

How to establish a PPP connection between NPort 6000 servers

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In this Technical Note, we cover the following topics:

1. Introduction to PPP operation on the NPort 6000
2. System overview
3. Configuring network
4. Configuring the NPort 6150 device port
5. Configuring the NPort 6450 device port
6. Testing the system
7. Q&A

1. Introduction to PPP operation on the NPort 6000

1.1 What is PPP (Point to Point Protocol)?

PPP is the Internet standard for transmission of IP packets over serial lines. It supports data transfer over async and sync lines and can be used to establish a bridge between serial and Ethernet interfaces. The proliferation of serial links, especially for dial-up Internet access, has led to widespread use of PPP. It is now one of the most popular layer two WAN technologies in the networking world, and has replaced SLIP as the standard for serial connections on all but legacy implementations.

Typical applications for PPP connections involve establishing modem access to Internet servers, or remote dial-up access to an office or industrial LAN, although many other applications are possible.

1.2 What are the benefits of using PPP with the NPort 6000?

The NPort 6000 supports PPP operation to provide dial-in/dial-out access for ISPs and enterprises that need a remote access solution. When a remote user uses a PPP dial-up connection to access the NPort 6000, the NPort 6000 not only acts as a dial-up server, but can also verify that the user has legal access to the network

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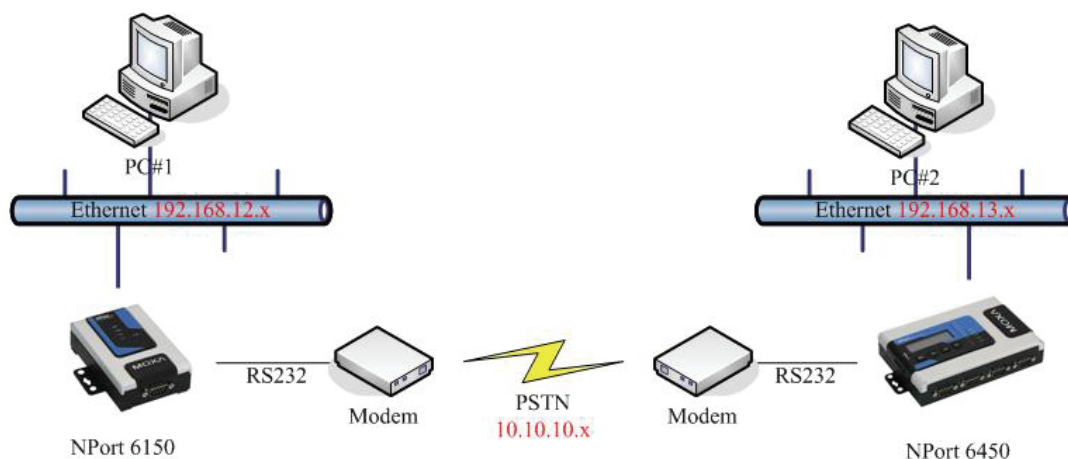


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by referring to a built-in user table or a RADIUS server.

2. System overview

A basic PPP connection involves a modem exchanging network packets with another modem, with each modem connected to a host PC. The diagram below shows this architecture using NPort 6000 servers:



In this paper, we will explain how to configure the two PCs and two NPorts for this architecture. This may be used as a starting reference point for other similar systems.

3. Configuring network

3.1 Ideally, each network segment should be assigned its own series of IP addresses. For this example, 192.168.12.x is used for the segment containing PC#1 and the NPort 6150, 10.10.10.x is used for the PPP connection, and 192.168.13.x is used for the segment containing PC#2 and the NPort 6450.

