# The i-7540D CAN-Ethernet Gateway

# User's Manual

# Warranty

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# **Table of Contents**

<i>1</i> .	Intr	oduction	4
1.	.1 F	eatures	5
1.	2 S	pecifications	6
1.	.3 V	xComm Technology	
2.	Har	dware	10
2.	1 B	lock Diagram	
2.	2 P	in Assignment	
	2.2.1	RS-232 & RS-485 & Power supply Interface	
	2.2.2	Connect to CAN Bus	
	2.2.3	Ethernet Connect	
2.	.3 T	erminator resistor settings	
2.	4 L	ED Indication	
	2.4.1	Power LED	
	2.4.2	CAN bus indicator LED	
	2.4.3	5-digits 7-Segment LED Displays	
<i>3</i> .	Soft	tware Utilities	23
3.	.1 i-	7540D Utility	
	3.1.1	Install & uninstall the i-7540D Utility	
	3.1.2	How to configure the module parameters	
	3.1.3	How to set the Bus Timing Registers	
	3.1.4	How to set the Acceptance Code and Mask	
	3.1.5	Enable Error Response	
	3.1.6	Enable Time-stamp Response	
	3.1.7	How to change web ID/PASSWORD configuration	
	3.1.8	How to test the module transmission performance	
	3.1.9	How to use CAN Bus Pair Connection	
3.	.2 N	IiniOS7 Utility	49
	3.2.1	Install the MiniOS7 Utility	50
	3.2.2	PC Diagnostic tools	
3.	.3 V	xComm Utility	56
<i>4</i> .	Sup	port Command List	57
4.	.1	tIIILDD <cr></cr>	59
4.	.2	TIIIL <cr></cr>	60
4.	.3	eIIIIIILDD <cr></cr>	61
4.	4	EIIIIIIIL <cr></cr>	
4.	5	99S	

4.6	99C	
4.7	99RA	66
4.8	99#P01	67
4.9	99#P02	69
4.10	99#P1	
4.11	99#P1B	
4.12	99\$P0105BBDSP	75
4.13	99\$P0205BBDSP	77
4.14	99\$P114PBCCMMET	
4.15	99\$P1B04TTRR	
4.16	99#PWID	
4.17	99#PWPW	
4.18	99\$PWIDLLxxxxx	
4.19	99\$PWPWLLxxxxx	
4.20	99#PPC	
4.21	99#PPIP	
4.22	99\$PPCLLABC	
4.23	99\$PPIPxxx	
4.24	General Error codes for commands from port 10003	
5. V	xComm Applications	91
5.1	Overview	
5.1.	1 Architecture	
5.1.	2 Ports mapping	
5.2	Installing the VxComm Driver	
5.3	Adding an i-7540D and configuring the VxComm Driver	
5.4	Removing an i-7540D	102
5.5	Uninstalling the VxComm Driver	
<b>6</b> . <b>A</b>	pplication with PISO-CAN 200/400 T	106
7. L	Diagnostics and Troubleshooting	109
7.1	Diagnostics	109
7.2	Trouble Shooting	117

# 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.



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

СРИ		
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	(CAN_H, CAN_L)	
Ethernet Dort	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;

	EirsAdD Utility	×
CAN Parameter CAN Specification 200 • CAN Sub-Bad rate 1000K • bits/bcc BTR0 00 PHext BTR1 00 PHext Acceptance Code 00 00 00 00 (PHext Acceptance Code 00 00 (PHext Acceptance Code 00 00 (PHext Acceptance Code 00 (PHext Acceptance PHext Acceptance PHe	Settinga         Lett           Methods Status         Send CAN Mestage           Gaterway:         192:158:03           Mask:         256:256:00           Veb ID:         75400           Send         Send           Reset System         Send           Modely IP         Send           ON Bus Pair Connection Status         Send	8 Tener mode (lived period) Interval 500 ms Start 2000 Ractive
Setting Defaults COM Status COM 1: 115200,8.N,1 Set	C CAN Bus Pair Connection Set	
COM2 9600.8.N,1 Set	Not Connected Co	Dicable Clear

# 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.



### 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

		0
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)
F		Initial pin for enable/disable
5	INTT	AUTOEXEC.BAT
6	D2+	Data+ pin of COM2 (RS-485)
7	D2-	Data- pin of COM2 (RS-485)
0		V+ of power supply
0	V3+	(+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  $120\Omega$  (or between  $108\Omega$ ~ $132\Omega$ ). The length related resistance should have 70 m $\Omega$ /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.

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

Table 2-4: Relation between bus cable and length

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 120 $\Omega$  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 <b>J3</b> Jumper Selection
--------------------------------------

Apply the termination resistor(120Ω)	Don't apply the termination resistor
J3 • •	J3 • •

#### 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.

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 1	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.

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 =  $192.168.255.1 \rightarrow$  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 =  $192.168.255.2 \rightarrow$  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.

