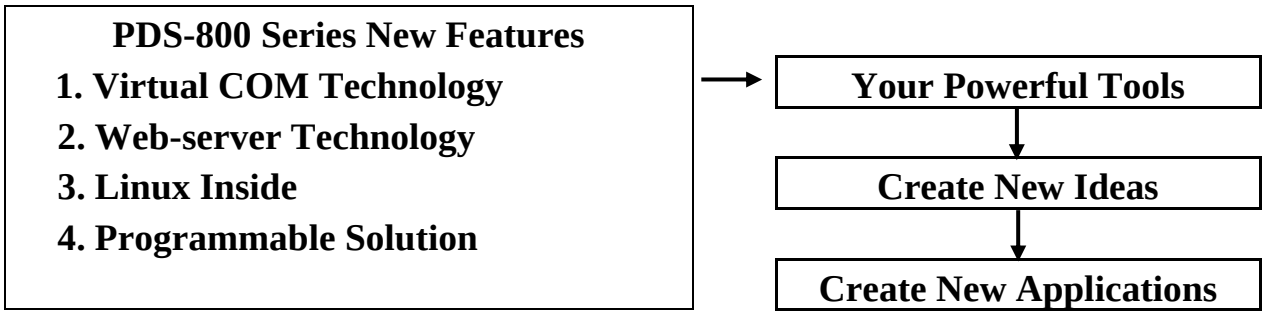
PDS-842/PDS-882 Series

User Manual



Warranty

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

Warning

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Table of Contents

Packing List

The package includes the following items:

- One PDS-8x2 series main control unit
- One printed Quick Start Guide
- One software utility CD
- One microSD card
- One DB-9 RS-232 cable
- One Screw driver

Note:

If any of these items are missed or damaged, contact the local distributors for more information. Save the shipping materials and cartons in case you want to ship in the future.

More Information:

Documentations
CD:\NAPDOS\pds-8x2\Document

VxComm Driver (Virtual COM)
CD: \NAPDOS\pds-8x2\vxcomm

1. Introduction

PDS-800 is a series of **Programmable Serial-to-Ethernet Device Servers**. They designed to meet the most common requirements of Internet/Ethernet applications, and enables users to remotely control your serial devices through an Ethernet network.

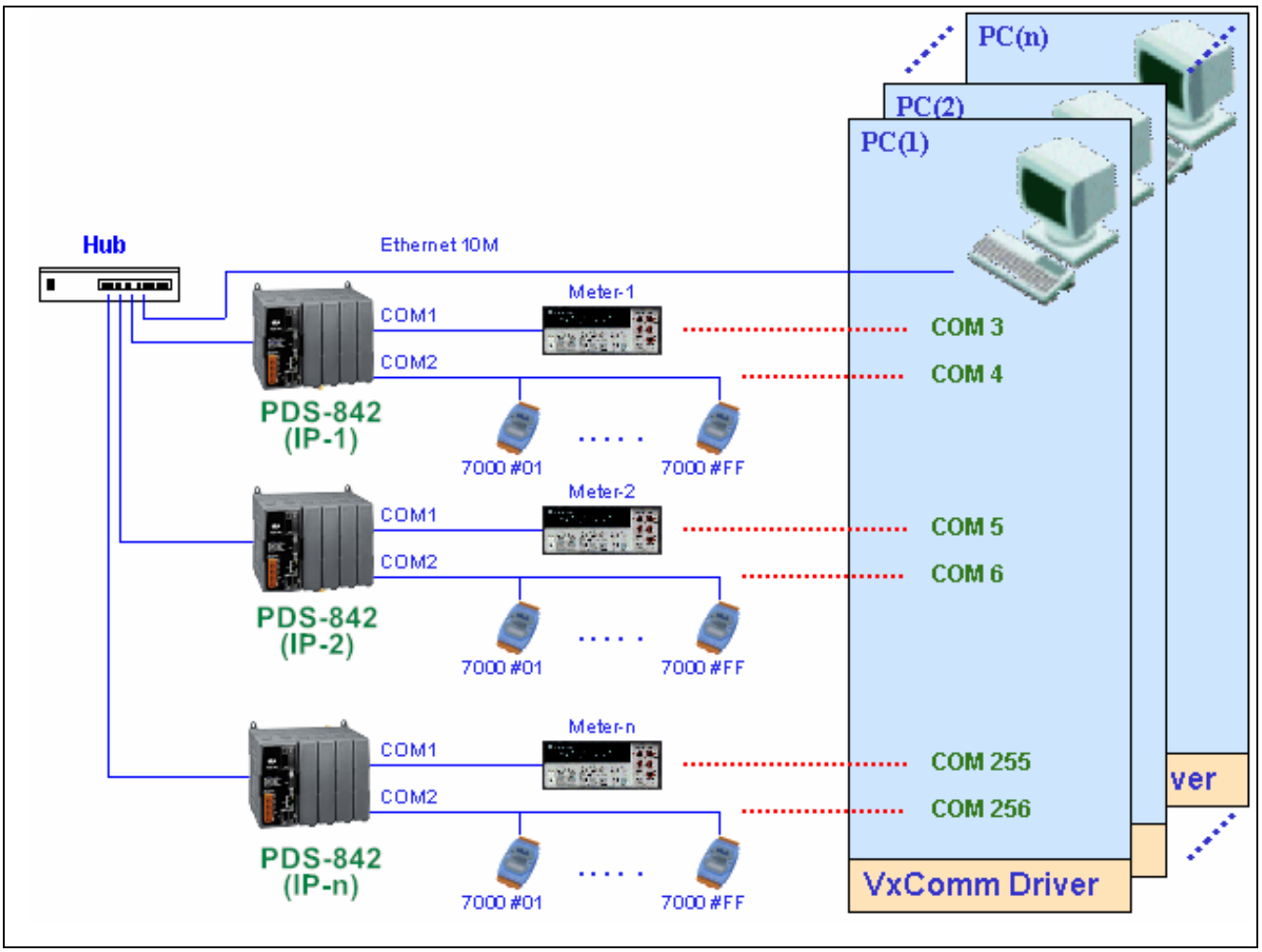
1.1 Why Ethernet Solutions?

Nowadays, the Ethernet protocol has become the de-facto standard for local area networks. Via the Internet, connectivity is occurring everywhere, from home appliances, to vending machines, to testing equipment, to UPS ...etc. An Ethernet network can link office automation and industrial control networks, access remote systems and share data and information between multivendor machines; it also provides a cost-effective solution for industrial control networks.

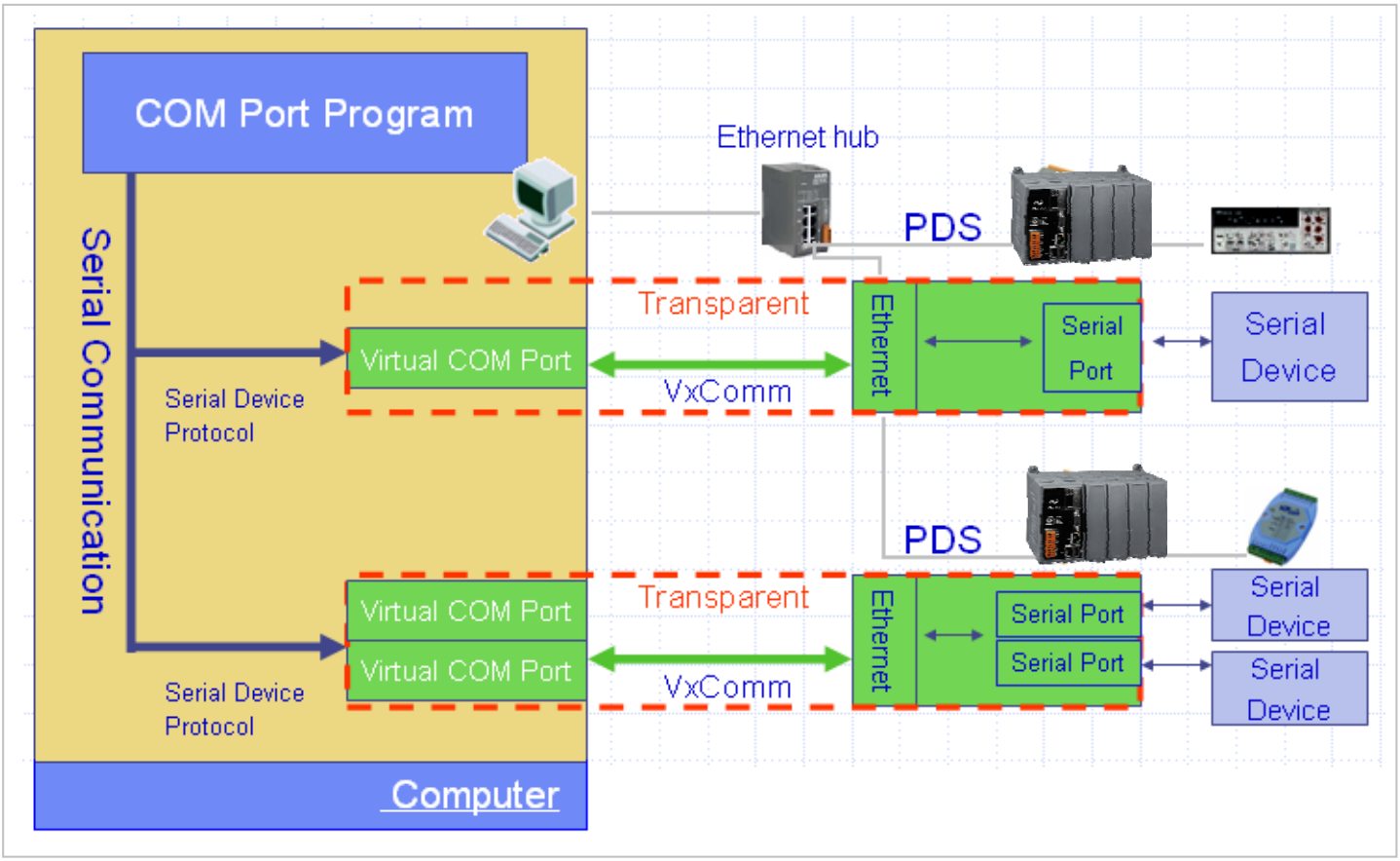
1.2 Why VxComm Technology?

In general, writing a TCP/IP program is more difficult than a COM port program, or the COM port communication system was built many years ago.

As a result, a new technology, **VxComm** was developed to **virtualizes the COM ports of the PDS-8x2 to allow up to 1 ~ 256 COM Ports to be used on the central computer.** The VxComm driver saves time when accessing serial devices through the Ethernet without the need for reprogramming the COM port software on the PC.

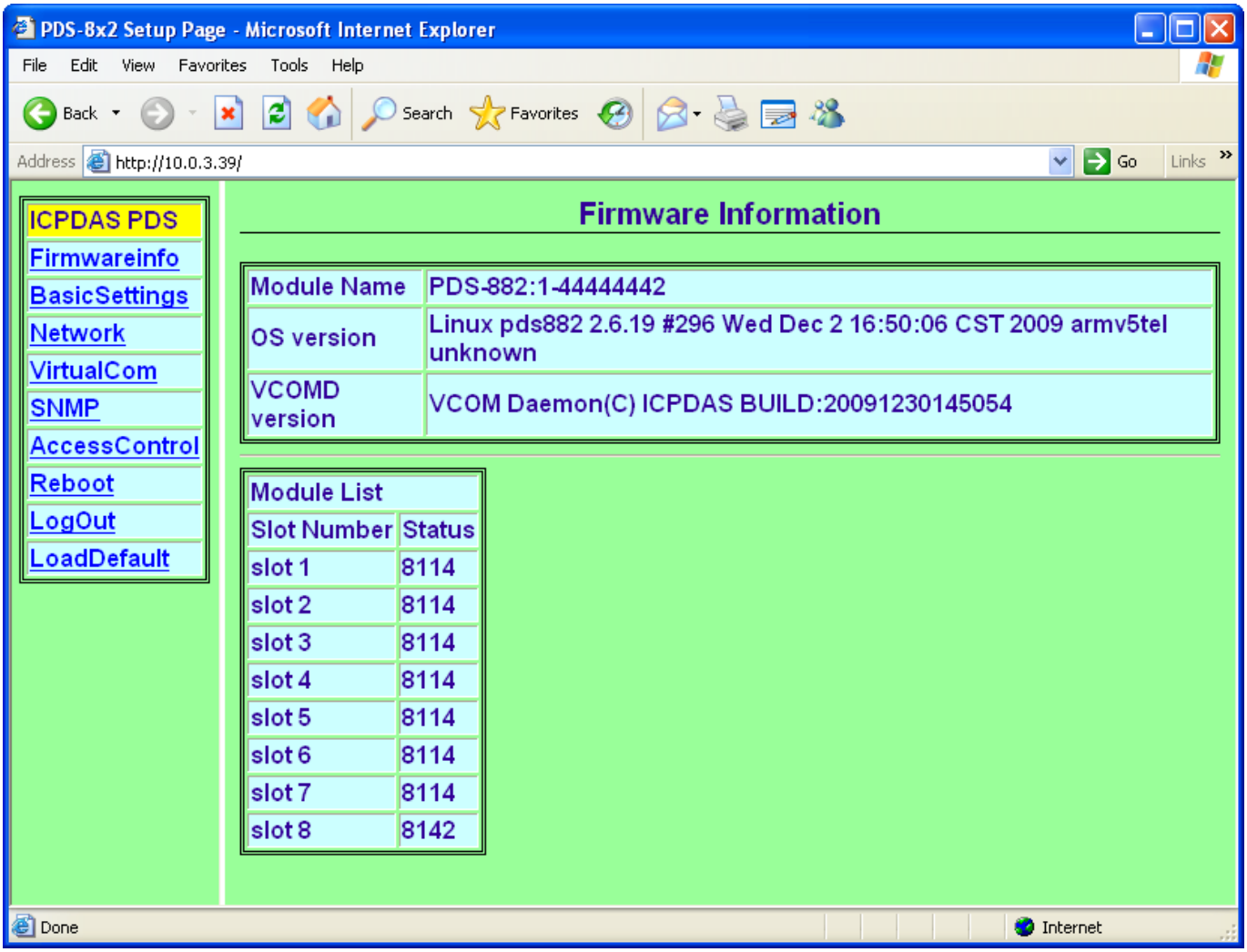


The VxComm driver controls all the details of the Ethernet TCP/IP programming technique; your COM port program will be able to access your serial devices through Ethernet in the same way as through COM port with the assistance of PDS-800 and VxComm technology.



1.3 Why Web Server Technology?

Web server technology enables configuration of the PDS-8x2 via a standard web browser interface, e.g. Internet Explorer, FireFox or Mozilla, etc. This means that it is easy to check the configuration of the PDS-8x2 via an Ethernet network without needing to install any other software tools; thereby reducing the user's learning carve.

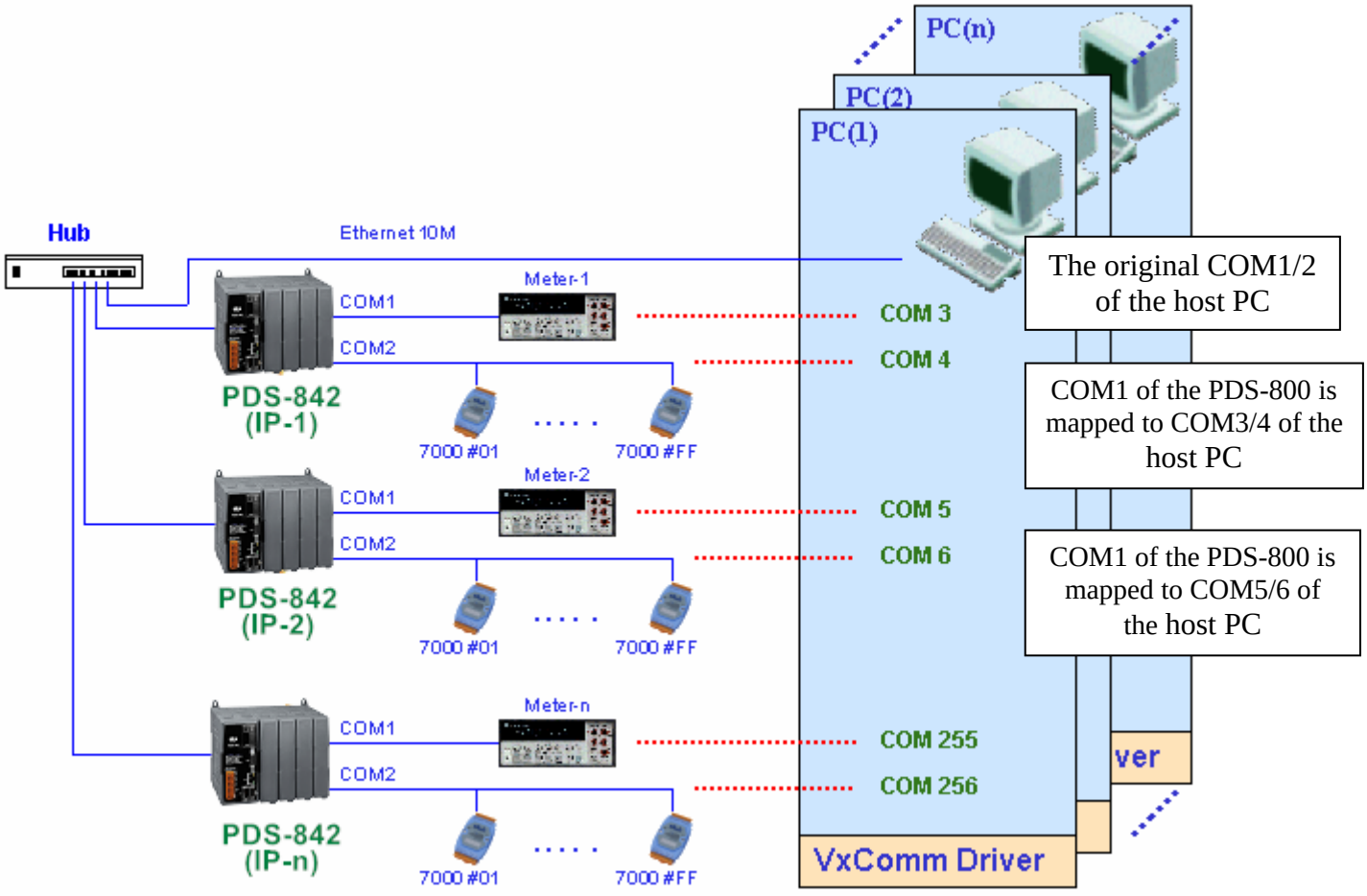


2. Typical Applications for the PDS-8x2

2.1 RS-232/485/422 Device Networking

---------- Using Virtual COM Technology ----------

The PDS-800 series is designed to link RS-232/485/422 devices to an Ethernet network. The VxComm utility allows the built-in PDS-800 COM Port to be virtualized to a standard COM Port of the host PC as shown below:



In the configuration above, Meter-1 is virtualized to link to COM3 of the host PC. Therefore a program original designed for the MS-COMM standard can access the meter without any modification.

2.2 Ethernet I/O Applications

The PDS-8x2 series provides of Ethernet I/O solutions:
Linking to I-7000 series modules

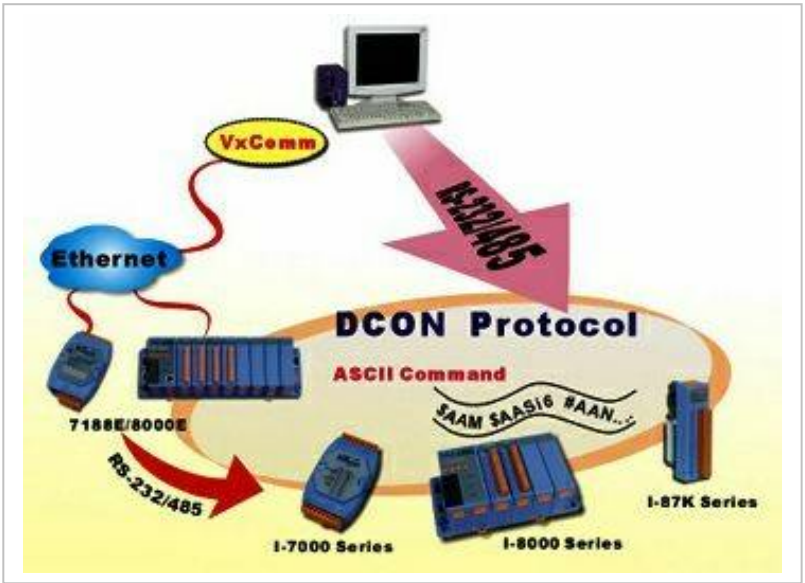
Linking to I-7000 series modules

The I-7000 series provides a variety of I/O operations, such as D/I, D/O, A/D, D/A, Counter and Frequency Measurement, etc. The I-7000 series was originally designed to be used with RS-485 networks, so RS-485 of COM on the PDS-8x2 can be used to link to I-7000 series modules (http://www.icpdas.com/products/Remote_IO/i-7000/i-7000_introduction.htm).

By using VxComm technology, programs that on the host PC support serial devices can be upgraded from a RS-485 network to an Ethernet network without requiring any modifications to the program. Refer to Sec. 2.1 for more information.

DCON Protocol

The DCON protocol is a request /reply communication. Protocol that is defined using a simple ASCII format, such as $AAN, $AASi6, #AAN, etc. and is used to access I-7000/8000/87k series I/O modules.



2.3 Linking I-7000 Series Modules to an Ethernet Network

The I-7000 family was originally designed for use with an RS-485 network. They are very robust and work well under the harsh industrial environments.

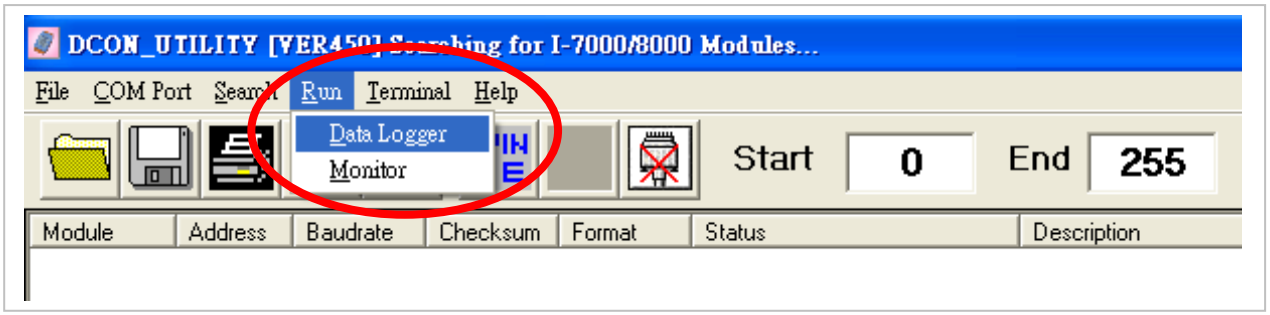
The PDS-8x2 enables I-7000 modules to be upgraded to an Ethernet solution. Linking I-7000 modules to an Ethernet combines the advantages of both RS-485 and Ethernet solutions and expands RS-485 applications to the whole world.

The VxComm approach provides an MS-COMM compatible interface. Therefore, previously developed programs should still function without the need for any modifications.

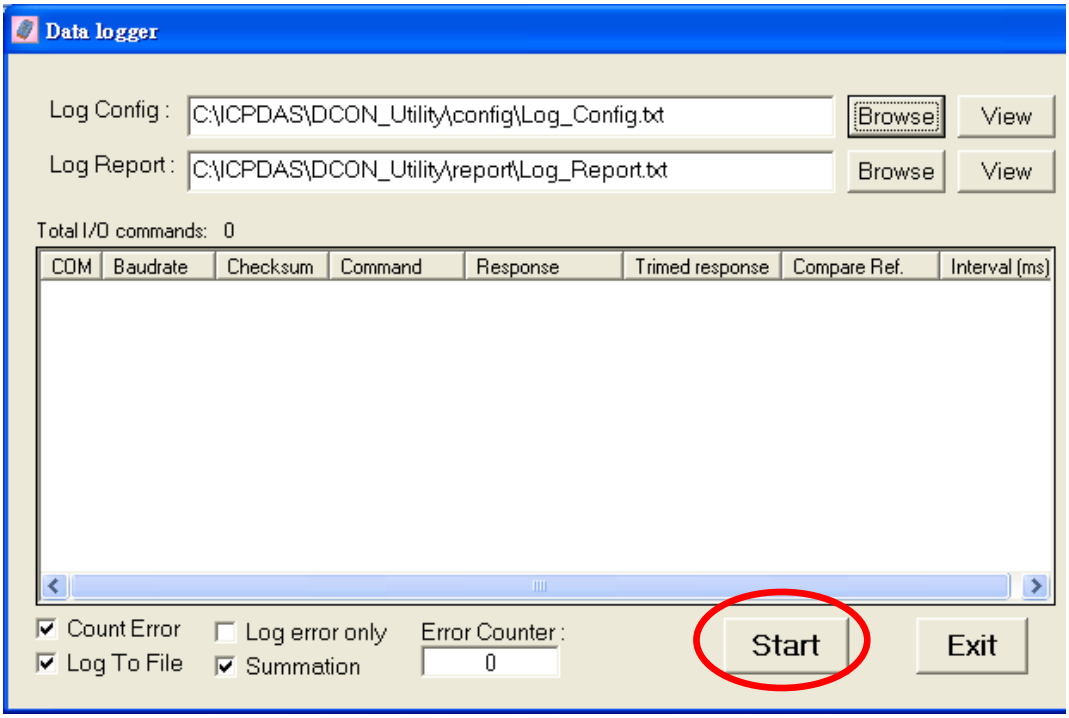
2.4 Configurable Ethernet Data Logger

Using the VxComm driver, PDS-8x2 + 7000 modules can be virtualized to become COM Port + 7000 modules located on the host-PC, and then the Data Logger in the DCON Utility can be used to access data of I-7000 from the Ethernet. Signal data originating from the I-7000 modules can be analyzed using MS-Excel without the need to write any custom programs

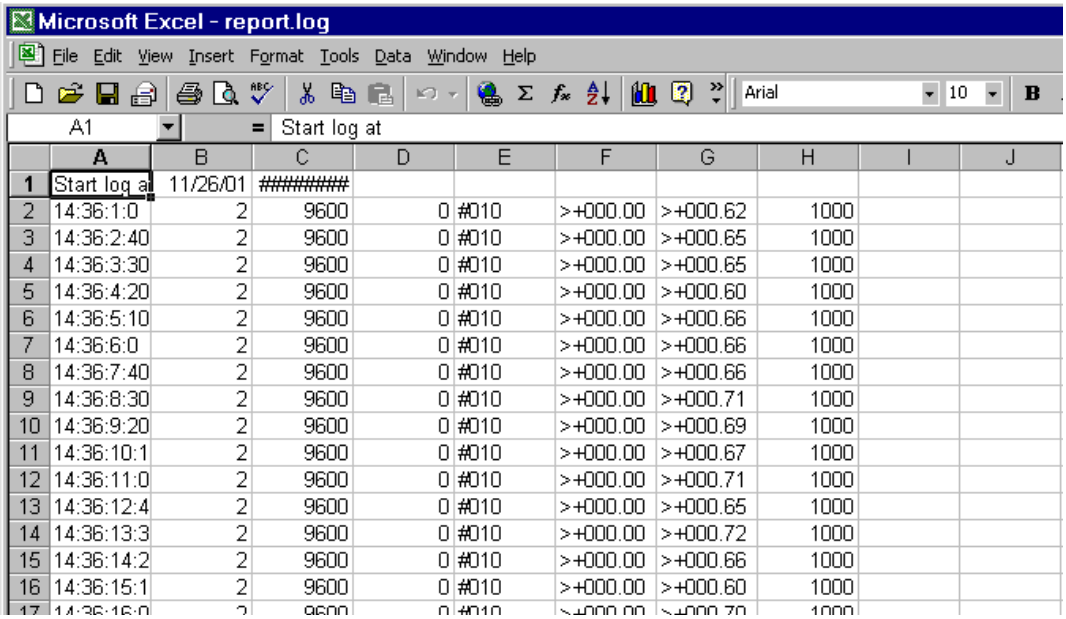
1: The DCON utility includes a log function, as show below:
(http://www.icpdas.com/products/dcon/introduction.htm)



2: Configure the system connection as shown below and click the “Start” button to begin logging data.