3.2 PC#1

IP Address	192.168.12.7
Netmask	255.255.255.0
Gateway	192.168.12.170 (NPort 6150)

3.3 NPort 6150 (see figure)

IP Configuration	Static
IP Address	192.168.12.170
Netmask	255.255.255.0
Gateway	N/A

```

c:\ Telnet 192.168.12.170
NP6150      NP6150_123  1.0.5  <Nov 15 2006 - 11:36:36>
-----
[Basic] Advanced Quit
Examine/modify basic network settings
ESC: back to menu  Enter: select

IP configuration      [Static ]
IP address            [192.168.12.170 ]
Netmask               [255.255.255.0 ]
Gateway              [          ]
DNS server 1         [          ]
DNS server 2         [          ]
PPPoE user account   [          ]
PPPoE password       [          ]
WINS function        [Enable ]
WINS server          [          ]
LAN speed            [Auto   ]

```

3.4 PC#2

IP Address	192.168.13.151
Netmask	255.255.255.0
Gateway	192.168.13.160 (NPort 6450)

3.5 NPort 6450 (see figure)

IP Configuration	Static
IP Address	192.168.13.160
Netmask	255.255.255.0
Gateway	N/A

```

c:\ Telnet 192.168.13.160
NP6450      NP6450_14  1.0.5  <Nov 15 2006 - 11:36:36>
-----
[Basic] Advanced Quit
Examine/modify basic network settings
ESC: back to menu  Enter: select

IP configuration      [Static ]
IP address            [192.168.13.160 ]
Netmask               [255.255.255.0 ]
Gateway              [          ]
DNS server 1         [          ]
DNS server 2         [          ]
PPPoE user account   [          ]
PPPoE password       [          ]
WINS function        [Enable ]
WINS server          [          ]
LAN1 speed           [Auto   ]

```

4. Configuring the NPort 6150 device port

4.1 Source and Destination IP

(under Port→Mode→Dial in/out)

Port	01
Application	Dial in/out
Mode	PPP

Description/more settings	Point-to-Point Protocol
Destination IP address	10.10.10.2
Source IP address	10.10.10.1
IP netmask	255.255.255.0
Incoming PAP check	None
Disconnect by	DCD-off

```

c> Telnet 192.168.12.170
NP6150      NP6150_123  1.0.5  <Nov 15 2006 - 11:36:36>
-----
[Modes] Line Port_alias pOrt_buf moDem Welcome_msg Quit
Examine/modify the operation mode of ports
-----
ESC: back to menu  Enter: select
-----
Port+-----+more settings
01: Destination IP address : [10.10.10.2 ] :int Protocol
   : Source IP address     : [10.10.10.1 ] :
   : IP netmask             : [255.255.255.0 ] :
   : TCP/IP compression    : [No ] :
   : Inactivity time (ms)  : [0 ] :
   : Link quality report   : [No ] :
   : Outgoing PAP ID       : [ ] :
   : PAP password          : [ ] :
   : Incoming PAP check    : [None ] :
   : Disconnect by         : [DCD-off] :
+-----+

```

4.2 Serial Parameters

(under Port→Line→Interface)

Port	01
Baud Rate	115200
Data	8
Stop	1
Parity	None
Flow Ctrl	RTS/CTS
FIFO	Enable
Interface	RS-232

```

c# Telnet 192.168.12.170
NP6150      NP6150_123  1.0.5  <Nov 15 2006 - 11:36:36>
-----
Modes [Line] Port_alias  pOrt_buf  moDem  Welcome_msg  Quit
Examine/modify port configuration

ESC: back to menu  Enter: select

Port  Baud Rate  Data Stop  Parity  Flow Ctrl  FIFO  Interface
01   [115200] [      ] [8]  [1  ] [None ] [RTS/CTS ] [Enable ] [RS-232 ]

```

4.3 AT Command and phone number

(under Port→Line→moDem)

Port	01
Enable	Yes
Initial string	ATS0=1
Dial up	ATD
Phone number	111

*ATS0=1 means Auto Answer

```

c# Telnet 192.168.12.170
NP6150      NP6150_123  1.0.5  <Nov 15 2006 - 11:36:36>
-----
Modes Line  Port_alias  pOrt_buf  [moDem]  Welcome_msg  Quit
Examine/modify modem settings

ESC: back to menu  Enter: select

Port  Enable  Initial string  Dial up  Phone number
01   [Yes]  [ATS0=1        ] [ATD    ] [111     ]