	퉬 i-7540D Utility		
	File Actions Help		
	Connect Disconnect Exit About	Network status	
	CAN Parameters CAN Specification CAN Bus Baud rate bits/sec	Network Status Gateway : N/A Set Mask : N/A Set	
CAN parameters	BTR0 00 (Hex) BTR1 00 (Hex)	MAC :         N/A           Web ID :         N/A         Set           Web Passwd :         N/A         Set	
	Acceptance Mask 00 00 00 00 (Hex) Error Resp.	Reset System     Modify IP	
	TimeStamp Resp.       Setting   Defaults	CAN Bus Pair Connection Status	CAN pair connection parameters
COM status	COM Status COM1: N/A Set COM2: N/A Set	Connect to N/A Set	
	Not Connected	Copyright(c) 2005 ICP DAS Co., LTD.	

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 <u>http://www.icpdas.com/products/Remote\_IO/can\_bus/i-7540.htm</u> 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.

i-7540D U	ility Setup		
Choose D Select fo	estination Location Ider where setup will install files.		N.
	Install i-7540D Utility to: C:\ICPDAS\CAN_Gateway\		Change
InstallShield –		< Back Next >	Cancel

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.

i-7540D Utility Setup
Ready to Install the Program The wizard is ready to begin installation.
Click Install to begin the installation.
If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.
InstallShield  < Back Install Cancel

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.

🐻 Add or Re	mov	re Programs		
	^	Currently installed programs:	Sort by: Name	*
C <u>h</u> ange or Remove		😂, I-7243D Utility	Size	11.07MB 🔼
		🌃 i-7540D Utility	Size	<u>15.08MB</u>
		Click here for support information.	Used	<u>rarely</u>
Add New			Last Used On	2007/8/31
Programs		To change this program or remove it from your computer, click Change/Remove.	Chang	ge/Remove
6		🧰 ICP DAS Utilities for ISaGRAF	Size	42.06MB
Add/Remove		🔥 InduSoft Web Studio v6.0 + Service Pack 5 Size 320.0		320.00MB
<u>W</u> indows Components		👘 Instrumentation ActiveX Library		
		🐒 InterBase 6.5	Size	14.55MB
		🔀 IVS-255	Size	4.22MB 🔽
Set Drogram	~			

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.

🎏 i-7540D Utility	×
File Actions Help	
Connect Disconnect Exit	
Settings Test	_
CAN Parameters	
CAN Specification Gateway : N/A Set	
Sotting	
BTRO 00	
R 192.168.255.1 3 - Set	
Acceptance C	
Acceptance M Timeout 5000 ms Connect	
Error Resp.	
TimeStamp Resp. CAN Bus Pair Connection Status	
Setting Defaults CAN Bus Pair Connection Set	
COM Status	
COM1: N/A Set	1
COM2: N/A Set Connect to N/A Set	
Not Connected Copyright(c) 2005 ICP DAS Co., LTD.	=

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.

	🎉 i-7540D Utility		
	File Actions Help		
	Connect Disconnect Exit	i-7540D's	
	Settings Test	CAN Status	
	CAN Parameters	Network Status	
	CAN Specification 2.0B	Gateway: 192.168.0.1 Set	
	CAN Bus Baud rate 1000K - bits/sec	Mask : 255.255.0.0 Set	
		MAC : 00:0d:e0:d0:a2:49	
	BIRUJUU (Hex) BIRIJUU (Hex)	Web ID : 7540D Set	
	Acceptance Code 00 00 00 00 (Hex)	Web Passwd : jcpdas7540D Set	
	Acceptance Mask FF FF FF FF (Hex)	Reset System	
		Modify IP Respons	e or not
		- CAN Bus Bair Connection Status	<u> </u>
Time-Stamp v	Setting Defaults	CAN Bus Pair Connection Set	
response or n	ot	C TCP  C UDP  C Server  C Client	
	COM1: 115200,8,N,1 Set		
	COM2: 9500.8 N 1 Set	Connect to 192.168.0.102 Set	
	Connected Configuration Mode v1.0.6[xx	/xx/2008] Copyright(c) 2005 ICP DAS Co., LTD.	

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.

	🎏 i-7540D Utility		
	File Actions Help		
	Connect Disconnect Exit About	IP/Gateway/Mask/ Web ID/Password	
	CAN Parameters	Network Status	
	CAN Specification 2.0B	Gateway : 192.168.0.1	
	CAN Bus Baud rate 1000K 💌 bits/sec	Mask : 255.255.0.0	
	BTRO 00 (Hex) BTR1 00 (Hex)	MAC : 00:0d:e0:d0:a2:49 Web ID : 7540D Set	
	Acceptance Code 00 00 00 00 (Hex)	Web Passwd :  icpdas7540D	
	Acceptance Mask FF FF FF FF (Hex)	Reset System	
	Error Resp. No	Modify IP	CAN Pair
	TimeStamp Resp. No 💌	CAN Bus Pair Connection Status	Status
RS-232/RS4	85 Setting Defaults	CAN Bus Pair Connection Set	
	COM Status COM1: 115200,8,N,1 Set COM2: 9600,8,N,1 Set	C TCP  UDP  Server  Client Connect to 192.168.0.102 Set	
	Connected Configuration Mode v1.0.6[x	x/xx/2008] Copyright(c) 2005 ICP DAS Co., LTD.	

