

# *NPort Family*

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## **Software Installation Guide**

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# *NPort* Family

## Software Installation Guide

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# Table of Contents

<b>1. Introduction .....</b>	<b>1-1</b>
NPort Family Features .....	1-1
Product Software Specification Chart .....	1-2
<b>2. Getting Started .....</b>	<b>2-1</b>
IP Address Configuration .....	2-1
Telnet Console .....	2-1
Serial Console (19200, n, 8, 1) .....	2-3
NPort Configurator for Windows .....	2-6
NPort Batch Configurator for Windows (npbc.exe) .....	2-6
NPort Batch Configurator for Linux (npbc.tgz) .....	2-8
<b>3. Installation and Configuration .....</b>	<b>3-1</b>
Server Configuration .....	3-1
Choosing the Proper Operation Mode .....	3-2
Host Based Mode .....	3-3
Single Host Mode .....	3-3
Custom Mode .....	3-4
Pair Connection Mode .....	3-5
Raw Connection Mode .....	3-6
TCP Server .....	3-7
TCP Client .....	3-9
UDP Server/Client .....	3-11
Ethernet Modem Mode (NPort Express ONLY) .....	3-13
Using Ethernet Modem .....	3-14
AT Commands .....	3-15
S Registers .....	3-17
<b>A. Reference Documents .....</b>	<b>A-1</b>



In this chapter, we present the following topics:

- NPort Family Features
- Product Software Specification Chart

## **NPort Family Features**

- Long range connection through the Intranet/Internet between host and serial device
- Easy serial port expansion; up to 128 ports for one Windows 95/98/ME host, and up to 256 ports for one Windows NT/2000/XP host
- Supports MAC-based IP address configuration
- Supports configuration store and copy for easy deployment
- Supports Windows Native COM and Linux Real TTY drivers
- Easy configuration and management
- Secure access control to network hosts
- Free Moxa PComm Lite Serial Control Library for easy serial device programming
- Serial connection speed of up to 230.4 Kbps

# Product Software Specification Chart

Model Operation Mode	NPort Express DE-311	NPort Express DE-211	NPort Express Module DE-311M	NPort Server Lite DE-301, DE-331	NPort Server Lite DE-302, DE-304, DE-332, DE-334	NPort Server Pro DE-308, DE-303
Windows Native COM driver	√	√	√	√	√	√
Linux fixed tty driver	√	√	√	√	√	√
Linux real tty driver	√	√	√	√	√	√
TCP Server	√	√	√	√	√	√
TCP Client	√	√	√	√	√	√
UDP Server/Client	√	√	√	√	√	√
Pair Connection	√	√	√	√		
Ethernet Modem	√	√	√			
Windows Native COM driver supports Windows 95/98/ME and Windows NT/2000/XP.						

In this chapter, we present the following topics:

- ❑ IP Address Configuration
  - Telnet Console
  - Serial Console (19200, n, 8, 1)
  - NPort Configurator for Windows
  - NPort Batch Configurator for Windows (npbc.exe)
  - NPort Batch Configurator for Linux (npbc.tgz)

## IP Address Configuration

NPort Device Servers are configured with the following default private IP address:

**Default IP address:** 192.168.127.254

(IP addresses of the form 192.168.xxx.xxx are referred to as *private IP addresses*, since it is not possible to directly access a device configured with a private IP address from a public network. For example, you would not be able to Ping such a device from an outside Internet connection. NPort Device Server applications that require sending data over a public network, such as the Internet, require setting up the server with a valid public IP address, which can be leased from a local ISP.)


You may use one of the following methods to configure the IP address assigned to your NPort Device Server.

### Telnet Console

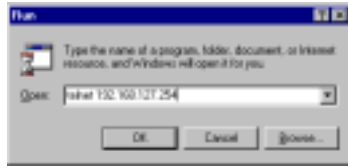
Depending on how your computer and network are configured, you may find it convenient to use network access to set up your NPort Device Server's IP address. This can be done using the Telnet program.



*NOTE: For NPort Express, you must set DIP switch 1 to the OFF position to be able to establish a Telnet connection.*

 *NOTE: NPort Server Lite and NPort Server Pro Device Servers are immediately accessible via Telnet, provided they are properly connected to the LAN.*

1. From the Windows desktop, click on **Start** and then select **Run**.
2. Type `telnet 192.168.127.254` (use the correct IP address if different from the default) in the **Open** text input box, and then click **OK**.



3. When the Telnet window opens, type 1 to select **ansi/vt100** for **Console terminal type**, and then press **Enter**.



4. If prompted for the **Console password**, input the password and then press **Enter**. A connection between your computer and NPort Device Server should now be established, and the MOXA NPort Device Server utility program will automatically start running.
5. To ensure proper operation, click on the **Terminal** menu, choose **Preferences...**, and then make sure **VT100 Arrows** is checked.



