

# NPort W2004 Series User's Manual

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[www.moxa.com/product](http://www.moxa.com/product)



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# NPort W2004 Series User's Manual

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# 1

## Introduction

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Moxa's NPort W2004 Series of wireless serial device servers give you an easy way to connect your RS-232/422/485 serial devices to a WLAN. The 4-port NPort W2004 is ideal for environments where a LAN is not available, or where serial devices are moved frequently.

The following topics are covered in this chapter:

- ❑ **Overview**
- ❑ **Package Checklist**
- ❑ **Product Features**
- ❑ **Product Specifications**
- ❑ **Serial Port Pin Assignments**

## Overview

Moxa's NPort W2004 wireless device server is the ideal choice for connecting your RS-232/422/485 serial devices—such as PLCs, meters, and sensors—to a Wired Ethernet LAN and Wireless LAN. Your communications software will be able to access the serial devices from anywhere over a local LAN, WLAN, or the Internet. Moreover, the WLAN environment offers an excellent solution for applications in which the serial devices are moved frequently from place to place.

NPort W2004 wireless serial device servers support automatic IP configuration protocols (DHCP) and manual configuration via a handy web browser console. Both IP configuration methods ensure quick and effective installation, and the NPort Windows Driver Manager Utility makes Port Mapping very convenient to configure.

An external antenna increases the range of the wireless connection. Users can position the adjustable antenna for maximum signal strength or even replace the antenna with their own for additional flexibility and scalability. This feature is particularly useful when a serial device is connected in a high interference area. As an added feature, a signal strength indicator is located on the front panel to make it easier to troubleshoot connection problems.

NPort W2004 wireless serial device servers ensure the compatibility of network software that uses a standard network API by providing TCP Server Mode, TCP Client Mode, and UDP Mode. The Real COM/TTY drivers allow software that works with COM/TTY ports to be set up to work over a TCP/IP network in no time. This excellent feature preserves your software investment and lets you enjoy the benefits of networking your serial devices instantly.

To make your management task easier, the NPort W2004 Series provides additional features, such as password authentication, IP filter, WEP support for 64-bit and 128-bit encryption, and SNMP support.

## Package Checklist

NPort W2004 is shipped with the following items:

### *Standard Accessories*

- NPort W2004 x 1
- Documentation & Software CD
- RJ45 to RJ45 Ethernet cross-over cable
- RJ45 to male DB9 cable
- RJ45 to female DB9 cable
- Power adaptor
- Warranty Booklet
- Quick Installation Guide

### *Optional Accessories*

- DK-35A DIN-Rail Mounting Kit (35 mm)
- CBL-RJ45M9-150 (8-pin RJ45 to male DB9 cable; 150 cm)
- CBL-RJ45F9-150 (8-pin RJ45 to female DB9 cable; 150 cm)
- CBL-RJ45M25-150 (8-pin RJ45 to male DB9 cable; 150 cm)
- CBL-RJ45F25-150 (8-pin RJ45 to female DB9 cable; 150 cm)

NOTE: *Notify your sales representative if any of the above items is missing or damaged.*

## Product Features

- Connect any serial device to WiFi 802.11g/b network
- 4 RS-232/422/485 ports, at up to 460.8 Kbps
- Web-based configuration via built-in Ethernet or WLAN
- Supports Windows and Linux Real COM drivers
- Versatile socket operation modes, including TCP Client/Server, pair connection, and UDP
- Secure data access via standard WEP
- Enhanced remote configuration via HTTPS and SSH
- Auto MDI/MDIX function

## Product Specifications

### WLAN

Standard Compliance	802.11g/b
Radio Frequency Type	DSSS, OFDM
Tx Power 11b	18 dBm $\pm$ 2 dBi
Tx Power 11g	16 dBm $\pm$ 2 dBi
Rx Sensitivity	-70 dBm @ 54 Mbps, -85 dBm @ 11 Mbps
Transmission Rate	54 Mbps (max.) with auto fallback (54, 48, 36, 24, 18, 12, 11, 9, 6, 5.5, 2, 1 Mbps)
Transmission distance	Up to 300 meters (@ 12 Mbps, in open areas)
Security	WEP 64-bit/128-bit data encryption
Antenna Connector	Reverse SMA
Network Mode	Infrastructure mode, Ad-Hoc mode