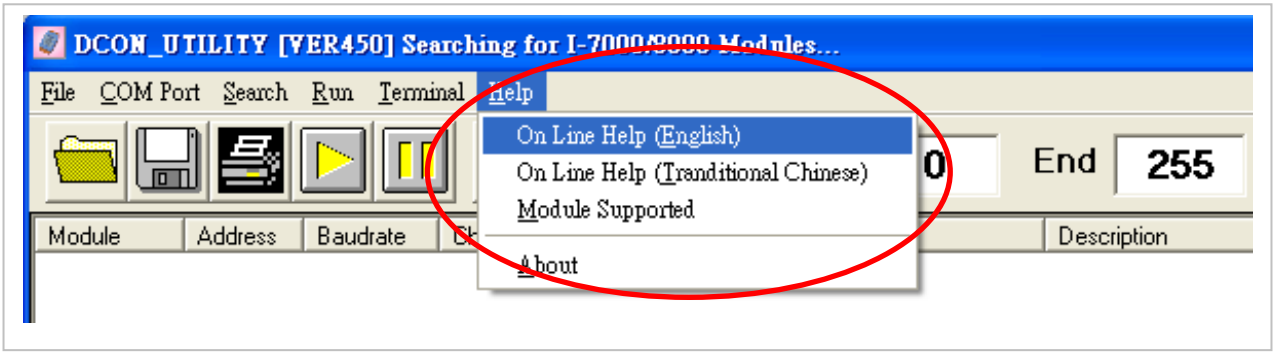


3: Open the log file in Excel to read the log data as shown in the example below:



	A	B	C	D	E	F	G	H	I	J
1	Start log at	11/26/01	#########							
2	14:36:1:0	2	9600	0	#010	>+000.00	>+000.62	1000		
3	14:36:2:40	2	9600	0	#010	>+000.00	>+000.65	1000		
4	14:36:3:30	2	9600	0	#010	>+000.00	>+000.65	1000		
5	14:36:4:20	2	9600	0	#010	>+000.00	>+000.60	1000		
6	14:36:5:10	2	9600	0	#010	>+000.00	>+000.66	1000		
7	14:36:6:0	2	9600	0	#010	>+000.00	>+000.66	1000		
8	14:36:7:40	2	9600	0	#010	>+000.00	>+000.66	1000		
9	14:36:8:30	2	9600	0	#010	>+000.00	>+000.71	1000		
10	14:36:9:20	2	9600	0	#010	>+000.00	>+000.69	1000		
11	14:36:10:1	2	9600	0	#010	>+000.00	>+000.67	1000		
12	14:36:11:0	2	9600	0	#010	>+000.00	>+000.71	1000		
13	14:36:12:4	2	9600	0	#010	>+000.00	>+000.65	1000		
14	14:36:13:3	2	9600	0	#010	>+000.00	>+000.72	1000		
15	14:36:14:2	2	9600	0	#010	>+000.00	>+000.66	1000		
16	14:36:15:1	2	9600	0	#010	>+000.00	>+000.60	1000		

By using the I-7000 DCON utility and MS Excel in conjunction with the **VxComm technology**, the signal data of I-7000 modules from the Ethernet network can be analyzed without the need to write custom programs. For more information about the **log function** refer to the online help feature (English and Traditional Chinese) of the DCON utility.



3. Hardware information

3.1 Features

- Incorporate Serial Devices in an Ethernet network
- "Virtual COM" extends PC COM ports
- VxComm Driver for Windows NT 4.0, 2000/XP/2003 and Vista32
- Programmable Internet/Ethernet Controller
- Watchdog Timer suitable for use in harsh environments
- Dual-LAN, 10/100 Base-TX Ethernet
- Power Reverse Polarity Protection
- DB-9 RS-232 Console Port
- ESD Protection and Frame Ground Design
- Low power consumption
- Made from fire retardant materials (UL94-V0 Level)

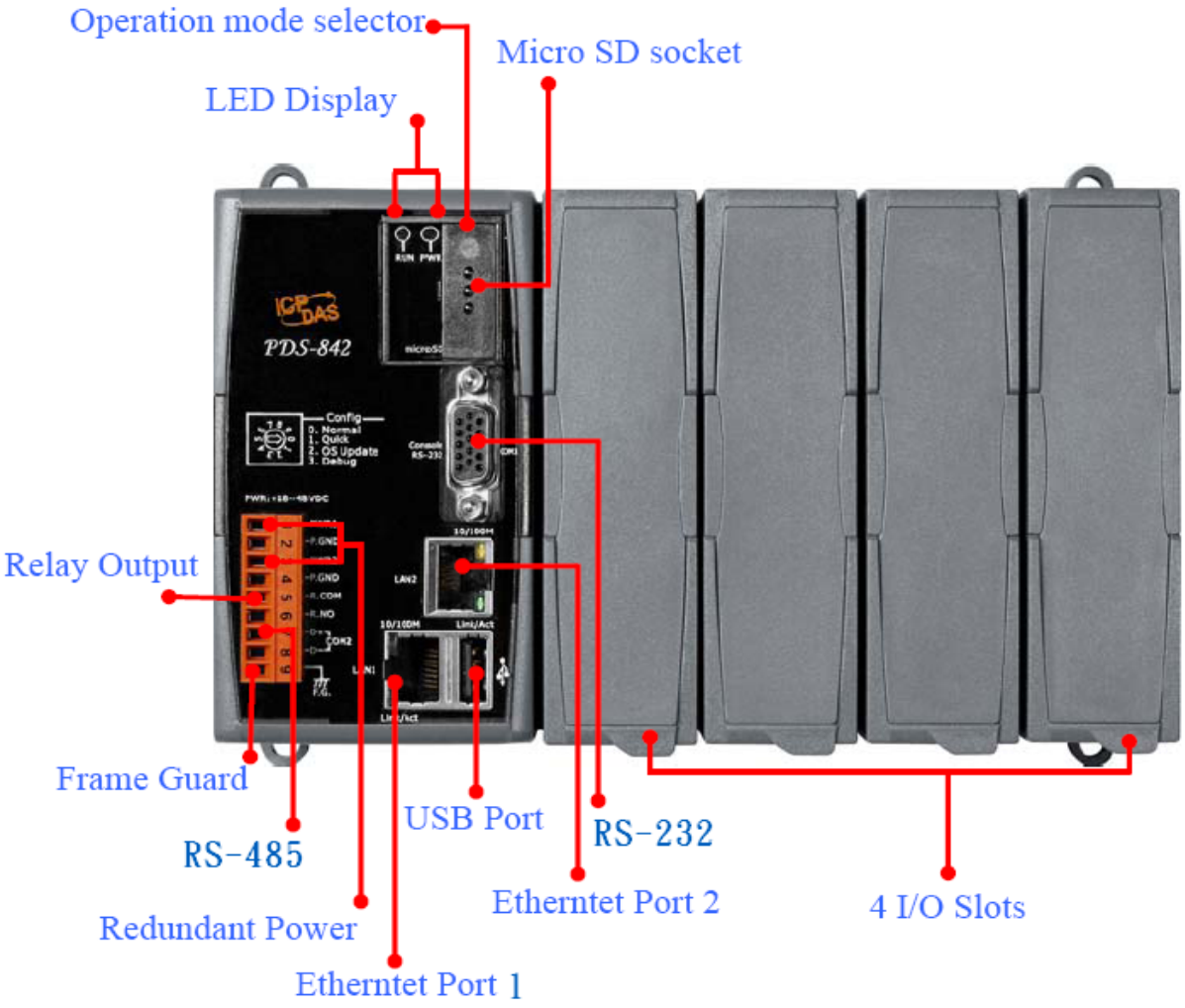
3.2 Applications

- Factory Automation
- Building Automation
- Home Automation

3.3 Specifications

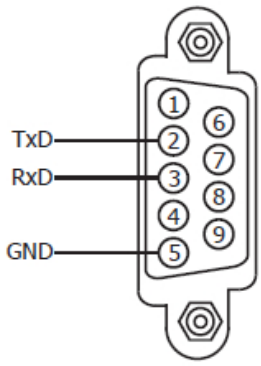
CPU	
CPU	PXA270 or compatible(32-bit and 520 MHz)
SRAM	64 MB
Flash Memory	64 MB
EEPROM	16 KB
Built-in Watchdog Timer	Yes
I/O Expansion Slots	PDS-842: 4 Slot PDS-882: 8 Slots
Programmable LED Indicator	1
Communication Interface	
COM1 (Console)	RS-232
Ethernet	Dual 10/100 Base-TX Ethernet
COM Port Formats	
Data bit	7, 8
Parity	Even, Odd, None
Stop bit	1
Operating Environment	
Operating Temperature	-25 ~ +75 °C
Storage Temperature	-30 ~ +85 °C
Power	
ESD Protection	Yes (with Frame Ground)
Protection	Power reverse polarity protection
Required Supply Voltage	+18 V_{DC} ~ +48 V_{DC} (non-regulated)
Power consumption	PDS-842: 8.4 W (0.35 A @ 24 V_{DC}) PDS-882: 9.1 W (0.38 A @ 24 V_{DC})
Dimensions (W x H x D)	
PDS-842	188 mm x 132 mm x 111 mm
PDS-882	312 mm x 132 mm x 111 mm

3.4 Front View

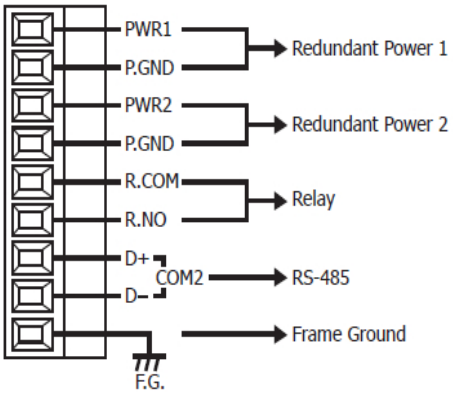


3.5 Pin Assignment

COM1: RS-232

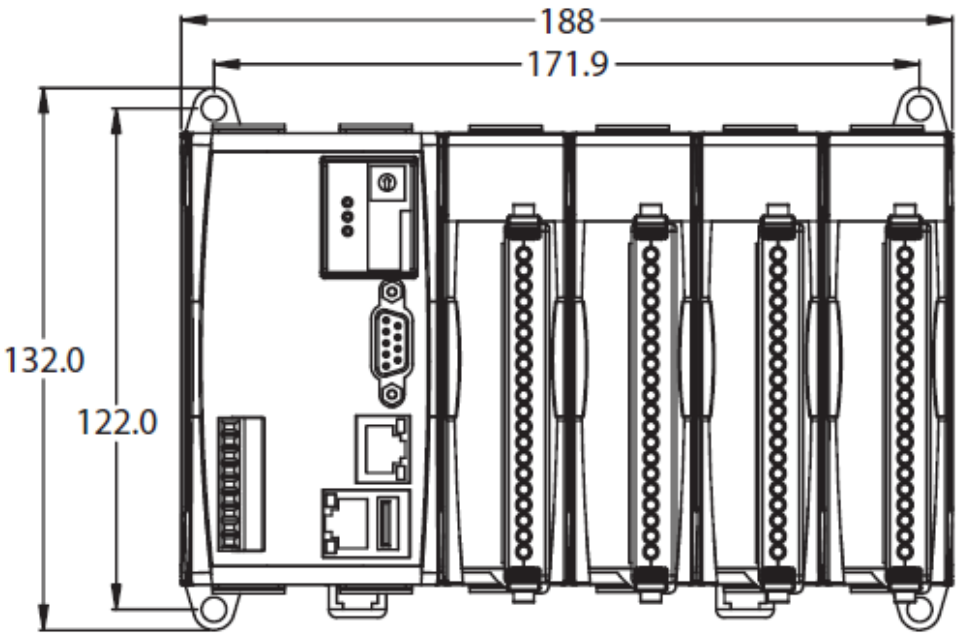


Terminal Block

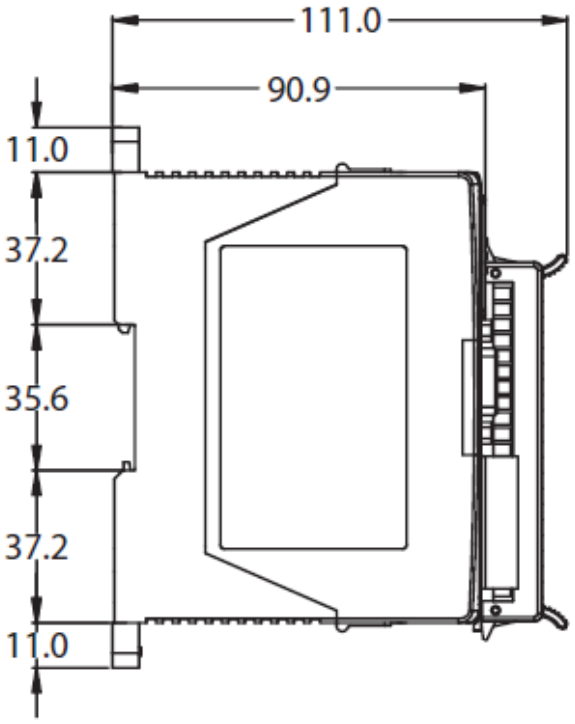


3.6 Dimensions

- **PDS-842**

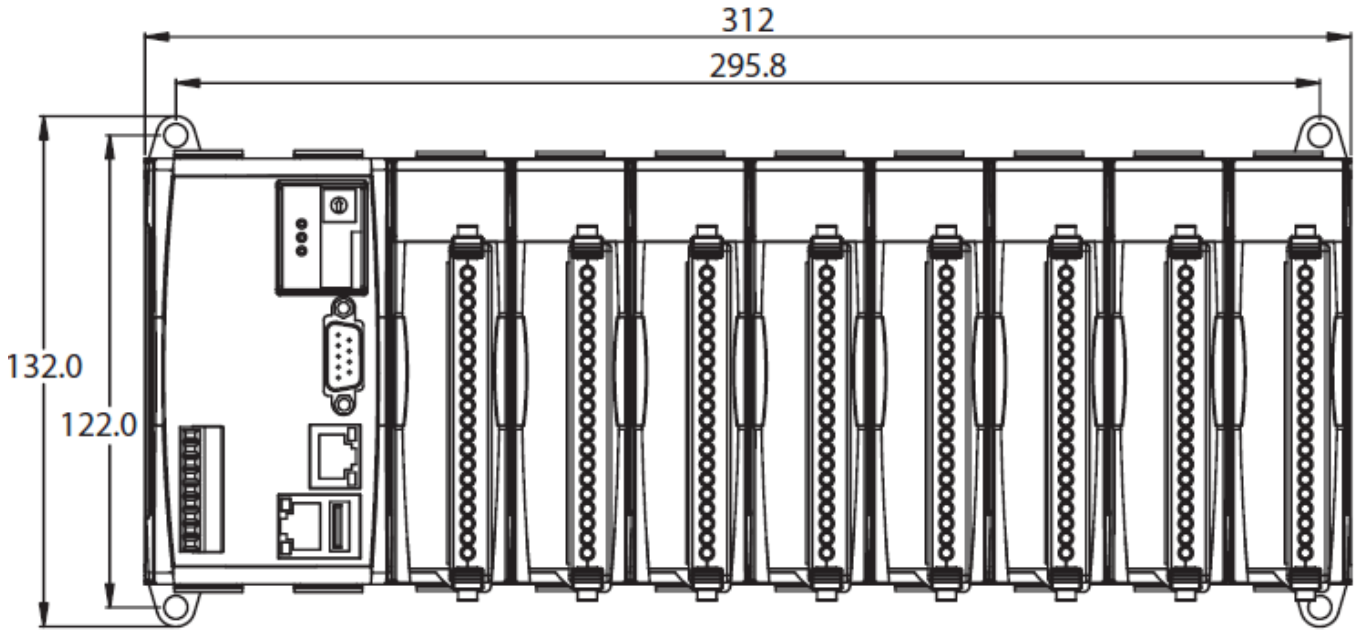


Front View

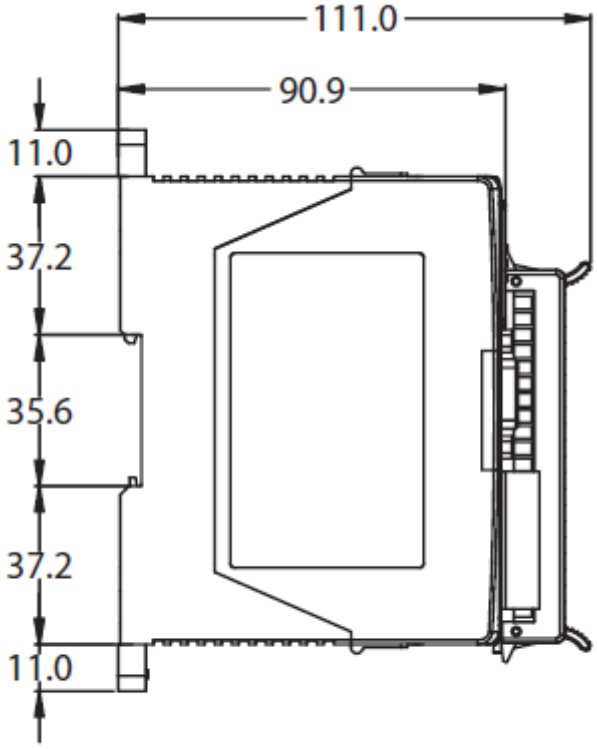


Left Side View

- **PDS-882**



Front View



Left Side View

3.7 PDS-800 Selection Guide

Model	PDS-842	PDS-882
Slots	4	8
CPU	PXA270 (520 MHz)	PXA270 (520 MHz)
RAM/Flash Disk	64 MB/ 64 MB	64 MB/ 64 MB
Ethernet	Dual 10/100 Base-TX Ethernet	Dual 10/100 Base-TX Ethernet
Operating System	Linux	Linux
Console Port	9-Wire RS-232	9-Wire RS-232
(Optional) Max. Serial Ports	16	32

Optional Serial Modules:

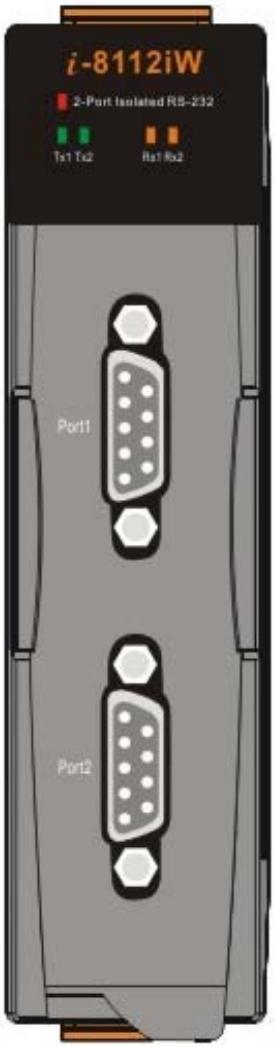
Module	I-8112iW	I-8114W	I-8114iW	I-8142iW	I-8144iW
Interface	9-Wire RS-232	9-Wire RS-232	5-Wire RS-232	4-Wire RS-422 2-Wire RS-485	4-Wire RS-422 2-Wire RS-485
Ports	2	4	4	2	4
FIFO	128 Bytes	128 Bytes	128 Bytes	128 Bytes	128 Bytes
Isolation	3000 V	-	3000 V	3000 V	3000 V
Self-tuner	-	-	-	Yes	Yes
Connector	DB-9	DB-37	DB-37	Terminal Block	Terminal Block

2-wire RS-485: Data+, Data- with Self-Tuner inside
4-wire RS-422: TxD+, TxD-, RxD+, RxD-
3-wire RS-232: RxD, TxD, GND
5-wire RS-232: RxD, TxD, CTS, RTS, GND
9-wire RS-232: RxD, TxD, CTS, RTS, DSR, DTR, DCD, RI, GND

3.8 Optional Serial Modules Pin Assignments

3.8.1 I-8112iW Pin Assignments

➲ 2-Port Isolated RS-232 Module



Pin Assignment Name	Terminal No.	Pin Assignment Name
GND1	05	
DTR1	04	
TxD1	03	
RxD1	02	
DCD1	01	
	09	RI1
	08	CTS1
	07	RTS1
	06	DSR1

DB-9 Male Connector(Port1)

Pin Assignment Name	Terminal No.	Pin Assignment Name
GND2	05	
DTR2	04	
TxD2	03	
RxD2	02	
DCD2	01	
	09	RI2
	08	CTS2
	07	RTS2
	06	DSR2

DB-9 Male Connector(Port2)

DB-9 Male Connector (Port 1)

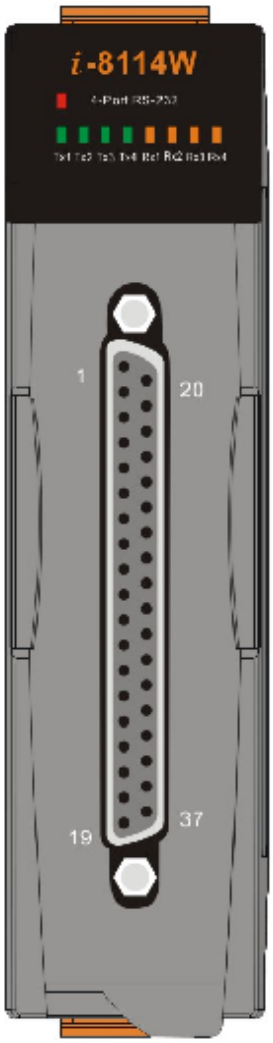
Pin	Name	Description
01	DCD1	Port1 DCD pin (RS-232)
02	RxD1	Port1 RxD pin (RS-232)
03	TxD1	Port1 TxD pin (RS-232)
04	DTR1	Port1 DTR pin (RS-232)
05	GND1	Power's Ground (Port1 GND)
06	DSR1	Port1 DSR pin (RS-232)
07	RTS1	Port1 RTS pin (RS-232)
08	CTS1	Port1 CTS pin (RS-232)
09	RI 1	Port1 RI pin (RS-232)

DB-9 Male connector (Port 2)

Pin	Name	Description
01	DCD2	Port2 DCD pin (RS-232)
02	RxD2	Port2 RxD pin (RS-232)
03	TxD2	Port2 TxD pin (RS-232)
04	DTR2	Port2 DTR pin (RS-232)
05	GND2	Power's Ground (Port2 GND)
06	DSR2	Port2 DSR pin (RS-232)
07	RTS2	Port2 RTS pin (RS-232)
08	CTS2	Port2 CTS pin (RS-232)
09	RI 2	Port2 RI pin (RS-232)

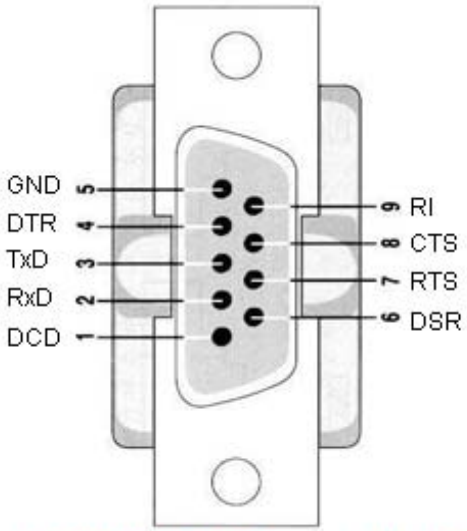
3.8.2 I-8114W Pin Assignments

➲ 4-Port RS-232 Module



Pin Assignment Name	Terminal No.		Pin Assignment Name
N.C.	01	20	RI3
DCD3	02	21	DTR3
GND	03	22	DSR3
CTS3	04	23	RTS3
RxD3	05	24	TxD3
RI4	06	25	DCD4
DTR4	07	26	GND
DSR4	08	27	CTS4
RTS4	09	28	RxD4
TxD4	10	29	RI2
DCD2	11	30	DTR2
GND	12	31	DSR2
CTS2	13	32	RTS2
RxD2	14	33	TxD2
RI1	15	34	DCD1
DTR1	16	35	GND
DSR1	17	36	CTS1
RTS1	18	37	RxD1
TxD1	19		

37-Pin Female D-Sub Connector(Port1~Port4)



DB-37 to Male DB-9 Connector_RS232

37-Pin Female D-Sub Connector for Port1~Port4

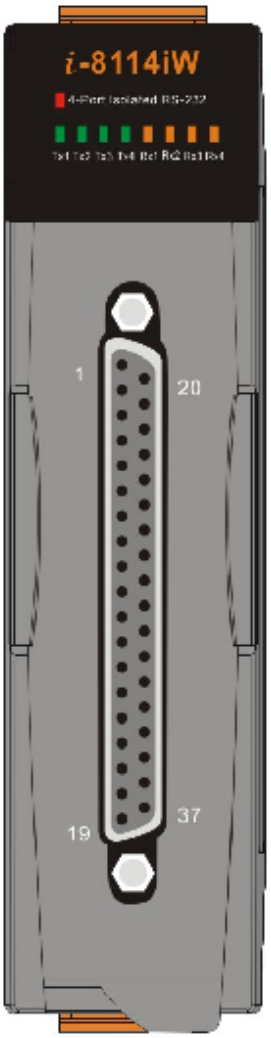
Pin	Name	Description		Pin	Name	Description
01	N.C.	Not Connected		20	RI3	Port3 RI pin (RS-232)
02	DCD3	Port3 DCD pin (RS-232)		21	DTR3	Port3 DTR pin (RS-232)
03	GND	Power's Ground		22	DSR3	Port3 DSR pin (RS-232)
04	CTS3	Port3 CTS pin (RS-232)		23	RTS3	Port3 RTS pin (RS-232)
05	RxD3	Port3 RxD pin (RS-232)		24	TxD3	Port3 TxD pin (RS-232)
06	RI4	Port4 RI pin (RS-232)		25	DCD4	Port4 DCD pin (RS-232)
07	DTR4	Port4 DTR pin (RS-232)		26	GND	Power's Ground
08	DSR4	Port4 DSR pin (RS-232)		27	CTS4	Port4 CTS pin (RS-232)
09	RTS4	Port4 RTS pin (RS-232)		28	RxD4	Port4 RxD pin (RS-232)
10	TxD4	Port4 TxD pin (RS-232)		29	RI2	Port2 RI pin (RS-232)
11	DCD2	Port2 DCD pin (RS-232)		30	DTR2	Port2 DTR pin (RS-232)
12	GND	Power's Ground		31	DSR2	Port2 DSR pin (RS-232)
13	CTS2	Port2 CTS pin (RS-232)		32	RTS2	Port2 RTS pin (RS-232)
14	RxD2	Port2 RxD pin (RS-232)		33	TxD2	Port2 TxD pin (RS-232)
15	RI1	Port1 RI pin (RS-232)		34	DCD1	Port1 DCD pin (RS-232)
16	DTR1	Port1 DTR pin (RS-232)		35	GND	Power's Ground
17	DSR1	Port1 DSR pin (RS-232)		36	CTS1	Port1 CTS pin (RS-232)
18	RTS1	Port1 RTS pin (RS-232)		37	RxD1	Port1 RxD pin (RS-232)
19	TxD1	Port1 TxD pin (RS-232)				

DB-37 to Male Db-9 Connector for Port1~Port4

Pin	Name	Description
01	DCD	Port1~Port4 DCD pin (RS-232)
02	RxD	Port1~Port4 RxD pin (RS-232)
03	TxD	Port1~Port4 TxD pin (RS-232)
04	DTR	Port1~Port4 DTR pin (RS-232)
05	GND	Port1~Port4 Power's Ground
06	DSR	Port1~Port4 DSR pin (RS-232)
07	RTS	Port1~Port4 RTS pin (RS-232)
08	CTS	Port1~Port4 CTS pin (RS-232)
09	RI	Port1~Port4 RI pin (RS-232)