6. Use the keyboard arrow keys to highlight **[serverConfig]** as shown below, and then press **Enter**.



- A window showing the various parameters required to configure the NPort Device Server opens up, with configurable parameters enclosed in square brackets.


```

serverconfig] NP_mode Serialport Monitor Ping Restart Exit
Config server settings
[ESC: back to menu Enter: select
Server Model          01-011
Server Name          [NP21113
Serial Number        21113
DHCP                 [Disable ]
Ethernet Status      100 bps
MAC Address          00:09:58:24:10:13
IP Address           [192.168.127.254]
Network              [255.255.255.0 ]
Gateway              [
Password             [


```

- Since our goal in this section is to set the IP address of the server, use the keyboard arrow keys to position the cursor over the first digit of the IP address. Type in the correct IP address and then press **Enter** to accept this value.
- Press **ESC** to return to the main menu, and then **Restart** to activate the change.

## Serial Console (19200, n, 8, 1)

 *NOTE: This section only applies to the NPort Express Series (NPort Server Pro and NPort Server Lite do NOT have console ports.)*

You may use the RS-232 console port to set up the IP address for the NPort Express Family. We suggest using MOXA PComm Terminal Emulator, which is available free of charge as part of the MOXA PComm Lite program suite, to carry out the installation procedure, although other similar utilities may also be used. (Please go to [www.moxa.com](http://www.moxa.com) to download the installation program for PComm Lite.)

 *NOTE: You must set DIP switch 1 to the ON position to be able to establish a console connection.*

- Plug your NPort Express's female serial port directly into your computer's male RS-232 serial port, or use an appropriate converter (refer to the Hardware Installation Guide for details).
- From the Windows desktop click on **Start** → **Programs** → **PComm Lite** → **Terminal Emulator**.

- When the **PCom Terminal Emulator** window opens, first click on the **Port Manager** menu item and select **Open**, or simply click on the **Open** icon.



- The **Property** window opens automatically. From the **Communication Parameter** page, select the appropriate COM port for the connection, **COM1** in this example, and **19200** for **Baud Rate**, **8** for **Data Bits**, **None** for **Parity**, and **1** for **Stop Bits**.



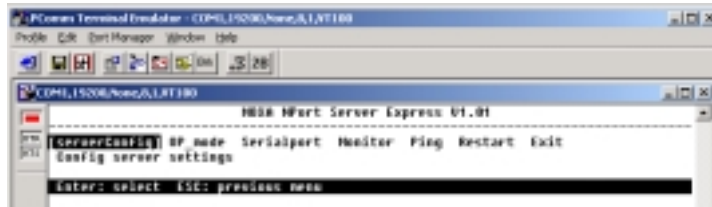
- From the **Property** window's **Terminal** page, select **VT100** for **Terminal Type** and then click **OK**.



6. Choose 1 for ansi/vt100 terminal emulation type, and then press **Enter**.

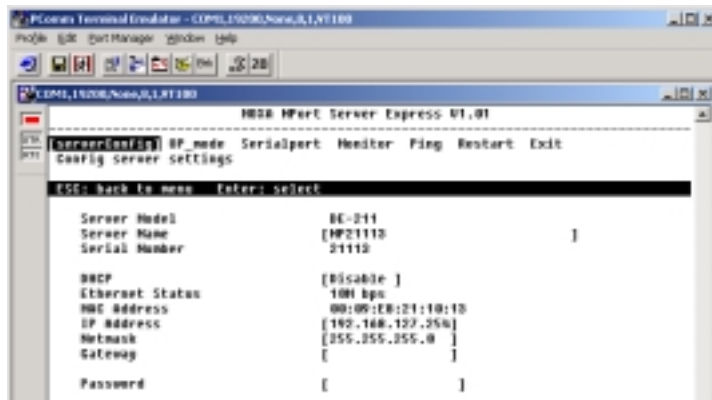


7. Use the keyboard arrow keys to highlight **[serverConfig]**, and then press **Enter** to select this option.



8. A window showing the various parameters required to configure NPort Express opens up, with configurable parameters enclosed in square brackets.

9. Our goal in this section is to set the IP address of NPort Express. Use the keyboard arrow keys to position the cursor over the first digit of the IP address. Type in the correct IP address, press **ESC** to return to the main menu, and then select **Restart** to activate the change.