### LAN

Ethernet	10/100 Mbps, RJ45
Protection	Built-in 1.5 KV magnetic isolation

### Serial

No. of ports	4
Interface	RS-232/422/485, with 15 KV ESD for all signals
Port Type	8-pin RJ45
RS-485 Data direction	ADDC™ (patented Automatic Data Direction Control)

### Serial Communication Parameters

Parity	None, Even, Odd, Space, Mark
Data Bits	5, 6, 7, 8
Stop Bits	1, 1.5, 2
Flow Control	RTS/CTS, XON/XOFF
Transmission Speed	50 bps to 460.8 Kbps

### Console Ports

Ethernet console x 1	10/100M LAN, 8-pin RJ45
RS-232 console x 1	8-pin, RJ45

**Software Features**

Protocols ICMP, IP, TCP, UDP, DHCP, Telnet, DNS, SNMP, HTTP, SMTP, SNTP, SSH, SSL, HTTPS  
 Utilities Windows utility for Windows 98/ME/2000/XP/2003  
 Configuration Web browser, serial/telnet console, or Windows utility

**Power Requirements**

Power Input 12-48 VDC  
 Power Consumption 685 mA @ 12V; 184 mA @ 24V, 340 mA @ 24V

**Mechanical Specifications**

Material SECC sheet metal (1 mm)

**Environmental**

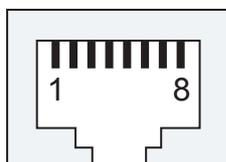
Operating Temperature 0 to 60°C (32 to 140°F), 5 to 95%RH  
 Storage Temperature -20 to 85°C (-4 to 185°F), 5 to 95%RH

**Regulatory Approvals**

EMC FCC Class A, CE Class A  
 Safety UL, CUL, TÜV

## Serial Port Pin Assignments

8-pin RJ45 Port



RS-232/422/485 Pinouts

Pin	RS-232	RS-422	RS-485 (4-wire)	RS-485 (2-wire)
1	DSR	---	---	---
2	RTS	TxD+	TxD+	---
3	GND	GND	GND	GND
4	TxD	TxD-	TxD-	---
5	RxD	RxD+	RxD+	Data+
6	DCD	RxD-	RxD-	Data-
7	CTS	---	---	---
8	DTR	---	---	---