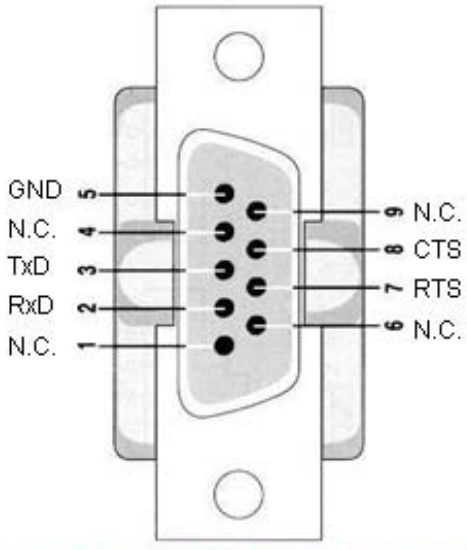
3.8.3 I-8114iW Pin Assignments

➲ 4-Port RS-232 Module



Pin Assignment Name	Terminal No.		Pin Assignment Name
N.C.	01		
N.C.	02	20	N.C.
GND3	03	21	N.C.
CTS3	04	22	N.C.
RxD3	05	23	RTS3
N.C.	06	24	TxD3
N.C.	07	25	N.C.
N.C.	08	26	GND4
RTS4	09	27	CTS4
TxD4	10	28	RxD4
N.C.	11	29	N.C.
GND2	12	30	N.C.
CTS2	13	31	N.C.
RxD2	14	32	RTS2
N.C.	15	33	TxD2
N.C.	16	34	N.C.
N.C.	17	35	GND1
RTS1	18	36	CTS1
TxD1	19	37	RxD1

37-Pin Female D-Sub Connector(Port1~Port4)



DB-37 to Male DB-9 Connector_RS232

37-Pin Female D-Sub Connector for Port1~Port4

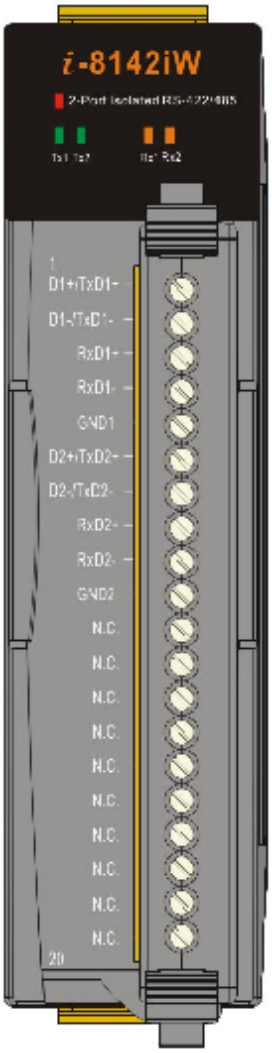
Pin	Name	Description		Pin	Name	Description
01	N.C.	Not Connected		20	N.C.	Not Connected
02	N.C.	Not Connected		21	N.C.	Not Connected
03	GND3	Power's Ground (Port3 GND)		22	N.C.	Not Connected
04	CTS3	Port3 CTS pin (RS-232)		23	RTS3	Port3 RTS pin (RS-232)
05	RxD3	Port3 RxD pin (RS-232)		24	TxD3	Port3 TxD pin (RS-232)
06	N.C.	Not Connected		25	N.C.	Not Connected
07	N.C.	Not Connected		26	GND4	Power's Ground (Port4 GND)
08	N.C.	Not Connected		27	CTS4	Port4 CTS pin (RS-232)
09	RTS4	Port4 RTS pin (RS-232)		28	RxD4	Port4 RxD pin (RS-232)
10	TxD4	Port4 TxD pin (RS-232)		29	N.C.	Not Connected
11	N.C.	Not Connected		30	N.C.	Not Connected
12	GND2	Power's Ground (Port2 GND)		31	N.C.	Not Connected
13	CTS2	Port2 CTS pin (RS-232)		32	RTS2	Port2 RTS pin (RS-232)
14	RxD2	Port2 RxD pin (RS-232)		33	TxD2	Port2 TxD pin (RS-232)
15	N.C.	Not Connected		34	N.C.	Not Connected
16	N.C.	Not Connected		35	GND1	Power's Ground (Port1 GND)
17	N.C.	Not Connected		36	CTS1	Port1 CTS pin (RS-232)
18	RTS1	Port1 RTS pin (RS-232)		37	RxD1	Port1 RxD pin (RS-232)
19	TxD1	Port1 TxD pin (RS-232)				

DB-37 to Male Db-9 Connector for Port1~Port4

Pin	Name	Description
01	N.C.	Not Connected
02	RxD	Port1~Port4 RxD pin (RS-232)
03	TxD	Port1~Port4 TxD pin (RS-232)
04	N.C.	Not Connected
05	GND	Port1~Port4 Power's Ground
06	N.C.	Not Connected
07	RTS	Port1~Port4 RTS pin (RS-232)
08	CTS	Port1~Port4 CTS pin (RS-232)
09	N.C.	Not Connected

3.8.4 I-8142iW Pin Assignments

➲ 2-Port Isolated RS-422/485 Module

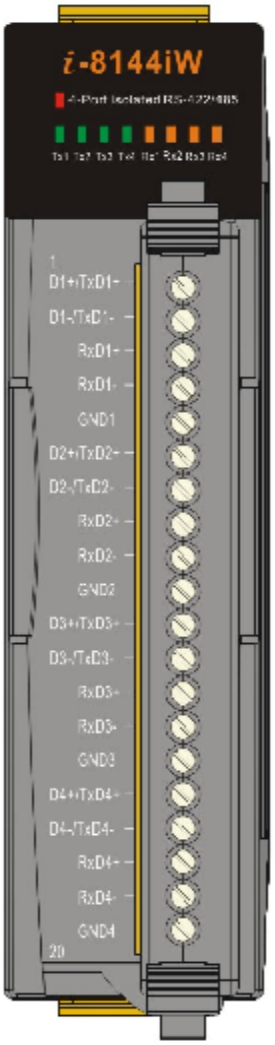


Terminal No.		Pin Assignment Name
	01	D1+/TxD1+
	02	D1-/TxD1-
	03	RxD1+
	04	RxD1-
	05	GND1
	06	D2+/TxD2+
	07	D2-/TxD2-
	08	RxD2+
	09	RxD2-
	10	GND2
	11	N.C.
	12	N.C.
	13	N.C.
	14	N.C.
	15	N.C.
	16	N.C.
	17	N.C.
	18	N.C.
	19	N.C.
	20	N.C.

Pin	Name	Description
01	D1+/TxD1+	Port1 Data+ pin (RS-485)/TxD+ pin (RS-422)
02	D1-/TxD1-	Port1 Data- pin (RS-485)/TxD- pin (RS-422)
03	RxD1+	Port1 RxD+ pin (RS-422)
04	RxD1-	Port1 RxD- pin (RS-422)
05	GND1	Power's Ground (Port1 GND)
06	D2+/TxD2+	Port2 Data+ pin (RS-485)/TxD+ pin (RS-422)
07	D2-/TxD2-	Port2 Data+ pin (RS-485)/TxD+ pin (RS-422)
08	RxD2+	Port2 RxD+ pin (RS-422)
09	RxD2-	Port2 RxD+ pin (RS-422)
10	GND2	Power's Ground (Port2 GND)
11	N.C.	Not Connected
12	N.C.	Not Connected
13	N.C.	Not Connected
14	N.C.	Not Connected
15	N.C.	Not Connected
16	N.C.	Not Connected
17	N.C.	Not Connected
18	N.C.	Not Connected
19	N.C.	Not Connected
20	N.C.	Not Connected

3.8.5 I-8144W Pin Assignments

➲ 4-Port Isolated RS-422/485 Module

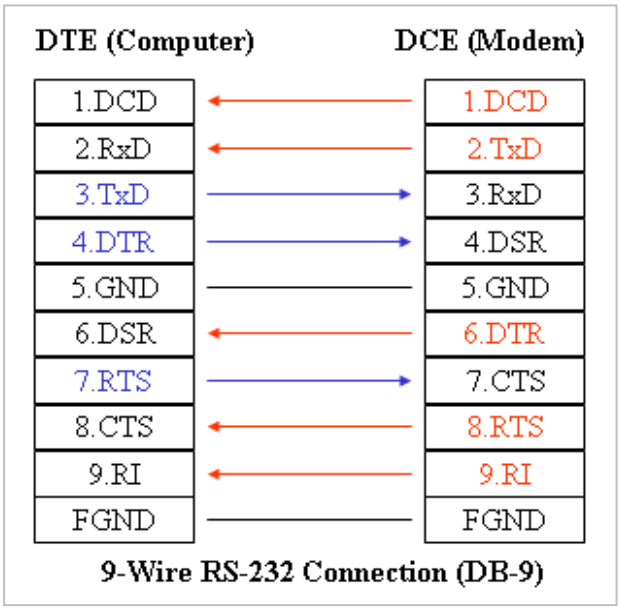


Terminal No.	Pin Assignment Name
01	D1+/TxD1+
02	D1-/TxD1-
03	RxD1+
04	RxD1-
05	GND1
06	D2+/TxD2+
07	D2-/TxD2-
08	RxD2+
09	RxD2-
10	GND2
11	D3+/TxD3+
12	D3-/TxD3-
13	RxD3+
14	RxD3-
15	GND3
16	D4+/TxD4+
17	D4-/TxD4-
18	RxD4+
19	RxD4-
20	GND4

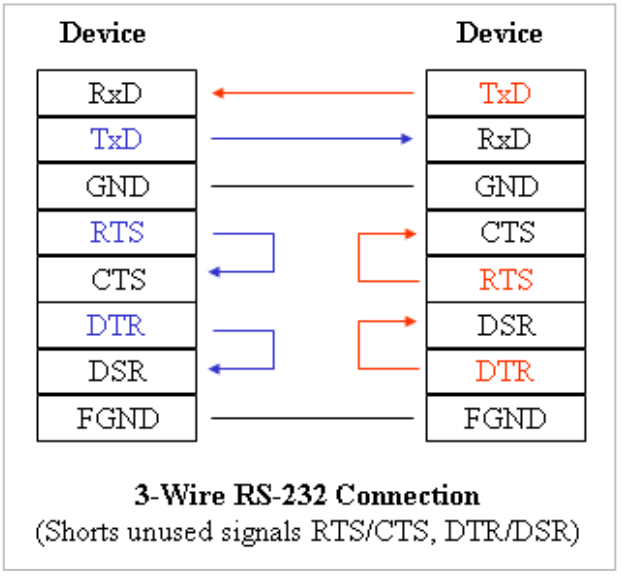
Pin	Name	Description
01	D1+/TxD1+	Port1 Data+ pin (RS-485)/TxD+ pin (RS-422)
02	D1-/TxD1-	Port1 Data- pin (RS-485)/TxD- pin (RS-422)
03	RxD1+	Port1 RxD+ pin (RS-422)
04	RxD1-	Port1 RxD- pin (RS-422)
05	GND1	Power's Ground (Port1 GND)
06	D2+/TxD2+	Port2 Data+ pin (RS-485)/TxD+ pin (RS-422)
07	D2-/TxD2-	Port2 Data+ pin (RS-485)/TxD+ pin (RS-422)
08	RxD2+	Port2 RxD+ pin (RS-422)
09	RxD2-	Port2 RxD+ pin (RS-422)
10	GND2	Power's Ground (Port2 GND)
11	D3+/TxD3+	Port3 Data+ pin (RS-485)/TxD+ pin (RS-422)
12	D3-/TxD3-	Port3 Data+ pin (RS-485)/TxD+ pin (RS-422)
13	RxD3+	Port3 RxD+ pin (RS-422)
14	RxD3-	Port3 RxD+ pin (RS-422)
15	GND3	Power's Ground (Port3 GND)
16	D4+/TxD4+	Port4 Data+ pin (RS-485)/TxD+ pin (RS-422)
17	D4-/TxD4-	Port4 Data+ pin (RS-485)/TxD+ pin (RS-422)
18	RxD4+	Port4 RxD+ pin (RS-422)
19	RxD4-	Port4 RxD+ pin (RS-422)
20	GND4	Power's Ground (Port4 GND)

4 Wiring Note for RS-232/422/485 Devices

4.1 RS-232 Wire Connections



9-Wire RS-232 Connection (DB-9)

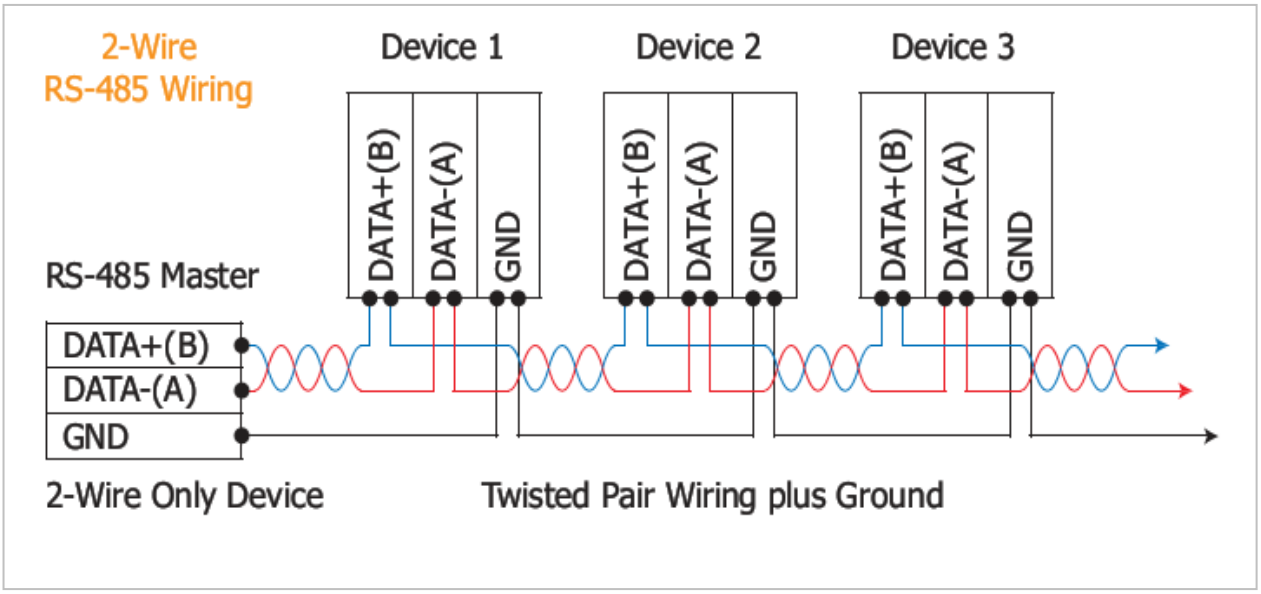


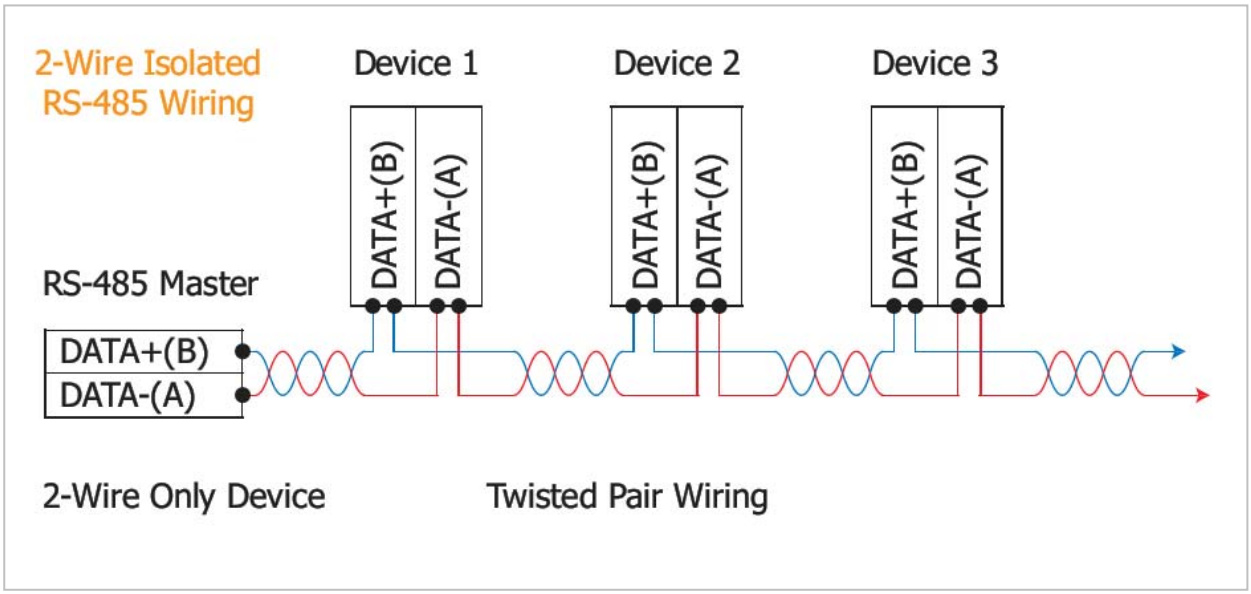
3-Wire RS-232 Connection
(Shorts unused signals RTS/CTS, DTR/DSR)

Note:

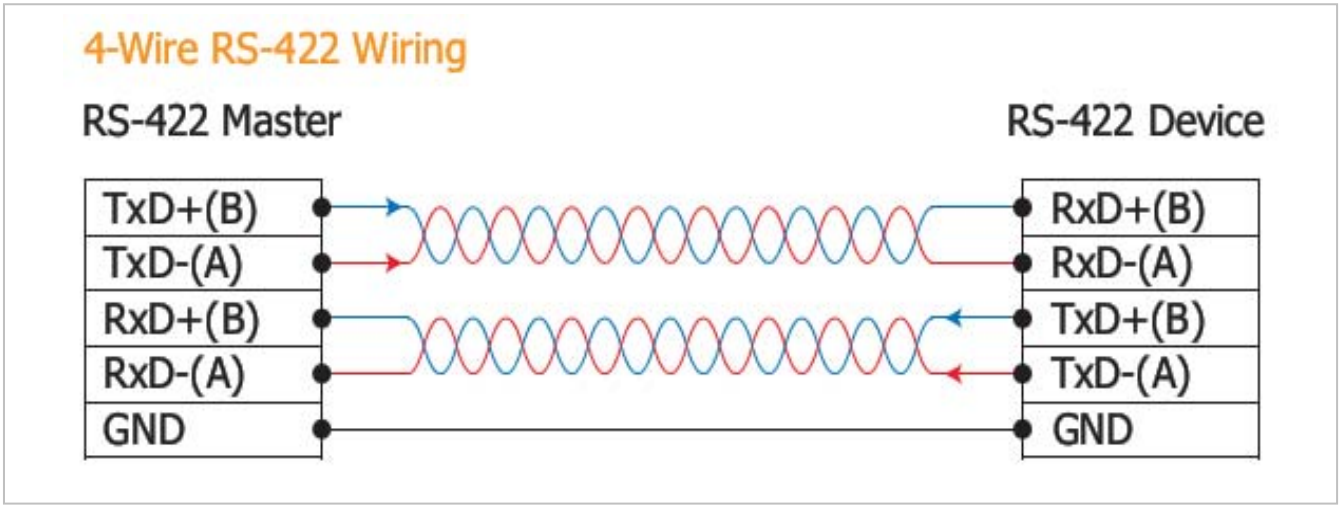
1. For 3-Wire RS-232 connections, it is recommended to short unused signals such as RTS/CTS and DTR/DSR, since some system may still check the CTS and DSR status.
2. FGND is the frame ground that soldered to DB9 metal-shield.

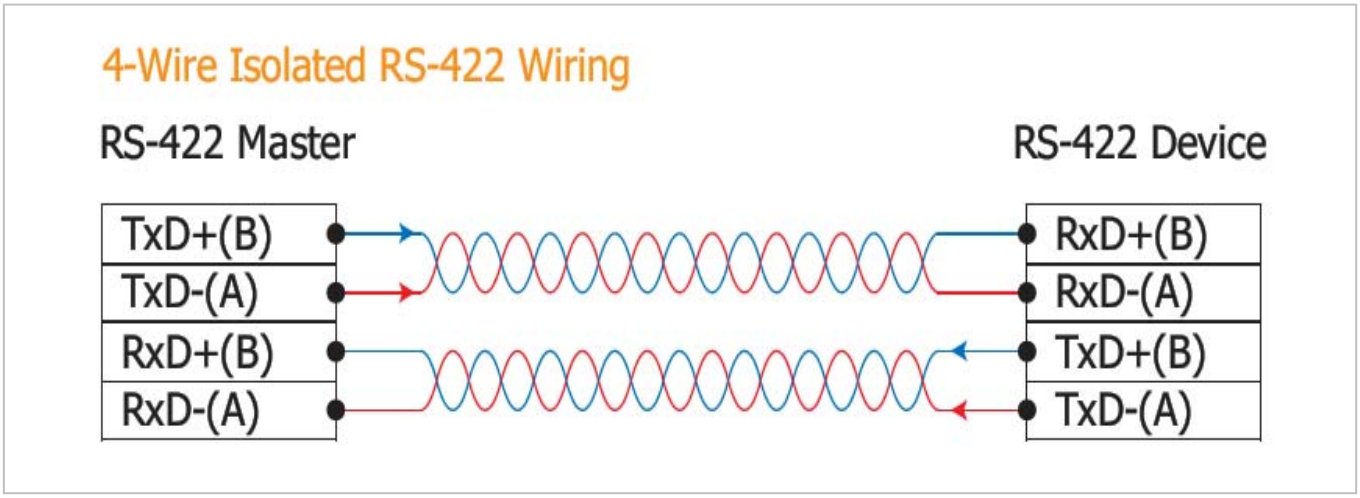
4.2 RS-485 Wire Connections





4.3 RS-422 Wire Connections





Note:

1. For **non-isolated** RS-422/485 ports, you should connect all signal grounds of RS-422/485 devices together. This reduces common-mode voltage between devices.
2. For **isolated** RS-422/485 ports, you should ****not**** connect all signal grounds or power grounds of RS-422/485 devices together. This ensures truly isolation between devices.

5 Setting up the PDS-8x2 controller

Step 1: Connect the PDS-8x2 controller to the Ethernet Network

Before connecting the PDS-8x2 controller to an Ethernet network, the following items are needed: ***(For example: PDS-842)***

1. Inserts a serial module (optional) in PDS-8x2 controller. ***(For example: I-8114iW)***

2. Power Supply：+18 ~ 48 V_{DC}
(*e.g.:KA-52F-48 :* http://www.icpdas.com/products/Accessories/power_supply/power_list.htm)

3. Hub
(*e.g.: NS-205:* http://www.icpdas.com/products/Switch/industrial/industrial_list.htm)

4. The network settings in the PC are correctly configured and the Ethernet connection is functioning normally.

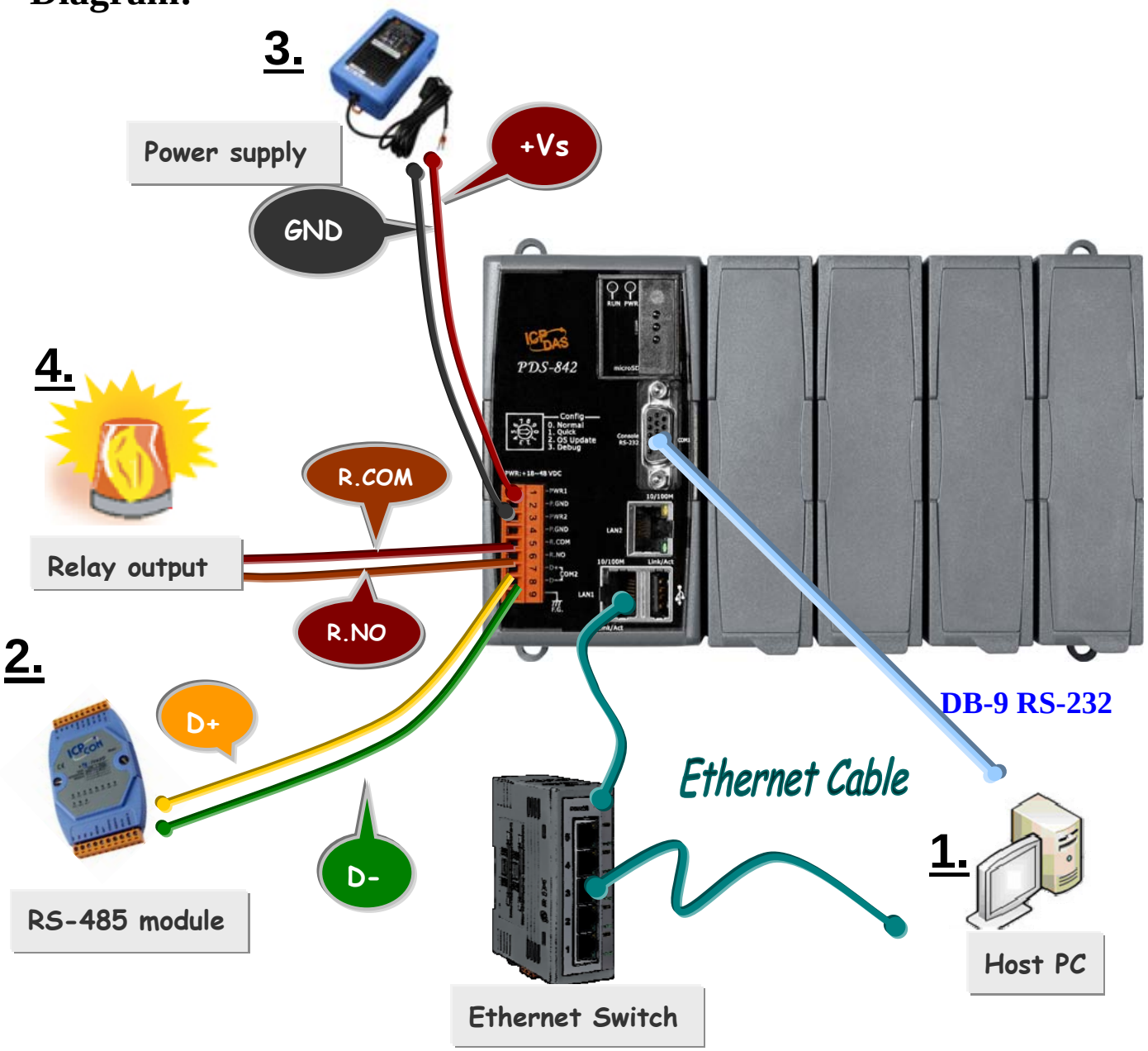
5. Disable or correctly configure the Windows firewall and any Anti-Virus software firewall first or else the "**Search Servers**" function in the VxComm Utility may not work. (Contact your System Administrator for more details of how to do this.)

6. Connect the PDS-8x2 controller to the Ethernet as shown on the following page and switch on the power.

7. Make sure the System LED indicator is flashing.

8. Install VxComm Utility on your PC
The software is located at：
http://ftp.icpdas.compub/cd/8000cd/napdos/driver/vxcomm_driver/

Diagram:



1. Connect both the PDS-8x2 controller and your computer to the same sub network or the same Ethernet Switch, and connects PDS-8x2's COM1 port (console port) and PC's RS-232 port by DB-9 RS-232 cable (CA-0915).