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.

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 11-bit ID Message:

#### 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.
- 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 m	ark "h"	behind	the valu	le means hex for	mat.)

# 3.1.5 Enable Error Response

퉬 i-7540D Utility	
File Actions Help	
Connect Disconnect Exit	
Settings Test	
CAN Parameters	Network Status
CAN Specification 2.0B	Gateway: 192.168.0.1 Set
CAN Bus Baud rate 1000K 🔻 bits/sec	Mask : 255.255.0.0 Set
	MAC : 00:0d:e0:d0:a2:49
BTR0 00 (Hex) BTR1 00 (Hex)	Web ID : 7540D Set
Acceptance Code 00 00 00 00 (Hex)	Web Passwd : jicpdas7540D Set
Acceptance Mask FF FF FF FF (Hex)	🔲 Reset System
	Modify IP
Error Resp. No	
TimeStamp Resp. No 💌	CAN Bus Pair Connection Status
Setting Defaults	CAN Bus Pair Connection Set
COM Status	C TCP C UDP C Server Client
COM1: 115200,8,N,1 Set	
COM2: 9600,8,N,1 Set	Connect to 192.168.0.102 Set
Connected Configuration Mode v1.0.6[x	x/xx/2008] Copyright(c) 2005 ICP DAS Co., LTD.

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	Departmen		
(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

퉬 i-7540D Utility				
File Actions Help				
Connect Disconnect Exit About				
Settings Test				
CAN Parameters	Network Status			
CAN Specification 2.0B	Gateway : 192.168.0.1 Set			
CAN Bus Baud rate 1000K 🔽 bits/sec	Mask : 255.255.0.0 Set			
	MAC : 00:0d:e0:d0:a2:49			
BIRUJUU (Hex) BIRIJUU (Hex)	Web ID : 7540D Set			
Acceptance Code 00 00 00 00 (Hex)	Web Passwd : icpdas7540D Set			
Acceptance Mask FF FF FF FF (Hex)	🗖 Reset System			
Error Besp No -	Modify IP			
TimeStamp Resp. No 🔹	CAN Bus Pair Connection Status			
Setting Defaults	CAN Bus Pair Connection Set			
COM Status	C TCP C UDP C Server Client			
COM1: 115200,8,N,1 Set				
COM2: 9600,8,N,1 Set	Connect to 192.168.0.102 Set			
Connected Configuration Mode v1.0.6[xx/xx/2008] Copyright(c) 2005 ICP DAS Co., LTD.				

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:

🎏 i-7540D Utility	×	
File Actions Help		
Connect Disconnect Exit	Timer mode (Date/Time) Start time Time Start Stop time Time Stop	
Settings Test		
Send CAN Message ID (Hext) Mode RTR DLC	Timer mode (fixed period) – Interval 500 ms	
D1 D2 D3 D4 D5 D6 D7 D8	Start Stop	Receive the first CAN message at
Send	Kecetve t1233AABBCC 33B7AA17 t45621122 33E054EB	33B/AA1/h us
Send Command To 7540D		Possive the second
Send Clear Result		CAN message at 33E054EBh us
	Disable	
Connected Operation Mode v1.0.4[08/3	1/2007] Copyright(c) 2005 ICP DAS Co., LTD.	

# 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.

	lasse					ſ	
1-75400 Setup Page - Microsoft Internet Exp	lorer					E	
File Edic view Pavorices Tools Help				_			
🌀 Back 🔹 🐑 👻 📓 🏠 🔎 Search	n 🤺 Favorites	) 🖉 👹	🖸 🔹 📴	<u>*</u> 10	- 🔏 👘		
Address 🛃 http://192.168.0.122/			💌 🔁 Go	Links »	🌀 SnagIt	۲,	📆 •
I-7540D Setup Page							^
Device information							
Module name :		I-7540D					
Firmware version :		v1.0.5[10/15	5/2007]				
TCP/IP library version : 1.19							
TCP/IP library date : Aug 22 2007							
Network Setting	Current		New				
IP Address	192.168.0.12	2	192.168	.255.100			
Subnet Mask	255.255.0.0		255.255	.0.0			
Gateway	192.168.0.25	4	192.168	.0.254			
CAN Port Setting	Current		New				~
🕘 Done					🥑 Interne	et 🛛	.:

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.