## NPort Configurator for Windows

NPort Configurator is a comprehensive Windows-based GUI that can be used to conveniently configure and maintain multiple NPort Device Servers. A suite of useful utilities is available to assist you in locating NPort Device Servers attached to the same LAN as the PC host (regardless of whether or not you know the NPort Device Servers' IP addresses), connecting to an NPort Device Server whose IP address is known, modifying one or multiple NPort Device Servers' network and/or serial configurations, and updating the firmware of one or more NPort Device Server. NPort Configurator is designed to provide you with instantaneous control of *all* your NPort Device Servers, regardless of location.

NPort Configurator provides the following useful utilities:

- **Broadcast Search**  
Locate all NPort Device Servers that are connected to the PC host's LAN.
- **Search by IP address**  
Locate a specific NPort Device Server by IP address, even if the NPort Device Server is located outside the PC host's LAN.
- **Upgrade Firmware**  
Keep your NPort Device Server up to date with the latest Moxa firmware.
- **Modify Configuration**  
Easily reconfigure an NPort Device Server's parameter settings, such as IP address, Netmask, Gateway, port settings, password, etc.
- **Export Configuration**  
Export an NPort Device Server configuration to a file on the PC host.
- **Import Configuration**  
Import an NPort Configuration from a file on the PC host to one or more NPort Device Servers.

## NPort Batch Configurator for Windows (npbc.exe)

NPort Batch Configurator for Windows (npbc.exe) is a command line program that can be used to manage multiple NPort Device Servers. By maintaining special "configuration files" (text files that contain all of the configuration settings for an NPort Device Server), administrators can easily modify the configuration of NPort Device Servers connected to the administrator's LAN. In fact, perhaps one of the main benefits to using this utility is that the administrator can simultaneously change the IP addresses of multiple NPort Device Servers which are all connected to the same LAN. And since NPort Batch Configurator runs from the DOS command line, it can be used with legacy applications that do not use any of the Windows operating systems.

NPort Batch Configurator provides the following useful utilities:

- **Modify IP address**  
Modify the IP addresses of multiple NPort Device Servers that are connected to the PC host's LAN.
- **Modify Configuration**  
Modify the entire configuration of multiple NPort Device Servers that are connected to the PC host's LAN.
- **Export Configuration**  
Export the configuration of one NPort Device Server to a file on the PC host.
- **Import Configuration**  
Import multiple (possibly different) configurations to multiple NPort Device Servers that are connected to the PC host's LAN.

One of the main benefits to using NPort Configurator is that you will be able to simultaneously configure/reconfigure any number of NPort Device Servers that are connected to the same LAN. Simply store multiple NPort Device Server configurations in the same text file, and then run the *npbc.exe* program from the DOS command line.



*NOTE: More details about NPort Configurator and NPort Batch Configurator can be found by accessing the NPort Configurator help file.*

*First run the installation program, called *nput.exe*, which is located on the NPort Software CD in a folder of the form:*

**nport\software\winxxx\nportxxx**

*Two files—*Npcfgui.exe* and *npbc.exe*—are extracted into the default folder *c:\Program Files\NPort Utility*. Run the program *npclfui.exe*, and then access the help menu to get detailed information about using NPort Configurator. Run the program *npbc.exe* by typing *npbc* from the DOS command line to display the help file for NPort Batch Configurator.*

## NPort Batch Configurator for Linux (npbc.tgz)

NPort Batch Configurator for Linux (npbc.tgz) is simply a Linux version of the program discussed in the previous section. The functions provided by the Linux version of the program are essentially the same as for the Windows version—please refer to the previous section for details.



*NOTE: To install NPort Batch Configurator for Linux, find the file npbc.tgz, which is located on the NPort Software CD in the following directory:*

**nport\software\linux\i386\npconfig**

*You may also refer to the readme file on the software CD for information about:*

1. IP and MAC address configuration
2. Export Configuration Table
3. Import Configuration to multiple NPort Device Servers.

## Installation and Configuration

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- Server Configuration
- Choosing the Proper Operation Mode
- Host Based Mode
  - Single Host Mode
  - Custom Mode
- Pair Connection Mode
- Raw Connection Mode
  - TCP Server
  - TCP Client
  - UDP Server/Client
- Ethernet Modem Mode (NPort Express ONLY)
  - Using Ethernet Modem
  - AT Commands
  - S Registers

### Server Configuration

The following figure shows the basic parameters that must be set up before you can begin using your NPort Device Server. Refer to the table on the next page for details on the meaning of each parameter.

```

serverconfig> NP_mode Serialpart Monitor Ping Restart Exit
Config server settings
ESC: back to menu Enter: select
Server Model          0E-211
Server Name           [NP2111]
Serial Number         21112
DHCP                  [Disable ]
Ethernet Status       10M bps
MAC Address           88:09:08:21:18:13
IP Address            [192.168.127.254]
Netmask               [255.255.255.0 ]
Gateway              [ ]
Password              [ ]