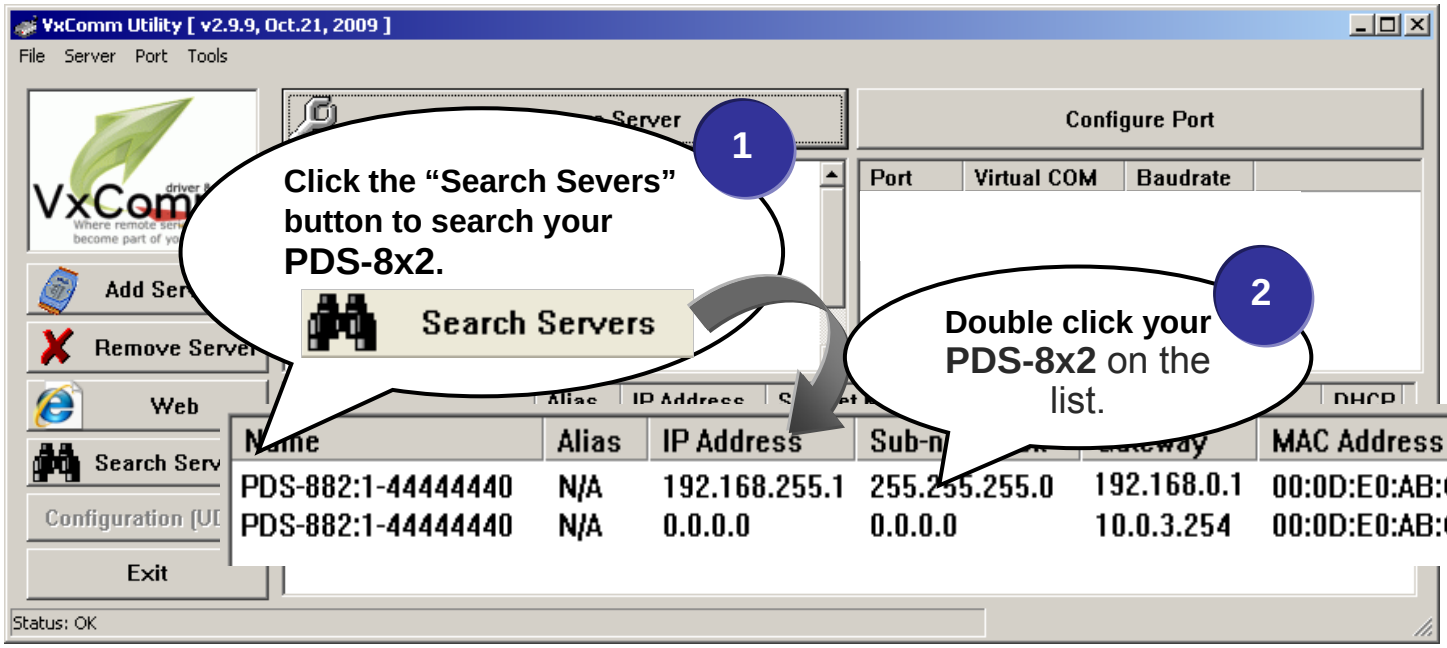
2. Connect both the PDS-8x2 controller and RS-485 module using the DATA+ and DATA- terminals.

3. Supply 24 V_{DC} (+18 ~ 48 V_{DC}) power to the PDS-800 controller.

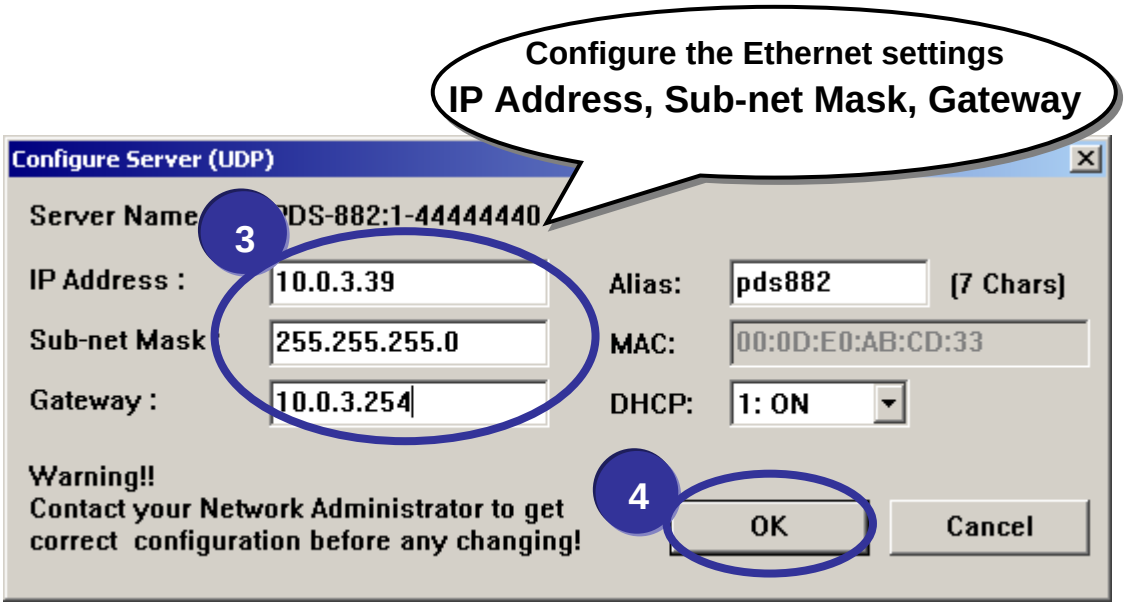
4. Connect both the PDS-8x2 controller and Relay output using the R_COM and R_NO terminals.

Step 2: Search the PDS-8x2 controller on the Ethernet network

1. Execute the VxComm Utility and then search your PDS-8x2 controller.
2. Double click the name of the PDS-8x2 to open the configuration settings dialog box.

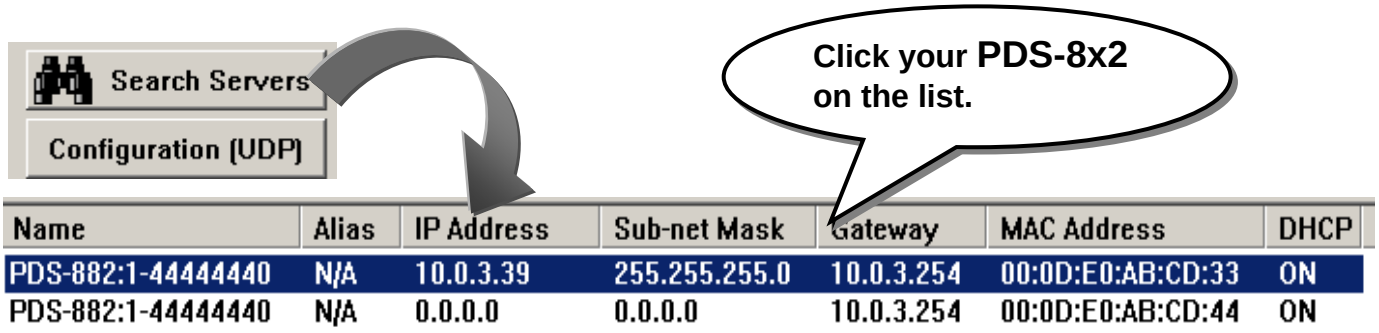


3. Contact your Network Administrator to obtain a correct network configuration (such as IP/Mask/Gateway). Enter the network settings and then click **"OK"**. The PDS-8x2 controller will be restarted itself immediately.



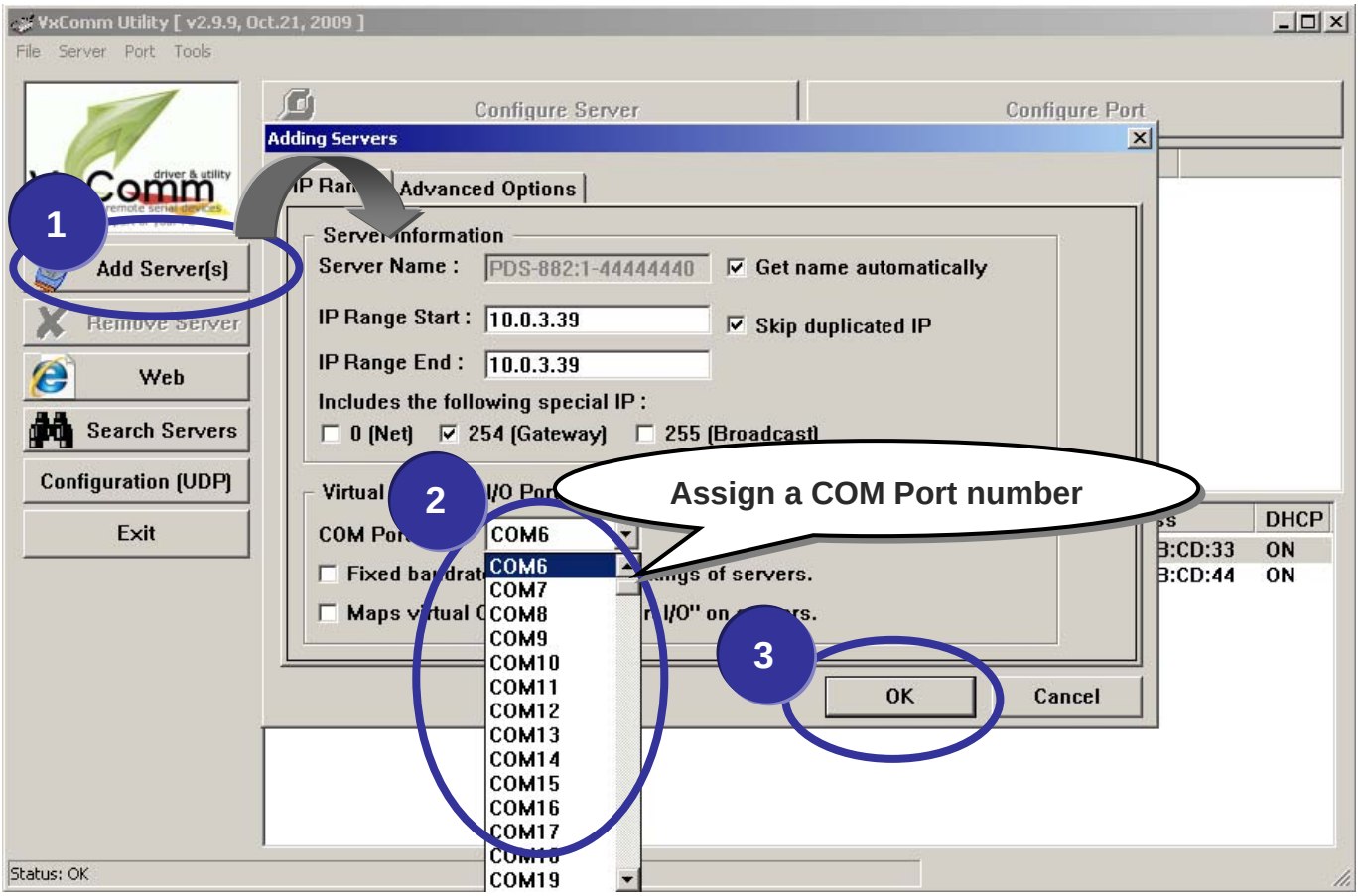
Step 3: Configuring Virtual COM Ports

1. Click the **Search Servers"** button again to search PDS-8x2 for ensuring the new configuration of PDS-8x2 is working well. Then click your PDS-8x2 on the list to select it.

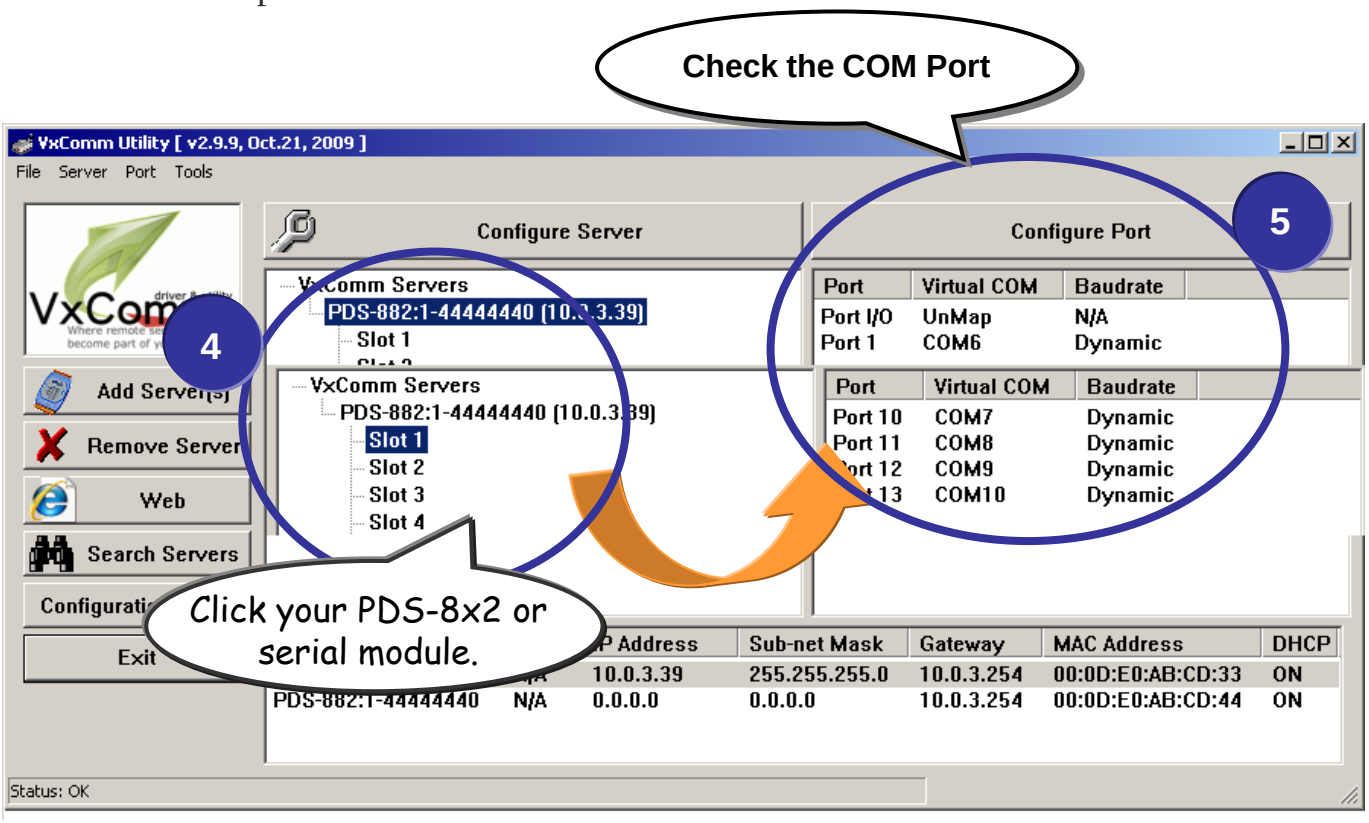


2. Click the 

button. Assign a COM Port number and click "OK" to save your settings.



3. Click on PDS-8x2 name or slot that your module plugged in, and then check the Virtual COM port numbers on the PC.

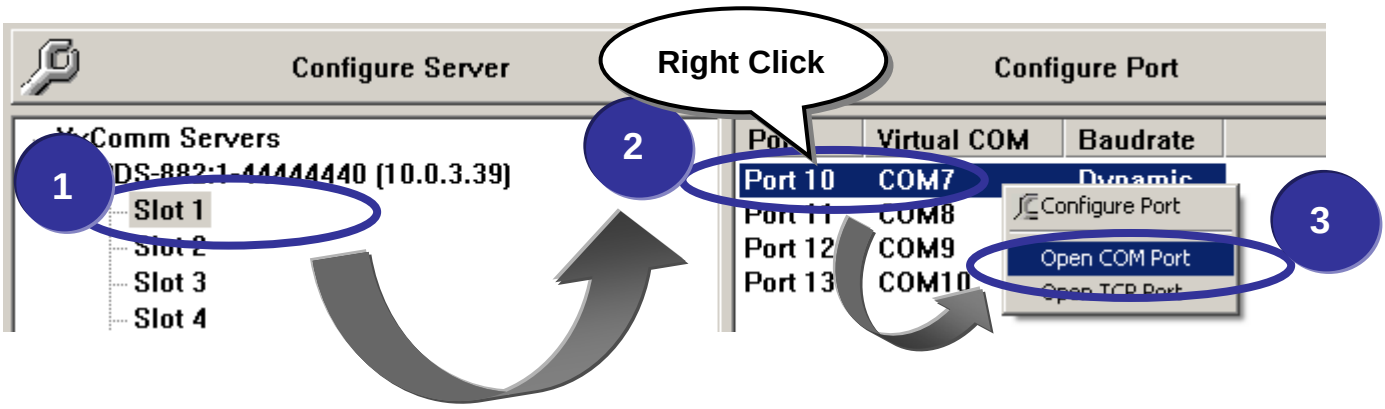


4. Click **"Tools"** >> "**Restart Driver**", and then click the "**Restart Driver**" button to start the driver.

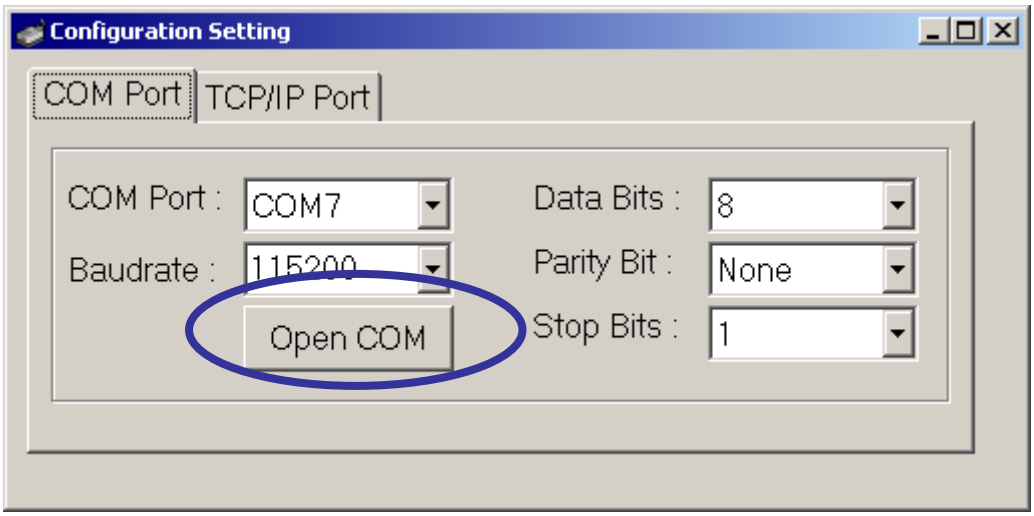
Step4: Testing your serial modules (Optional)

1. Connect the “RXD1” and the “TXD1” of the serial modules (optional), as shown in the diagram in **Step1**. ***(For example: I-8114iW)***

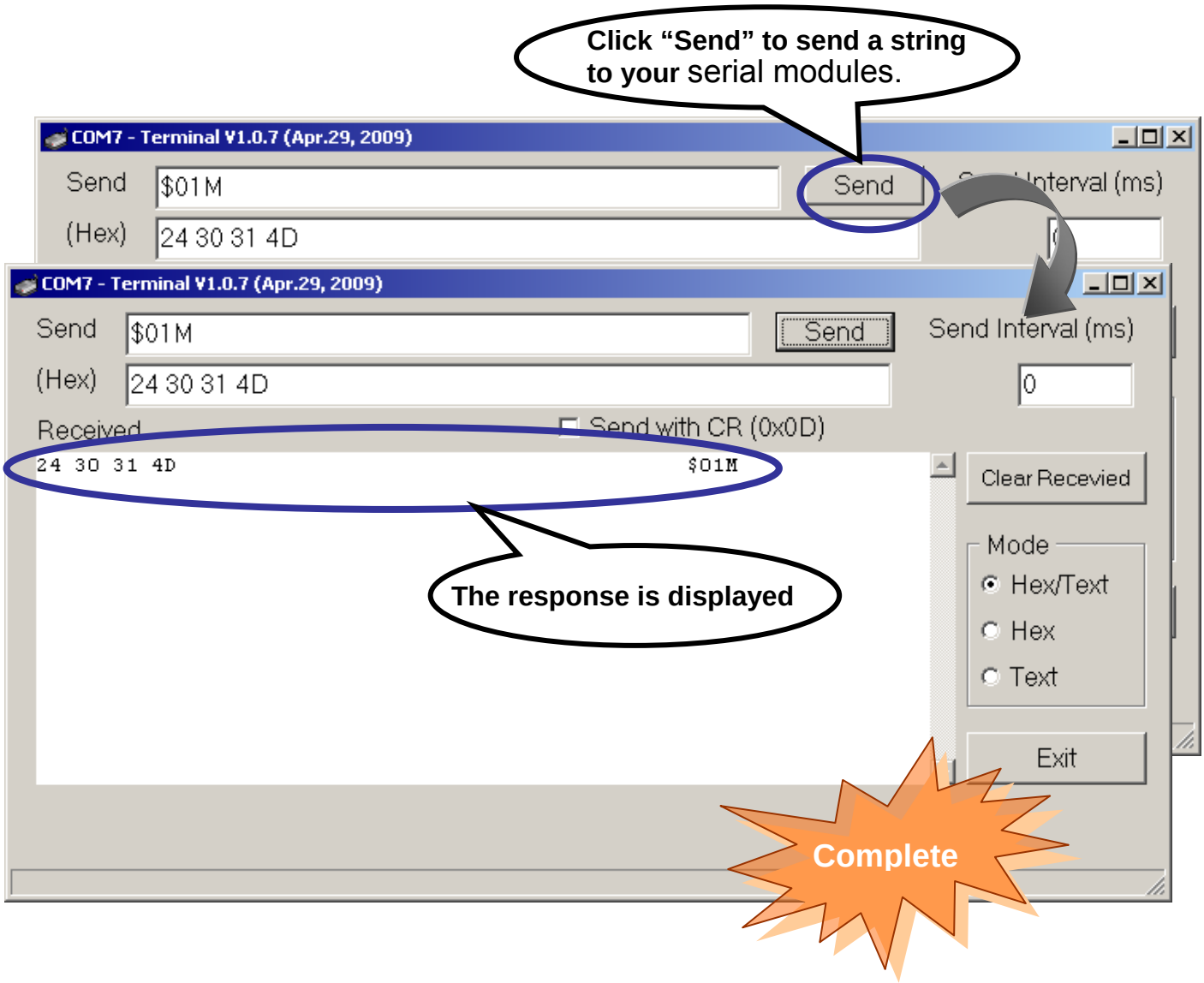
2. Click **“Slot 1”** and right click Port 10 and then choose the **“Open COM Port”** option.



3. Check that the configuration of the COM Port is correct and then click the **“Open COM”** button.



4. Type a string in the send field then click the "send" button. Check whether the response is the same with the string sent or not.



5. If the test is successful, other COM port programs will be able to work directly by using the Virtual COM Port.

6. While using RS-485 modules (***Ex:I-8144iW***), you should wire the "**Data1+"** with "**Data 2+"** signals, and wire the "**Data1-"** with "**Data2-"** signals for self-test. Then open the first two COM ports, send data to one and receive data from the other.

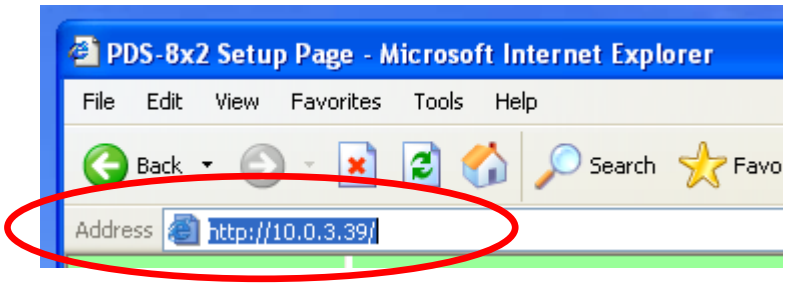
6 Configuration with Web Browser

Once the PDS-8x2 controller has been correctly configured and is networking normally, the configuration details can be retrieved or amended using either the VxComm Utility or a standard web browser, such as IE, FireFox, or Mozilla, etc.

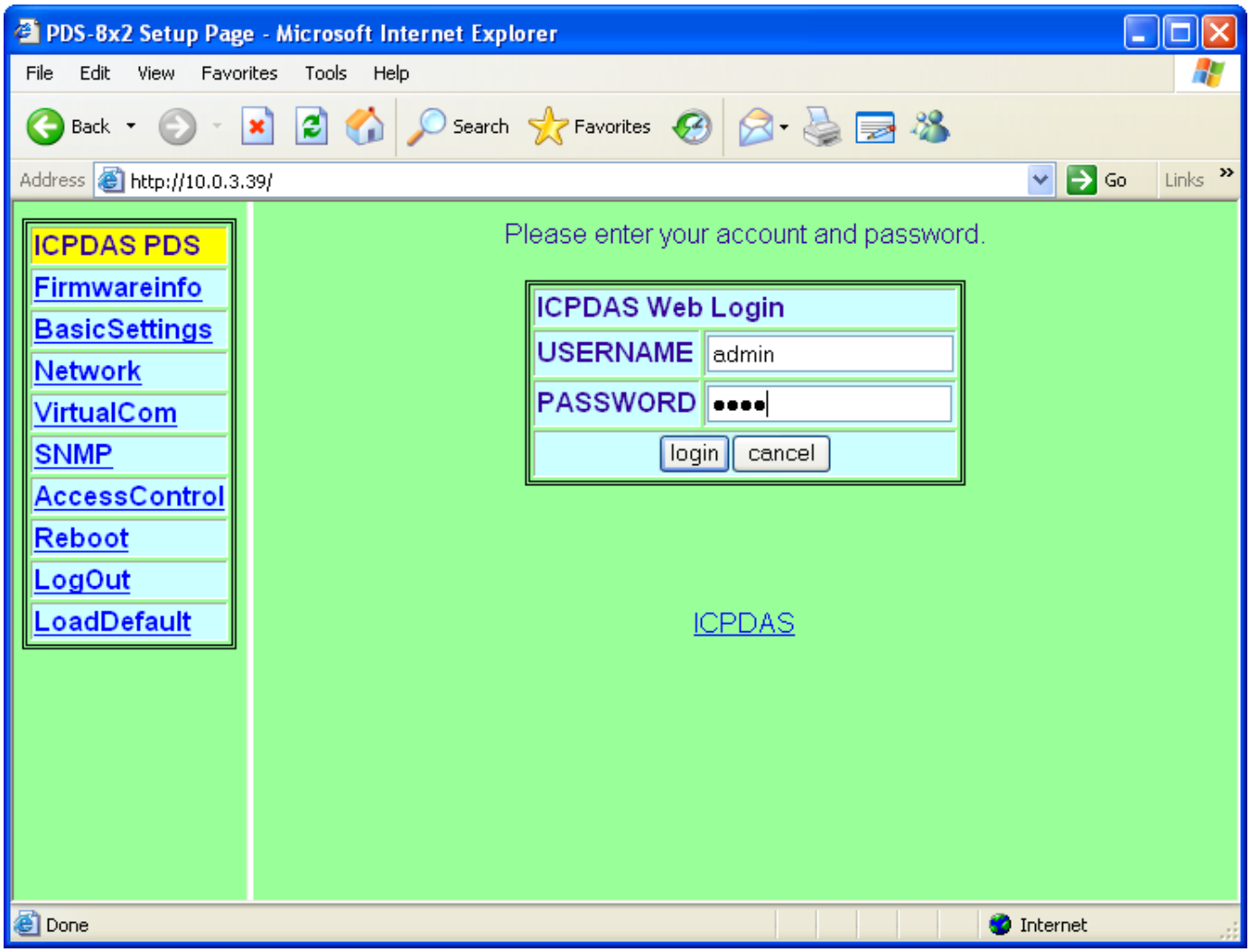
6.1 Connecting to the PDS-8x2 controller

If the COM port program is operating with a PDS-800, changing the configuration will cause a program error.

Enter the IP address of the PDS-8x2 controller in the Address field and press "Enter" to connect to the PDS-8x2 controller.