🐴 I-7540D Setup Page	- Microsoft Internet Exp	lorer			
File Edit View Favorites Tools Help					
🕞 Back 🝷 🛞 - [	💌 😰 🏠 🔎 Search	n 🤆 Favorites 🙆 🔗	• 🎍 🖸 • 🗖	J 🔝 🛍 🚳	
Address 🗿 http://192.168.0.122/ 💽 🔂 Go Links 🎽 😏 Snaglt 📑					
Acceptance Ma	515			(Hex)	^
Bus Timing Reg	jister 0	00 (Hex)	00	(Hex)	
Bus Timing Reg	jister 1	00 (Hex)	00	(Hex)	
COM Port Sett	ing				
COM1:115200,N, COM2:115200,N,	8,1 8,1				
Port	Baud rate	Data bits	Parity	Stop bits	
COM1 🗸	115200 🗸	8 🗸	None 🗸	1 🗸	
ID: 7540D PASSWORD: Reset System III IP/MASK/GATEWAY changes take affect after system is reset III SET TCP/IP and COM/CAN PORT					
🕘 Done				🎯 Internet	

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".

🐝 i-7540D Utility	
File Actions Help	
Connect Disconnect Exit	
Settings Test	
CAN Parameters	Network Status
CAN Specification 2.0B	Gateway: 192.168.0.1 Set
CAN Bus Baud rate 1000K 💌 bits/sec	Mask : 255.255.0.0 Set
	MAC : 00:0d:e0:d0:a2:49
BIRUJUU (Hex) BIRIJUU (Hex)	Web ID : 7540D Set
Acceptance Code 00 00 00 00 (Hex)	Web Passwd : icpdas7540D Set
Acceptance Mask FF FF FF FF (Hex)	Reset System
	Modify IP
Error Resp. No	
TimeStamp Resp. No 💌	CAN Bus Pair Connection Status
Setting Defaults	CAN Bus Pair Connection Set
COM Status	C TCP  C UDP  C Server  C Client
COM1: 115200,8,N,1 Set	
COM2: 9600,8,N,1 Set	Connect to 192.168.0.102 Set
Connected Configuration Mode v1.0.6[xx	:/xx/2008] Copyright(c) 2005 ICP DAS Co., LTD.

# 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.

	🍒 i-7540D Utility	X
ക	File Actions Help	
	Connect Disconnect Exit About	
•	Settings Test	
	CAN Parameters	Network Status
	CAN Specification	Gateway : N/A Set
	CAN Bus Baug	Mar N/A Set
V	Setting	
	IP 192.168.25	
	Acceptance C	
	Acceptance M Timeout 5000	ms Connect
	Error Resp.	
	TimeStamp Resp.	CAN Bus Pair Connection Status
	Setting Defaults	CAN Bus Pair Connection Set
	CDM Status	© TCP C UDP ⊙ Server C Client
	COM1: N/A Set	
	COM2: N/A Set	Connect to N/A Set
	Not Connected	Copyright(c) 2005 ICP DAS Co., LTD.

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.



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.

퉬 i-7540D Utility		Ì
File Actions Help		Start/stop time of timer mode
Connect Disconnect	Timer mode (Date/Time) Start time Time Start Stop time Time Stop	
Settings Test		
Send CAN Message ID (Hex) Mode RTR DLC 000 0 0 0	Timer mode (fixed period)	Fixed period to send CAN message
D1 D2 D3 D4 D5 D6 D7 D8 00 00 00 00 00 00 00 00 00 00	Start Stop	
Send	Ndeive	
Send Command To 7540D		
Send Clear Result		
	Disable Clear	
Connected Operation Mode v1.0.5[10/1	5/2007] Copyright(c) 2005 ICP DAS Co., LTD.	

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.

🎏 i-7540D Utility		
File Actions Help		
Connect Disconnect Exit		
Settings Test		
CAN Parameters	Network Status	
CAN Specification	Gateway : N/A Set	
CAN Bus Baud rate	Mask : N/A Set	
	MAC: N/A	
BIRUJUU (Hex) BIR1JUU (Hex)	Web ID : N/A Set	
Acceptance Code 00 00 00 00 (Hex)	Web Passwd : N/A Set	
Acceptance Mask 00 00 00 00 (Hex)	E Reset System	
Even Deven	Modify IP	
Error Hesp.		CAN Pair
TimeStamp Resp. 📃 🔽	CAN Bus Pair Connection Status	Status
Setting Defaults	CAN Bus Pair Connection Set	L
- COM Status	© TCP C UDP © Server C Client	
COM1: N/A Set		
	Connect to N/A Set 1	
COM2: N/A Set		
Not Connected	Copyright(c) 2005 ICP DAS Co., LTD.	

### 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)

- 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.

🚵 MiniOS7 Utility Verion 3.1.1 (build 3.1.1.1)					
👔 🔀 File 🌘 Connection 👻 🐟 Command 🛐 Configuration 🏾	📷 Tools 🧼 Help 🔻				
	7188XW				
	7188EU				
	7188E				
	Send232				
	SendTCP				
	V×Comm Utility				
	Console F10				

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 Win32 on 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 <a href="http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/minios7/utility/">http://ftp.icpdas.com.tw/pub/cd/8000cd/napdos/minios7/utility/</a>

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.

