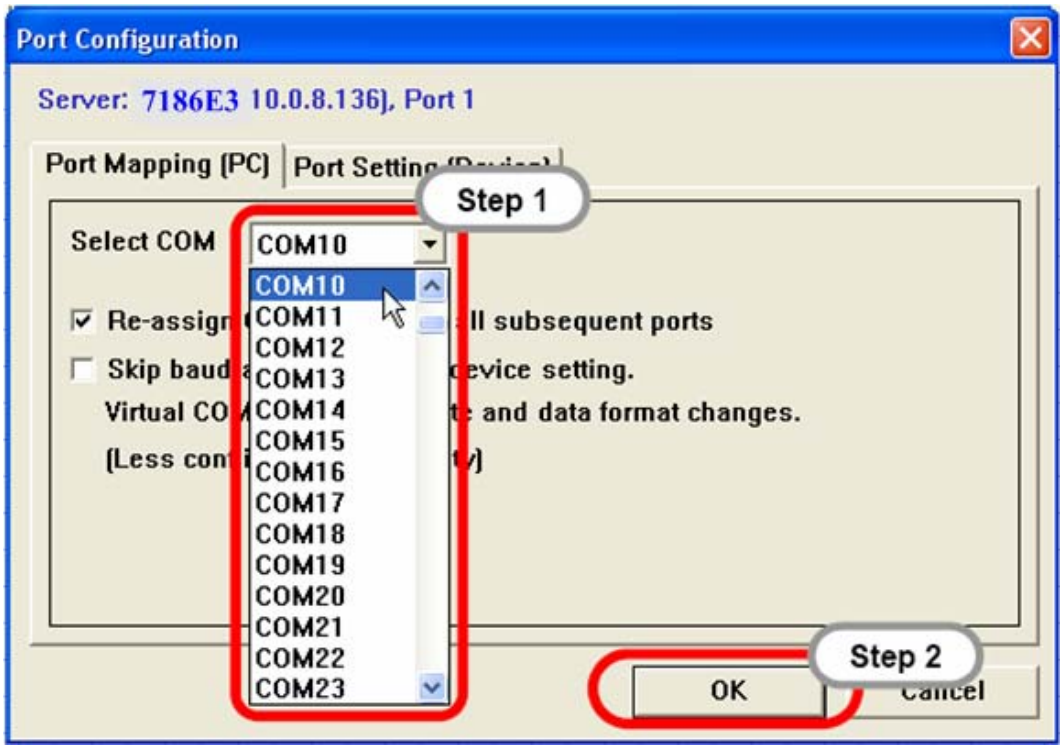
- **Command Port field:**

  By default, the Command/Configuration TCP port is 10000. If you change the setting of µPAC-7186E, then you must assign the correct one in this field to let the VxComm Utility and Driver to get access to the device.

Step 4: And then it will display the name of “7186E3” and it’s IP. Select one of the i-7540D devices and configure the virtual COM port(s) by double clicking "Port 1", "Port 2" or “Port 3”.



Step 5: Select an appropriate COM port number, and then click the OK button.

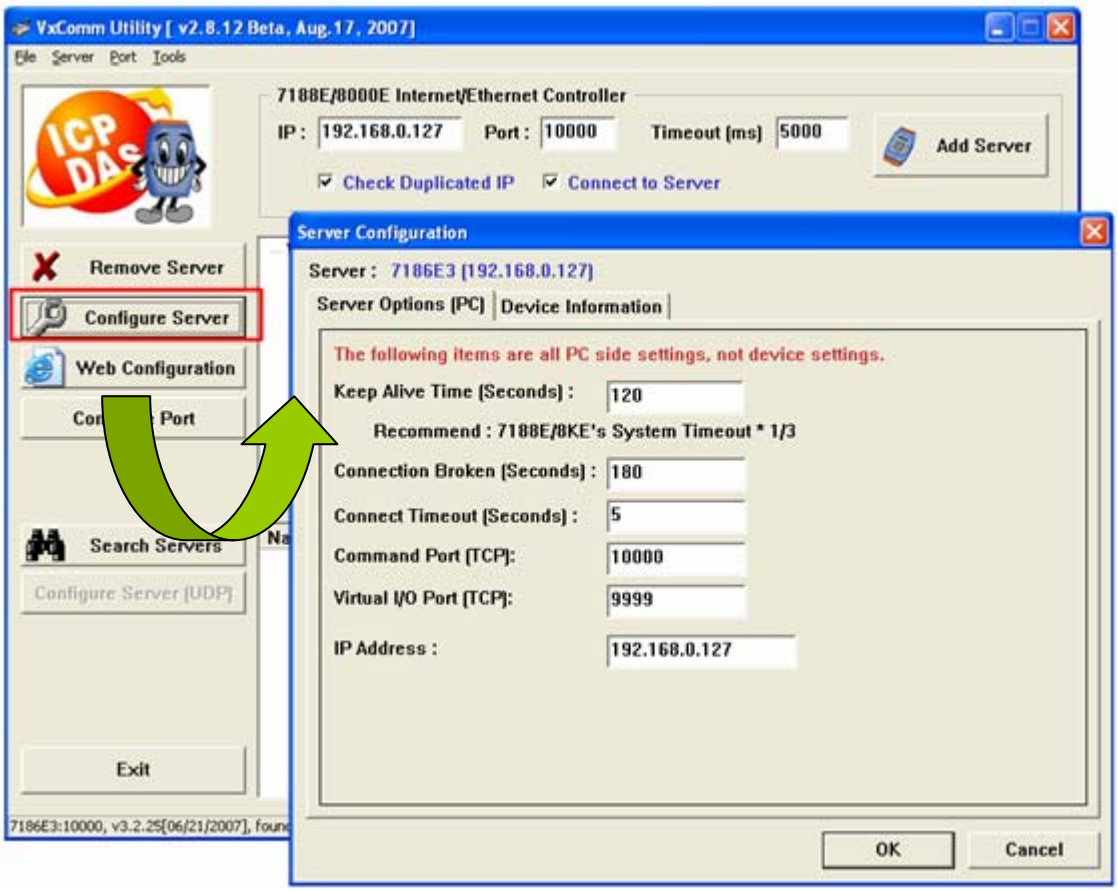


Note:

- **Re-assign COM number for all subsequent ports option**
  This option automatically sequentially assigns the ports with the available COM port numbers.

- **Use 7188E/8000E current setting (Fixed Configuration)**
  If using this Port Configuration function, you will not be able to dynamically change the Baud Rate and data format.

Step 6: Select one of the i-7540D modules, and then click the **Server Options** button to configure the server options.



Step 7: Enter the new configuration settings. The new settings will replace any text already in the Server Options window text boxes. Click the **OK** button to save the new settings.

Notes:

- **Keep Alive Time (ms) field**:
  After connecting to the µPAC-7186E, the VxComm Driver will automatically and periodically send commands to keep the i-7540D alive. The timer will be reset after each send/receive command/data success. The Keep-Alive mechanism will not work until the next timeout. The default setting of Keep-Alive time is about 7000 ms. Its recommended setting is (i-7540D's System Timeout * 1 / 3) or smaller value.

- **Connection-Broken (ms) field**:
  The VxComm Driver will try to re-connect if the connection is broken. When the client is sending a message to the µPAC-7186E, the Internet (TCP/IP)

layer may respond with a “Disconnect” event to the VxComm Driver if it fails to send the message after 20 seconds or more. Users can set a smaller **Connection-Broken time** (for example: 10000 ms) to force the VxComm Driver to re-connect again and get a quicker response.

If the connection has no sending/receiving signal before the **Connection-Broken time** has timed out, the connection will be marked as broken. The VxComm Driver will also re-connect it again. Thus, the **Keep-Alive Time** should be smaller than the **Connection-Broken time** to make the connection come on-line.

The default **System Timeout** (/STxxx) value of the i-7540D is about 300 seconds. After client programs have connected to the µPAC-7186E, clients have to send command to keep the i-7540D alive before it times out, otherwise the µPAC-7186E will reset itself and clients will have to reconnect to the i-7540D again.

Users can set the **Keep-Alive Time** and **Connection-Broken** time to 0 to disable this mechanism. The System Timeout will have to be set to 0 to disable the reset mechanism.

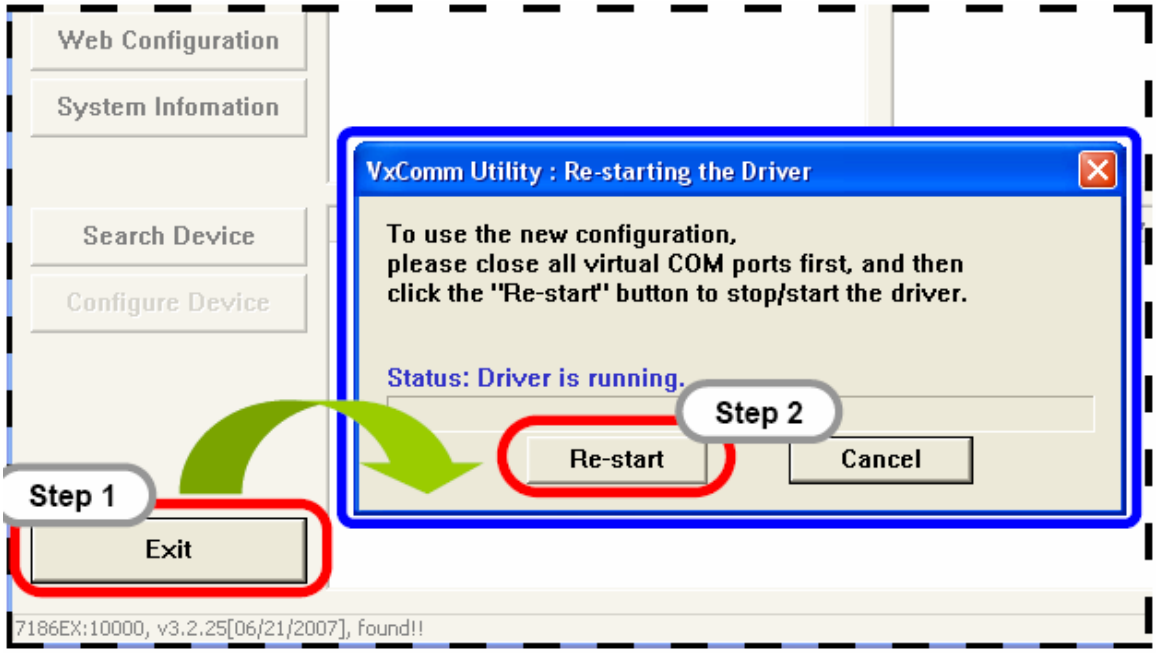
- **Connect Timeout (ms) field**:
  The timeout value will be passed into MS TCP/IP driver for reference when connecting and disconnecting.