```

4.4 Route Table

(under→System→Misc.→Route)

Entry	01
Gateway	10.10.10.1
Destination	192.168.13.0

Netmask	255.255.255.0
Metric	01
Iface	port01

```

ca Telnet 192.168.12.170
NP6150 NP6150_123 1.0.5 <Nov 15 2006 - 11:36:36>
-----
Ip_filter Sntp Ddns Host [Route] User Auth sVs_log Quit
Examine/modify the routing table
ESC: back to menu Enter: select

Entry Gateway Destination Netmask Metric Iface
01 [10.10.10.1 ] [192.168.13.0 ] [255.255.255.0 ] [01] [port01]
02 [ ] [ ] [ ] [ ] [ ] [ ]
03 [ ] [ ] [ ] [ ] [ ] [ ]
04 [ ] [ ] [ ] [ ] [ ] [ ]
05 [ ] [ ] [ ] [ ] [ ] [ ]
06 [ ] [ ] [ ] [ ] [ ] [ ]
07 [ ] [ ] [ ] [ ] [ ] [ ]
08 [ ] [ ] [ ] [ ] [ ] [ ]
09 [ ] [ ] [ ] [ ] [ ] [ ]
10 [ ] [ ] [ ] [ ] [ ] [ ]
11 [ ] [ ] [ ] [ ] [ ] [ ]
12 [ ] [ ] [ ] [ ] [ ] [ ]
13 [ ] [ ] [ ] [ ] [ ] [ ]
14 [ ] [ ] [ ] [ ] [ ] [ ]
15 [ ] [ ] [ ] [ ] [ ] [ ]
16 [ ] [ ] [ ] [ ] [ ] [ ]

```

5. Configuring the NPort 6450 device port

5.1 Source and Destination IP

(under Port→Mode→Dial in/out)

Port	01
Application	Dial in/out
Mode	PPP
Description/more settings	Point-to-Point Protocol
Destination IP address	10.10.10.1
Source IP address	10.10.10.2
IP netmask	255.255.255.0
Incoming PAP check	None
Disconnect by	DCD-off

* If the port is only used for in-coming PPP connections, you can set the mode to PPPD

```

c:\ Telnet 192.168.13.160
NP6450      NP6450_14  1.0.5  <Nov 15 2006 - 11:36:36>
-----
[Modes] Line  Port_alias  pOrt_buf  moDem  Welcome_msg  Quit
Examine/modify the operation mode of ports
-----
ESC: back to menu  Enter: select
-----
Port+-----+more settings
01: Destination IP address  : [10.10.10.1  ] int Protocol
02: Source IP address      : [10.10.10.2  ] int Protocol
03: IP netmask             : [255.255.255.0] int Protocol
04: TCP/IP compression    : [No  ]       int Protocol
   : Inactivity time (ms)  : [0  ]
   : Link quality report   : [No  ]
   : Outgoing PAP ID       : [  ]
   : PAP password          : [  ]
   : Incoming PAP check    : [None ]
   : Disconnect by        : [DCD-off]
+-----+

```

5.2 Serial Parameters

(under Port→Line→Interface)

Port	01
Baud Rate	115200
Data	8
Stop	1
Parity	None
Flow Ctrl	RTS/CTS
FIFO	Enable
Interface	RS-232

```

c:\ Telnet 192.168.13.160
NP6450      NP6450_14  1.0.5  <Nov 15 2006 - 11:36:36>
-----
Modes [Line] Port_alias  pOrt_buf  moDem  Welcome_msg  Quit
Examine/modify port configuration
-----
ESC: back to menu  Enter: select
-----
Port  Baud Rate  Data Stop  Parity  Flow Ctrl  FIFO  Interface
01  [115200]  [  ] [8] [1] [None] [RTS/CTS] [Enable] [RS-232]
02  [115200]  [  ] [8] [1] [None] [RTS/CTS] [Enable] [RS-232]
03  [115200]  [  ] [8] [1] [None] [RTS/CTS] [Enable] [RS-232]
04  [115200]  [  ] [8] [1] [None] [RTS/CTS] [Enable] [RS-232]