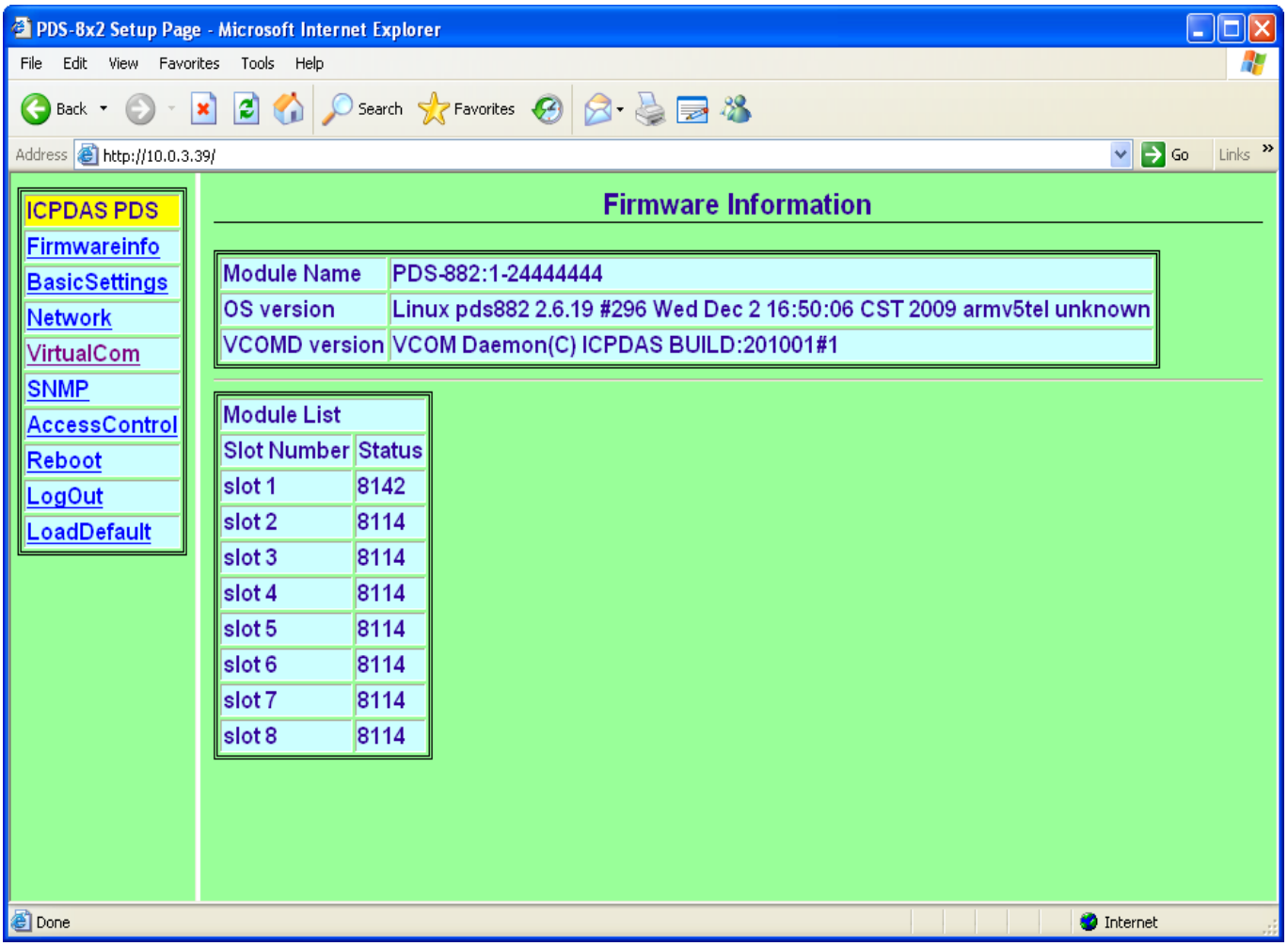


If connection succeeds, the login form will appear as below:

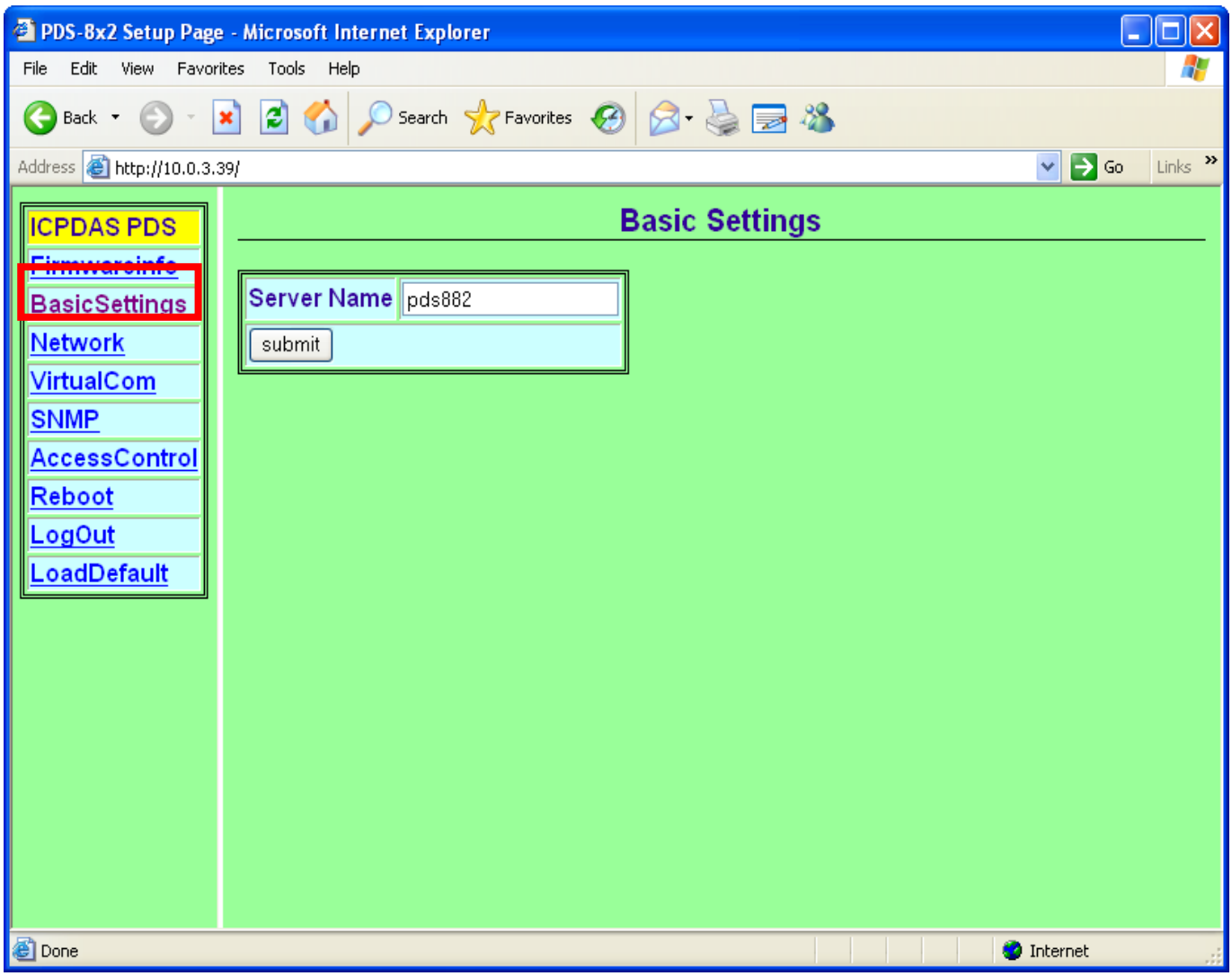


The default account and password of Web Management are **admin** and **test**.
(NOTICE: **The account and password are case-sensitive.**)

When authentication succeeds, you can see the Firmware information display

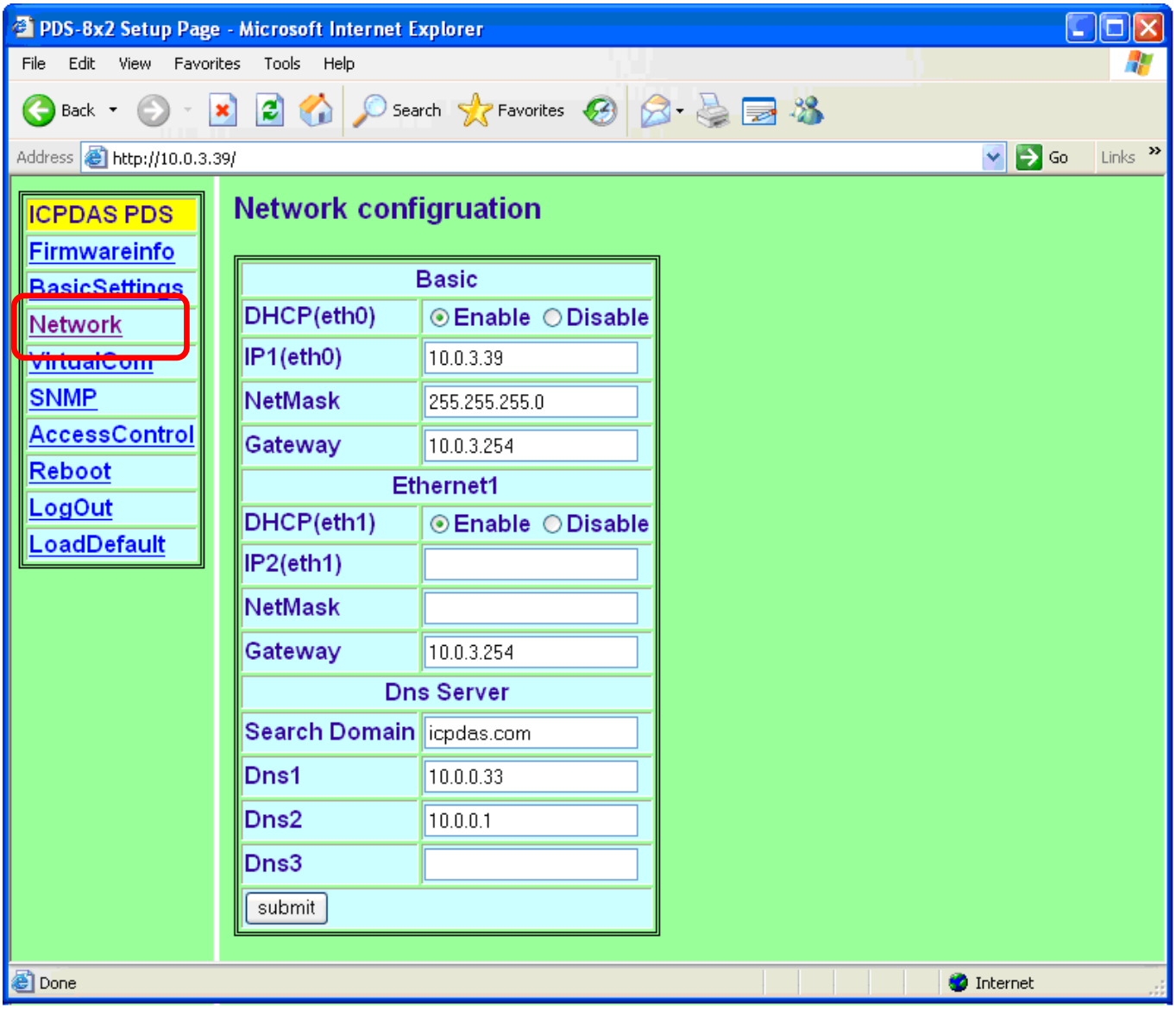


6.2 Basic Settings



In Basic settings page, you can give a name to the PDS-8x2 as you want. (Max. 8 characters)

6.3 Network Settings



Network (TCP/IP) Setup page

- **IP Address**
- **Subnet Mask**
- **Gateway**

The above three items are the most important network settings and should always correspond to the LAN definition. If they do not match, the PDS-8x2 controller will not operate correctly. If the settings are changed while the module is operating, any links to Virtual COM Port based applications currently in use will be lost and an error will occur.

- **DHCP** : disabled / enabled

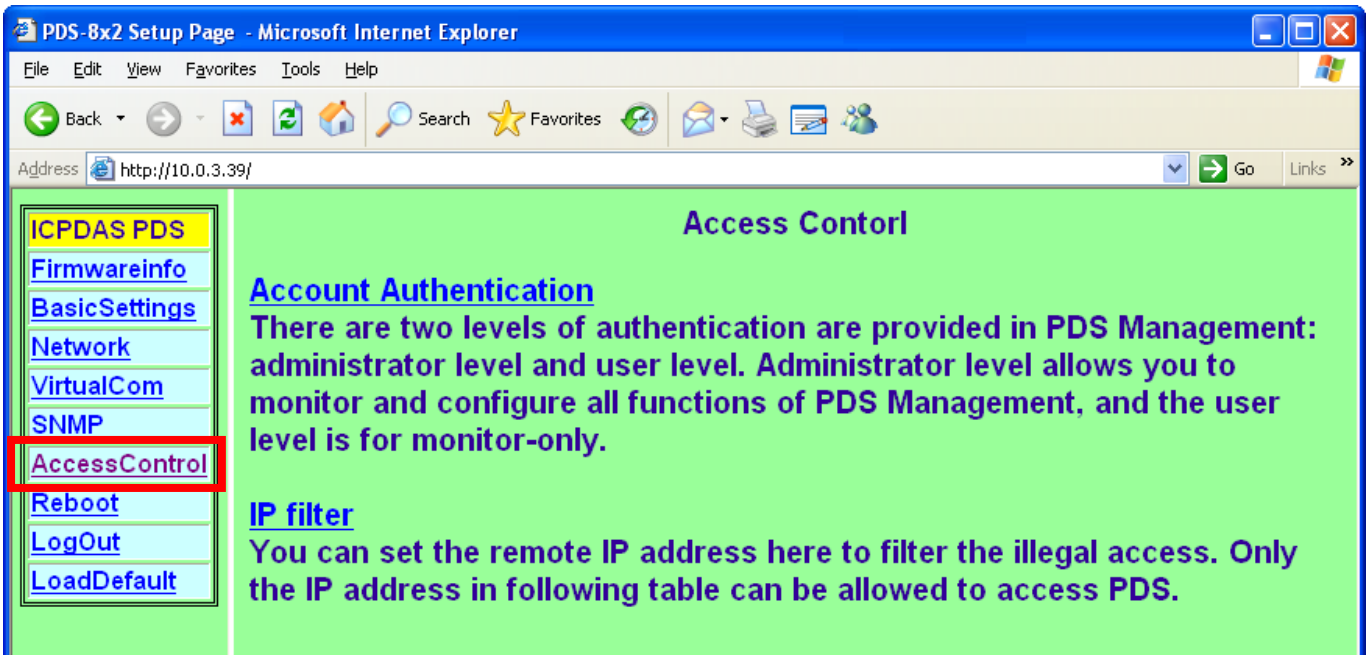
  It is recommended that the DHCP Client setting is kept as disabled, and using static network settings. This ensures your PDS-8x2 always using a fixed IP address, and you don't need to configure the virtual COM mappings again and again.

- **DNS server** :
  - **Search Domain**: Most queries for names within this domain can use short names relative to the local domain. If no **domain** entry is present, the domain is determined from the local host name
  - **Name Server**: Set Domain Name Servers.

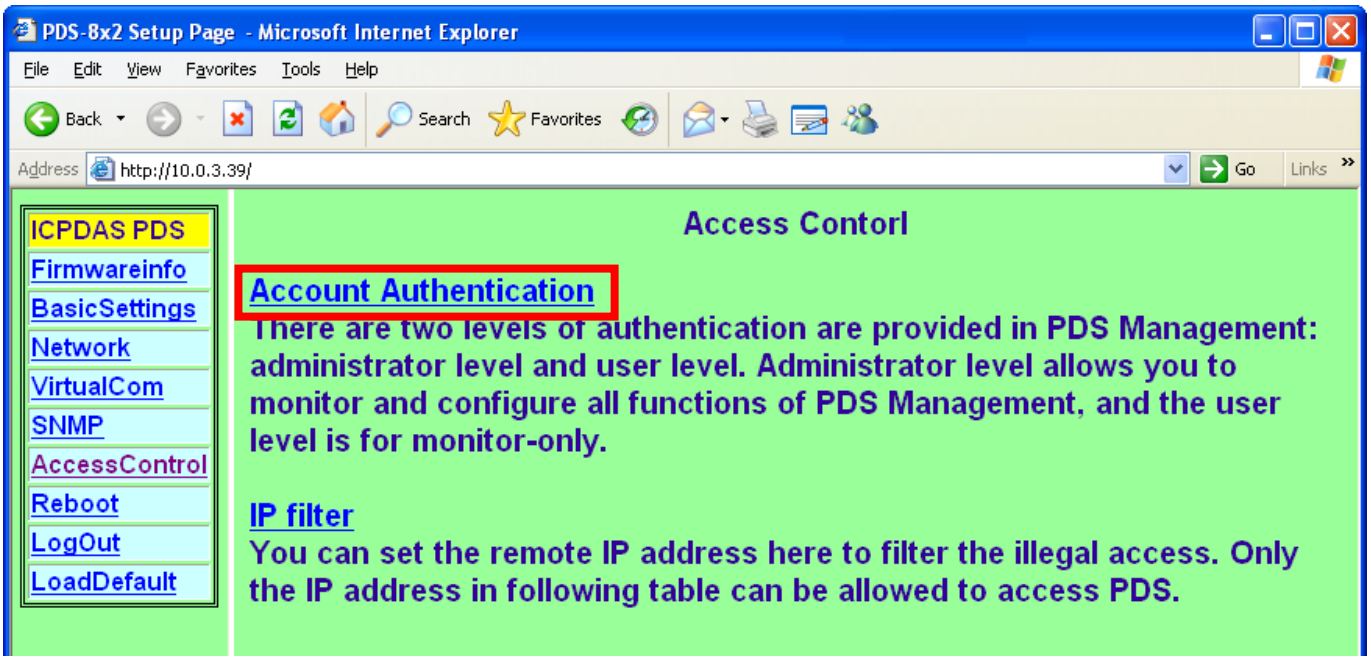
After setting the new configuration, click the "Reboot" item to save the new settings to the PDS-8x2 controller, the PDS-8x2 controller will reboot itself after the saving operation is complete, otherwise the original settings will still be valid until the next power-on.

6.4 Access Control

There are two methods to access control: *Account Authentication* and *IP-filter*.



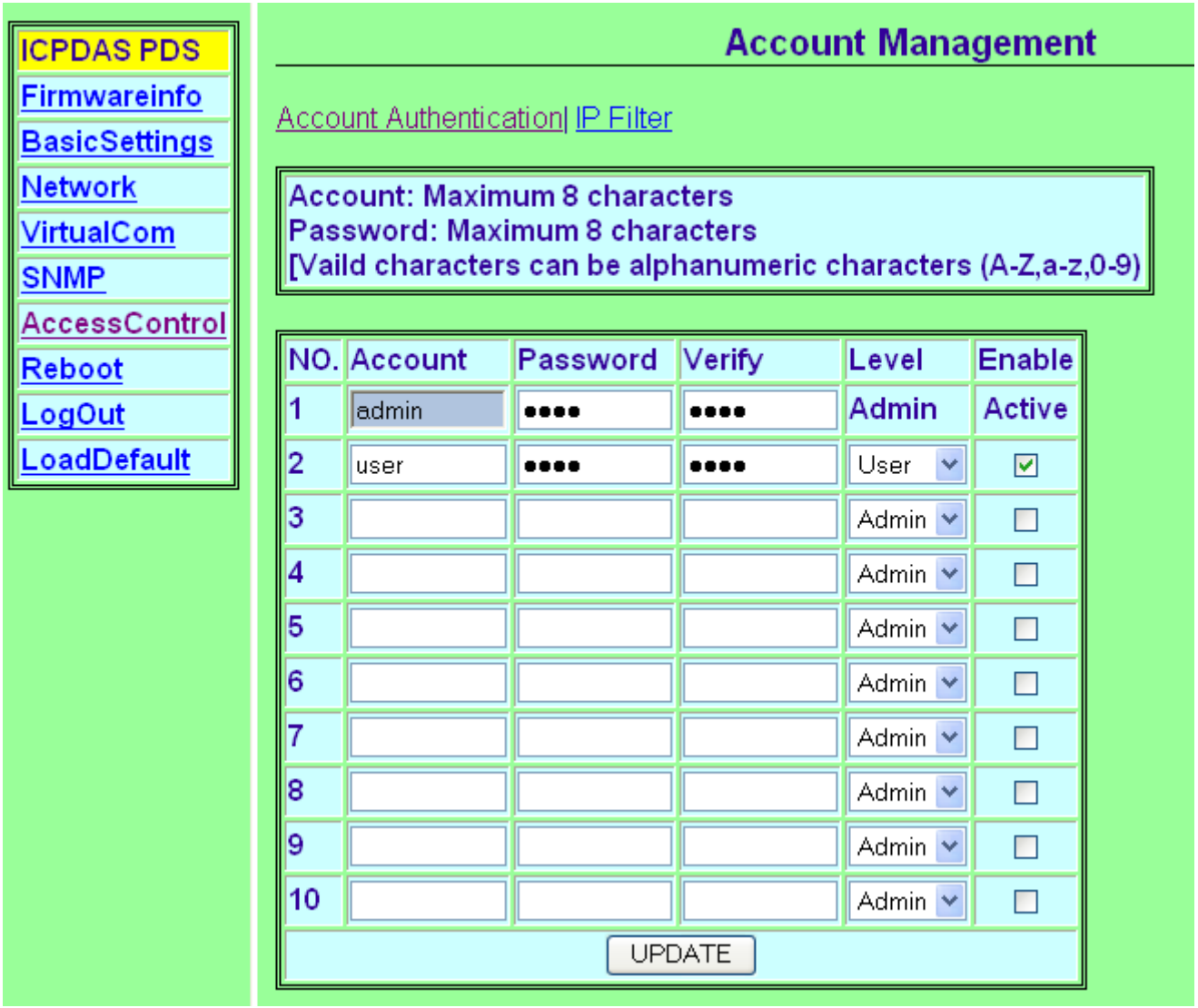
Account Authentication



There are two levels of authentication are provided in PDS Management: administrator level and user level.

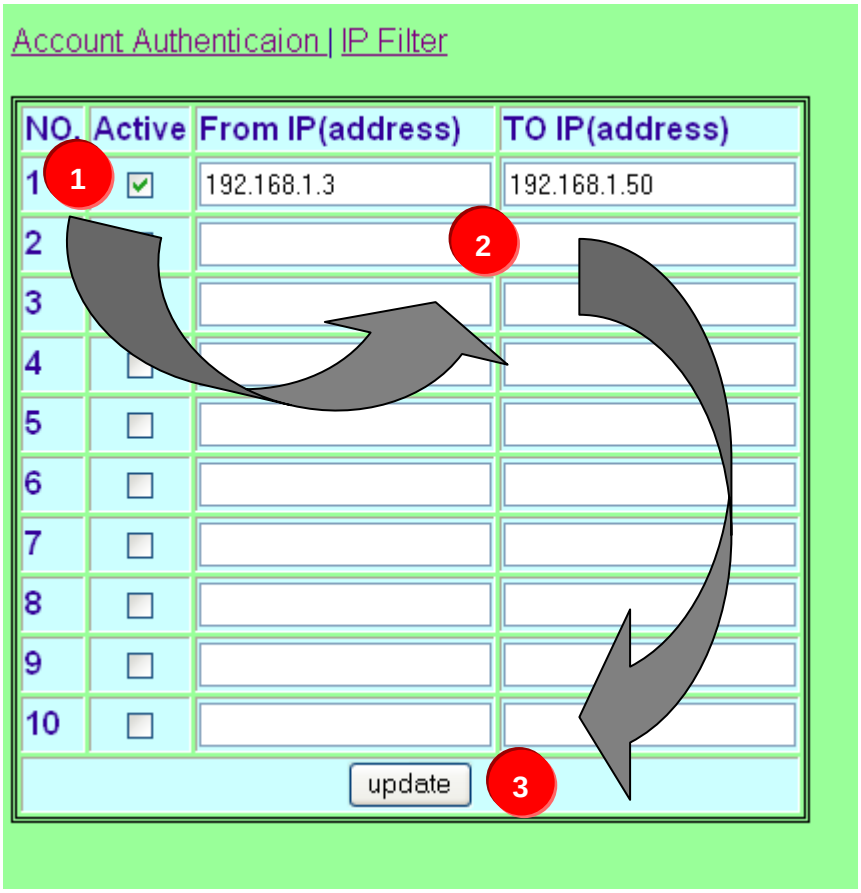
Administrator level allows you to monitor and configure all functions of PDS Management, and the user level is for monitor-only.

PDS Management supports 5 accounts for your setting. The account and password are limited to 8 characters max. Before click SUBMIT, please make sure the Enable checkbox is ticked, otherwise, the setting will be ignored.



IP filter

You can set the remote IP address here to filter the illegal access. Only the IP address in following table can be allowed to access PDS.



Before UPDATE the setting, you have to tick the <Active > checkbox; otherwise system will ignore the setting data. Since the table is empty, system will allows all hosts to access the PDS.

NOTICE
After UPDATE you must *reboot* the PDS for the changes to take effect

6.5 Virtual COM Setting

6.5.1 Before virtual com setting

➲ N-Port Module (i-8114w or other serial module) Support

The serial port number (**device name)** of I-8114W and I-8112iW modules is presented in the Fig.6.5.1 and Fig.6.5.2 and it is fixed according to their slot position in the PDS-8x2.