- **Command TCP Port field**:
  By default setting, the i-7540D use TCP port **10000** as the Command / Configuration port. If you change the setting of i-7540D, you must assign the correct one in the field. So the VxComm Driver can connect to the right TCP port.

  This TCP port is used to configure the Baud rate, data format, CTS/RTS control mode and Break, etc.

- **Port7000 Port field**:
  By default setting, the i-7540D use TCP port **9999** as the Port7000 port. This TCP port is reserved.

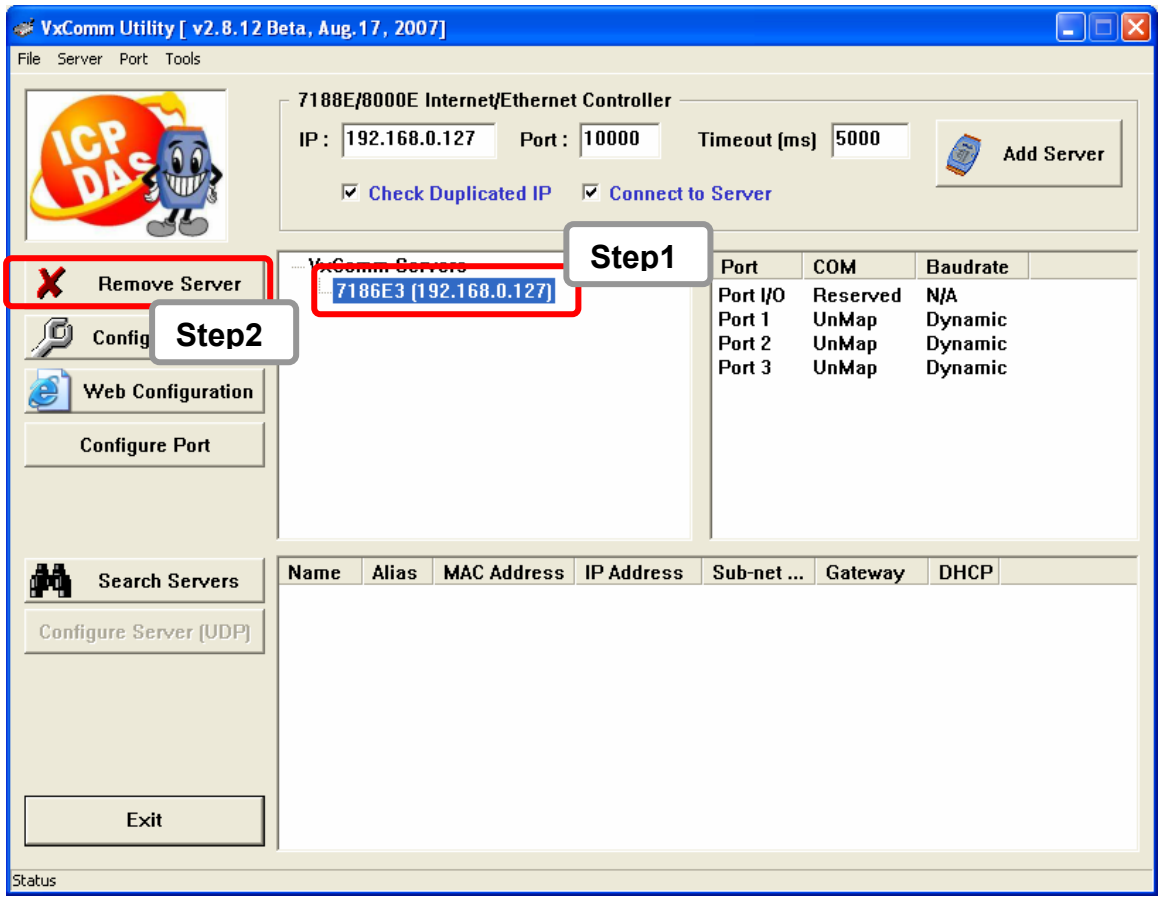
Step 8: Click the **Exit** button to exit the VxComm Utility. Before exiting, the **Re-starting the Driver** dialog window will automatically display. Click the **Re-start** button to stop/start the driver.



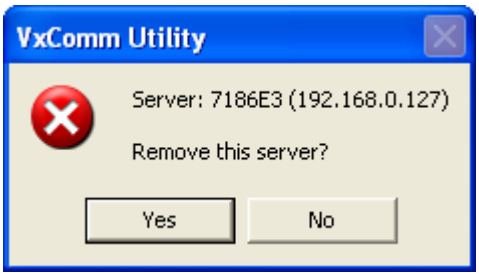
5.4 Removing an i-7540D

Step 1: Open the **VxComm Utility**.

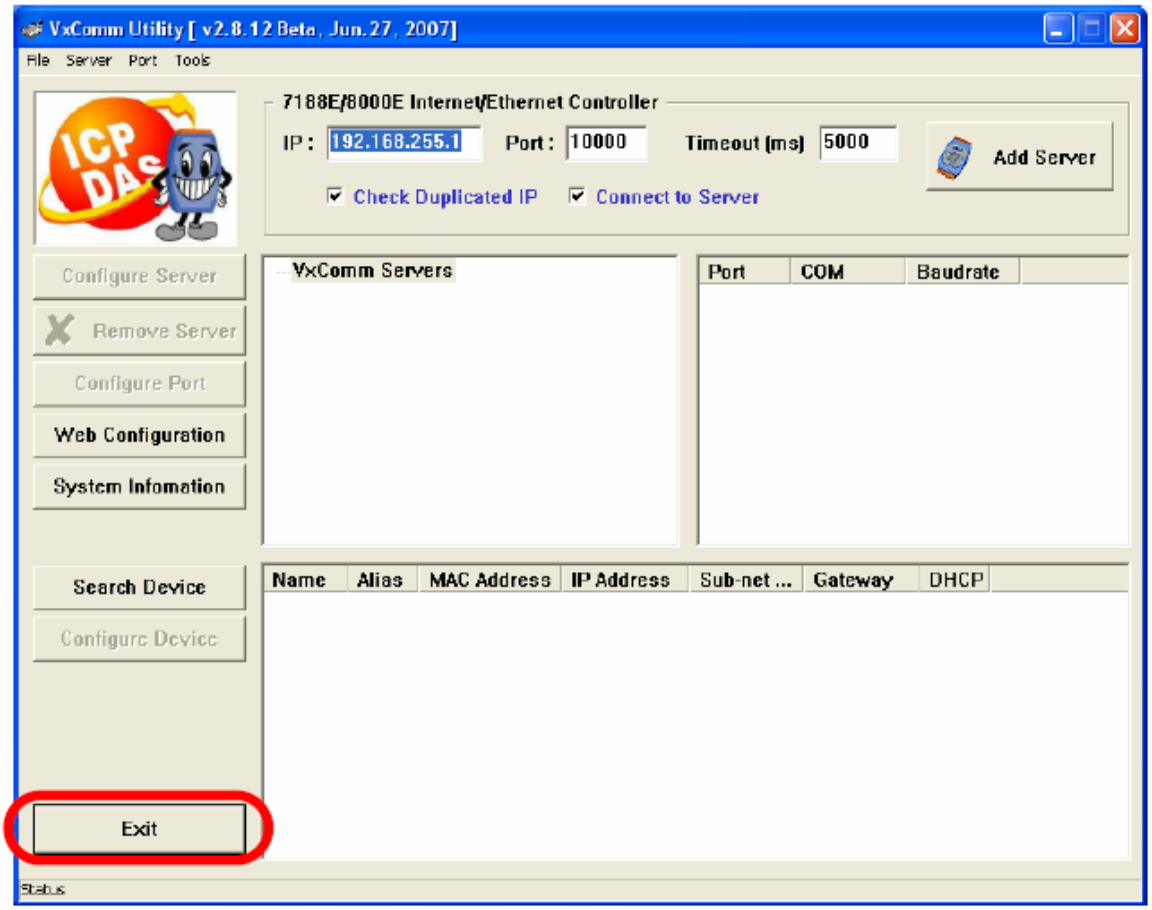
Step 2: Click the server name you want to remove, and then click the **Remove Server** button.



Step 3: The following window will be displayed, make sure of your choice, and then click the **Yes** button to remove it.

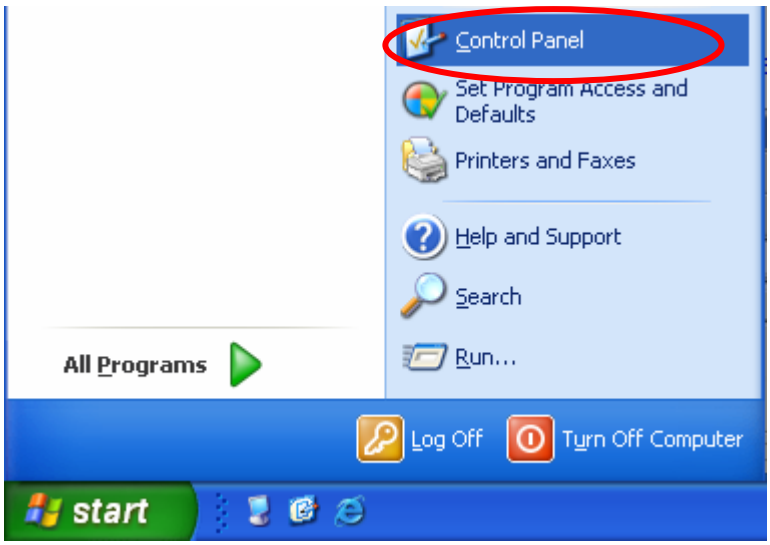


Step 4: Click the **Exit** button to finish this utility.