```

5.3 AT Command and phone number

(under Port→Line→moDem)

Port	01
Enable	Yes
Initial string	ATS0=1
Dial up	ATD
Phone number	222

*ATS0=1 means Auto Answer

```

c# Telnet 192.168.13.160
NP6450 NP6450_14 1.0.5 <Nov 15 2006 - 11:36:36>
-----
Modes Line Port_alias pOrt_buf [moDem] Welcome_msg Quit
Examine/modify modem settings
ESC: back to menu Enter: select
Port Enable Initial string Dial up Phone number
01 [Yes] [ATS0=1] [ATD] [222]
02 [No] [AT] [ATD] [ ]
03 [No] [AT] [ATD] [ ]
04 [No] [AT] [ATD] [ ]

```

5.4 Route Table

(under→System→Misc.→Route)

Entry	01
Gateway	10.10.10.2
Destination	192.168.12.0
Netmask	255.255.255.0
Metric	01
Iface	port01

```

c# Telnet 192.168.13.160
NP6450 NP6450_14 1.0.5 <Nov 15 2006 - 11:36:36>
-----
Ip_filter Snmp Ddns Host [Route] User Auth sYs_log Quit
Examine/modify the routing table
ESC: back to menu Enter: select
Entry Gateway Destination Netmask Metric Iface
01 [10.10.10.2] [192.168.12.0] [255.255.255.0] [01] [port01]
02 [ ] [ ] [ ] [ ] [ ] [lan]
03 [ ] [ ] [ ] [ ] [ ] [lan]
04 [ ] [ ] [ ] [ ] [ ] [lan]
05 [ ] [ ] [ ] [ ] [ ] [lan]
06 [ ] [ ] [ ] [ ] [ ] [lan]
07 [ ] [ ] [ ] [ ] [ ] [lan]
08 [ ] [ ] [ ] [ ] [ ] [lan]
09 [ ] [ ] [ ] [ ] [ ] [lan]
10 [ ] [ ] [ ] [ ] [ ] [lan]
11 [ ] [ ] [ ] [ ] [ ] [lan]
12 [ ] [ ] [ ] [ ] [ ] [lan]
13 [ ] [ ] [ ] [ ] [ ] [lan]
14 [ ] [ ] [ ] [ ] [ ] [lan]
15 [ ] [ ] [ ] [ ] [ ] [lan]

```

6. Testing the system

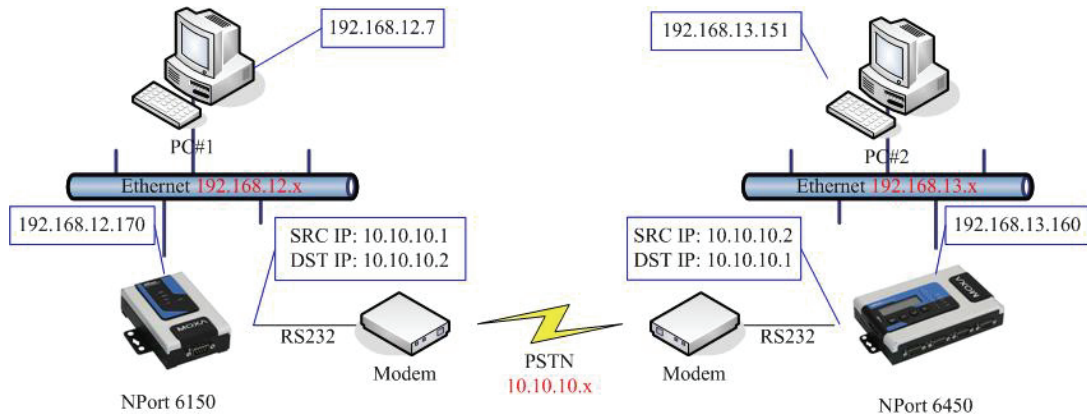
After configuration is completed, you can verify the settings by using PC#1 to ping PC#2 or the NPort 6450. The NPort 6150 will automatically use the attached modem to dial out to the remote PC. Each NPort's front panel should indicate that the device port is in use – this may also be verified by checking the line status in each NPort's web or Telnet console. This is an indication that the PPP connection has been established. You may also verify the connection by separately pinging each node from PC#1.