```

Server Configuration			
Setting	Value	Notes	Necessity
Server Model	DE-xxx	Set at the factory.	---
Server Name	alpha-numeric	This option is particularly useful for specifying the location or application of several different servers.	Optional
Serial Number	alpha-numeric	Set at the factory	---
DHCP	Disable/enable	Selecting the <i>enable</i> option allows a DHCP Server to automatically assign the server's IP address.	Optional
Ethernet Status	---	Indicates the Ethernet connection status	---
MAC Address	48-bit number	The MAC (Media Access Control) address is a unique identifier set at the factory.	---
IP Address	32-bit number, default = 192.168.127.254	The IP (Internet Protocol) address identifies the server on the TCP/IP network.	Required
Netmask	32-bit number, default = 255.255.255.0	Identifies the server as belonging to a Class A, B, or C network.	Required
Gateway	32-bit number	IP address of the router that provides network access outside the server's LAN.	Required
Password	alpha-numeric	Console password	Optional

## Choosing the Proper Operation Mode


In this section, we describe the various NPort Device Server operation modes. The options include operation modes that use a driver installed on the host computer, operation modes that rely on TCP/IP socket programming concepts, and operation modes that typically involve communication between pairs of appropriately configured NPort Device Servers.

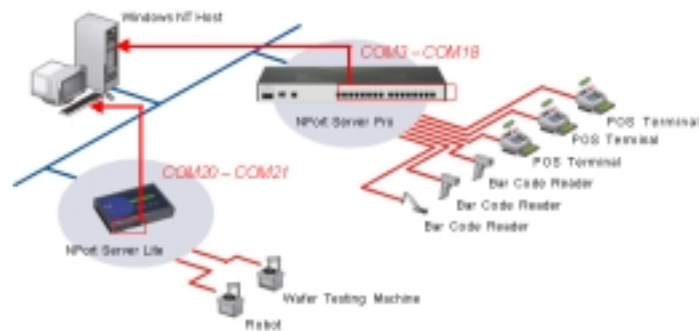
## Host Based Mode

Host Based Mode uses a Moxa supplied driver to establish a *transparent* connection between host and serial device, by creating a virtual local COM port on the host computer for each of the NPort Device Server's serial ports. The important point is that Host Based Mode allows users to continue using RS-232/422/485 serial communications software that was written for pure serial communications applications. The driver intercepts data sent to the host's COM port, packs it into a TCP/IP packet, and then redirects it through the hosts Ethernet card. At the other end of the connection, the NPort Device Server accepts the Ethernet frame, unpacks the TCP/IP packet, and then transparently sends it to the appropriate serial device attached to one of the NPort Device Server's serial ports.

## Single Host Mode

Single Host Mode is a natural extension of the host-to-device setup in which a serial device, such as a card reader, is connected directly to a PC's COM port. That is, one host is given the right to connect to the NPort Device Server's attached serial devices, and data acquisition and control of these devices is limited to this one host.

 **NOTE:** *Single Host Mode restricts access control of the NPort Device Server to only one host. However, any networked host can take control of an NPort Device Server configured for Single Host Mode that is not password protected. Once a second host adds control of the NPort Device Server to its own system, the original host will thereafter be denied access to the NPort Device Server. To avoid this problem, be sure to set up a console password when using Single Host Mode.*




**Fig. 3.1: Host Based Mode—Single Host Mode**

Figure 3.1 illustrates a Host Based Mode topology that consists of one host, a 2-port NPort Server Lite, and a 16-port NPort Server Pro. For this type of setup, the one host is able to control the serial ports of up to 18 different serial devices located at two different sites.

## Custom Mode

Custom Mode allows users to set up more advanced communications topologies between remote hosts and serial devices connected to one or more NPort Device Servers. Using this operation mode, it is possible for several hosts to divide usage of a multiport NPort Device Server's ports, or share the same port belonging to one particular NPort Device Server.

 **NOTE:** Custom Mode allows several hosts to have access control of the same NPort Device Server. The Moxa driver that comes with your NPort Device Server controls host access to attached serial devices by checking a host's IP address.

**Use Moxa's NPort Manager utility to adjust the Access Control Table—you may add access either by port or by server.**

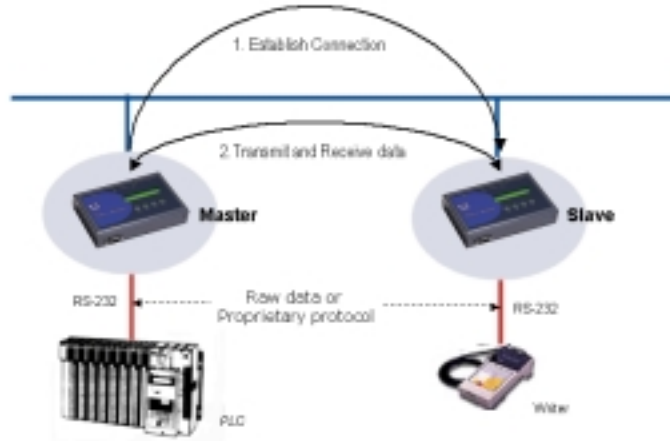


**Fig. 3.2: Host Based Mode—Custom Mode**

Figure 3.2 illustrates a Host Based Mode topology that consists of two hosts which share access to serial devices via one NPort Server Pro. In this case, half of the NPort Device Server's ports are relegated to Host A, and the other half are relegated to Host B.