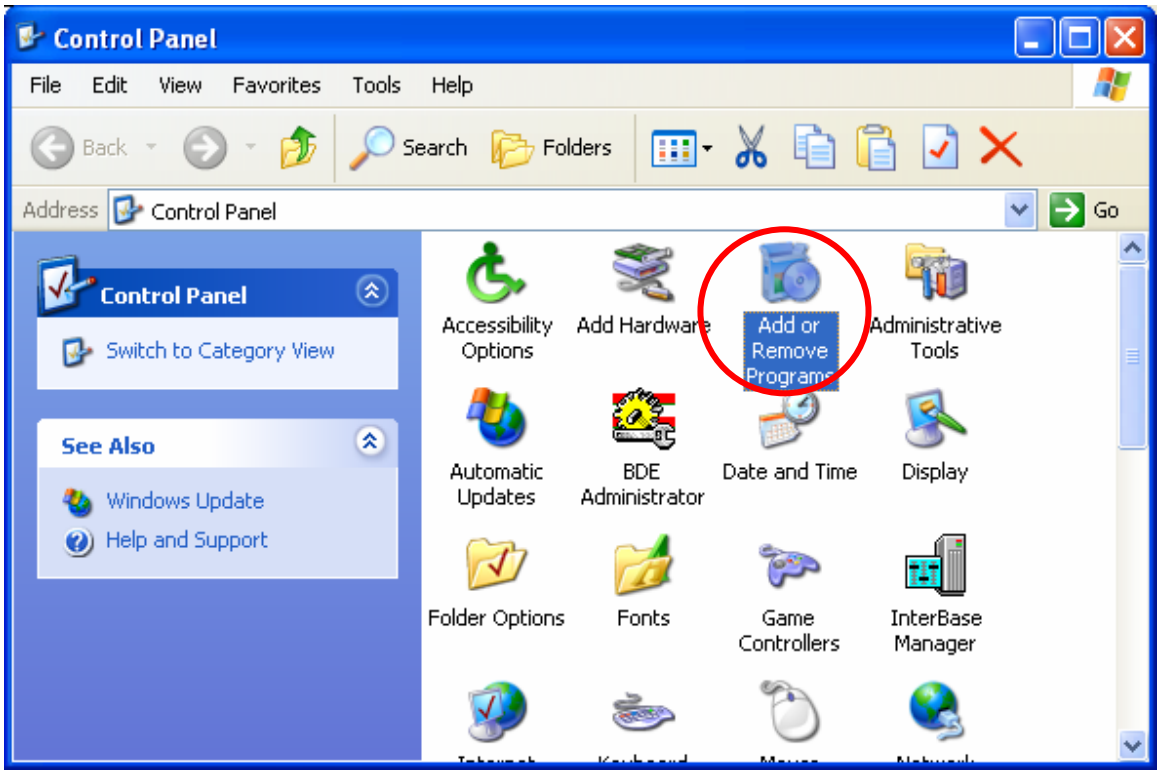


5.5 Uninstalling the VxComm Driver

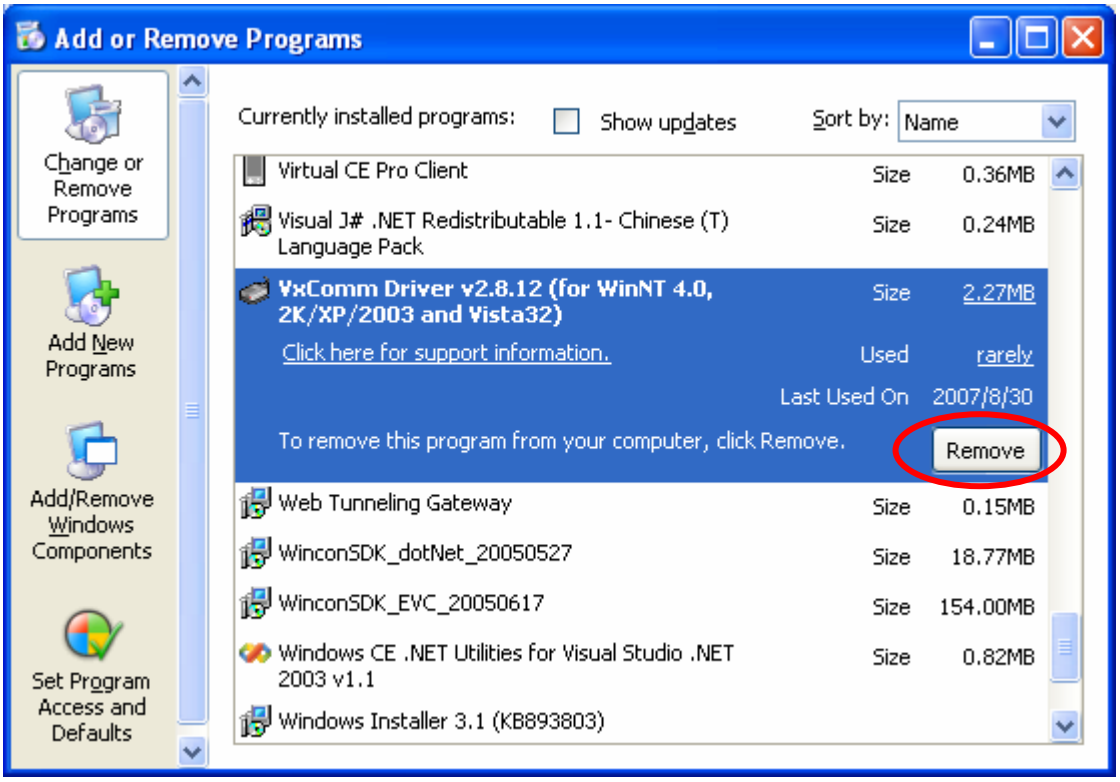
Step 1: Select the "Control Panel".



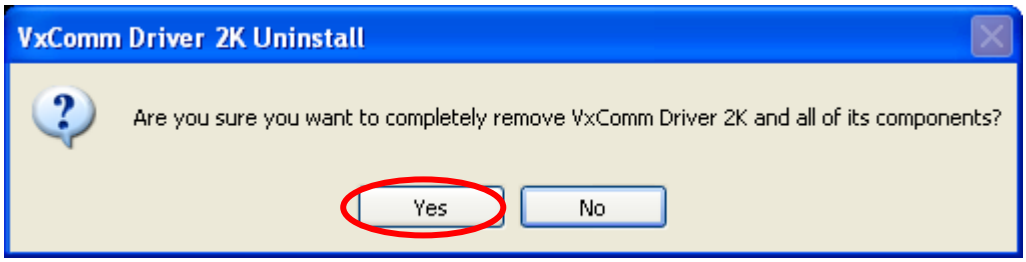
Step 2: Click the "Add or Remove Programs" to open the dialog.



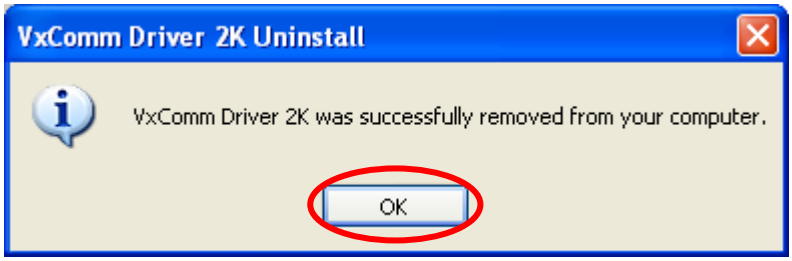
Step 3: Find out the VxComm Driver, and click the “Remove” button.



Step 4: Click the button “Yes” to remove the software



Step 5: Finally, click the “OK” button to finish the uninstall process



6. Application with PISO-CAN 200/400 T

In this chapter, we describe the i-7540D application in CAN network. On the CAN bus side, the device is the PISO-CAN200/400-T of ICP DAS. And here the i-7540D is a CAN-Ethernet gateway device. It allows users to send specific commands from It's Ethernet port10003 to CAN bus. Receive response message form CAN bus and then convert these CAN messages to specific commands. After converting, it sent these specific commands to those who establish connection with it from port 10003. The architecture is depicted as figure 5-1.

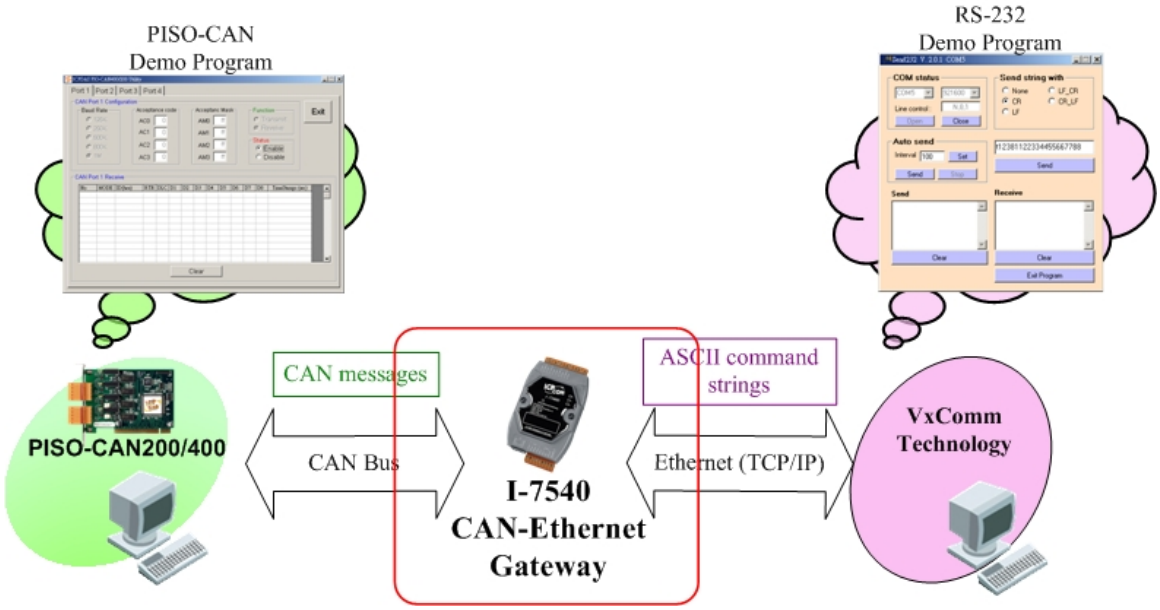


Figure 6-1 Architecture of the demo in PISO-CAN200/400 PCI card

The information of devices and software in this application is below:

- **Hardware:**

CAN bus side: PISO-CAN 200/400-T
Ethernet side: PC with VxComm technology
CAN-Ethernet Gateway: i-7540D

- **Software:**

CAN bus side: the utility in PISO-CAN200/400 PCI card
Ethernet side: send232 tool in MiniOs7 Utility.