# 2

## Getting Started

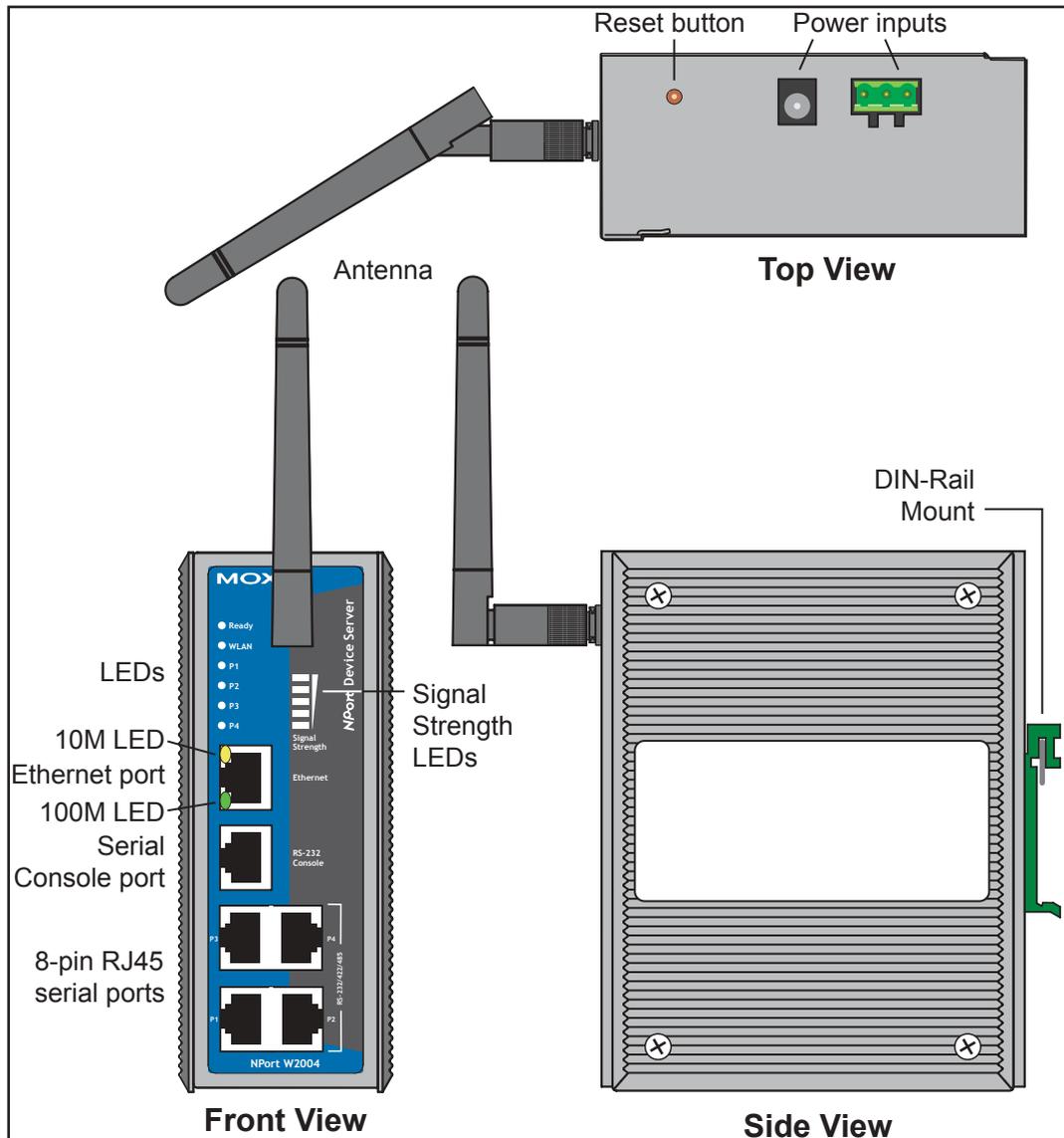
---

This chapter includes information about installing NPort W2004.

The following topics are covered in this chapter:

- ❑ **Panel Layout**
- ❑ **Connecting the Hardware**
  - Wiring Requirements
  - Connecting the Power
  - Connecting to the Network
  - Connecting to a Serial Device
  - LED Indicators

## Panel Layout



## Connecting the Hardware

This section describes how to connect NPort W2004 to serial devices for first time testing purposes. We cover Wiring Requirements, Connecting the Power, Connecting to the Network, Connecting to a Serial Device, and LED Indicators.

## Wiring Requirements



### ATTENTION

#### Safety First!

Be sure to disconnect the power cord before installing and/or wiring your device.

#### Wiring Caution!

Calculate the maximum possible current in each power wire and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size.

If the current goes above the maximum ratings, the wiring could overheat, causing serious damage to your equipment.

#### Temperature Caution!

Be careful when handling the device. When plugged in, the device's internal components generate heat, and consequently the casing may feel hot to the touch.

You should also pay attention to the following items:

- Use separate paths to route wiring for power and devices. If power wiring and device wiring paths must cross, make sure the wires are perpendicular at the intersection point.

**NOTE:** Do not run signal or communication wiring and power wiring in the same wire conduit. To avoid interference, wires with different signal characteristics should be routed separately.

- Use the type of signal transmitted through a wire to determine which wires should be kept separate. The rule of thumb is that wiring that shares similar electrical characteristics can be bundled together.
- Keep input wiring and output wiring separate.
- Where necessary, it is advisable to label the wiring to all devices in the system.

## Connecting the Power

Connect the 12-48 VDC power line with NPort W2004's power jack. When the power is supplied properly, the "Ready" LED will show a solid red color until the system is ready, at which time the "Ready" LED will change to a green color.

## Connecting to the Network

Connect one end of the Ethernet cable to NPort W2004's 10/100M Ethernet port and the other end of the cable to the Ethernet network. If the cable is properly connected, NPort W2004 will indicate a valid connection to the Ethernet in the following ways:

- The Ethernet LED maintains a solid green color when connected to a 100 Mbps Ethernet network.
- The Ethernet LED maintains a solid orange color when connected to a 10 Mbps Ethernet network.
- The Ethernet LED will flash when Ethernet packets are being transmitted or received.