Config TCP/IP       Send Command To 7188E       Network Status         Gateway:       NC       Set         Connect       Disconnect       Send       Clear Result         Select Port:       Send Data with       MAC:       NC         Nome © CR © LF © LF © RC CR_LF © CS_CR       Modify IP       7188E COM Status         Send       NC       Set         Send       Fw. Ver.       NC         Clear       MiniOs7 Version       NC	🍓 Send TCP : 7188E/8000E Diagnostics App. v2.01	
	Config TCP/IP Send Command To 7188E Send Clear Result Select Port: None © CR © LF © LF_CR© CR_LF© CS_CR Send Data: Send Clear Clear Clear	Network Status         Gateway:       NC         Mask:       NC         MAC:       NC         Modify IP         7188E COM Status         NC       Set         Fw. Ver.       Set         NC       Set         MiniOs7 Version       NC         NC       Close

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".

😚 Send TCP : 7188E/8000E Diagnostics App. v2.01	
Config TCP/IP Send Command To 7188E	Network Status
192.168.255.1       Connect       Send       Clear Result	Gateway: 192.168.0.1 Set Mask: 255.255.0.0 Set
7188E3 is connected	MAC: 00:80:31:00:01:1d
Select Port: Send Data with	Modify IP
Send Data:	7188E COM Status
Send	9600,8,N,1 Set
	Fw. Ver.
Receive :	v3.0.01[11/19/2001]
Clear	MiniOs7 Version
	v1.0.14(2001/8/1)
	Close

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

🏘 Send TCP : 7188E/8000E Diagnostics App. v2.01	
Config TCP/IP Send Command To 7188E	Network Status
192.168.255.1	Gateway: 192.168.0.1 Set
Connect Disconnect Clear Result	Mask: 255.255.0.0 Set
7188E3 is connected	MAC: 00:80:31:00:01:1d
Select Port:       Send Data with         Port 1       O None O CR O LF O LF_CRO CR_LFO	CS_CR Modify IP
Send Data:	7188E COM Status
Send	9600,8,N,1 Set
	Fw. Ver.
Receive :	v3.0.01[11/19/2001]
Clear	MiniOs7 Version
	v1.0.14(2001/8/1)
	Cloæ

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".

🎯 Send TCP : 7188E/8000E Diagnostics App. v2.01	×
Config TCP/IP Send Command To 7188E	Network Status
192.168.255.1	Gateway: 192.168.0.1 Set
Connect Disconnect Send Clear Result	Mask: 255.255.0.0 Set
Schet Be (1) Suid Date (2)	MAC: 00:80:31:00:01:1d
Port2 C None CR LF C LF_CRC CR_LFC CS_CR	Modify IP
Send Data:	7188E COM Status
Send \$02M	9600,8,N,1 Set
24.30.32.4d.	-Fw. Ver.
Receive :	v3.0.01[11/19/2001]
Clear [1027021	- MiniOs7 Version
21.30.32.37.30.32.31.	v1.0.14(2001/8/1)
	Close

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.

🥳 Send TCP : 7188E/8000E Dia;	gnostics App. v2.(	01			_ 🗆 ×
-Config TCP/IP	-Send Comma	und To 7188E		Network Status	
192.168.255.1	10			Gateway: 192.168.0.1	Set
Connect Disconnect	Send	Clear Result		D55 255.0.0	Set
7188E3 is connected 71	88E COM Port Se	etting		×	
Select Po 1 Send Data	_		_ \	Set	
Port 2 C None	Baud:  11	.5200		Cancel Modify IP	
Send Data:	DataBit: 8		-	tus	<b>2</b>
Send \$02M	n i Ma		_		Set
, 24.30.32.4d	Parity: 1		<u> </u>		
	StopBit 1		<b>-</b>	0011	
				.001]	
				MiniOs7 Version	
J21.30.32.37.30.32.31.				v1.0.14(2001/8/1)	
				·	Close
				1	

 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: COmmandCOmmand

<command/>	: The commands of the i-7540D.
<cr></cr>	All commands from this port must end with the character
	. " <cr>" (The ASCII value is 13).</cr>

Command	Description
tIIILDD <cr></cr>	Send or receive a standard data frame.
TIIIL <cr></cr>	Send or receive a standard remote frame.
ellIIIIILDD <cr></cr>	Send or receive an extended data frame.
EIIIIIIIL <cr></cr>	Send or receive an extended remote frame.

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

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

Command	Description
S	Read the status value of i-7540D
С	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
\$P114PBCCMMET	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

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

#### 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: tllLDD...<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

# 4.2 TIIIL<CR>

**Description:** Send or receive a standard CAN remote frame.

# Syntax: TIIL<CR>

т	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.

# 4.3 ellIIIIILDD...<CR>

Description: Send or receive an extended CAN data frame.

# Syntax: ellIIIIILDD...<CR>

е	Stands for the extended (2.0B) data frame.
	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: e1234567851122334455<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.