Please do the following steps to setup the system before you execute this application program.

Step 1: Setup the VxComm Utility. And the virtual COM port of PC is setting as following figure. The installing steps about the VxComm Utility tool, please see section 5.2.

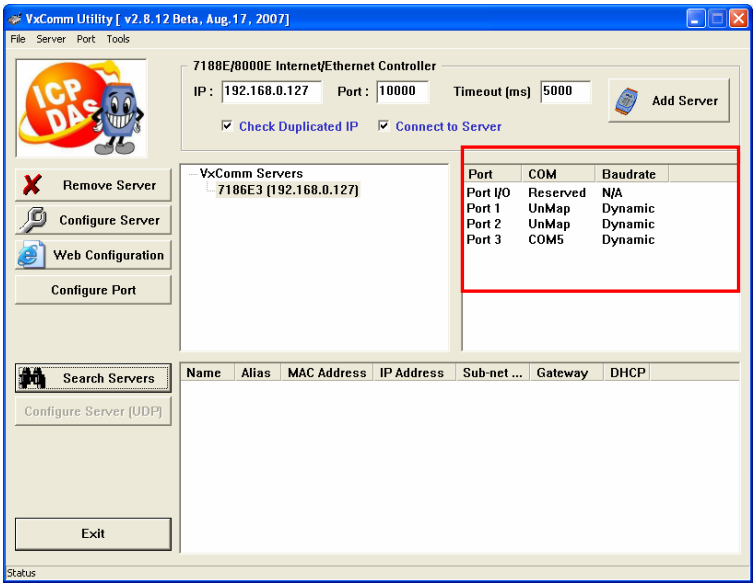


Figure 6-2: VxComm Utility tool

Step 2: Install the PISO-CAN200/400 PCI card. For more information, please see PISO-CAN user manual.

Step 3: Setup the system of i-7540D by using the i-7540D's utility tool. Here the parameters of i-7540D are setting as following figure.

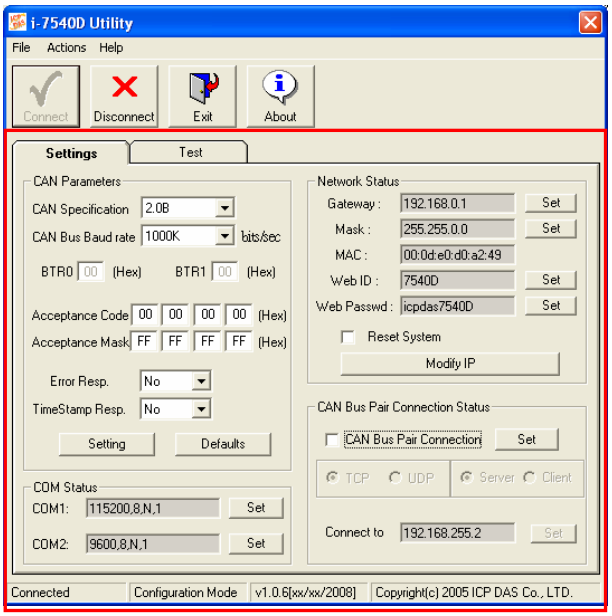
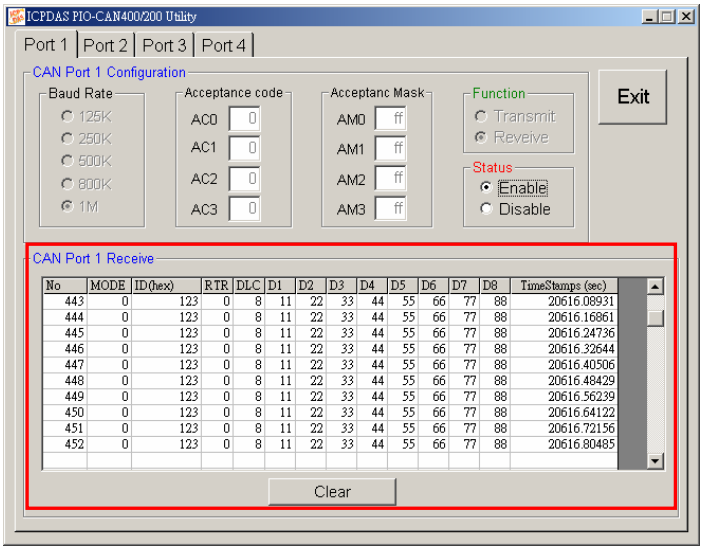
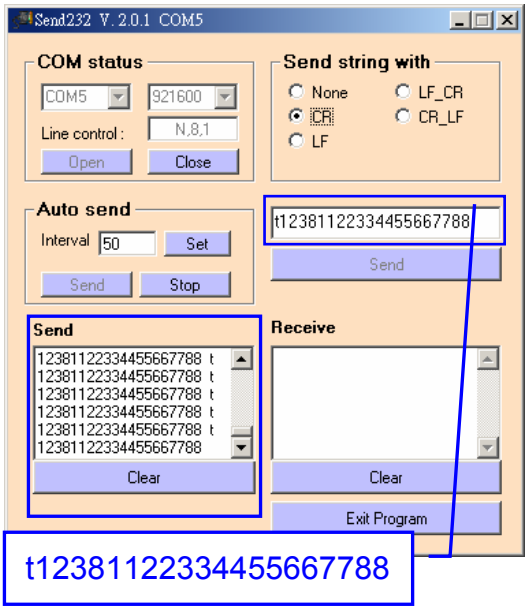


Figure 6-3: i-7540D Utility tool

Step 4: Now, start to send and receive message between PC's RS-232 port and CAN port by the i-7540D. The following figures display the sending and receiving messages

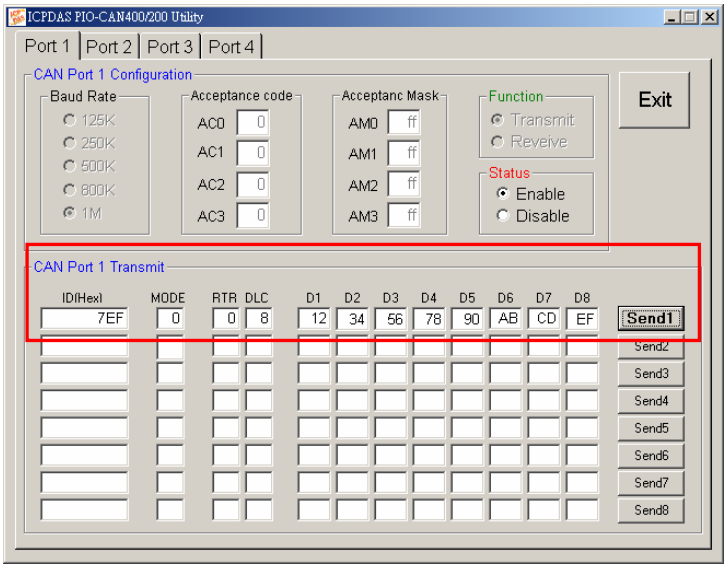


CAN card received messages

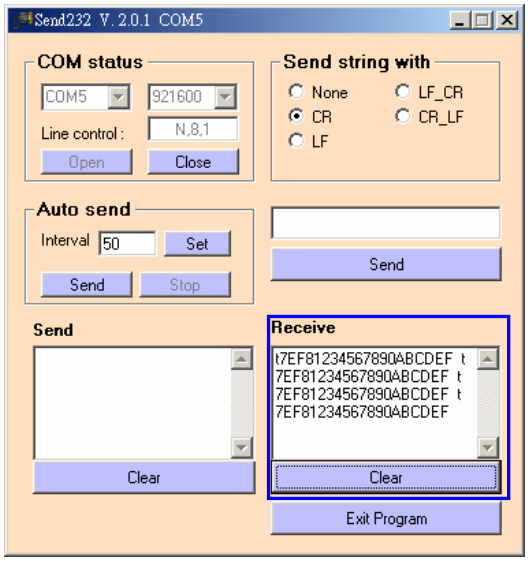


Messages sent from RS-232 port by VxComm technology

Figure 6-4: Send Messages from RS-232 to CAN



Send messages from CAN card



RS-232 port received messages

Figure 6-4: Send Messages from RS-232 to CAN

7. Diagnostics and Troubleshooting

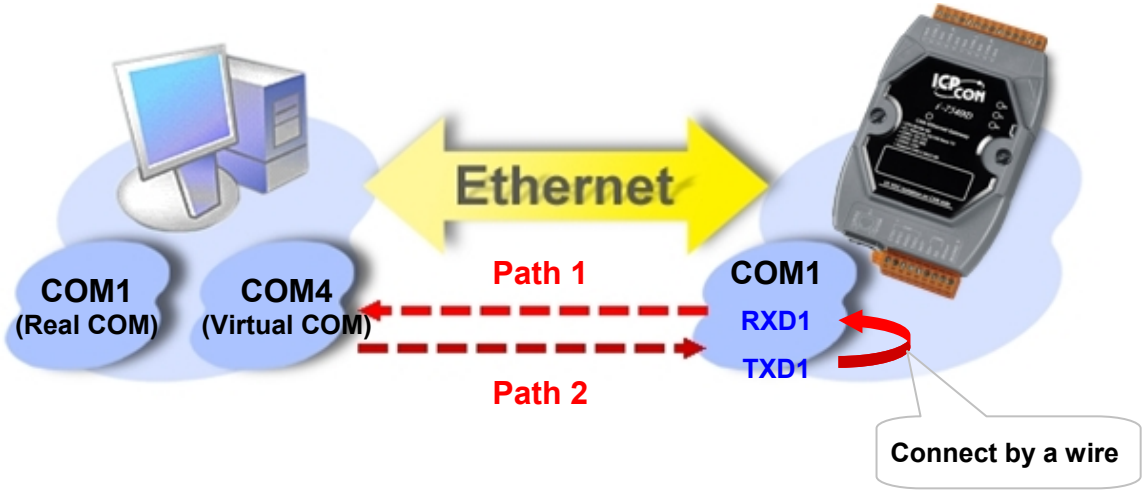
7.1 Diagnostics

After configuring the VxComm Driver by using the VxComm Utility, the VxComm Driver should work without error. However, users can use a simple test to make sure it's working properly.