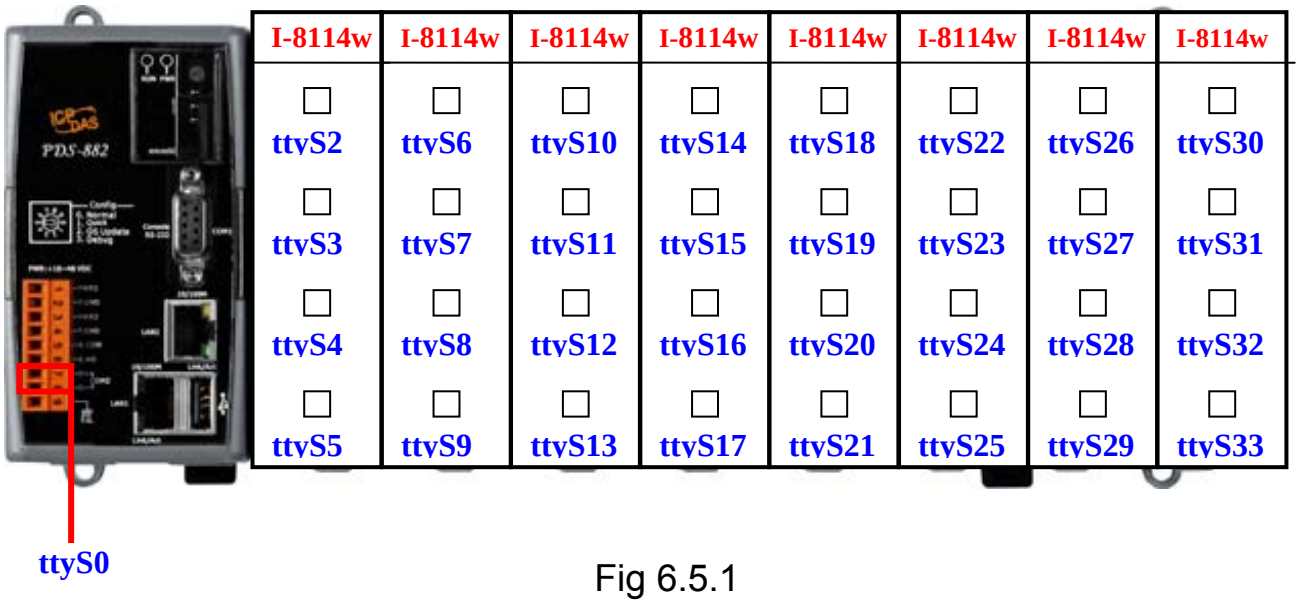


Fig 6.5.1

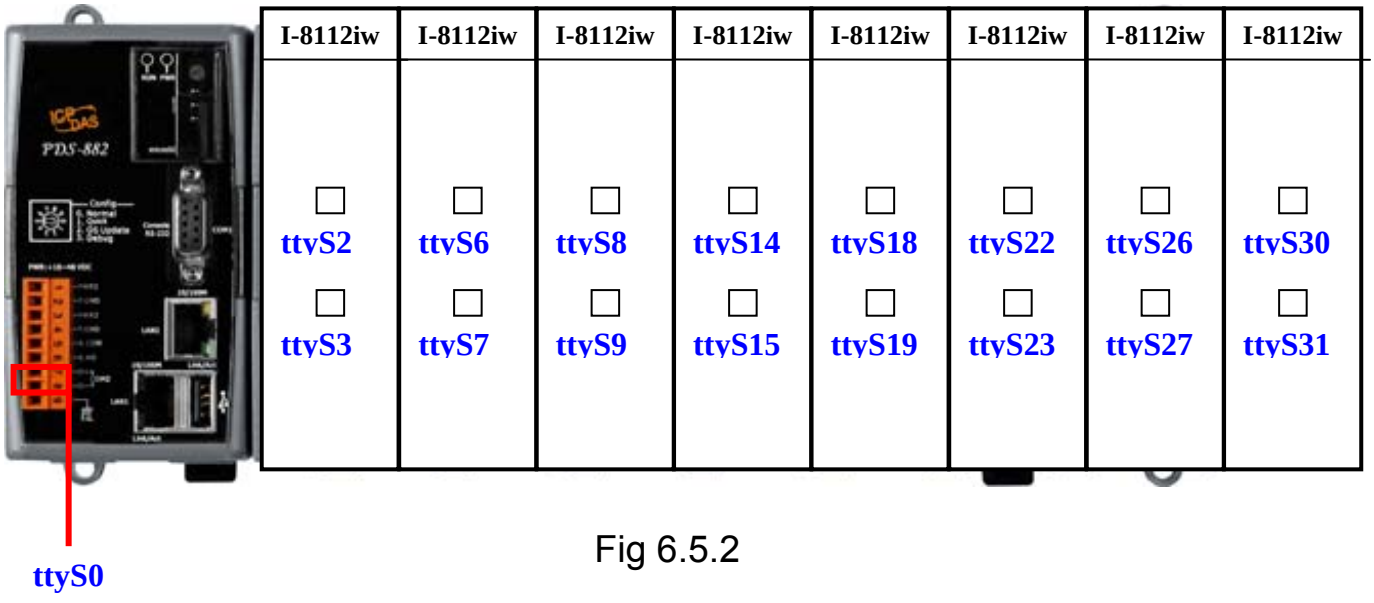


Fig 6.5.2

6.5.2 Default virtual Com setting

In VCOM utility, you will see the PORT 1~N (Fig 6.5.3). The port number of I-8114W and I-8112iW modules is presented in the Fig.6.5.4 and Fig.6.5.5 and it is fixed according to their slot position in the PDS-8x2

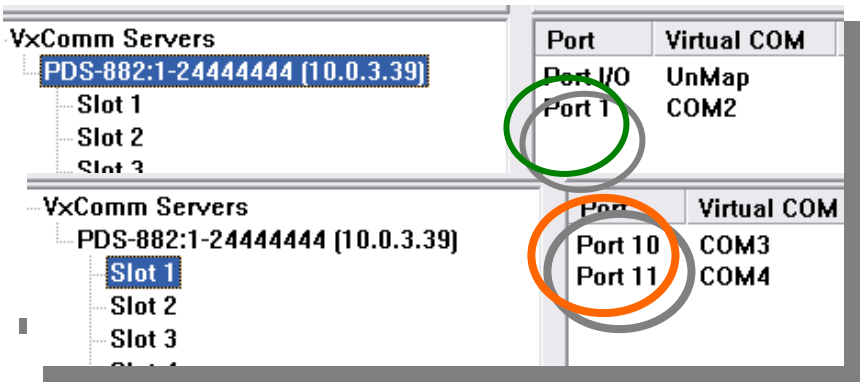


Fig 6.5.3

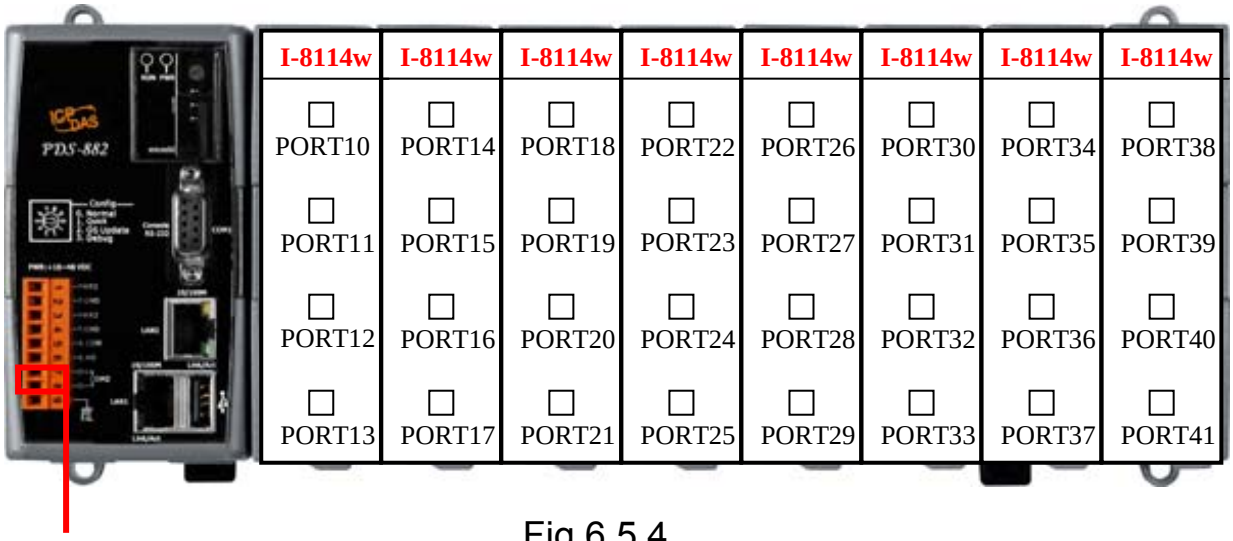


Fig 6.5.4

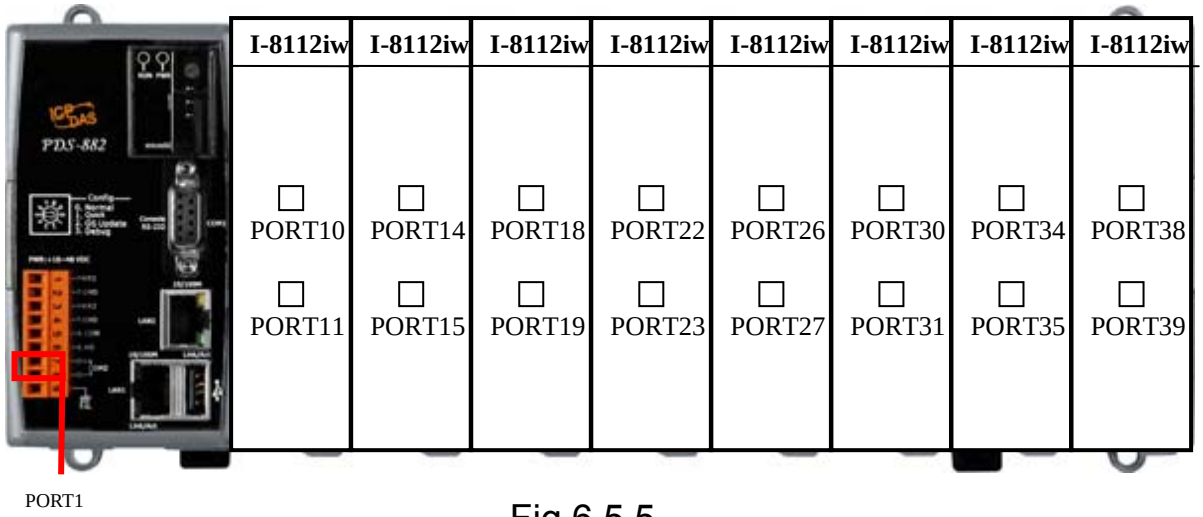


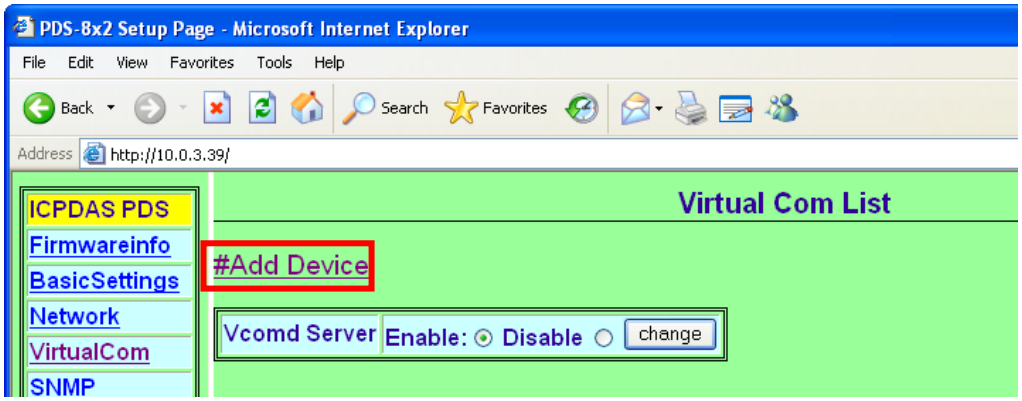
Fig 6.5.5

I-8K High Profile modules selection guide

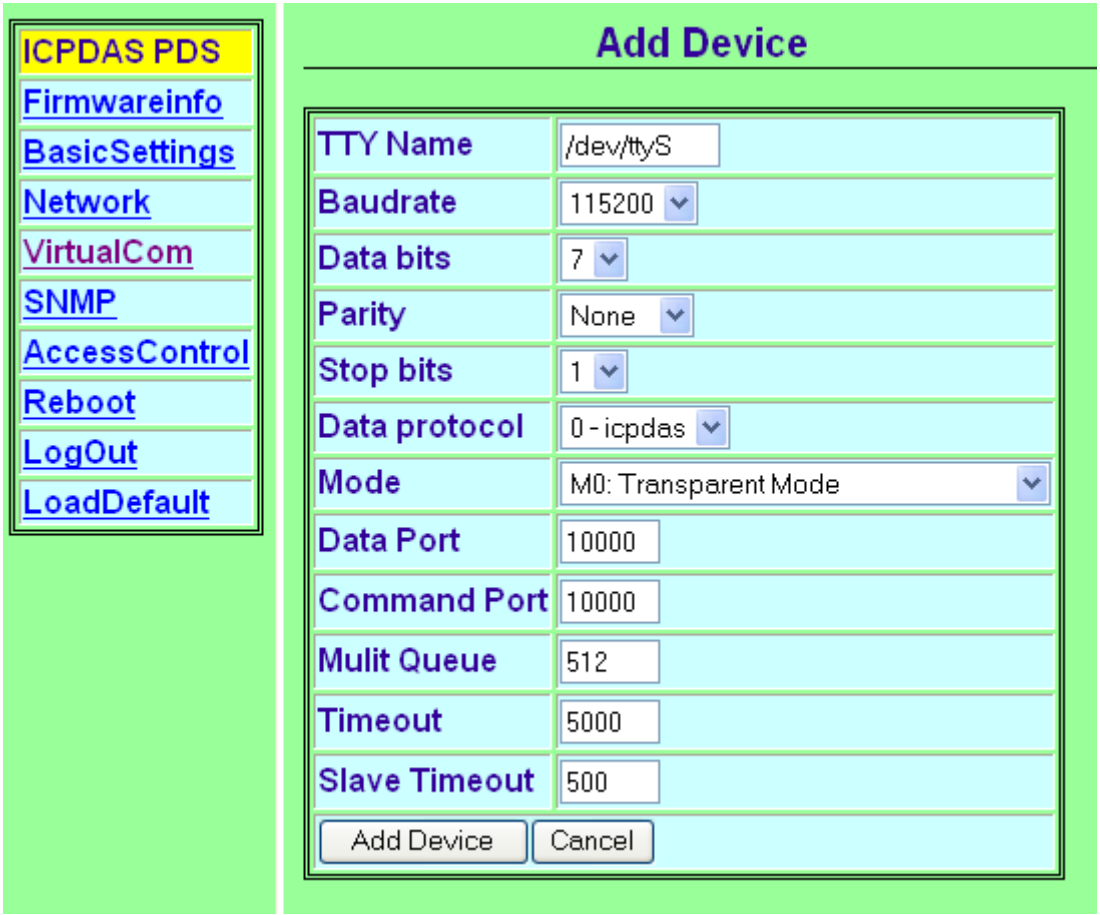
Module	Interface	Port	Max. Channels	Max. Speed (K bps)	Isolation
I-8112iW	RS-232	2	16	115.2	2500V
I-8114W	RS-232	4	32	115.2	—
I-8114iW	RS-232	4	32	115.2	2500V
I-8142iW	RS-422/RS-485	2	16	115.2	2500V
I-8144iW	RS-422/RS-485	4	32	115.2	2500V

http://www.icpdas.com/products/Remote_IO/i-8ke/selection_rs232_i8k.htm

6.5.3 Add Device



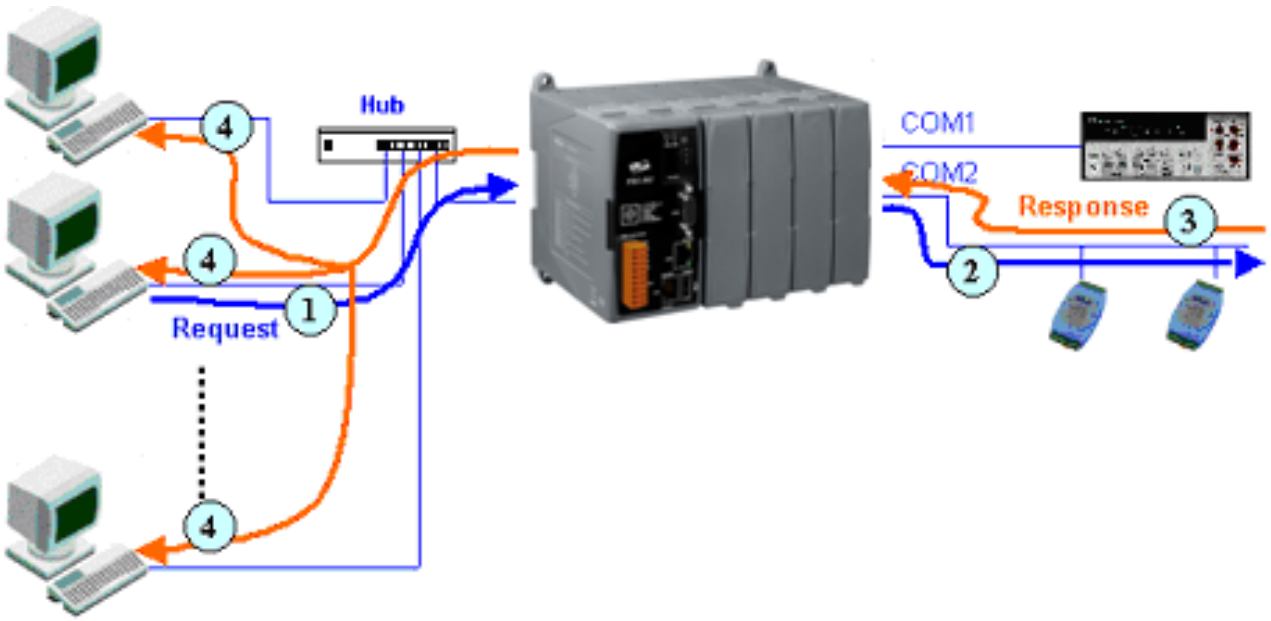
Click the "**Add Device** "Link. The "**Add Device"** form will display as below



- **TTY Name** : PDS-842 : ttyS2~ttyS17 / PDS-882: ttyS2~ttyS33
- **Baud rate** : 600 ~ 115200
- **Data Bits** : 7 ~ 8
- **Parity** : None,Odd,Even,Mark,Space
- **Stop Bits** : 1,2
- **Data protocol** : ICP DAS protocol
- **Mode** : M0,M1,M2

■ **M0: Transparent Mode**

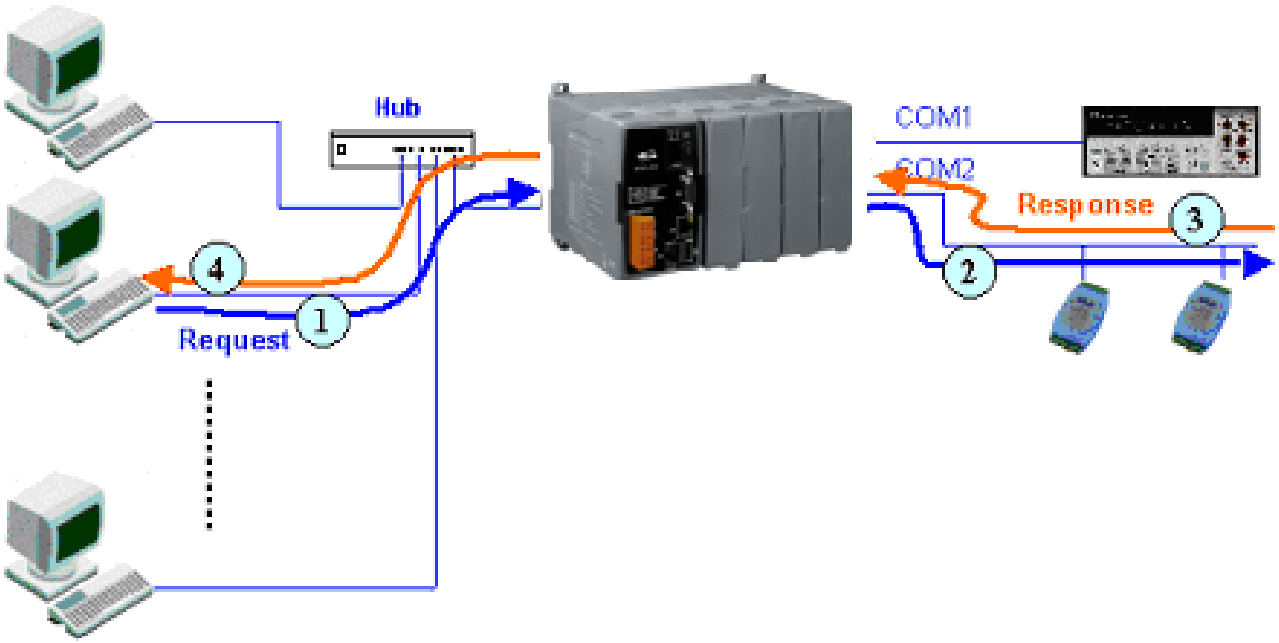
Condition 1: One client sends a request to the PDS-8x2 controller to access each device. The PDS-8x2 controller echoes the data from each device to each connected client.



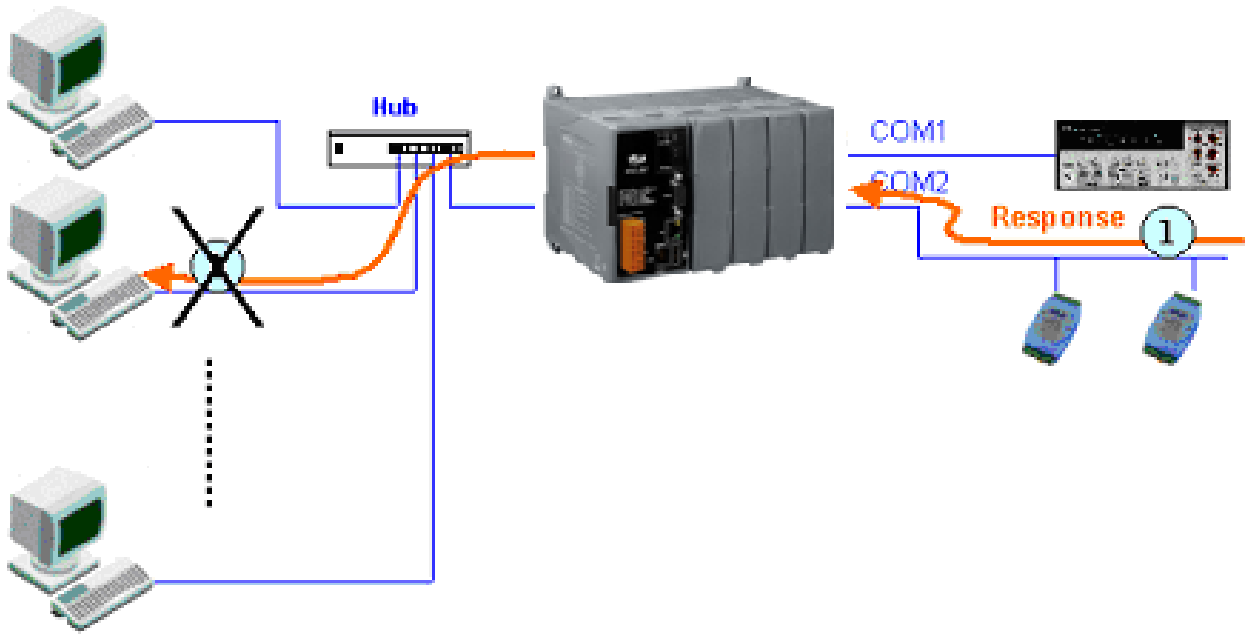
Condition 2: No clients send any requests to the PDS-8x2 controller. The PDS-8x2 controller echoes data from the devices to each connected client.

- **M1: Slave Mode (Single-echo mode)**

  Condition 1: One client sends a request to the PDS-8x2 controller to access the other devices. The PDS-8x2 controller echoes data from the devices to the client that requested the service.



Condition 3: No clients send any requests to the PDS-8x2 controller. The PDS-8x2 controller doesn't echo any data from the devices to any client.

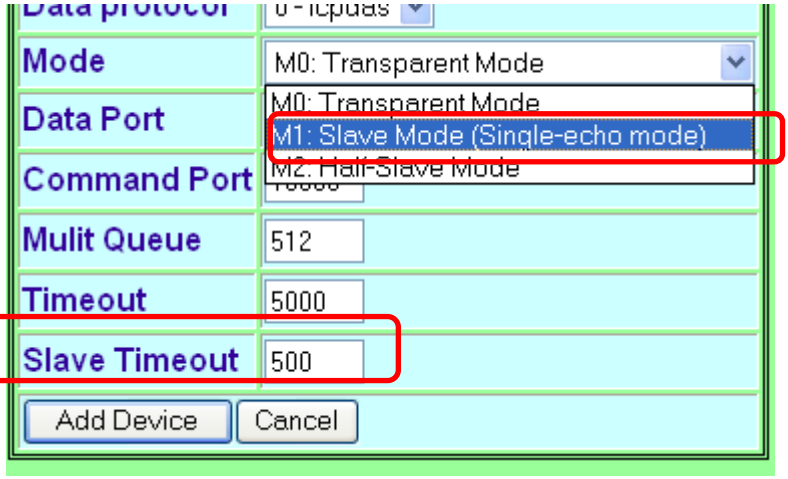


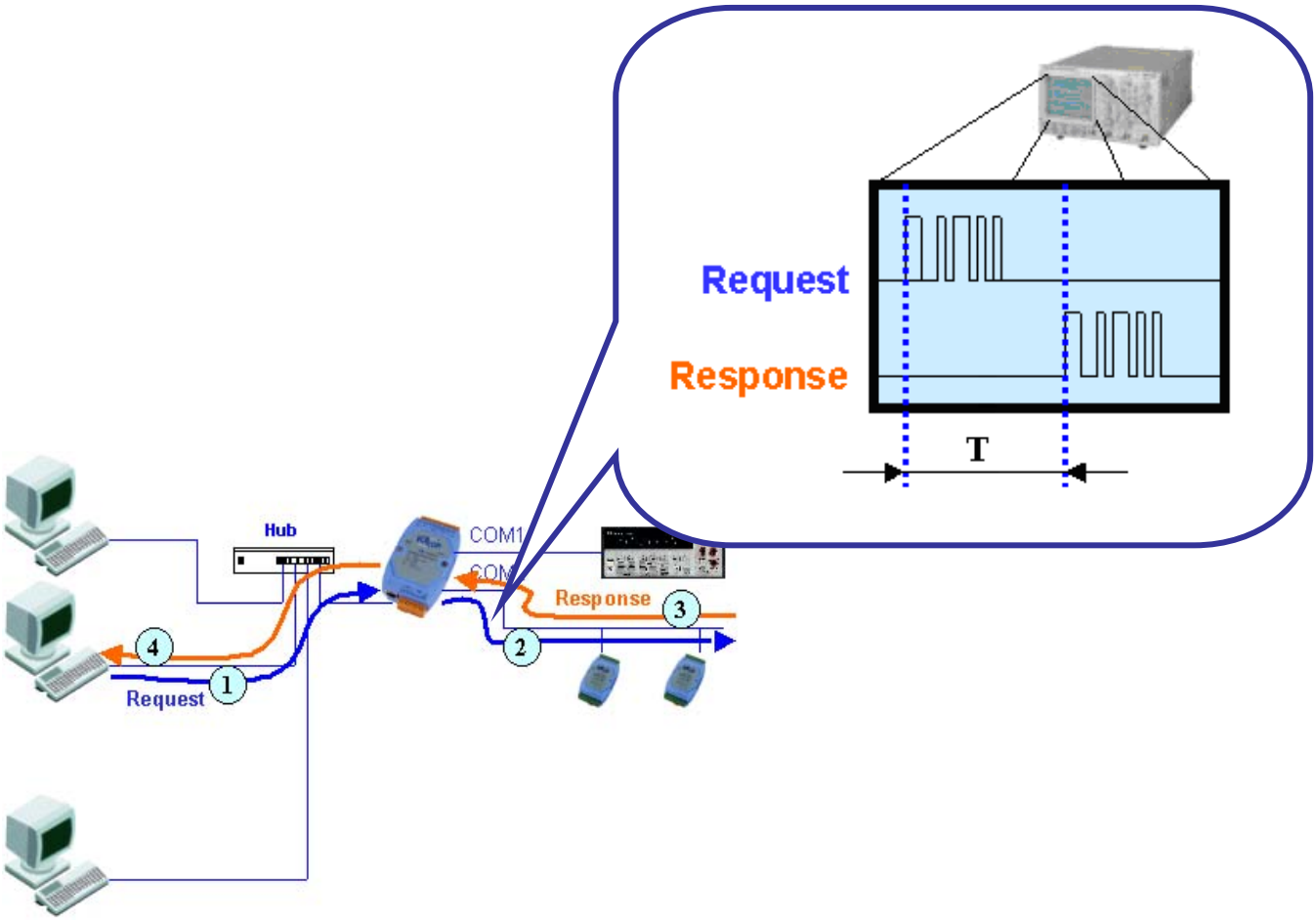
■ **M2: Half-Slave Mode (Is situated between M0 and the M1 mode)**

In M2 mode, if only then single connection is the same with the M0 mode, this connection has the right of use, even if will come from COM Port of message also to give the TCP port on own initiative. (Refer to P55. **M0 Mode** declaration)

When has multiple connections is equally operates with the M1 mode, uses COM Port by way in turn, but COM Port right of use will retain the TCP connection which will issue a command for last. (Refer to P56. **M1 Mode** declaration)

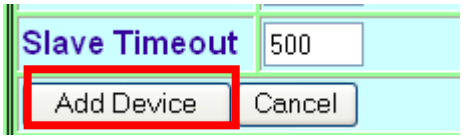
In M1 mode, the slave mode timeout setting is use to set the waiting time after last character of the request sent to the device. If the device does not respond within the timeout value, the PDS-8x2 controller will return a timeout error and process next request.