# 4.4 EIIIIIIIL<CR>

**Description:** Send or receive an extended CAN remote frame.

### Syntax: EllIIIIIL<CR>

E	Stands for the extended (2.0B) CAN remote frame.
	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.

### 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
current baud rate setting of CAN
CAN register
CAN transmit error counter
CAN receive error counter
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.

AsciiToHex( <b>C</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

Table 4-3: CAN baud rate 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 Trans	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
Dit 1	Data Overrun Status	1	Overrun; a message was lost
		0	Absent; no data overrun has occurred
Bit 0 (LSB)	(LSB) Receive Buffer Status	1	Full; one or more messages are available in the RXFIFO
		0	Empty; no message is available

Table 4-4: CAN status register list

Table 4-5: CAN Error flag list

AsciiToHex( <b>O</b> )	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

# 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.

# 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
Ρ	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.

# 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
Ρ	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.

# 4.10 99#P1

Description: Read the CAN configuration

Syntax: 99#P1

99#P1 Command character

# Response:

Valid Command: 14PBCCCCCCCMMMMMMMET Invalid command: ERROR

14	Delimiter for valid command
Р	CAN specification
	0 = 2.0A
	1 = 2.0B
В	CAN Baud rate
22222222	32 bits Acceptance Code Register (00000000~FFFFFFF)
ммммммм	32 bits Acceptance Mask Register (00000000~FFFFFFF)
E	Error response or not
	0 = Disable
	1 = Enable
т	Timestamp response or not
	0 = Disable
	1 = Enable

CAN baud rate list

В	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: 14040000000FFFFFFF00 The response will show the following results: CAN specification=2.0A, CAN baud rate=125Kbps, acceptance code register=00000000, acceptance mask register=FFFFFFF, disable error response, disable timestamp response.
## 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
Р	CAN specification
	0 = 2.0A
	1 = 2.0B
В	CAN Baud rate
TT	CAN Bus Timing Register 0 (00~FF)
RR	CAN Bus Timing Register 1 (00~FF)

В	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

#### CAN baud rate list

## > 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.

- 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
Ρ	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
Ρ	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\$P114PBCCCCCCCMMMMMMMET

99\$P114	Command character
Р	CAN specification
	0 = 2.0A
	1 = 2.0B
В	CAN Baud rate
22222222	32 bits Acceptance Code Register (0000000~FFFFFFF)
MMMMMMM	32 bits Acceptance Mask Register (00000000~FFFFFFF)
E	Error response or not
	0 = Disable
	1 = Enable
т	Timestamp response or not
	0 = Disable
	1 = Enable

CAN baud rate list

В	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\$P114040000000FFFFFFF00 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
тт	Bus Timing Register 0 (00~FF)
RR	Bus Timing Register 1 (00~FF)

## Response:

Valid Command: OK Invalid command: ERROR

- 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".

- 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".

- 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.

- 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.
<b>XXXXX</b>	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.

- 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
Α	Enable CAN bus pair connection flag, 0: Disable, 1: Enable
В	Using TCP or UDP connection; 0: TCP, 1: UDP
С	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.

- 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".

- 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\$PP(	C Command character
LL	number of parameters, here fix to "03"
Α	Enable CAN bus pair connection flag, 0: Disable, 1: Enable
В	Using TCP or UDP connection; 0: TCP, 1: UDP
С	Act as a server or client; 0: server, 1: client
Note:	
1.	When <b>A=</b> 0, <b>B</b> and <b>C</b> 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.

- 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\$PPIPCommand characterxxx...IP address, iii/ppp/III/PPP: 3 digits numberNote:

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.

- 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

AsciiToHex	Description	
(Error code)		
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	

## Table 4-6: Error code table

# 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.
  - <u>http://ftp.icpdas.com/pub/cd/8000cd/napdos/7188e/tcp/vxcomm/</u> 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.

Stateme Dilver Satup		<b>308</b>
VxComm Driver v2.0	18.12 Beta 3	
for Windows 2000/X	P/2003	
Supports 71 Supports 71		8
Chosese Destination Selectricities	n Location sense will noted these	
	Enne will vold VoCurwcht in the Solvergeleider Ta austell to file Stater, data New Ta andel to a stillware Nation State. Skill Drawe and sense larger later.	
	Contractor Faller EVETEASUATIone (Row (R	
(Testing)	c gask (gast ) Caro	-1
Statt State		9 8 9 SISS

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.

VxComm Utility [ v2.8.1	2 Beta, Jun. 27, 2007]		
Step	0 1 EIBODOE Internet/Ethernet (	Controller	
	IP: 192.168.255.1 ort:	Connect to Server Step 2	Add Server
Configure Server	VxComm Servers	Port COM	Baudrate
X Remove Server			
Configure Port			
Web Configuration			
System Information			
Search Device	Name Alias MAC Address	IP Address Sub-net Gateway	DHCP
Configure Device			
Exit			
7186E::10000, \3.2.25[06/21/200	7], Faund I		

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).