Note: The test method depends on the user's devices and client programs.

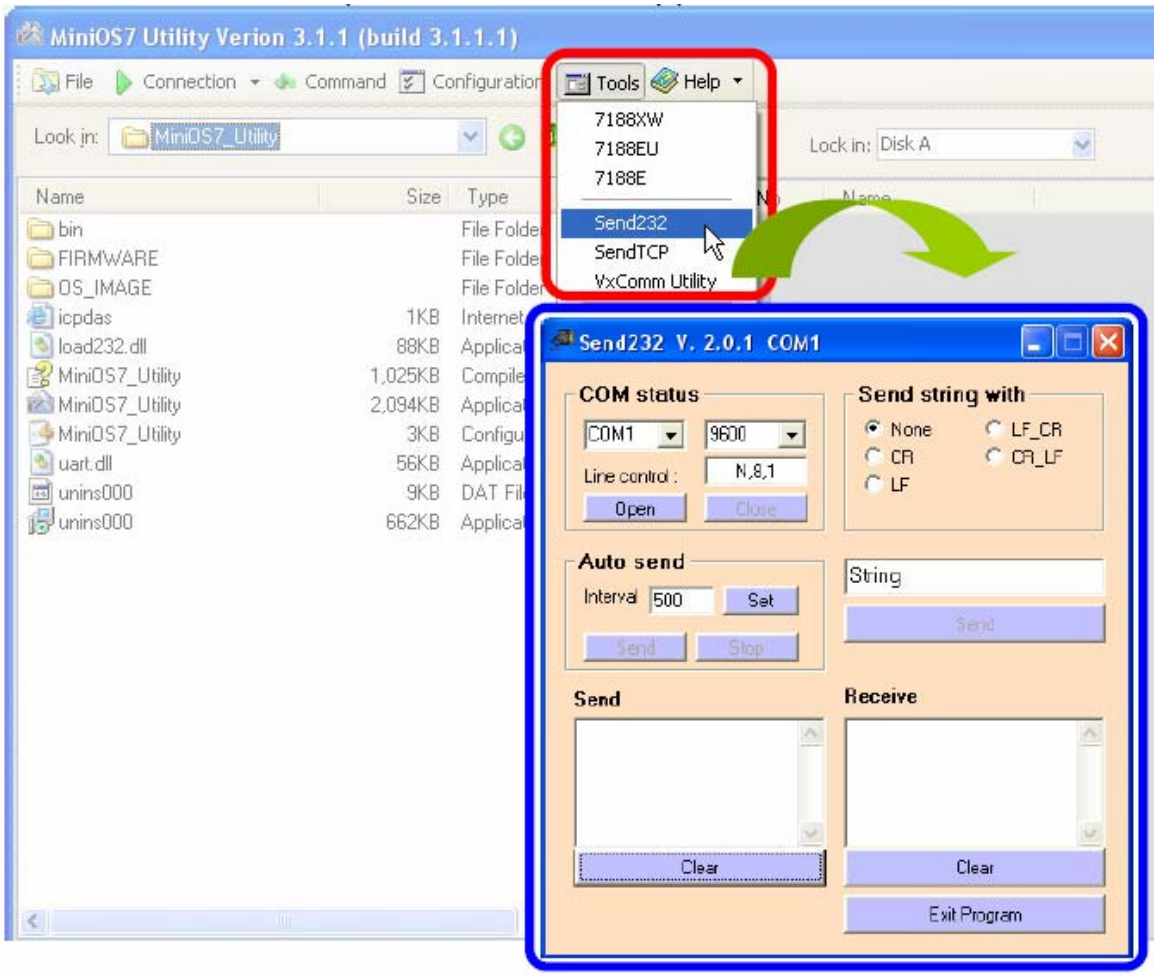
■ Example 1: Loop-Back Testing

Step 1: Connect the TXD1 to the RXD1 of the i-7540D.

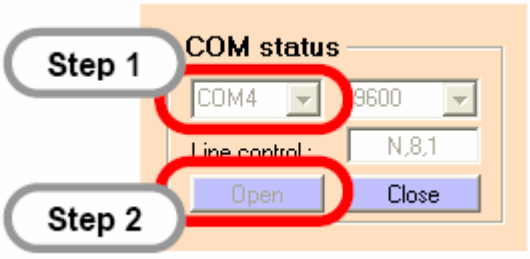


Step 2: Set COM1 of the i-7540D as virtual COM4 of the Host PC using the VxComm Utility.

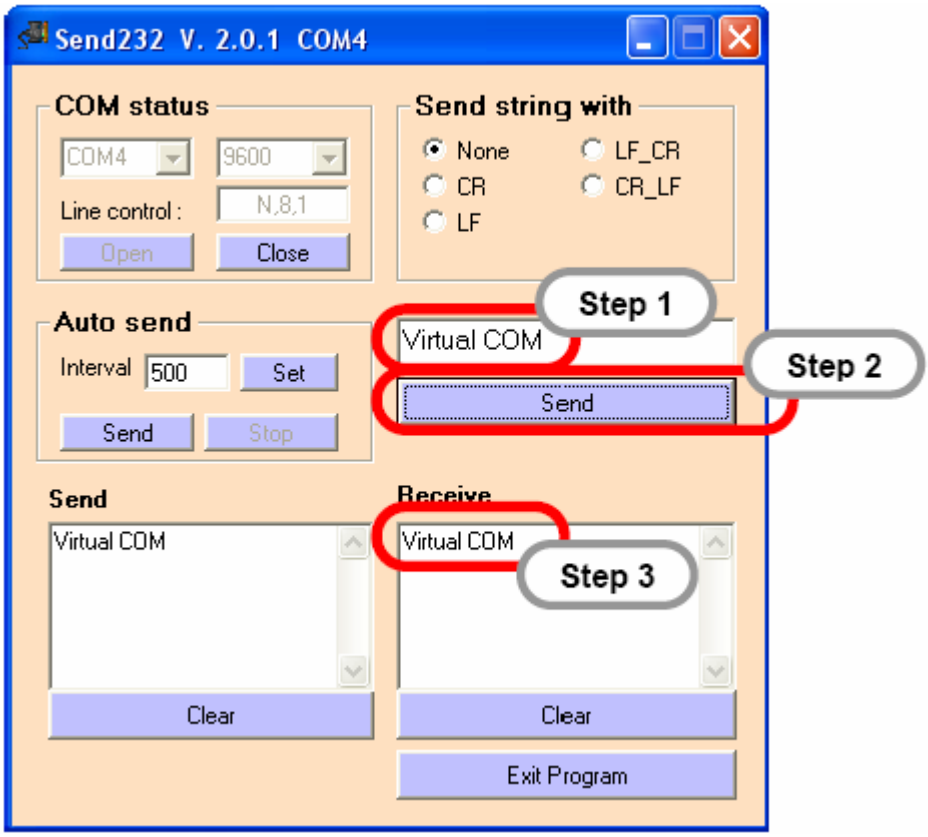
Step 3: On the Tools menu of the MiniOS7 Utility, and then click the Send232 to open the Send232 application.



Step 4: Select the COM4, and then click the Open button to open COM4 of the Host PC.

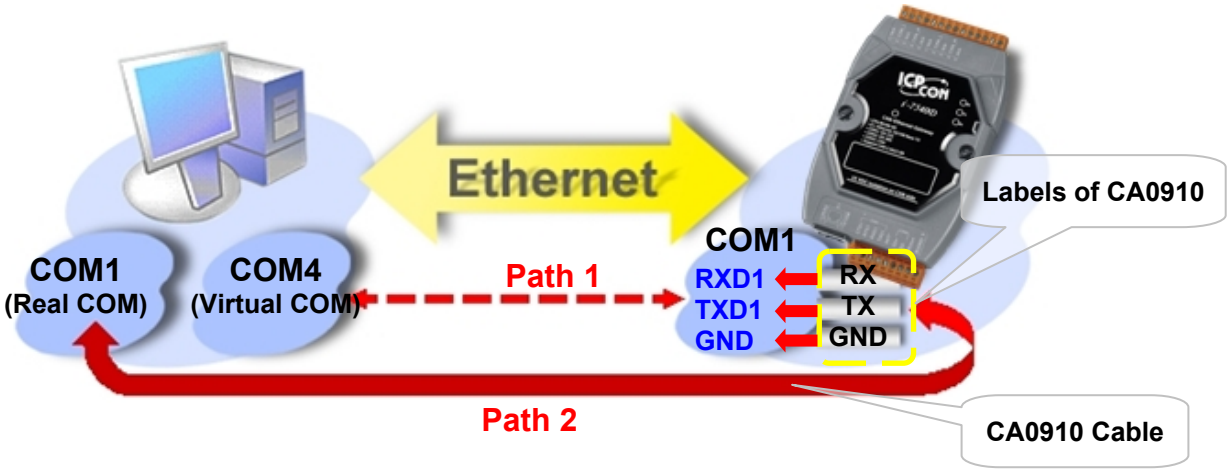


Step 5: Type any characters in the Send text box, and then click the Send button. The characters will be sent from COM4 of the Host PC to COM1 of the i-7540D (via Path 1), and will be immediately returned from COM1 of the i-7540D to COM4 of the Host PC (via Path 2) then displayed on the Receive text box of the Send232.