## Connecting to a Serial Device

Connect the serial data cable between NPort W2004 and the serial device. Serial data cables are optional accessories for NPort W2004. Refer to Chapter 1 under **Optional Accessories** in the **Ordering Information** section for information about the RJ45-to-DB25 and RJ45-to-DB9 cables.

## LED Indicators

**LED Indicators**—The front panel of NPort W2004 has eleven LED indicators, as described in the following table.

LED Name	LED Color	LED Function
Ready	red	<b>Steady on</b> —Power is on and NPort is booting up. <b>Blinking fast</b> (once every 0.5 sec)—Indicates a LAN IP conflict. <b>Blinking slowly</b> (once every sec)—Looking for an IP when no DHCP server is available.
	green	<b>Steady on</b> —Power is on and NPort is functioning normally. <b>Blinking fast</b> (once every 0.5 sec)—Loading factory default configuration after holding in the reset button for 5 seconds. <b>Blinking slowly</b> (once every sec)—The device server has been located by NPort Search utility.
	off	Power is off, or power error condition exists.
WLAN	green	<b>On</b> —Wireless enabled. <b>Blinking fast</b> (once every 0.5 sec)—Indicates a WLAN IP conflict. <b>Blinking slowly</b> (once every sec)—Looking for an IP when no DHCP server is available.
P1, P2, P3, P4	orange	Serial port is receiving data.
	green	Serial port is transmitting data.
	off	No data is being transmitted or received through the serial port.
Signal Strength (5 LEDs)	green	These 5 LEDs are used to indicate the WLAN signal strength, in increments of 20%. The bottom LED of these 5 will be lit when the WLAN links to the access point.
10/100 M Ethernet	orange	10 Mbps Ethernet connection
	green	100 Mbps Ethernet connection
	off	Ethernet cable is disconnected, or has a short.

# 3

## Initial IP Address Configuration

---

When setting up your NPort W2004 for the first time, the first thing you should do is configure the IP address. Select one of the initial IP Address configuration methods to configure NPort W2004's IP Address. For more details about network settings, see the **Network Settings** section from Chapter 5, **Web Console Configuration**.

This chapter covers the following topics:

- ❑ **Installation Procedure for First-time Users**
- ❑ **Factory Default IP Address**
- ❑ **Telnet Console**
- ❑ **Serial Console (19200, n, 8, 1)**

## Installation Procedure for First-time Users

- STEP 1: After removing NPort W2004 from the box, use a cross-over Ethernet cable to connect directly to your computer's Ethernet port.
- STEP 2: Attach the power adaptor to the NPort W2004 and then plug the adaptor into an electrical outlet.
- STEP 3: Use the Web console to configure the NPort W2004 via the Ethernet port.

**NOTE** We recommend that you use the web console to configure NPort W2004. See Chapter 5 for instructions on how to use the web console.

## Factory Default IP Address

NPort W2004 is configured with the following default IP addresses:

LAN:

Setting	static IP
IP Address	192.168.126.254
Netmask	255.255.255.0

→ If the Ethernet port is unable to get an IP address from the DHCP server, then the IP address/netmask will revert to 192.168.126.254/255.255.255.0.

WLAN:

Setting	static IP
IP Address	192.168.127.254
Netmask	255.255.255.0

→ If the WLAN port is unable to get an IP address from the DHCP server, then the IP address/netmask will revert to 192.168.127.254/255.255.255.0

**NOTE** If you forget the IP address, you can use the NPort Search utility (from your PC) to locate the NPort W2004 unit over the network. You will be able to view the IP address on the screen.

**NOTE** Only one Network Interface can be used at the same time. If the Ethernet Link is active, then the WLAN will be disabled. If the WLAN is active, then the Ethernet Link will be disabled.

**NOTE** The default login parameters are: **username = admin**, and **password = blank**.

## Telnet Console

1. From the Windows desktop, click on **Start** and then select **Run**
2. Type telnet 192.168.126.254 (default IP address) in the **Open** text input box, and then click on **OK**.