## Pair Connection Mode

Pair Connection Mode employs two 1-port NPort Device Servers in tandem, and can be used to remove the 15-meter distance limitation imposed by the RS-232 interface. One NPort Device Server is connected from its RS-232 port to the COM port of a PC or other type of computer, such as hand-held PDAs that have a serial port, and the serial device is connected to the RS-232 port of the other NPort Device Server. The two NPort Device Servers are then connected to each other with a cross-over Ethernet cable, both are connected to the same LAN, or in a more advanced setup, they communicate with each other over a WAN (i.e., through one or more routers). Pair Connection Mode transparently transfers both data and modem control signals between the two NPort Device Servers.



**Fig. 3.3: Pair Connection Mode**

Figure 3.3 illustrates a Pair Connection Mode topology that consists of two NPort Device Servers used to provide access to a serial device (in this case, the PLC). This example illustrates that access to the serial device can be provided to non-PC hosts, such as the Writer shown in the figure.

```
-----  
| Remote IP address : [           ] |  
| TCP alive check time: [ 7 ] minutes |  
-----
```

Pair Connection (Master)			
Setting	Value	Notes	Necessity
Remote IP address	valid IP	IP address of another NPort Device Server, configured for Pair Connection (Slave), with which this NPort Device Server can request a connection.	Required
TCP alive check time	0	TCP connection is never closed by this device.	Optional
	1 – 99 min.	TCP connection is automatically closed by this device if there is no TCP activity for the given time.	

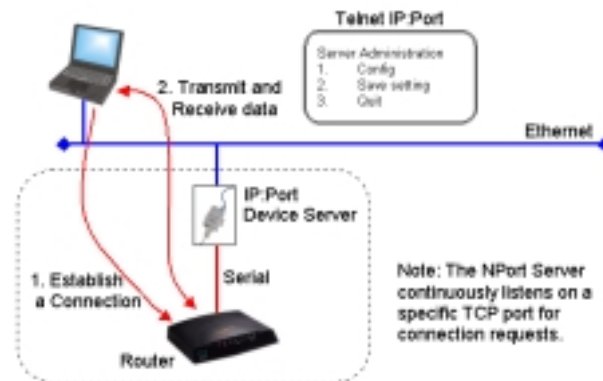
Pair Connection (Slave)			
Setting	Value	Notes	Necessity
Remote IP address	valid IP	Allows contact with only the specified remote IP address.	Optional
	<i>blank</i>	Allows contact with any remote Master.	
TCP alive check time	0	TCP connection is never closed by this device.	Optional
	1 – 99 min.	TCP connection is automatically closed by this device if there is no TCP activity for the given time.	

## Raw Connection Mode

Raw Connection Mode consists of three different operation modes: TCP Server, TCP Client, and UDP Server/Client. Keep in mind that the main differences between TCP and UDP is that TCP guarantees delivery of data by requiring that the recipient sends an acknowledgement to the sender. UDP does not require this type of verification, making it possible to offer speedier delivery. UDP also allows multicasting of data to groups of IP addresses.

## TCP Server

**RAW Connection (TCP Server)** operation mode is designed for use with serial devices that act as servers. That is, they passively wait for other devices to contact them and request that a TCP connection be established between the two devices. It also means that your application software acts as a Client, in that it can actively poll remote serial devices.



**Fig. 3.4: Raw Connection (TCP Server)**

Note that leaving the **Destination IP address** option blank allows any remote networked device to request a connection. Inputting one IP address for this option means that only a remote device with that IP address is allowed to establish a TCP connection. Also note that the **Delimiter 1**, **Delimiter 2**, and **Force transmit** options are used to activate the optional Data Packing function.

```
-----  
| TCP port      : [4001 ]  
| Destination IP addr : [          ]  
| Delimiter 1 (Hex) : [  ]  
| Delimiter 2 (Hex) : [  ]  
| Force transmit (ms) : [          ]  
| Inactivity time : [          ] ms(0-65535)  
| TCP alive check time: [7 ] minutes  
-----
```