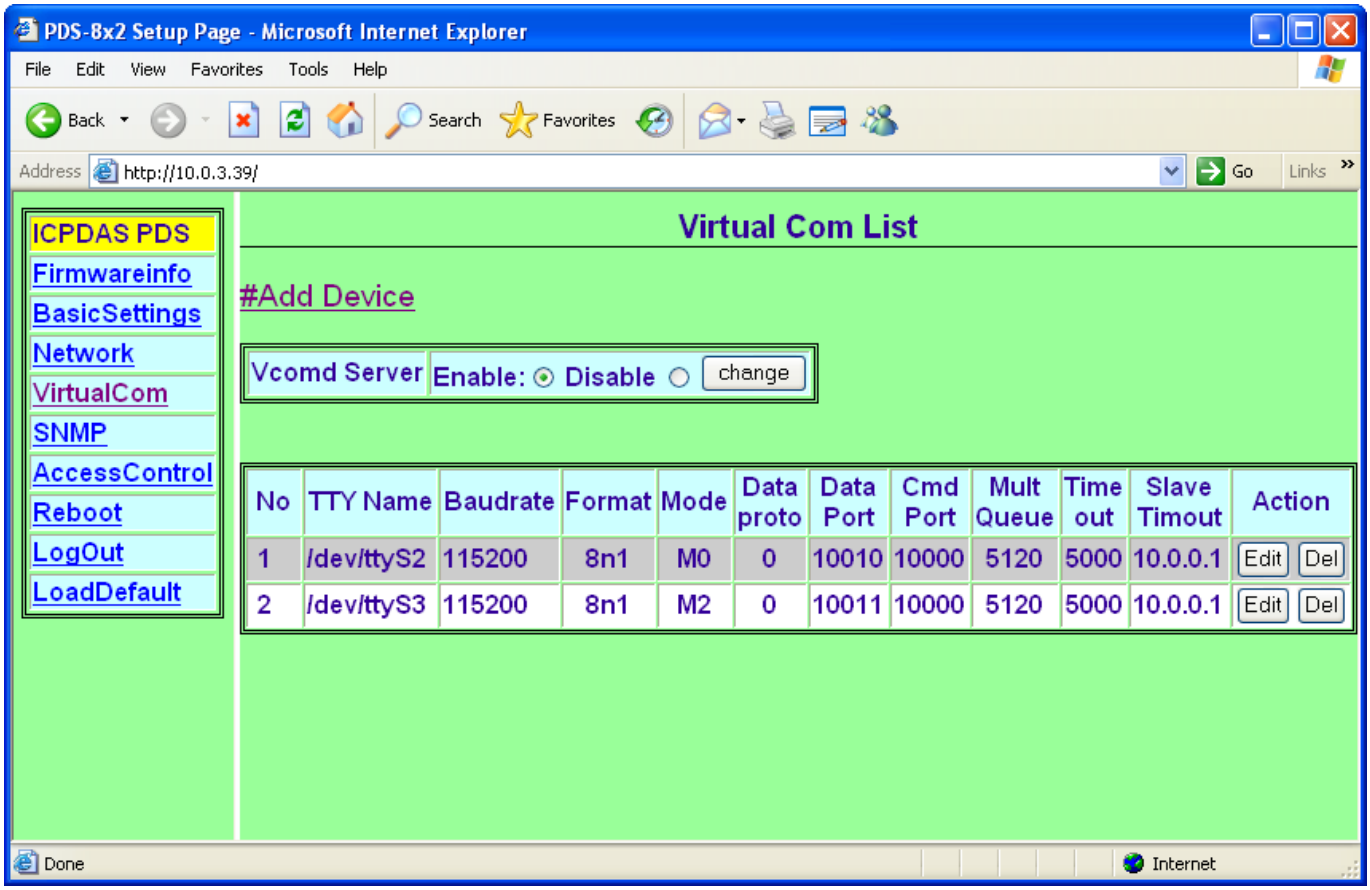

Mode
M0: Transparent Mode
M0: Transparent Mode
M1: Slave Mode (Single-echo mode)
M2: Half-Slave Mode
Data Port
Command Port
Mulit Queue
512
Timeout
5000
Slave Timeout
500
Add Device
Cancel


Request
Response
T
Hub
COM1
Response
3
2
4
1
Request

- **Data Port** : port number start from **10010** (TCP protocol)
- **Command Port** : port number default value is **10000** (for ICP DAS protocol default value is **10000.)** If you don't know this mean. Don't change it!
- **Multi Queue** :set buffer size
- **Timeout** **:**set time out value
- **Slave time out** **:**set slave time out value

After setting click the "add device" button.
The virtual com list will appear as below.





6.5.4 Edit device

Click the “Edit” button to edit which device you want to change it.

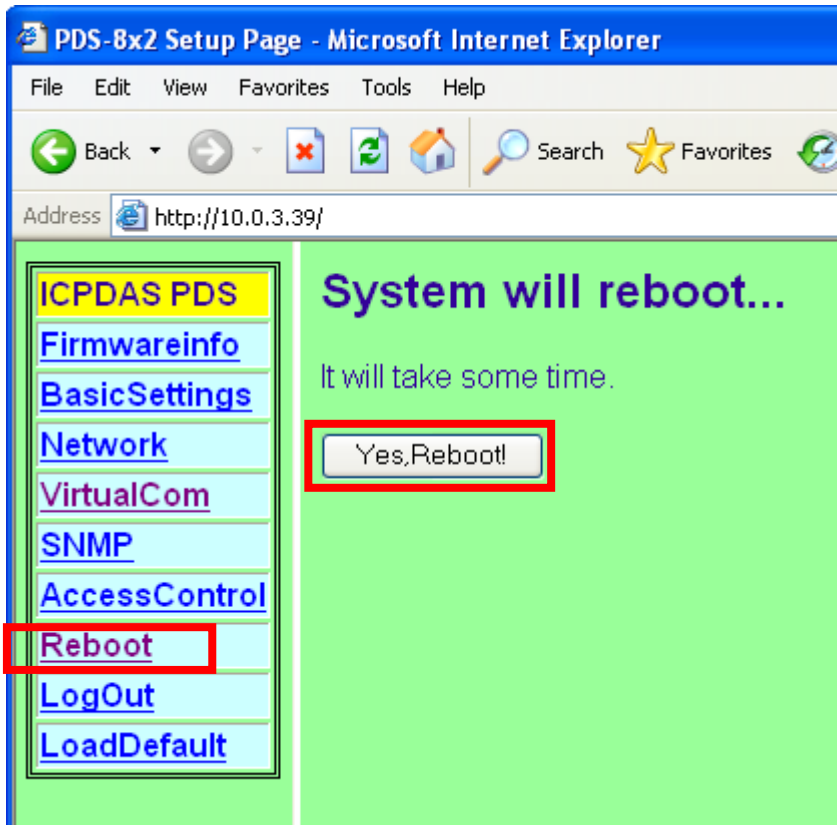
6.5.5 Delete device

Click the “Del” button to remove the device which you want to remove it.

6.5.6 Enable / Disable Virtual com service

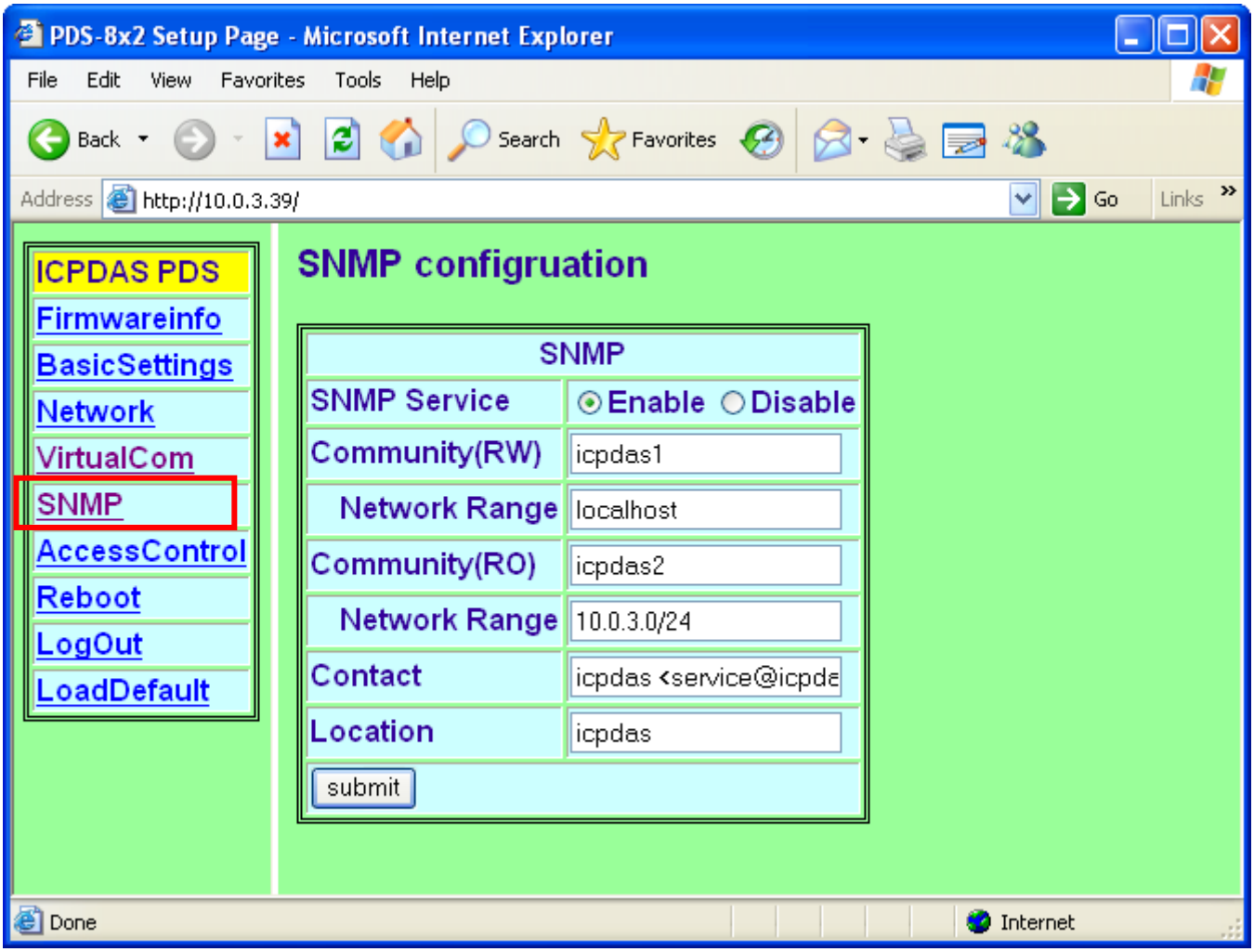
1. Choose Enable or Disable option and click “change” button .
2. Then reboot the PDS.

It will take effect **after reboot**.



6.5 SNMP Configuration

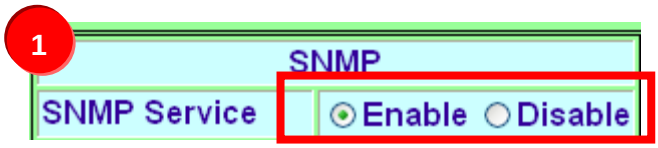
PDS supports SNMP protocol



6.5.7 Enable / Disable SNMP service

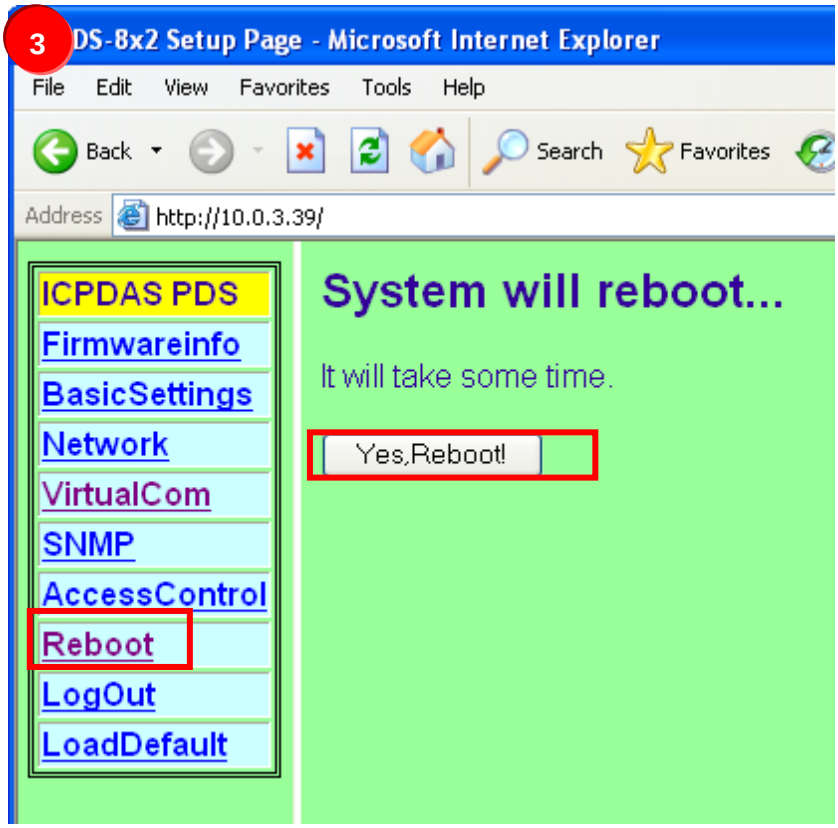
SNMP service is default service in PDS. It will *start at boot time*.

1. Choose Enable or Disable option

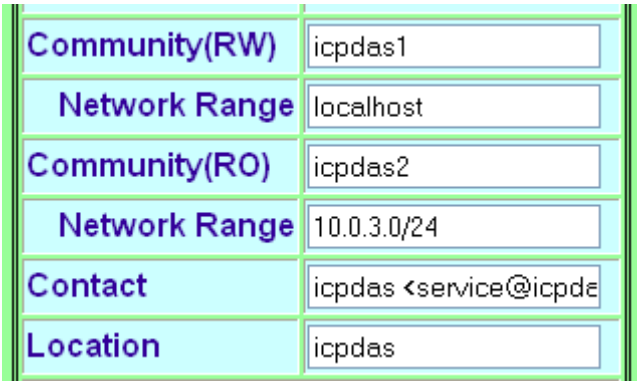


2. Click the submit button

3. **Reboot. It will take effect after reboot**



6.5.8 SNMP Settings

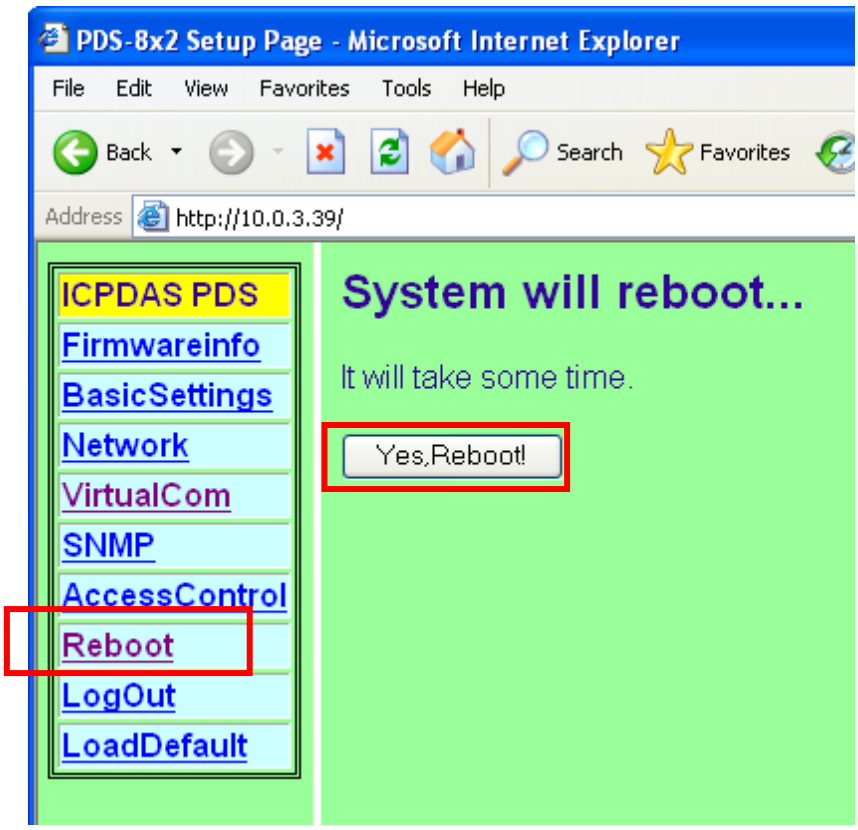


- Community : SNMP Community Strings are like passwords for network elements
  - RW: This community string which is used for **read-write** access to PDS. Using this community string, can actually change MIB variables on PDS.
  - RO: This community string which is used for **read-only** access to PDS. Using this community string, can retrieve data from PDS

- Network Range: Specify the network range of Community(RW/RO)
- Contact: Specify the contact information usually include contactor's email / phone.
- Location: Specify the location string for SNMP agents such as factory, office … etc.

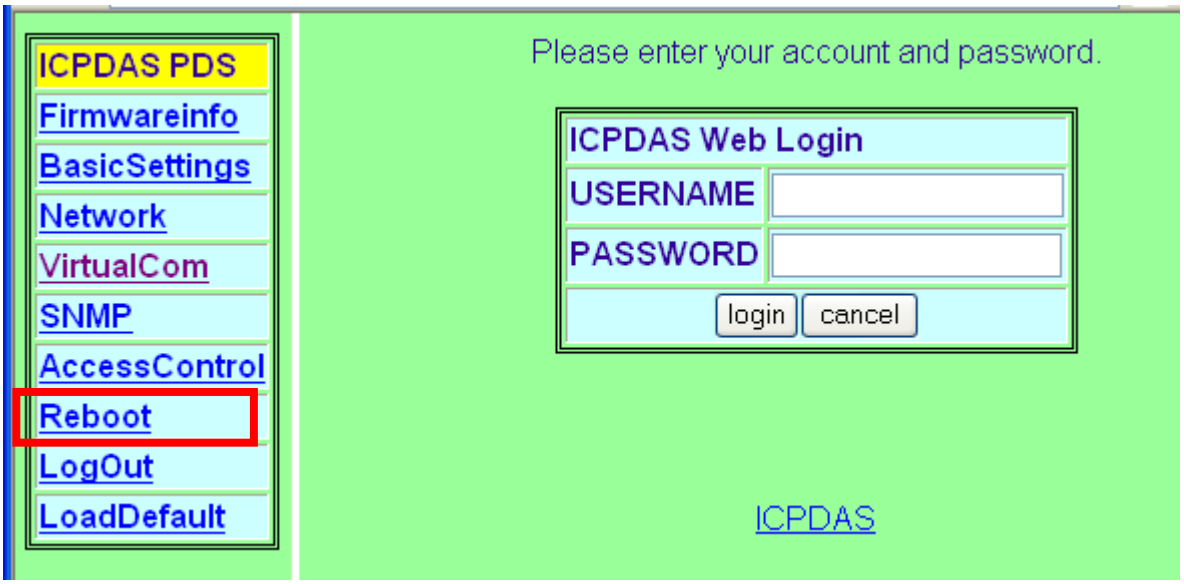
After setting, click the submit button and reboot the PDS. It will take effect after reboot. (You can reference the section 6.6.1)

6.6 Reboot



6.7 Logout

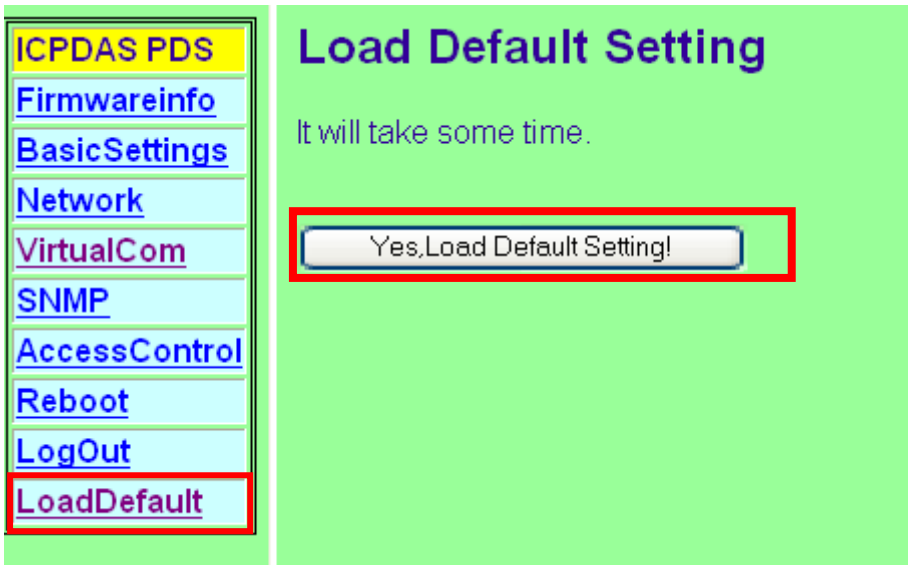
Logout the web management interface.



6.8 Load Default

This function will reset all of PDS's settings to their factory default settings. Be aware that previous settings will be lost.

Click the "Yes, Load Default setting!" button. PDS will reboot automatically

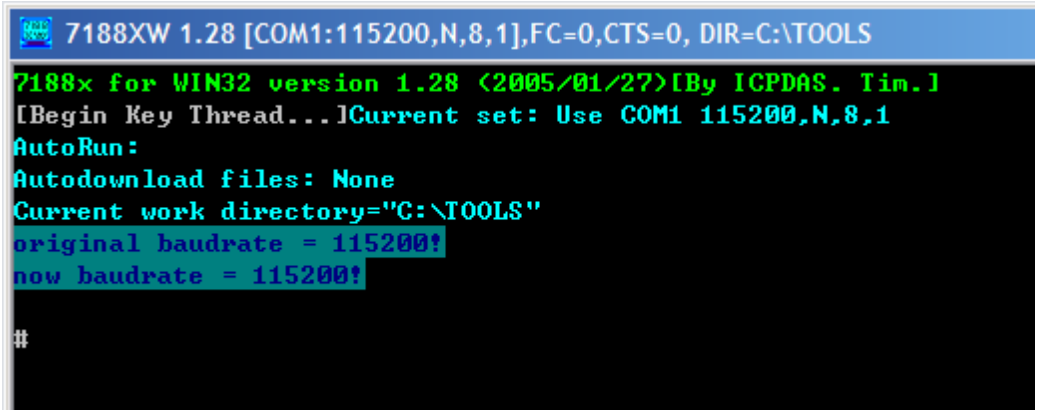


Appendix A: Linking to a Development PC

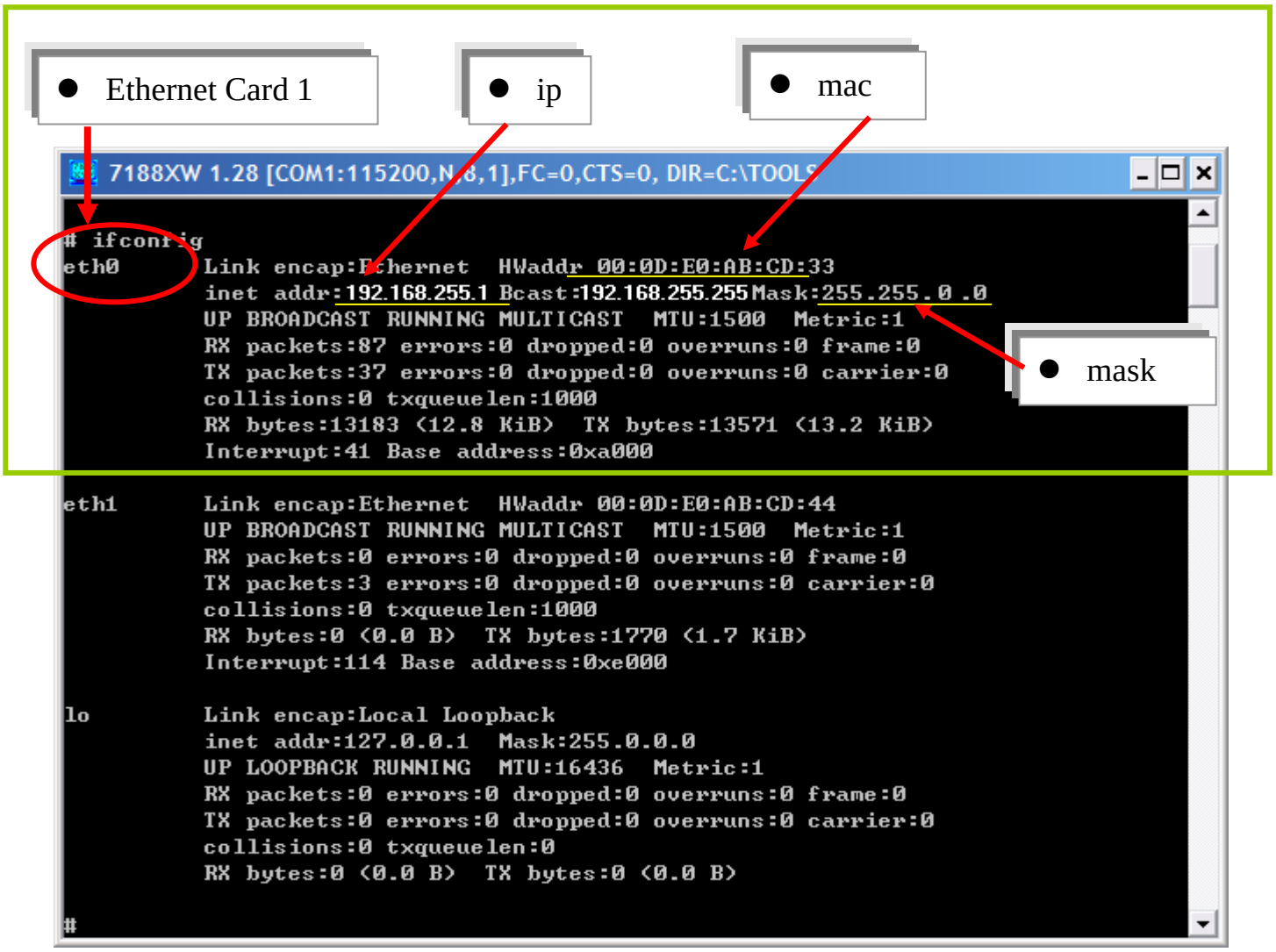
Step 1: **Connect the download-cable, CA-0915, between the PDS-8x2 controller and COM1** of the development PC as per above the diagram.