When the Telnet window opens, if you are prompted to input the Console password, input the password and then press Enter. Note that this page will only appear if the NPort W2004 is password protected.

```
-----  
Host Name       : NPW2004_20  
Model Name     : NPort W004-US  
LAN MAC Address : 00:90:e8:93:04:36  
WLAN MAC Address : N/A  
Serial No      : 20  
Firmware Version : 0.0.1.1_beta6  
-----  
<< Main Menu >>  
  (1) Time Settings  
  (2) Network Settings  
  (3) Serial Port Settings  
  (4) System Management  
  (q) Quit
```

3. Type **2** to select **Network settings**, and then press **Enter**.

```
-----  
Host Name       : NPW2004_20  
Model Name     : NPort W004-US  
LAN MAC Address : 00:90:e8:93:04:36  
WLAN MAC Address : N/A  
Serial No      : 20  
Firmware Version : 0.0.1.1_beta6  
-----  
<< Main Menu >>  
  (1) Time Settings  
  (2) Network Settings  
  (3) Serial Port Settings  
  (4) System Management  
  (q) Quit  
  
Key in your selection: 2
```

4. Type **2** to select **Ethernet Configuration** and then press **Enter**.

```
<< Main Menu >>
(1) General Settings
(2) Ethernet Configuration
(3) WLAN Configuration
(4) View Settings
(5) Back to the Main Menu
(6) Quit

Key in your selection: 2
```

5. Type **2** to select **IP Address** and then press **Enter**, then use the **Backspace** key to erase the current IP address, type in the new IP address, and then press **Enter**.

```
<< Main Menu->Network Settings->Ethernet Configuration >>
(1) IP Configuration
(2) IP Address
(3) Netmask
(4) Gateway
(v) View Settings
(m) Back to Main Menu
(q) Quit

Key in your selection: 2
IP Address : 192.168.126.254
```

6. Type **m** and then press **Enter** to return to the main menu.

```
<< Main Menu->Network Settings->Ethernet Configuration >>
(1) IP Configuration
(2) IP Address
(3) Netmask
(4) Gateway
(v) View Settings
(m) Back to Main Menu
(q) Quit

Key in your selection: m
```

7. Type **4** to select **System Management**, and then type **4** to select **Maintenance**.

```
<< Main Menu >>
(1) Time Settings
(2) Network Settings
(3) Serial Port Settings
(4) System Management
(q) Quit
```

```
Key in your selection: 4
```

```
-----
<< Main Menu >>
(1) Misc. Network Settings
(2) Auto Warning Settings
(3) System Status
(4) Maintenance
(m) Back to Main Menu
(q) Quit
```

```
Key in your selection: 4
```

8. Type **4** and then type **y** to **Restart** the system.

```
<< Main Menu->System Management->Maintenance >>
(1) Load Factory Default
(2) Change Password
(3) Restart Port
(4) Restart System
(m) Back to Main Menu
(q) Quit
```

```
Key in your selection: 4
```

```
Are you sure to restart system?
(y) Yes
(n) No
```

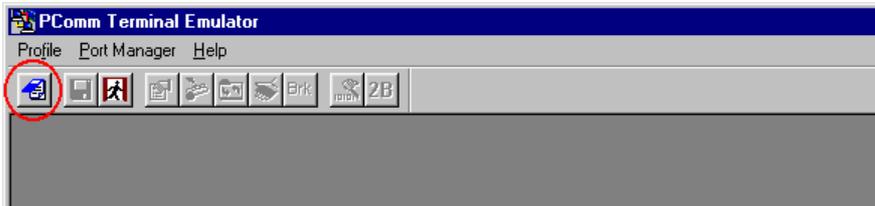
```
Key in your selection: y
```

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

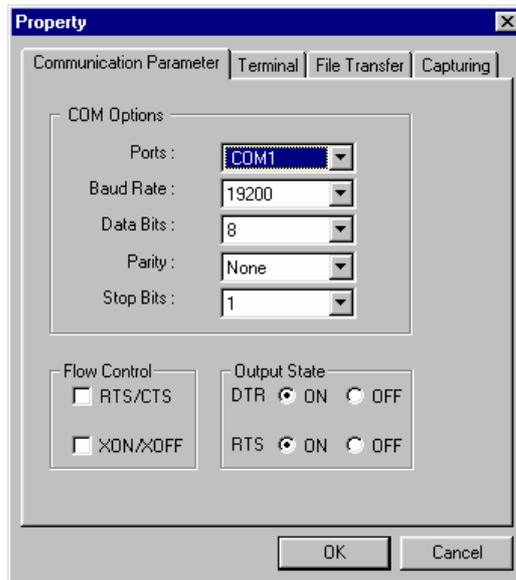
Before configuring the NPort W2004 via the serial console, turn off the power and use a serial cable to connect the NPort W2004 to your computer's serial port.