RAW Connection (TCP Server)			
Setting	Value	Notes	Necessity
TCP port	valid port number	The TCP port that other devices must use to contact this device. To avoid conflicts with standard TCP ports, the default is set to 4001.	Required
Destination IP addr	valid IP	Allows contact with only the specified remote IP address.	Optional
	<i>blank</i>	Allows contact with any remote networked device.	
Delimiter 1 (Hex)	ASCII code for the 1 <sup>st</sup> delimiter	Once the NPort Device Server receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it out the NPort Device Server's Ethernet port. <i>Note: Delimiter 2 is optional. If left blank, then Delimiter 1 alone trips clearing of the buffer. *</i>	Optional
Delimiter 2 (Hex)	ASCII code for the 2 <sup>nd</sup> delimiter		Optional
Force transmit (ms)	<i>blank</i> (or 0)	Disabled.	Optional
	1 – 65535	Forces the NPort Device Server's TCP/IP protocol software to try to pack serial data received during the specified time into the same data frame. *	
Inactivity time	<i>blank</i> (or 0)	Disabled.	Optional
	1 – 65535 ms	TCP connection is automatically closed by this device if the serial port is idle for the given time.	
TCP alive check time	0	TCP connection is never closed by this device.	Optional
	1 – 99 min.	TCP connection is automatically closed by this device if there is no TCP activity for the given time.	

\* If the size of the received serial data is greater than 1K, the NPort Device Server will automatically pack the data and send it to the Ethernet.

## TCP Client

The RAW Connection (TCP Client) operation mode is designed for use with serial devices that act as clients. That is, they actively request that a TCP connection be established with another device.



Fig. 3.5: Raw Connection (TCP Client)

Note that the **Destination IP address** is a required option. This means that the device can only be set up to request service from one remote networked device. We should also point out that the **Delimiter 1**, **Delimiter 2**, and **Force transmit** options are used to activate the optional Data Packing function.

```
-----  
| Destination IP addr : [          ] |  
| TCP port           : [4001 ] |  
| TCP connect       : [Startup  ] |  
| Delimiter 1 (Hex) : [   ] |  
| Delimiter 2 (Hex) : [   ] |  
| Force transmit (ns) : [   ] |  
| Inactivity time   : [   ] ms(0-65535)|  
| TCP alive check time: [7 ] minutes |  
-----
```

RAW Connection (TCP Client)			
Setting	Value	Notes	Necessity
Destination IP addr	valid IP	Allows connection with only the specified remote IP address.	Required
TCP port	valid port number	Specific TCP port through which the remote IP address listens over the TCP connection.	Required
TCP connect	Startup	Attempts to establish a TCP connection as soon as the NPort Device Server is powered on.	Required
	Any Character	Attempts to establish a TCP connection as soon as the NPort Device Server starts receiving serial data.	
Delimiter 1 (Hex)	ASCII code for the 1 <sup>st</sup> delimiter	Once the NPort Device Server receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it out the NPort Device Server's Ethernet port. <i>Note: Delimiter 2 is optional. If left blank, then Delimiter 1 alone trips clearing of the buffer. *</i>	Optional
Delimiter 2 (Hex)	ASCII code for the 2 <sup>nd</sup> delimiter		Optional
Force transmit (ms)	<i>blank</i> (or 0)	Disabled.	Optional
	1 – 65535	Forces the NPort Device Server's TCP/IP protocol software to try to pack serial data received during the specified time into the same data frame. *	
Inactivity time	<i>blank</i> (or 0)	Disabled.	Optional
	1 – 65535 ms	TCP connection is automatically closed by this device if the serial port is idle for the given time.	
TCP alive check time	0	TCP connection is not closed due to an idle serial line.	Optional
	1 – 99 min.	TCP connection is automatically closed by this device if there is no TCP activity for the given time.	

\* If the size of the received serial data is greater than 1K, the NPort Device Server will automatically pack the data and send it to the Ethernet.

## UDP Server/Client

The UDP Server/Client operation mode is designed for applications that need speedier data transmission, or that make use of UDP's broadcast and multi-cast capabilities. Keep in mind that UDP differs from TCP in that a UDP transmission does not first require a connection to be opened before sending data, and the receiving party does not issue acknowledgements to the sender.

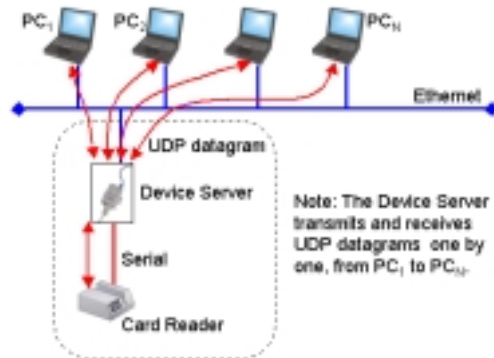


Fig. 3.6: UDP Server/Client

We should point out that the **Delimiter 1**, **Delimiter 2**, and **Force transmit** options are used to activate the optional Data Packing function.