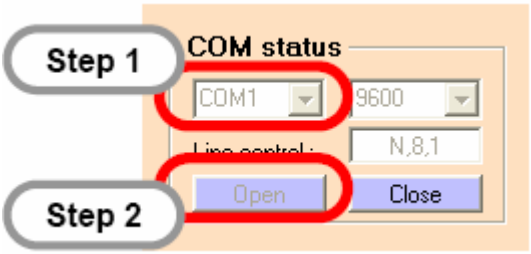
■ Example 2: Close-Loop Testing

Step 1: Establish a connection as follows:



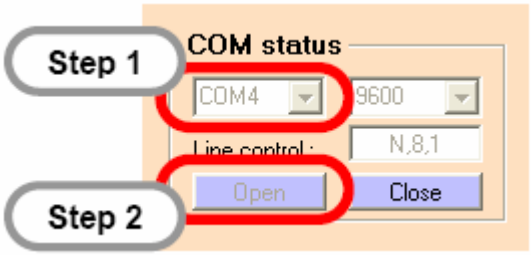
Step 2: On the **Tools** menu of the MiniOS7 Utility, and then click the Send232 to open the **Send232** application.

Step 3: Select the COM1, and then click the Open button to open COM4 of the Host PC.



Step 4: Set COM1 of the i-7540D as virtual COM4 of the Host PC using the VxComm Utility.

Step 5: Execute another Send232 application, and open the virtual COM4 of the Host PC.



Step 6: Type “COM1” in left hand window, and then click Send button. Data will be sent from COM1 of the Host PC through Path1 to COM1 of the i-7540D and will be immediately returned through Path2 to COM4 of the Host PC.

Step 7: Type “Virtual COM” in right hand window, and then click Send button. Data will be sent from COM1 of the Host PC through Path1 to COM1 of the i-7540D and will be immediately returned through Path2 to COM4 of the Host PC.

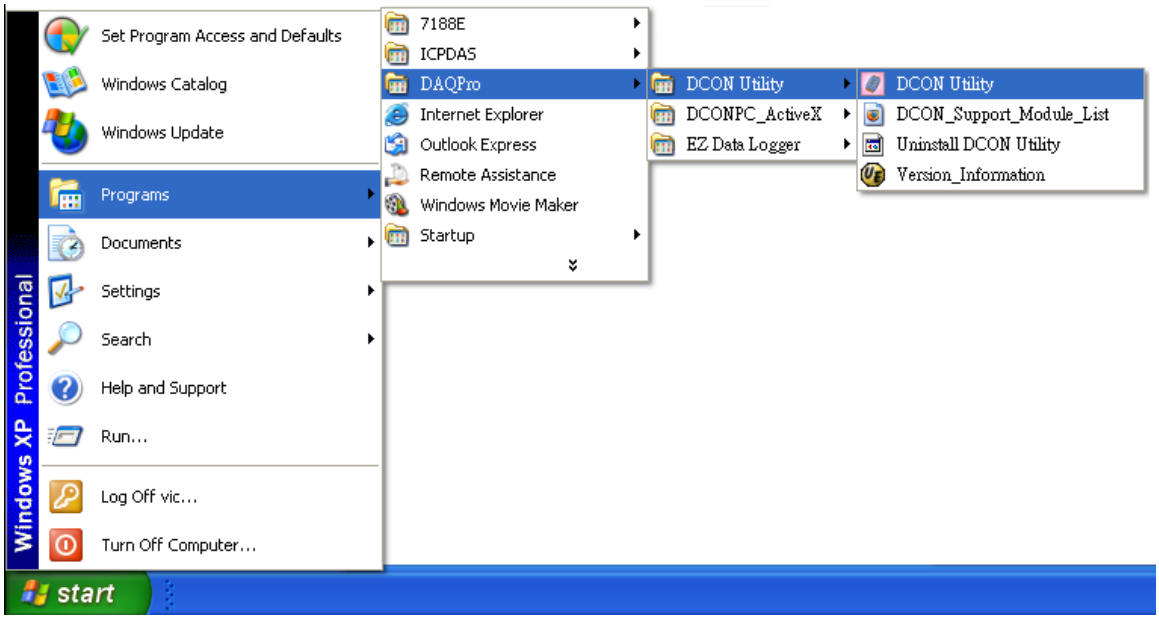
■ Example 3: External-Devices Testing

Connect 7000 series modules to COM2 of the i-7540D. Set COM2 of the as virtual COM10 of the Host PC using the VxComm Utility. Thus, we can use the DCON Utility to search the 7000 series module through COM10.

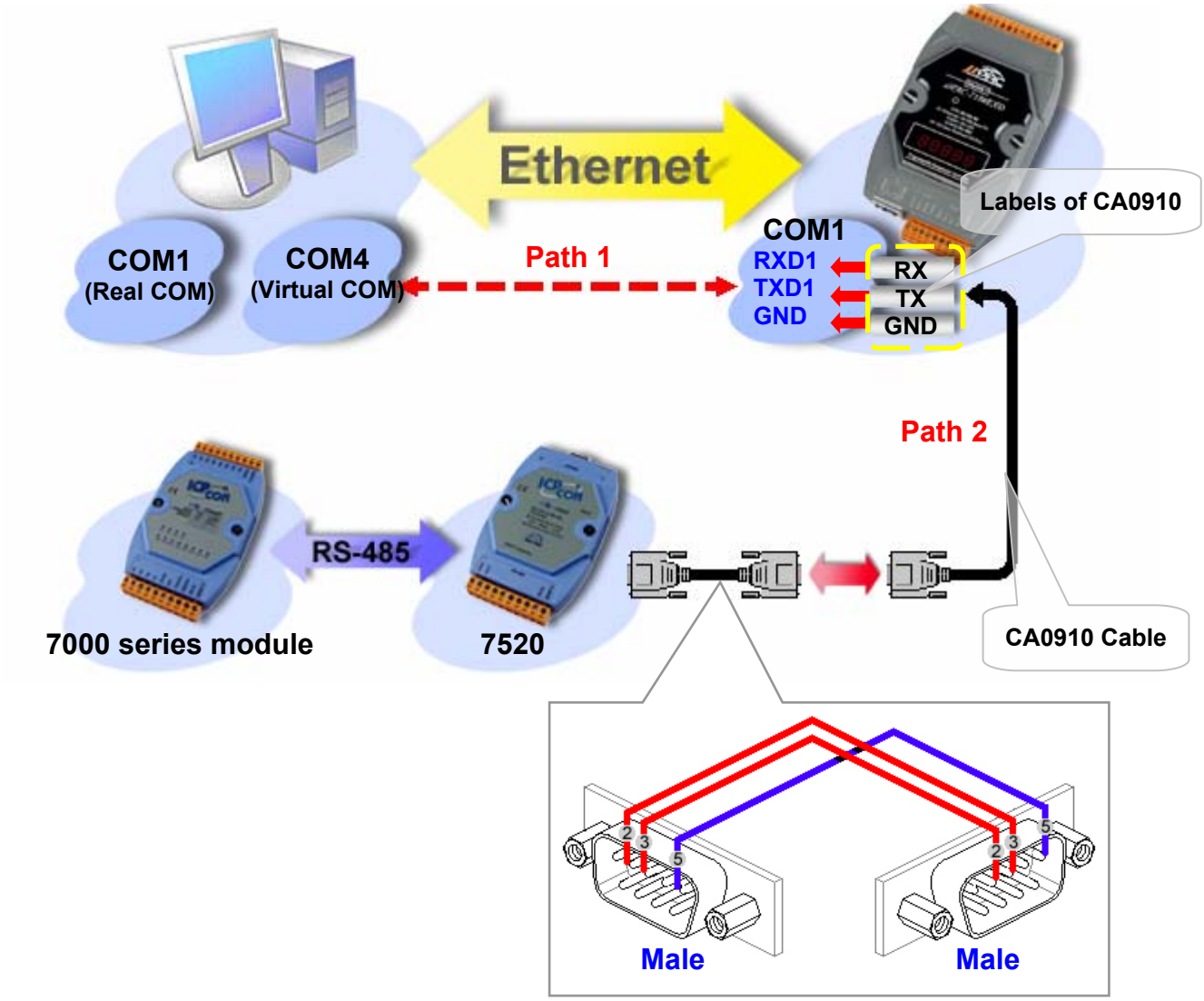
Note: The DCON Utility has to be installed on your Host PC. The installation software can be obtained from the following location:

- http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/setup/
- CD:\Napdos\Driver\DCON_Utiltiy\Setup\

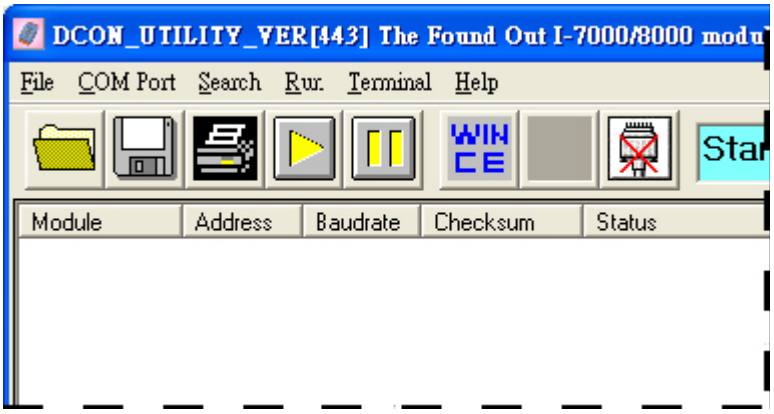
Step 1: Run the DCON Utility.