We suggest using MOXA PComm Terminal Emulator, which can be downloaded free of charge from [www.moxa.com](http://www.moxa.com), to carry out the configuration procedure.

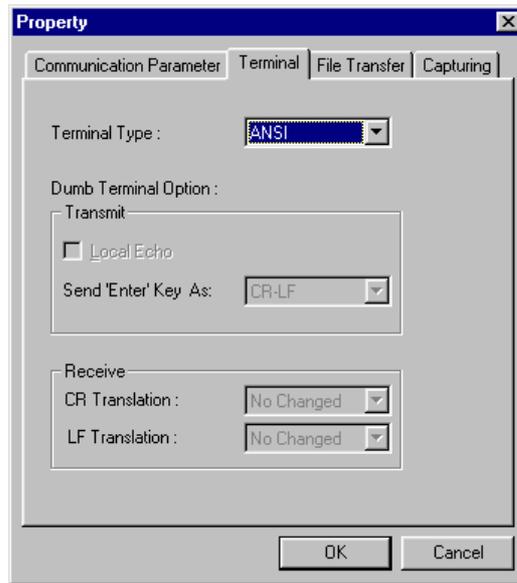
1. Connect NPort W2004's serial port 1 directly to your computer's male RS-232 serial port.
2. From the Windows desktop, click on **Start → Programs → PComm Lite → Terminal Emulator**.
3. When the **PComm Terminal Emulator** window opens, first click on the **Port Manager** menu item and select **Open**, or click on the **Open** icon.



4. 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**.



5. From the **Property** window's **Terminal** page, select **ANSI** or **VT100** for **Terminal Type**, and click on **OK**. If you select **Dumb Terminal** as the terminal type, some of the console functions—especially the “Monitor” function—may not work properly.



6. Input the password when prompted.
7. Start by configuring the IP address under **Network Settings**. Refer to the **Telnet Console** section for instructions on how to configure the rest of the IP settings.



# 4

## Choosing the Proper Operation Mode

---

In this chapter, we describe the various NPort W2004 operation modes. The options include an operation mode that uses a driver installed on the host computer, and operation modes that rely on TCP/IP socket programming concepts. After choosing the proper operation mode in this chapter, refer to Chapter 5 for detailed configuration parameter definitions.

This chapter covers the following topics:

- ❑ **Overview**
- ❑ **TCP Server Mode**
- ❑ **TCP Client Mode**
- ❑ **UDP Mode**
- ❑ **Real COM Mode**

## Overview

NPort W2004 wireless Serial Device Servers are used to network-enable traditional RS-232/422/485 devices. A Serial Device Server is a tiny computer equipped with a CPU, real-time OS, and TCP/IP protocols that can bi-directionally translate data between the serial and Ethernet formats. The Serial Device Server lets you use a computer to access, manage, and configure remote facilities and equipment over the Internet from anywhere in the world.

Traditional SCADA and data collection systems rely on serial ports (RS-232/422/485) to collect data from different types of instruments. Since NPort W2004 wireless Serial Device Servers network-enable instruments equipped with an RS-232/422/485 communication port, your SCADA and data collection system will be able to access all instruments connected to a standard TCP/IP network, regardless of whether the devices are used locally or at a remote site.

NPort W2004 is an external IP-based network device that allows you to expand the number of serial ports for a host computer on demand. As long as your host computer supports the TCP/IP protocol, you won't be limited by the host computer's limited number of conventional busses (such as ISA or PCI), or lack of drivers for various operating systems.

In addition to providing socket access, NPort W2004 also comes with a Real COM/TTY driver that transmits all serial signals intact. This means that you can continue using existing COM/TTY-based software, eliminating the need to invest in additional, costly software.