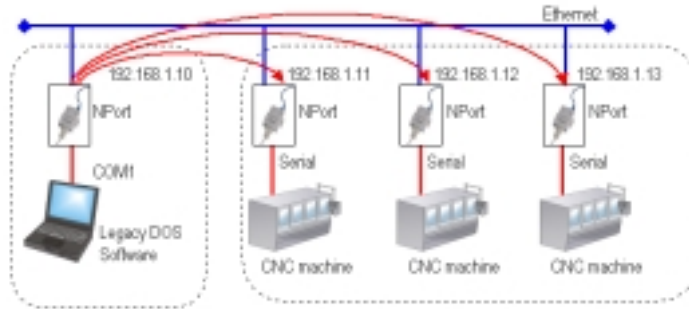
	Begin	End	Port
(Serial to LAN)			
Dest. IP addr 1	[	]	
Dest. IP addr 2	[	]	
Dest. IP addr 3	[	]	
Dest. IP addr 4	[	]	
(LAN to Serial)			
Src. IP addr 1	[	]	
Src. IP addr 2	[	]	
Src. IP addr 3	[	]	
Src. IP addr 4	[	]	
Local Listen Port	= [4000]		
Delimiter 1 (Hex)	= [ ]		
Delimiter 2 (Hex)	= [ ]		
Force transmit (ms)	= [ ]		

RAW Connection (Server/Client)			
Setting	Value	Notes	Necessity
(serial to LAN)			
Dest. IP addr 1	A host or a group of hosts.	Data is sent from the NPort Device Server to these remote IP addresses.	Required
Dest. IP addr 2			Optional
Dest. IP addr 3			Optional
Dest. IP addr 4			Optional
(LAN to serial)			
Src. IP addr 1	A host or a group of hosts.	Allows receipt of data from only these specified remote IP addresses.	Optional
Src. IP addr 2			Optional
Src. IP addr 3			Optional
Src. IP addr 4			Optional
Local Listen Port	valid port number	Used by the NPort Device Server to listen for data coming in over the Ethernet line.	Required
Delimiter 1 (Hex)	ASCII code for the 1 <sup>st</sup> delimiter	Once the NPort Device Server receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it out the NPort Device Server's Ethernet port. <i>Note: Delimiter 2 is optional. If left blank, then Delimiter 1 alone trips clearing of the buffer. *</i>	Optional
Delimiter 2 (Hex)	ASCII code for the 2 <sup>nd</sup> delimiter		Optional
Force transmit (ms)	<i>blank</i> (or 0)	Disabled.	Optional
	1 – 65535	Forces the NPort Device Server's TCP/IP protocol software to try to pack serial data received during the specified time into the same data frame.	

\* If the size of the received serial data is greater than 1K, the NPort Device Server will automatically pack the data and send it to the Ethernet.

## Ethernet Modem Mode (NPort Express ONLY)

The Ethernet Modem operation mode is designed for use with legacy operating systems, such as MS-DOS, that do not support TCP/IP Ethernet. By connecting a 1-port NPort Device Server's (applies to models DE-211/311/311M) serial port to the MS-DOS computer's serial port, it is possible to use legacy software originally designed to transmit data via modem, but now transmit the data over the Ethernet.



**Fig. 3.7: Ethernet Modem Mode**

When wishing to “dial out” over the Ethernet, the user simply uses the remote NPort Device Server’s IP address in place of the phone number.

```
ATDT 192.168.1.11:4001
OK
Connected
.....
+++
ATH
OK
ATDT 192.168.1.12:4001
OK Connected
.....
+++
ATH
OK
```

# Using Ethernet Modem

## Dial-in

NPort Express listens for a TCP/IP connection request from the remote Ethernet modem or host. NPort Express's response depends on the ATSO value, as outlined below.

*ATSO=0 (default):*

*NPort Express will temporarily accept the TCP connection and then send the "RING" signal out through the serial port. The serial controller must reply with "ATA" within 2.5 seconds to accept the connection request, after which NPort Express enters data mode. If no "ATA" command is received, NPort Express will disconnect after sending three "RING" signals.*

*ATSO ≥ 1:*

*NPort Express will accept the TCP connection immediately and then send the "CONNECT <baud>" command to the serial port, in which <baud> represents the baud rate of NPort Express's serial port. After that, NPort Express immediately enters data mode.*

## Dial-out

NPort Express accepts the AT command "ATD <IP>:<TCP port>" from the serial port and then requests a TCP connection from the remote Ethernet Modem or PC. This is where <IP> is the IP address of the remote Ethernet modem or PC, and <TCP port> is the TCP port number of the remote Ethernet modem or PC. Once the remote unit accepts this TCP connection, NPort Express will send out the "CONNECT <baud>" signal via the serial port and then enter data mode.