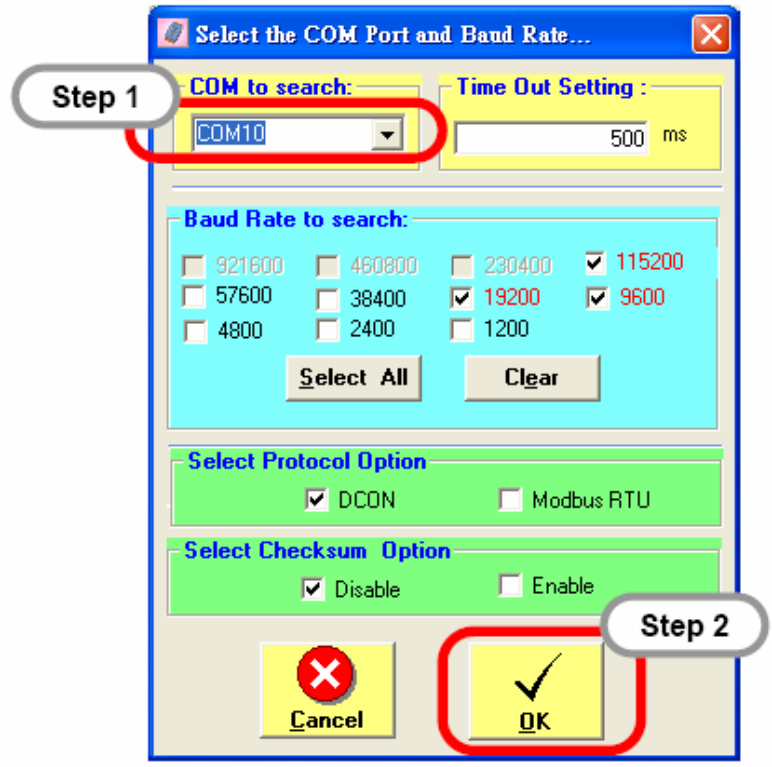


Step2: Establish connection as follows:

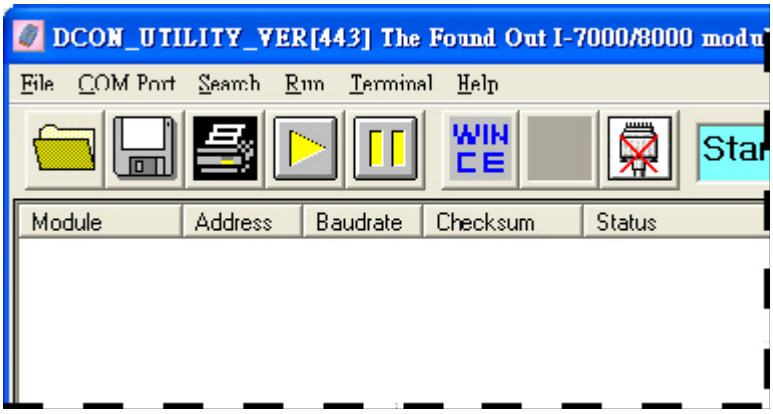


Step 3: Click the COM Port to choose the COM port number, baud rate, and checksum. For example: COM10, 115200, 19200, 9600 and No-Checksum. (These settings depend on the settings of 7000 series module.)

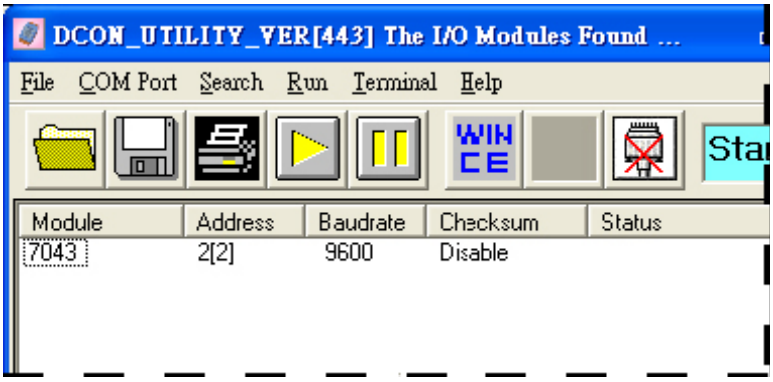




Step 4: Click the  search icon.



Step 5: If the VxComm Driver works properly, the DOCN Utility can search the module(s) connected to COM2 of the i-7540D.



7.2 Trouble Shooting

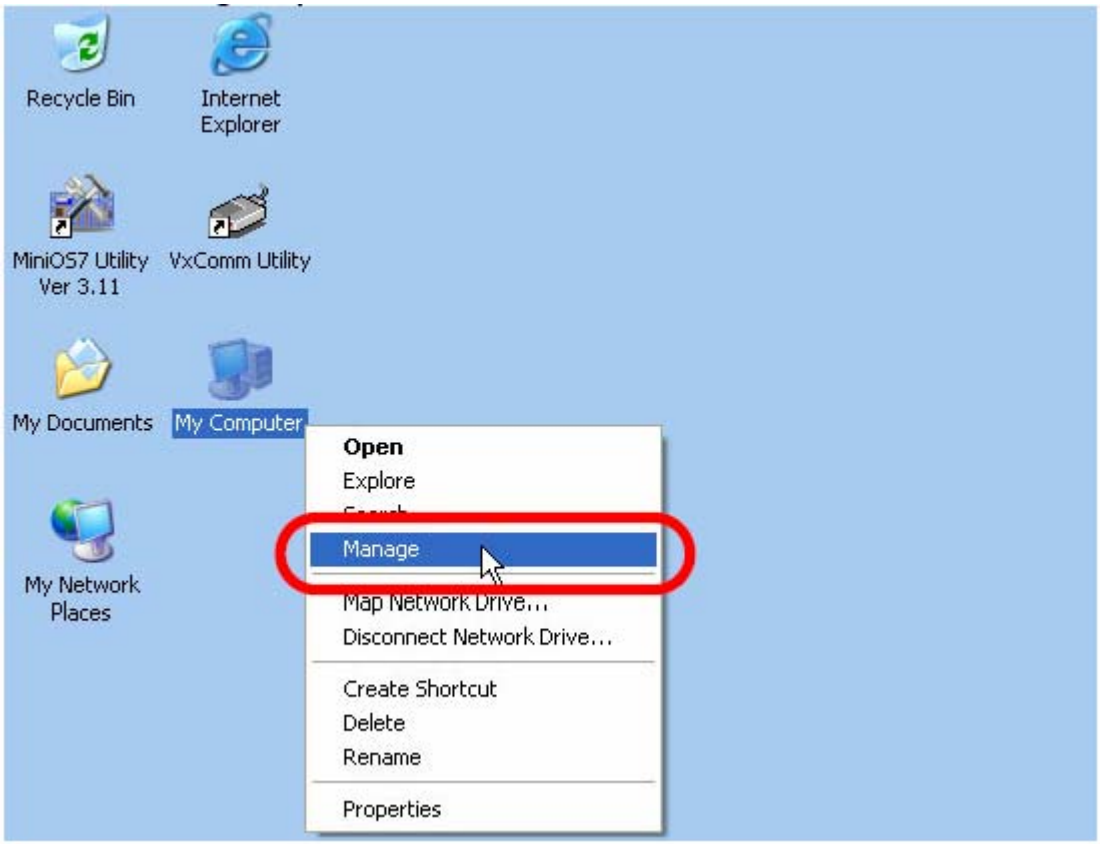
Problem 1: The client program fails to open the COM port that was created by the VxComm Driver.

Solution 1: Check the power supply, network cable, IP address, subnet mask and gateway of the i-7540D.

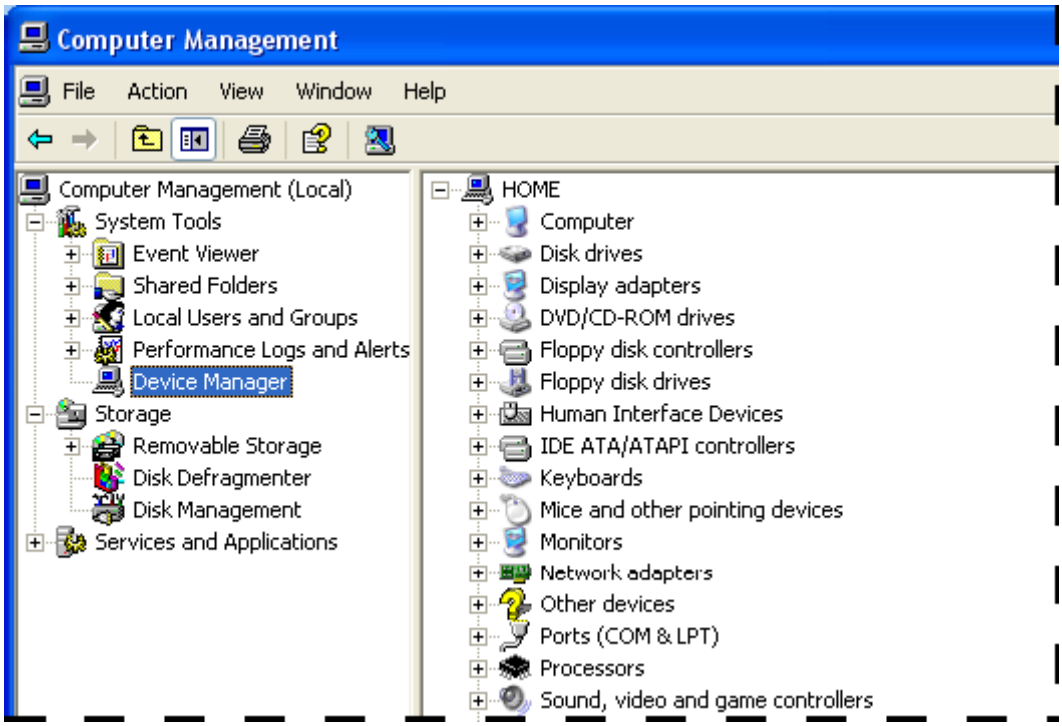
Problem 2: The client program still fails to open the COM port.

Solution 2:

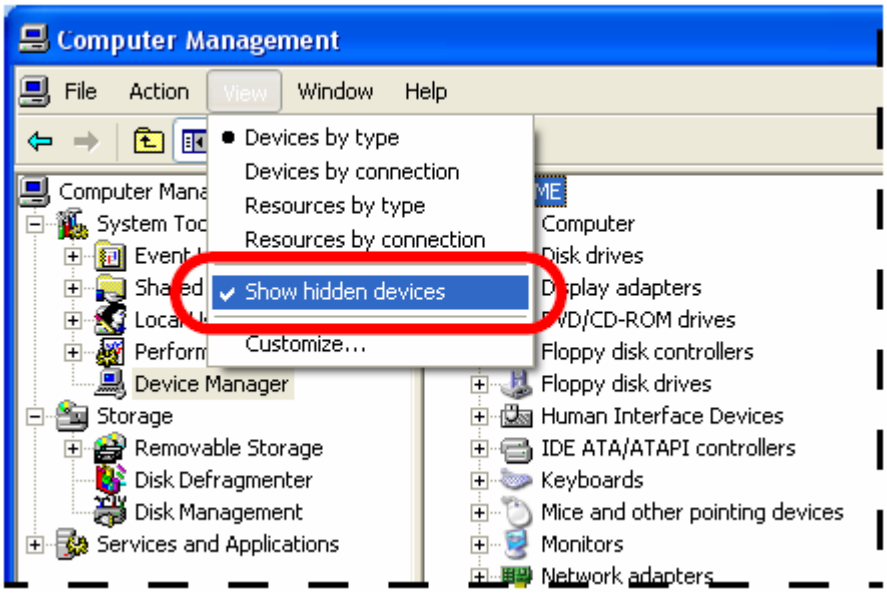
Step1: Right click the My Computer icon and select the Manage option.