Step 2: Execute 7188XW.EXE

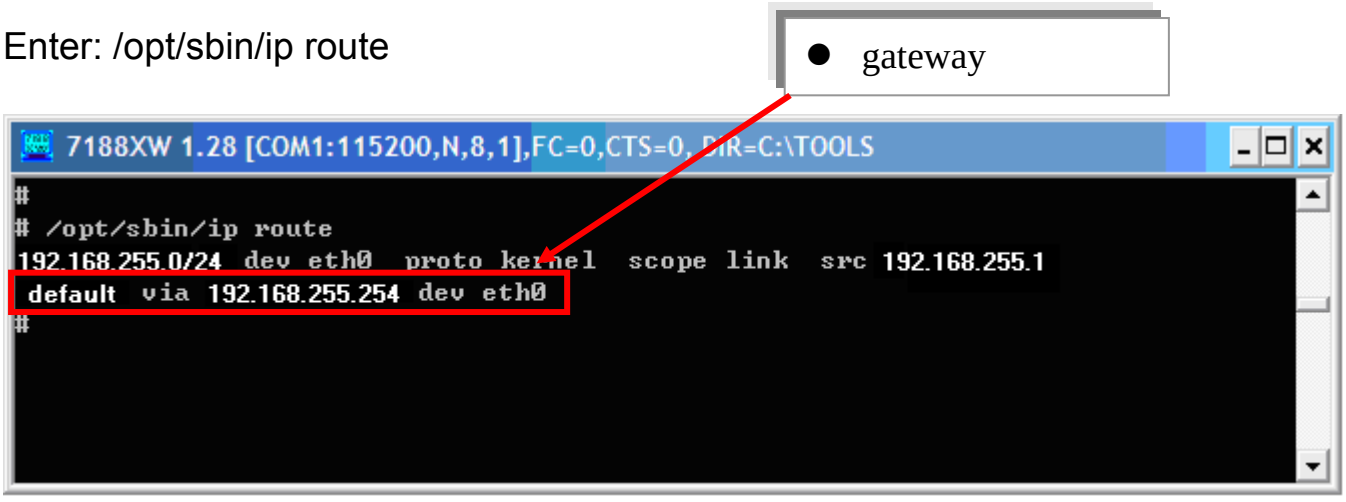
Step 3: Press [Enter] twice on the development PC:



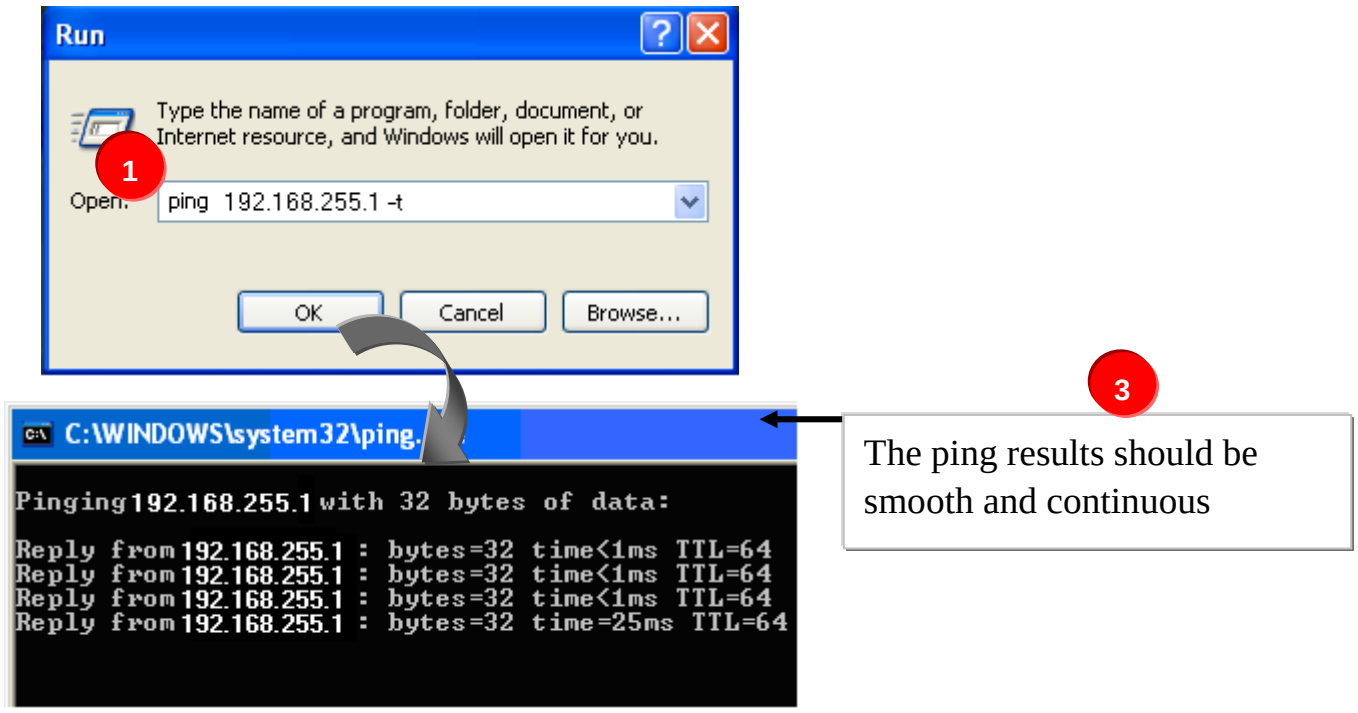
Step 4: Read the configuration of the PDS-8x2 (The following is a default value):
Enter: ifconfig command



Enter: /opt/sbin/ip route



Step 5: Execute ping you IP (*Example:* **ping 10.0.3.39 –t)** using a run command as follows:



Note:

- **192.168.255.1** is the default IP of the PDS-8x2 controller. The IP address can be changed using the instructions in step 4.
- If the PDS-8x2 cannot be successfully pinged from the PC, refer to step 8 to change the configuration of the PDS-8x2 controller. (The mask and gateway addresses of PDS-8x2 controller and the PC should make the network definition.)
- Each PDS-800 MAC address is unique in the default shipping.

In general, if the host PC can ping the PDS-8x2 controller smoothly and continuously, all other software and drivers for the PDS-8x2 controller will operate correctly. Therefore, users should ensure that the development PC is able to ping the PDS-8x2 controller smoothly before any further testing is carried out.

Appendix B: Glossary

1. Ethernet

The term Ethernet generally refers to a standard published in 1982 by Digital Equipment Corp., Intel Corp. and Xerox Corp. Ethernet is the most popular physical layer local area network (LAN) technology today. Ethernet is a best-effort delivery system that uses CSMA/CD technology. It recognizes hosts using 48-bit MAC address.

2. Internet

Physically, the Internet is a collection of packet switching networks interconnected by gateways along with TCP/IP protocol that allows them to perform logically as a single, large and virtual network. The Internet recognizes hosts using 32-bit IP address.

3. TCP/IP

The transmission Control Protocol (TCP) and the Internet Protocol (IP) are the standard network protocols. They are almost always implemented and used together and called TCP/IP. TCP/IP can be used to communicate across any set of interconnected networks.

4. TCP (Transmission Control Protocol)

TCP provides a reliable flow of data between two hosts. It is associated with tasks such as dividing the data passed to it from applications into appropriately sized chunks for the network layer below, acknowledging received packets, setting timeouts to make certain that the other end acknowledges packets that are sent, and so on.

5. UDP (User Datagram Protocol)

UDP provides a much simpler service to the application layer. It just sends packets of data from one host to the other. But there is no guarantee that the packets will reach the destination host.

6. Gateway

Computers that interconnect two networks and pass packets from one to the other are called Internet Gateways or Internet Routers. Gateways route packets that are based on the destination network, not on the destination host.

7. IP (Internet Protocol) address

Every interface on an Internet must have a unique IP address (also called an Internet address). These addresses are 32-bit numbers. They are normally written as four decimal numbers, one for each byte of the address such as "**192.168.41.1"**. This is called dotted-decimal notation.

8. MAC (Media Access Control) address

To allow a computer to determine which packets are meant for it, each computer attached to an Ethernet is assigned a 48-bit integer known as its MAC address (also called an Ethernet address, hardware address or physical address). They are normally written as eight hexadecimal numbers such as "**00:71:88:af:12:3e:0f:01**". Ethernet hardware manufacturers purchase blocks of MAC addresses and assign them in sequence as they manufacture the Ethernet interface hardware. Thus, no two hardware interfaces have the same MAC address.

9. Subnet Mask

Subnet mask is often simply called the mask. Given its own IP address and its subnet mask, a host can determine if a TCP/IP packet is destined for a host that is (1) on its own subnet, or (2) on a different network. If (1), the packet will be delivered directly; otherwise if, will be delivered via gateways or routers.

10. ARP (Address Resolution Protocol)

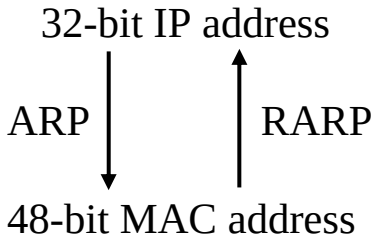
Consider two machines A and B that share a physical network. Each has an assigned IP address IP_A and IP_B, and a MAC address the MAC_A and MAC_B. The goal is to devise low-level software that hides MAC addresses and allows higher-level programs to work only with the IP addresses. Ultimately, however, communication must be carried out by the physical networks using whatever MAC address scheme the hardware supplies.

Suppose machine A wants to send a packet to machine B across a physical network to which they are both attached, but A only has the Internet address for B, IP_B. The question arises: how does A map that address to the MAC address for B, MAC_B?

ARP provides a method of dynamically mapping 32-bit IP address to the corresponding 48-bit MAC address. The term dynamic is used since it happens automatically and is normally not a concern for either the application user or the system administrator.

11. RARP (Reverse Address Resolution Protocol)

RARP provides a method of dynamically mapping 48-bit MAC address to the corresponding 32-bit IP address.



12. ICMP (Internet Control Messages Protocol)

No system works correctly all the time. ICMP provides a method of communicating between the Internet Protocol software on one machine and the Internet Protocol software on another. It allows gateways to send error or control messages to other gateways or allows a host to know what is wrong with the network communication.

13. Ping

Ping sends an ICMP echo request message to a host, expecting an ICMP echo reply to be returned. Normally, if a host cannot be pinged, you won't be able to use Telnet or FTP to connect to the host. Conversely, if Telnet or FTP cannot be used to connect to a host, Ping is often the starting point to determine what the problem is.

14. Packet

A packet is the unit of data sent across a physical network. It consists of a series of bits containing data and control information, including the source and the destination node (host) address, and is formatted for transmission from one node to another.

15. Socket

Each TCP segment contains the source and destination port number that can be used to identify the sending and receiving application. These two values, along with the source and destination IP address in the IP header, uniquely identify each connection.

The combination of an IP address and a port number is called a socket.

16. Clients and Servers

The client-server paradigm uses the direction of initiation to categorize whether a program is a client or server. In general, an application program that initiates peer to peer communication is called a client. End users usually invoke client programs when they use network services.

Most client programs consist of conventional application program develop tools. Each time a client program is executed; it contacts a server, sends a request and waits for a response. When the response arrives, the client program continues processing. Client programs are often easier to develop than servers, and usually require no special system privileges to operate.

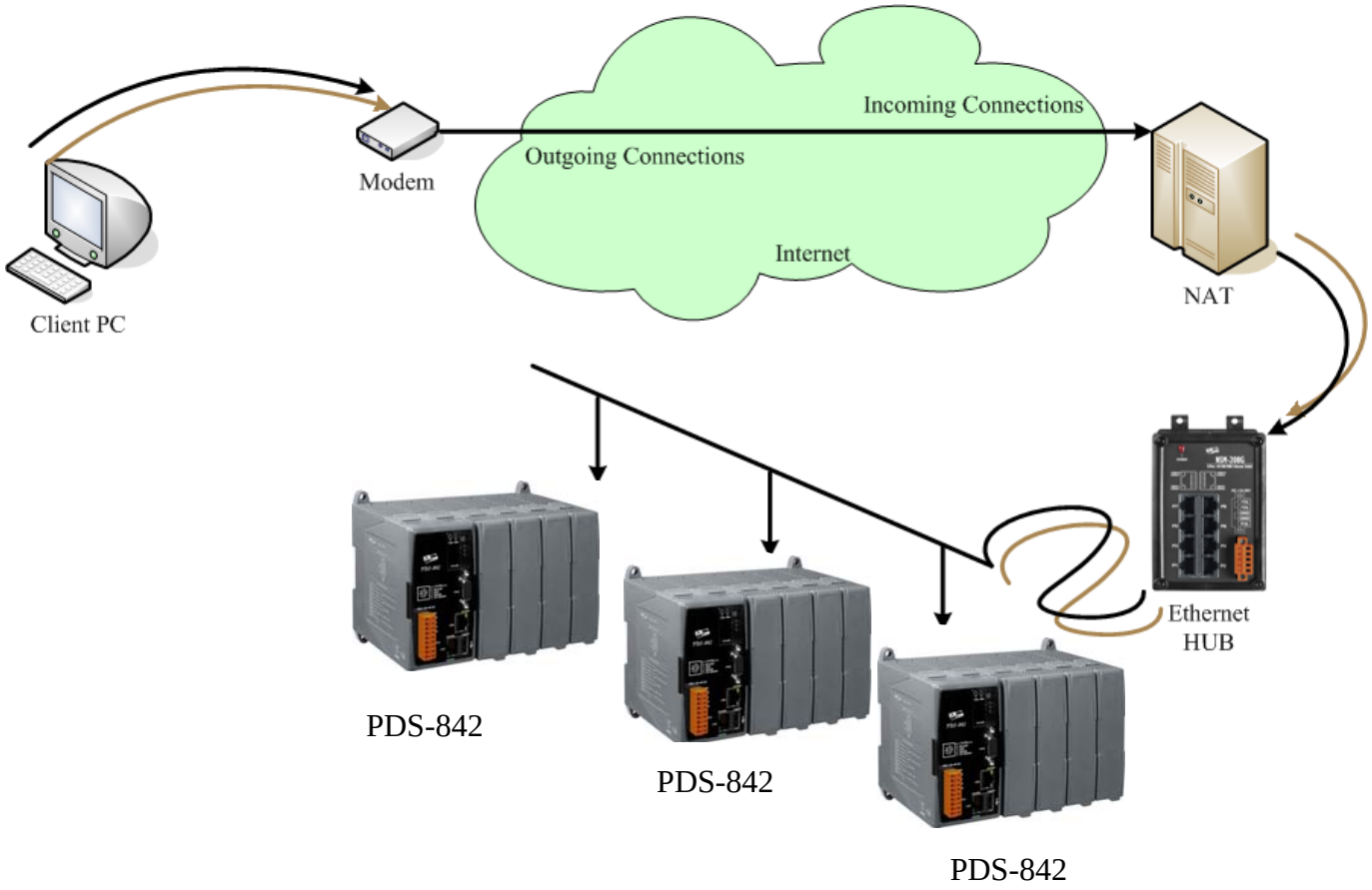
By comparison, a server is any program that waits for incoming requests from a client program. The server receives a request from a client, performs the necessary computation and returns the result to the client.

17. Firmware

Firmware is an alterable program located or stored in the semi-permanent storage area, e.g., ROM, EEPROM, or Flash memory.

FAQ

1. How to access the remote PDS-8x2 that placed behind an NAT or firewall?



The remote site must have a NAT (or a router supports NAT) server. NAT stands for Network Address Translator.

By using (configuring) the NAT server, NAT can forward (bypass) all specified TCP port connection to specified PDS-8x2 devices.
For example:

- *PDS-800 #1 with 4-Port serial module * 2 pcs*

  TCP ports **10000~10001** of NAT maps to **Command and COM1** of PDS-800 #1
  TCP ports **10010~10017** of NAT maps to **COM1 ~ COM8** of serial modules on PDS-800 #1

- *PDS-800 #2 with 4-Port serial module * 2 pcs*

  TCP ports **10020~10021** of NAT maps to **Command and COM1** of PDS-800 #2
  TCP ports **10030~10037** of NAT maps to **COM1 ~ COM8** of serial modules on PDS-800 #2

Please note, if your NAT (router) built-in a firewall feature, you have to configure the NAT to allow incoming TCP port connections.
For example:

PDS-800 #1:
TCP port includes 10000 ~ 10001 and 10010 ~ 10017 of NAT

PDS-800 #2:
TCP port includes 10020 ~ 10021 and 10030 ~ 10037 of NAT

In the VxComm Utility, you have to connect to the PDS-800 by using NAT's address and NAT's TCP ports instead of PDS-800's setting.
For example:

To add PDS-800 #1, it's IP: Port should be NAT: 10000.
To add PDS-800 #2, it's IP: Port should be NAT: 10020.

2. How to open a virtual COM port that larger than "COM 10" by calling CreateFile() Win32 API?

If you want to open "COM 11", the correct way to call the CreateFile() is as follows:

```
CreateFile(
    "\\\\. \\COM11",    // address of name of the communications device
    fdwAccess,          // access (read-write) mode
    0,                  // share mode
    NULL,               // address of security descriptor
    OPEN_EXISTING,      // how to create
    0,                  // file attributes
    NULL                // handle of file with attributes to copy
    );
```

Notes:

1. This syntax also works for ports COM 1 through COM 10. See more... MS Q115831.
2. Maximum COM port number for VxComm Driver is COM 256.
3. Valid COM port number for MSCOMM.OCX is between 1 to 16. Please refer to MSComm.CommPort.
4. The "\\.\" prefix must be add to the COM port name (device name) when it is larger than "COM 10". But please note that the "\" character is a special escape symbol in C\C++ language, thus you have to use "\\\\.\\" prefix in C\C++ language.

3. Does VxComm Driver (PC) support auto-reconnection after fixing a network break?

Yes, the VxComm Driver (PC) supports the auto-reconnection mechanism in version 2.00 and above. The VxComm Utility allows the user to set the Keep-Alive Time (ms) and Connection-Broken Time (ms) in the server options.

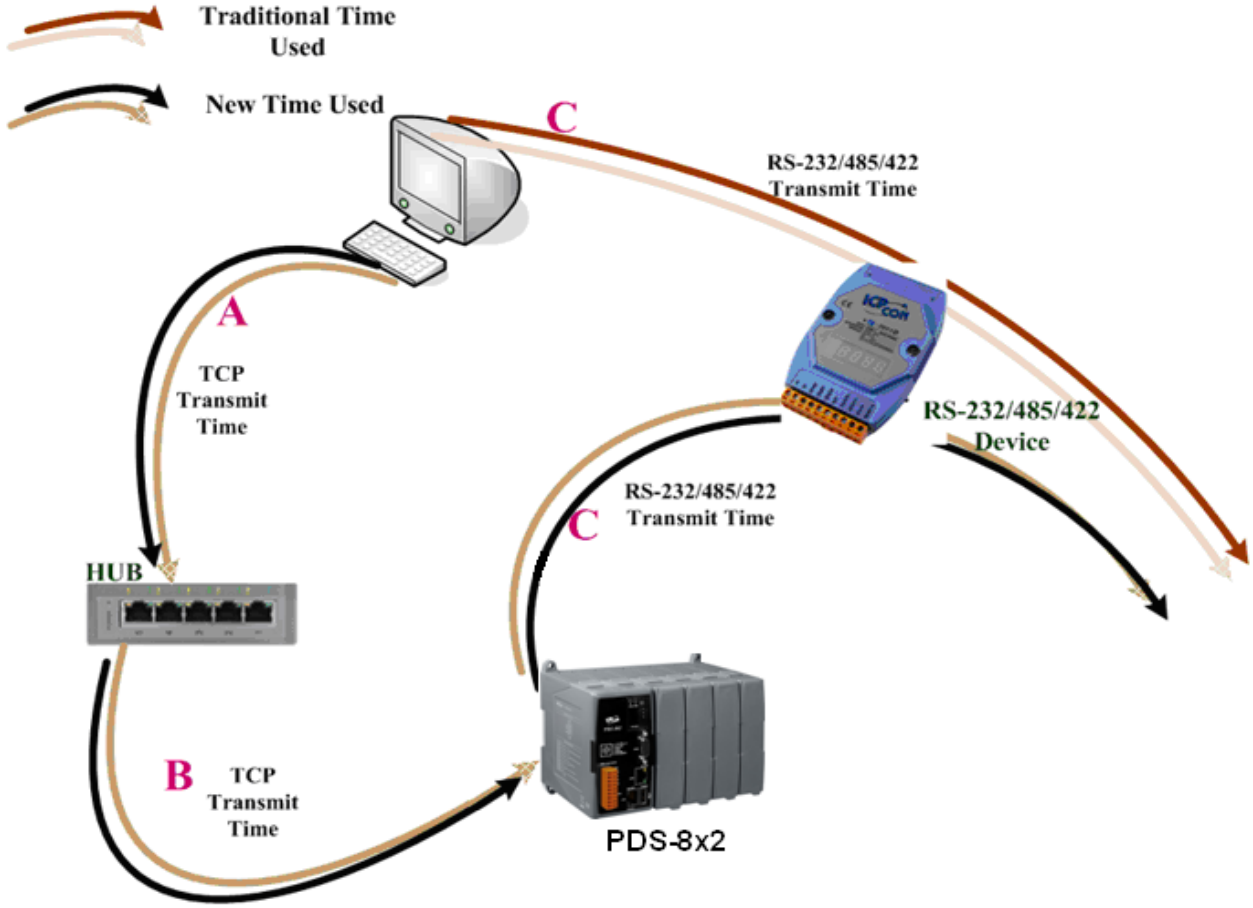
For more details, refer to the "Adding a 7188E/8000E/PDS-700/DS-700/PDS-800 server and configuring the VxComm Driver" section of the VxComm Driver/Utility User Manual.

4. Why doesn't the VxComm Driver (PC) receive data from the PDS-8x2 module?

In Other reasons causing the problem may be: incorrect wiring, power supply problems IP conflicts, MAC conflicts, an incorrect subnet mask or an invalid IP address. For more details, refer to the "Diagnostics and Troubleshooting" section of the VxComm Driver/Utility User Manual.

5. Does the transmission speed become faster when the serial device working with Serial to Ethernet device servers?

The speed depends on the applications. For transparent applications, it includes Ethernet latency in transmission and may get slower. But you can improve the communication speed by increasing the baud rate since you placing the device server more close to serial device and reduce the communication distance. The higher baud rate should be able to be used in short cable (distance) without communication problem.



Traditional time used	RS-232/485/422 transmit time (C)
New time used	Internet/Ethernet transmit time + RS-232/485/422 transmit time (A+B+C)

(All TCP packets need an extra ACK packet to commit the transmit action. This also causes a little additional delay in communication).

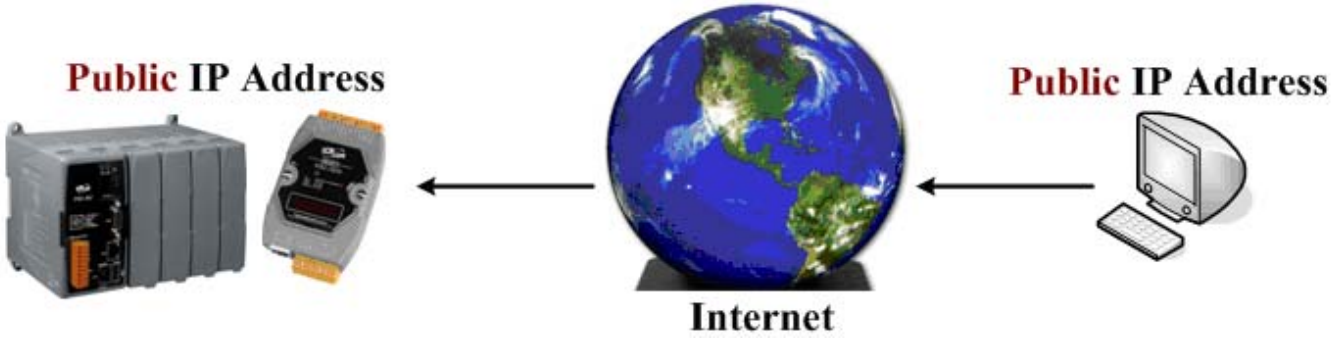
6. Why does the PDS-8x2 module fail on a (public) Internet connection?

The default IP address (LAN1) of the PDS-8x2 module is 192.168.255.1, which can be only used on a private Internet connection. A private network packet will not be routed via a (public) Internet connection, which is the reason why the PDS-8x2 module failed on the Internet.

The IANA has reserved three address spaces for private internets (RFC 1918).

10.0.0.0 - 10.255.255.255 (10/8 prefix)
172.16.0.0 - 172.31.255.255 (172.16/12 prefix)
192.168.0.0 - 192.168.255.255 (192.168/16 prefix)

The 7188E/8000E/PDS-700/DS-700/PDS-800 module can operate on the Internet using a legal public IP address. This address can be obtained from your ISP or network administrator.



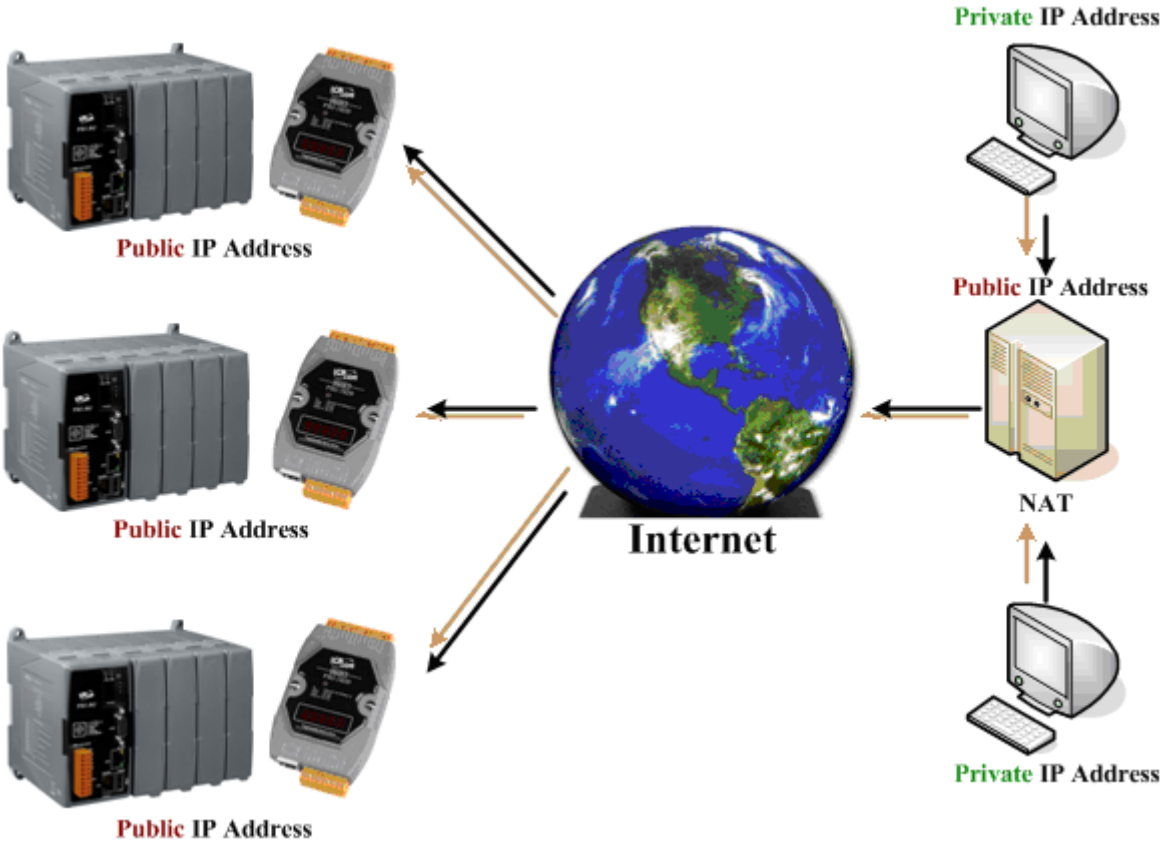
Note:

IANA: Internet Assigned Numbers Authority

RFC: Request for Comments

ISP: Internet Service Providers

A private internet client may communicate with a public Internet server (7188E/8000E/PDS-700/DS-700/PDS-800 modules) only if the NAT service for the client is available.



Note:

NAT: Network Address Translator

7. Can I use the SetCommState ( ) API to changes the Baud Rate/data format settings of a virtual COM port?

Yes. In a Win32 environment, the CreateFile( ) API should be called to open the COM Port(s) and then the SetCommState( ) API can be used to configure the settings.

Third-party tools may provide an OpenCom( ) function for accessing a COM port. In actuality, the CreateFile( ) and SetCommState( ) APIs must be used to implement these kinds of functions.

8. Can I search or connect to PDS-8x2 when my PC's IP address is not in the IP filter list of PDS-8x2? How can I solve it?

A. No, you cannot search or connect to PDS-8x2 when the PC's IP address is not in the IP filter list of PDS-8x2. You can solve the problem by:

1. Add your PC's IP address into the IP filter table of PDS-8x2 by using web configuration access control in section 7.4.1.
2. Or change your PC's IP address to one of the IP addresses listed in IP filter table.
3. Or disable the IP filter function of the PDS-8x2 by using console command. Refer to section 6.4
4. Or clear all configurations setting on PDS-8x2 by using "load default" function section 6.9. It also clears the IP filter table, password, alias... setting. You have to reboot the PDS-8x2 for loading new configuration.