## Disconnection request from local side

When NPort Express is in data mode, the user can drive the DTR signal to OFF, or send "+++ " from the local serial port to NPort Express. NPort Express will enter command mode and return "NO CARRIER" via the serial port, and then input "ATH" to shut down the TCP connection after 1 second.



*NOTE: The "+++ " command cannot be divided. The "+" character can be changed in register S2, and the guard time, which prefixes and suffixes the "+++ " in order to protect the raw data, can be changed in register S12.*

## Disconnection request from remote side

After the TCP connection has been shut down by the remote Ethernet modem or PC, NPort Express will send the “NO CARRIER” signal via the serial port and then return to command mode.

```

+-----+
| TCP port      : [4001 ] |
| Destination IP addr : [      ] |
| TCP alive check time: [7 ] minutes |
+-----+

```

Ethernet Modem			
Setting	Value	Notes	Necessity
TCP port	valid port No.	The TCP port that other devices must use to contact this device. To avoid conflicts with standard TCP ports, the default is set to 4001.	Required
Destination IP addr	valid IP	Allows connection with only the specified remote IP address.	Optional
TCP alive check time	0	TCP connection is not closed due to an idle serial line.	Optional
	1 – 99 min.	TCP connection is automatically closed by this device if there is no TCP activity for the given time.	

## AT Commands

NPort Express supports the following common AT commands used with a typical modem:

No.	AT command	Description	Remarks
1	ATA	Answer manually	
2	ATD <IP>:<Port>	Dial up the IP address : Port No.	
3	ATE	ATE0=Echo OFF ATE1=Echo ON (default)	
4	ATH	ATH0=On-hook (default) ATH1=Off-hook	
5	ATI, ATI0, ATI1, ATI2	Modem version	reply “OK” only
6	ATL	Speaker volume option	reply “OK” only
7	ATM	Speaker control option	reply “OK” only

8	ATO	On line command	
9	ATP, ATT	Set Pulse/Tone Dialing mode	reply "OK" only
10	ATQ0, ATQ1	Quiet command (default=ATQ0)	
11	ATSr=n	Change the contents of S register	See "S registers"
12	ATSr?	Read the contents of S register	See "S registers"
13	ATV	Result code type ATV0 for digit code, ATV1 for text code 0=OK 1=connect (default) 2=ring 3=No carrier 4=error	
14	ATZ	Reset (disconnect, enter command mode and restore the flash settings)	
15	AT&C	Serial port DCD control AT&C0=DCD always on AT&C1=DTE detects connection by DCD on/off (default)	
16	AT&D	Serial port DTR control AT&D0=recognize DTE always ready AT&D1, AT&D2=reply DTE when DTR On (default)	
17	AT&F	Restore manufacturer's settings	
18	AT&G	Select guard time	reply "OK" only
19	AT&R	Serial port RTS option command	reply "OK" only
20	AT&S	Serial port DSR control	reply "OK" only
21	AT&V	View settings	
22	AT&W	Write current settings to flash for next boot up	

## S Registers

No.	S Register	Description & default value	Remarks
1	S0	Ring to auto-answer (default=0)	
2	S1	Ring counter (always=0)	no action applied
3	S2	Escape code character (default=43 ASCII "+")	
4	S3	Return character (default=13 ASCII)	
5	S4	Line feed character (default=10 ASCII)	
6	S5	Backspace character (default= 8 ASCII)	
7	S6	Wait time for dial tone (always=2, unit=sec)	no action applied
8	S7	Wait time for carrier (default=3, unit=sec)	
9	S8	Pause time for dial delay (always=2, unit=sec)	no action applied
10	S9	Carrier detect response time (always=6, unit 1/10 sec)	no action applied
11	S10	Delay for hang up after carrier (always=14, unit 1/10 sec)	no action applied
12	S11	DTMF duration and spacing (always=100 ms)	no action applied
13	S12	Escape code guard time (default=50, unit 1/50 sec) to control the idle time for "+++"	



# Reference Documents

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- ❑ Driver Installation Guides
  - Win9x/NT installation guide  
(CD-ROM://nport/document/np-win98nt-installation.pdf)
  - Win2000 installation guide  
(CD-ROM://nport/document/np-win2k-installation.pdf)
  - WinXP installation guide  
(CD-ROM://nport/document/np-winxp-installation.pdf)
- ❑ Utility User's Guides
  - NPort Monitor User's Guide  
(CD-ROM://nport/document/nportmonitor.pdf)