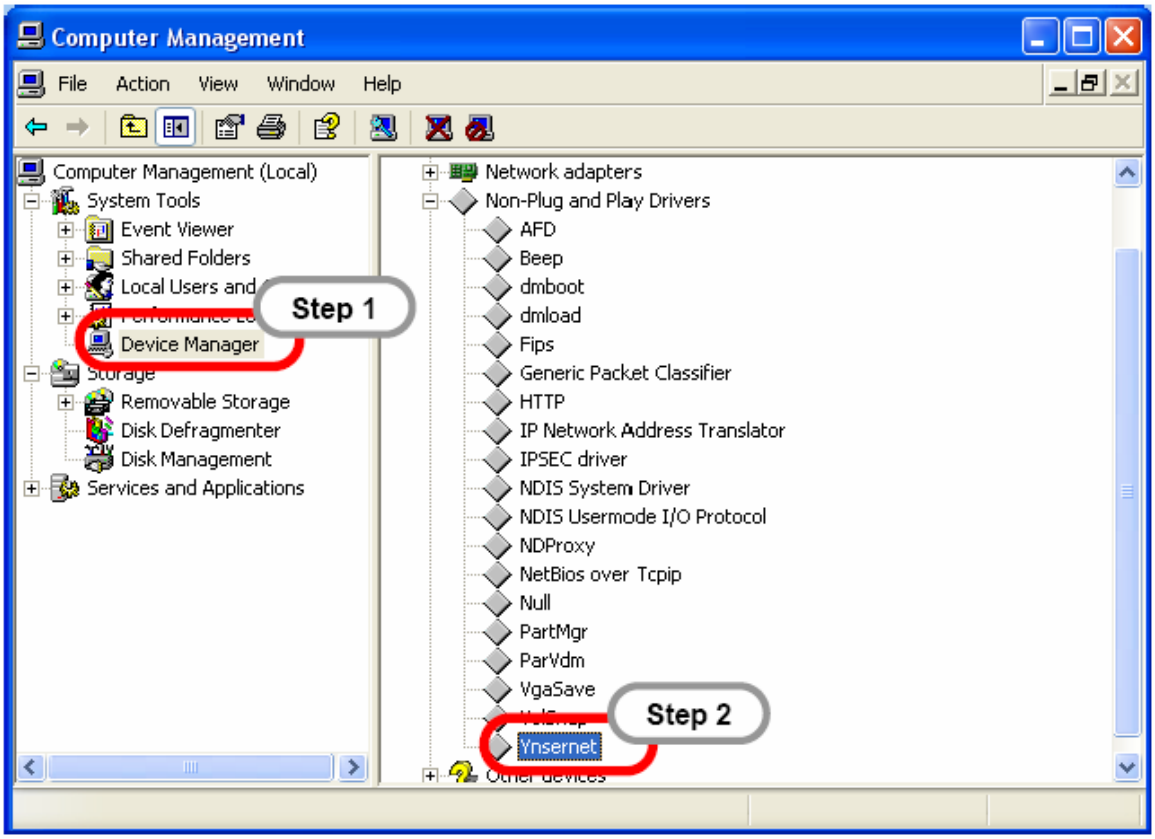
Step 2: Select the Device Manager icon from the Computer Management program.



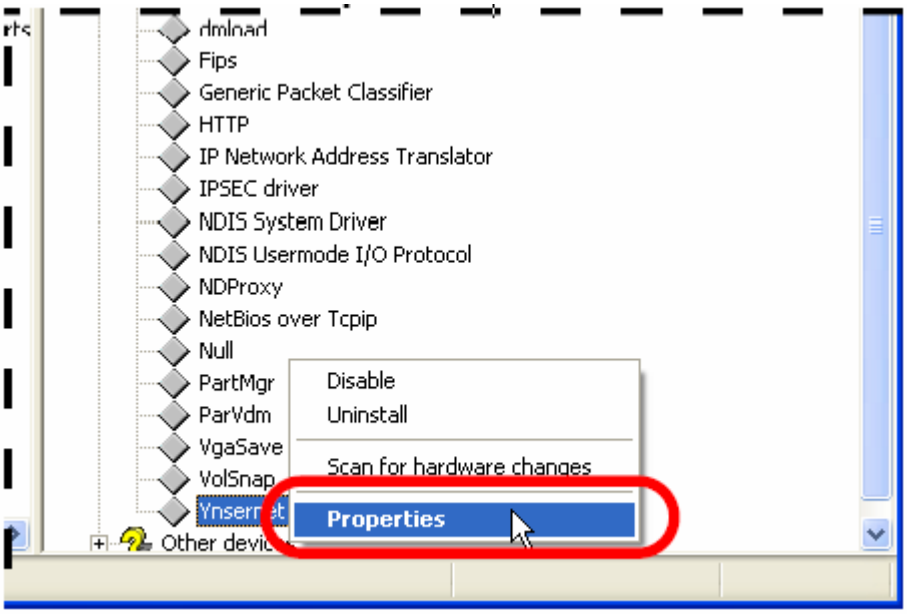
Step 3: Click Show hidden devices from the View menu



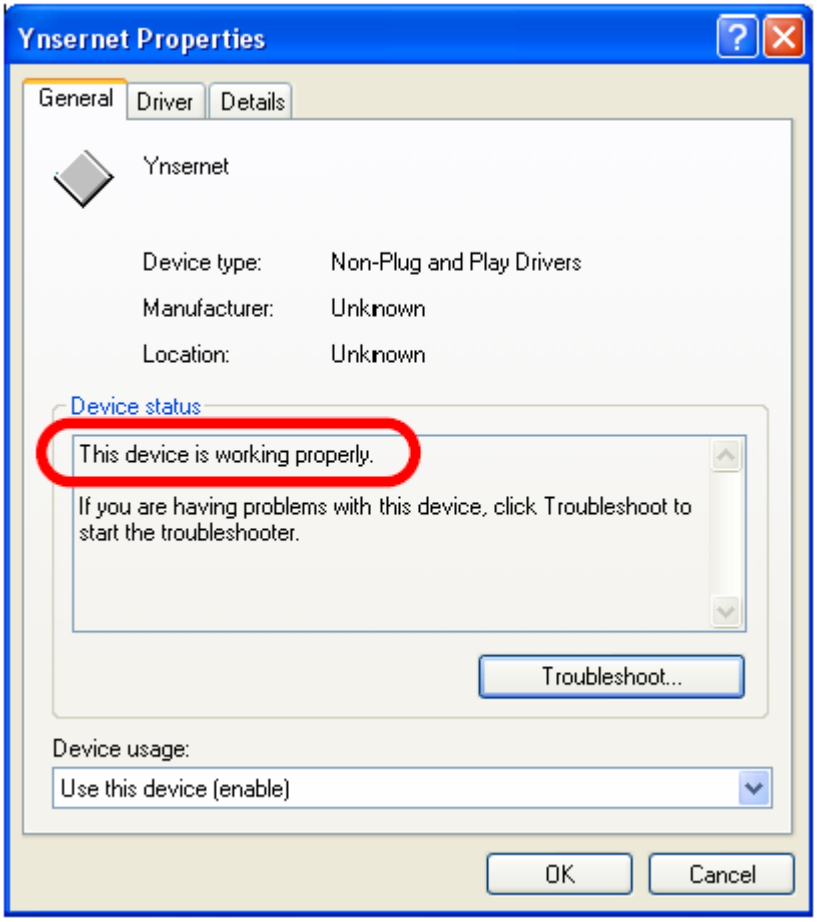
Step 4: Select the Non-Plug and Play Drivers/Ynsernet item.



Step 5: Right-click the mouse button on the Ynsernet item and click the Properties.



Step 6: Check that the message “This device is working properly” is displayed. If the driver is shown as not working properly, remove it and then re-install and reconfigure the driver.



Problem 3: The client programs successfully open the COM port, but fail to access the device.

Solution 3: Check the power supply and wiring (RS-232: RXD, TXD; RS-485: D+, D-; GND) of the device.

Error Code: Only For i-7540D's COM3 (CAN port)

If the Error response function on the i-7540D module is set to be "Yes"(that mean enable) via the i-7540D Utility during the configuration period, the i-7540D will send the error code to the device of the host PC through the Ethernet port 10003 when the i-7540D produces an error message automatically during the operation mode. The meanings of these error codes are given below:

Table 7-1: Error code table

Error code	Description	Possible causes & solutions
1	Invalid header	The RS-232 command string header is not "t","T","e","E".
2	Invalid length	The length of command string is invalid. For example: ✧ Error: t0013112233 Right: t0013112233<CR>
3	Invalid CAN identifier	The CAN identifier bits depend on CAN specification CAN 2.0A: total 11 bits, 0x000 ~ 0x7FF CAN 2.0B: total 29 bits, 0x00000000 ~ 0x1FFFFFFF
4	Invalid CAN data length	The data byte of the CAN Message does not match the data length of the CAN Message. For example: ✧ Error: t001512345<CR> ✧ Right: t00150102030405<CR>

If the i-7540D CAN baud rate is not the same as the CAN baud rate on the CAN network, the ER LED on the i-7540D will be flash with a constant frequency and the TX LED will solid green because the i-7540D cannot send any CAN messages to the CAN network. Therefore, users will need to read the i-7540D status by using the command "99S" (in the section 4.5) to help users understand what is going in the module. In general, the following errors could occur: CAN media connection problem, terminal resistor problem, different baud rate configuration with CAN network and so on.