- 1) ping 192.168.12.170 (NPort 6150)
- 2) ping 10.10.10.1 (Port1's Source IP)
- 3) ping 10.10.10.2 (Port1's Destination IP)

4) ping 192.168.13.160 (NPort 6450)

5) ping 192.168.13.151 (PC#2)

You may also directly access the NPort 6450 or resources on PC#2 to verify that there are no problems at any stage of communication.



* PC#1 will not be able to obtain a response from 10.10.10.x until the PPP connection is established.

7. Q&A

7.1 Q: Can I use PPP with the NPort for remote communication between two PLCs?

A: Yes. Two NPorts can be used to establish a PPP connection between two PLCs with unique IP addresses on the same subnet. This is an effective way to extend communication over long distances, and is essentially the same architecture for a PPP connection between PC#1 and PC#2. As soon as Ethernet packets are routed from one PLC to another, the corresponding NPort will automatically dial out to the other NPort and establish the PPP connection.

7.2 Q: Can a PPP connection be established using a null modem cable instead of using modems?

A: Yes. In fact, it is easier to establish a PPP connection with a null modem cable rather than with modems. When the configuration is complete and the null modem cable is attached, the PPP connection should function as normal.

7.3 Q: My PC already has a default gateway. If I am unable to configure the NPort as the PC's gateway, what should I do?

A: In this kind of network environment, you should try adding a routing table entry on your PC. This is done at the command line as follows:

```
route ADD 192.168.13.0 MASK 255.255.255.0 192.168.12.170 METRIC 3 IF 2
```

In this example, 192.168.13.0 is the destination, 255.255.255.0 is the netmask, and 192.168.12.170 is the gateway.

7.4 Q: Sometimes, I am unable to establish a PPP connection on my PC. What can I do to resolve this?

A: There may be multiple NICs (network interface cards) installed on your PC, which can cause conflicts with your routing. Try disabling WLAN or Dual LAN and see if that resolves the problem.

- 7.5 Q: I would like to establish a PPP connection between two NPort 6000 servers using just RS422 or RS485 cable and no modems. Is this possible?

A: Yes. A PPP connection can be established between two NPort 6000 servers using just RS422 or RS485 cable and no modems. However, this is not possible with 2-wire RS485 half-duplex operation. When configuring for this kind of PPP connection, make sure that for each device port, "Disconnect by" is set to DRS-off or none, and the interface is set to either RS422 or 4-wire RS485. You may ignore all modem settings.

- 7.6 Q: Can MOXA's CN2516, CN2510 or CN2610 async servers also be used in PPP connections with the NPort 6000?

A: Yes. MOXA's CN2516, CN2510 and CN2610 async servers all support Dial in/out applications and should be able to establish PPP connection with no problem.

- 7.7 Q: The latest firmware for the NPort 5600 server supports PPP mode. Is PPP operation on the NPort 5600 exactly the same as on the NPort 6000?

A: No. Although the NPort 5600 supports PPP mode in the latest firmware version, it can only be used for dial-in applications. Also, the NPort 5600 (including the NPort 5610 and 5650) does not include a routing table, which is important in allowing remote PCs gain access to Ethernet resources.