Dialog	×
Selecting correct model number	ОК
Model Number: 7186E3 -	Cancel

#### • 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  $\mu$ PAC-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".

VxComm Servers	Port	COM	Baudrate
- 7186E3 (192.168.0.127)	Port I/O Port 1 Port 2	Reserved UnMap UnMap	N/A Dynamic Dynamic

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

Port Configuration	ji -		×
Server: 7186E3	10.0.8.136),	Port 1	
Port Mapping (F	PC) Port Setti	Step 1	- 1
Select COM	COM10		
Image: Re-assign         Image: Skip baud         Virtual CO         (Less control	COM10 COM11 COM12 COM13 COM14 COM15 COM15 COM16 COM17 COM18 COM19 COM20 COM21 COM22 COM23	<ul> <li>Il subsequent ports</li> <li>cevice setting.</li> <li>t: and data format changes.</li> <li>1/]</li> <li>Step 2</li> <li>OK Cancel</li> </ul>	

#### 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.

Leren I	P: 192.168.0.127 Port: 10000	Timeout (ms) 5000	Add Server
Remove Server	Check Duplicated IP Con Server Configuration	nect to Server	
Configure Server Web Configuration Cor Port Search Servers Na Configure Server (UDP)	Server Options (PC) Device Info The following items are all PC : Keep Alive Time (Seconds) : Recommend : 7188E/8KE' Connection Broken (Seconds) : Connect Timeout (Seconds) : Command Port (TCP): Virtual I/O Port (TCP): IP Address :	mation   side settings, not device setti 120 s System Timeout * 1/3 180 5 10000 9999 192.168.0.127	ngs.
Exit			

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  $\mu$ PAC-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  $\mu$ PAC-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  $\mu$ PAC-7186E, clients have to send command to keep the i-7540D alive before it times out, otherwise the  $\mu$ PAC-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.

100

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.

Web Configuration	
System Infomation	
	VxComm Utility : Re-starting the Driver
Search Device	To use the new configuration, please close all virtual COM ports first, and then
Configure Device	click the "Re-start" button to stop/start the driver.
	Status: Driver is running.
Shand	Re-start Cancel
Step 1	
7186EX:10000, v3.2.25[06/21/2007	], found!!

## 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.

a VxComm Utility [ v2.8.12 Beta, Aug. 17, 2007]				
File Server Port Tools				
	7188E/8000E Internet/Ethernet Controller — IP : 192.168.0.127 Port : 10000 IV Check Duplicated IP IV Connect to	Timeout (ms) 5000 o Server	add Server	
Y Remove Server	Step1	Port COM	Baudrate	
	7186E3 [192.168.U.127]	Port I/O Reserved	N/A Dunamia	
🔎 Config Step2		Port 2 UnMap	Dynamic	
Web Configuration		Port 3 UnMap	Dynamic	
Configure Port				
Search Servers	Name Alias MAC Address IP Address	Sub-net Gateway	DHCP	
Configure Server (UDP)				
Exit				
Status				

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.

(

≪ VxComm Utility [ v2.8.1	2 Beta , Jun. 27 , 2007]	
File Server Port Tools	<ul> <li>7188E/8000E Internet/Ethernet Controller</li> <li>IP: 192.168.255.1 Port: 10000</li> <li>✓ Check Duplicated IP</li> <li>✓ Connect</li> </ul>	r Timeout (ms) 5000 Add Server
Configure Server	VxComm Servers	Port COM Baudrate
Web Configuration System Infomation		
Search Device Configure Device	Name Alias MAC Address IP Addres	ss Sub-net Gateway DHCP
Exit		

## 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.

🛷 VxComm Utility [ v2.8.12 E	leta, Aug.17, 2007]			
File Server Port Tools				
	7188E/8000E Internet/Ethernet IP : 192.168.0.127 Port : Check Duplicated IP	Controller 10000 Timeout (m I Connect to Server	ns) 5000	Jadd Server
Remove Server		Port Port I/O Port 1	COM Reserved	Baudrate N/A Dynamic
Configure Server		Port 2 Port 3	UnMap COM5	Dynamic Dynamic Dynamic
Web Configuration				
Search Servers	Name Alias MAC Address	IP Address Sub-net	Gateway	DHCP
Configure Server (UDP)				
Fxit				
Status				

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.

i-7540D Utility       File     Actions       Help       Connect       Disconnect       Exit	
Settings     Test       CAN Parameters     CAN Specification       CAN Specification     2.08       CAN Bus Baud rate     1000K       BTR0     00       Hex     BTR1       Acceptance Code     00       OO     00       Acceptance Code     00       Error Resp.     No       TimeStamp Resp.     No	Network Status           Gateway:         192.168.0.1         Set           Mask:         255.255.0.0         Set           MAC:         [00:0de0:d0:a2:49]         Veb ID:         75400           Veb ID:         75400         Set         Set           Web Passwd:         icpdas75400         Set         Set           CAN Bus Pair Connection Status         Connection Status         Set         Set
Setting         Defaults           COM Status         COM:           COM1:         115200,8,N,1         Set           COM2:         9600,8,N,1         Set           Connected         Configuration Mode         v1.0.6[x	CAN Bus Pair Connection Set

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



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

CPDAS PIO-CAN400/200 Ubility         ■ □           Port 1         Port 2         Port 3         Port 4           CAN Port 1         Configuration         Exit         Exit           Baud Rate         Acceptance code         Acceptance Mask         Function           C 125K         Acc 0         0         AM0         ff           C 250K         Ac1         0         AM1         ff           C 800K         Ac2         0         AM2         ff         Status           C 1M         AC3         0         AM3         ff         C bisable	Send 222 V. 2.0.1 COM5 COM status COM5 921600 C Line control: N.8.1 Open Close Auto send Interval 50 Set
CAN Port 1 Transmit           ID/Hext         MODE         RTR         DLC         D1         D2         D3         D4         D5         D6         D7         D8           7EF         0         0         8         12         34         56         78         90         AB         CD         EF         Send1           1	Send Stop Send Send Stop Send Send TPEF81234567890ABCDEF t 7EF81234567890ABCDEF t 7EF8124567857857857857857857857857857857857857857
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.

MiniOS7 Utility Verion 3.1.1 (I	build 3.1.1.1		
Image: Second section     Image: Second section       Look jn:     Image: Second section section	nd 😨 Configur	tion Tools Help - 7188XW 7188EU	ock in: Disk A
Name bin FIRMWARE OS_IMAGE icpdas load232.dll MiniOS7_Utility MiniOS7_Utility MiniOS7_Utility uart.dll unins000 unins000	Size Type File F File F 1KB Inten 88KB Appli 1,025KB Com 2,094KB Appli 3KB Conf 56KB Appli 9KB DAT 662KB Appli	7188E Send232 Send7CP VxComm Utility Send232 V. 2.0.1 COM1 COM status COM status COM1 9600 Line control : N.8.1 Open Conce Auto send Interval 500 Set	Neme Send string with None CLF_CR CR CR_LF LF String
		Send Stop	Receive

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.

Send232 V. 2.0.1 COM4		
COM status	Send string with	
COM4 👿 9600 🔽	None     OLF_CR	
Line control : N,8,1		
Open Close		
-Auto send	Step 1	
Interval 500 Set	Virtual COM	Step 2
Send Stop	Send	
Send	Beceive	
Virtual COM	Virtual COM	
	Step 5	
~	~	
Clear	Clear	
	Exit Program	

#### 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.



i-7540D CAN-Ethernet Gateway User's Manual (Version 1.4, April/2008)

112

- 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.)



i-7540D CAN-Ethernet Gateway User's Manual (Version 1.4, April/2008)

	Select the COM Port and Baud Rate				
(	Step 1	COM to s	earch:	Time Out Se	etting :
	Ţ	COM10	◄		500 ms
		- Baud Bate	e to search: –		
		921600	<b>F</b> 460800	230400	✓ 115200
		57600 4800	<b>5</b> 38400	✓ 19200	9600
		1 4000	Select All	Clear	
		-Select Pro	stocol Option		DTU
		-Select Ch	l¥ DCON		JUS KTU
		- Jeicet en	Disable	🗖 Enab	le
					Step 2
			<b>V</b>		
	L		Lancer		
Step 4: Click	the 📐 s	search ico	on.		
(	🖉 DCON_U	TILITY_VE	R[443] The	Found Out I-7	7000/8000 modu
	Eile COM Po	nt <u>S</u> eamh <u>]</u>	<u>Run T</u> ermina	1 <u>H</u> elp	
				<u>WN</u>	Star
[	Module	Address	Baudrate	Checksum	Status

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



i-7540D CAN-Ethernet Gateway User's Manual (Version 1.4, April/2008)

### **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.



i-7540D CAN-Ethernet Gateway User's Manual (Version 1.4, April/2008)

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.

Ynserne	t Properties		?×
General	Driver Details		
$\diamond$	Ynsernet		
	Device type:	Non-Plug and Play Drivers	
	Manufacturer:	Unknown	
	Location:	Unknown	
Devic	ce status		
This	device is working pr	operly.	
If you are having problems with this device, click Troubleshoot to start the troubleshooter.			
			~
		Troubleshoot	
Device usage:			
Use th	is device (enable)		~
		ОК Са	incel

- **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:

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:	
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	<ul> <li>The data byte of the CAN Message does not match the data length of the CAN Message. For example:</li> <li>♦ Error: t001512345<cr></cr></li> <li>♦ Right: t00150102030405<cr></cr></li> </ul>	

#### Table 7-1: Error code table

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.

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http://golfingnear.com Email search by domain

http://emailbydomain.com Auto manuals search

http://auto.somanuals.com TV manuals search

http://tv.somanuals.com