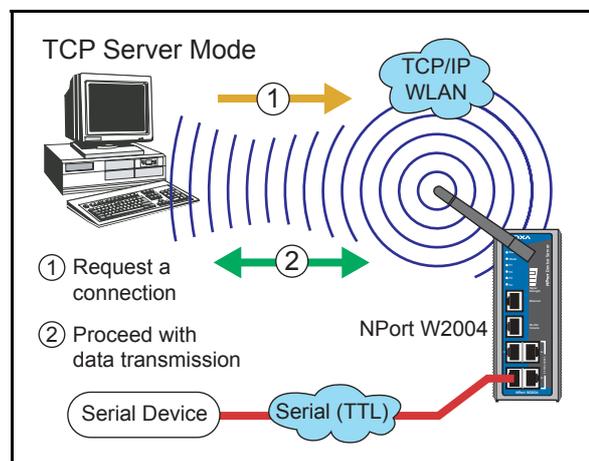
Three different Socket Modes are available: TCP Server, TCP Client, and UDP Server/Client. The main difference between the TCP and UDP protocols is that TCP guarantees delivery of data by requiring the recipient to send an acknowledgement to the sender. UDP does not require this type of verification, making it possible to offer speedier delivery. UDP lets you unicast to one IP address, or multicast to groups of IP addresses.

## TCP Server Mode

In TCP Server mode, NPort W2004 is configured with a unique IP:Port address on a TCP/IP network. NPort W2004 waits passively to be contacted by the host computer, allowing the host computer to establish a connection with and get data from the serial device.

This operation mode also supports up to 4 simultaneous connections, so that multiple hosts can collect data from the same serial device—at the same time.

As illustrated in the figure, data transmission proceeds as follows:



1. The host requests a connection from the NPort W2004 configured for TCP Server Mode.
2. Once the connection is established, data can be transmitted in both directions—from the host to the NPort W2004, and from the NPort W2004 to the host.

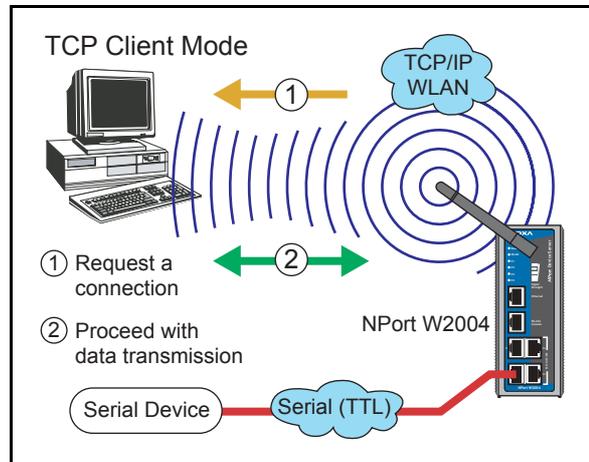
## TCP Client Mode

In TCP Client mode, NPort W2004 can actively establish a TCP connection to a pre-defined host computer when serial data arrives.

After the data has been transferred, NPort W2004 can disconnect automatically from the host computer by using the **TCP alive check time** or **Inactivity time** settings. Refer to Chapter 5 for more details

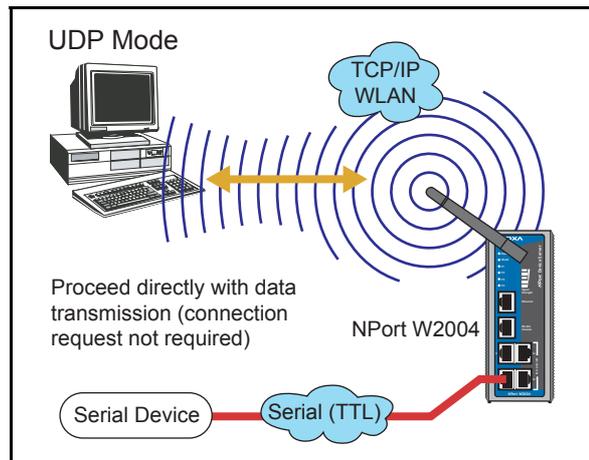
As illustrated in the figure, data transmission proceeds as follows:

1. The NPort W2004 requests a connection to the host.
2. Once the connection is established, data can be transmitted in both directions—from the host to the NPort W2004, and from the NPort W2004 to the host.



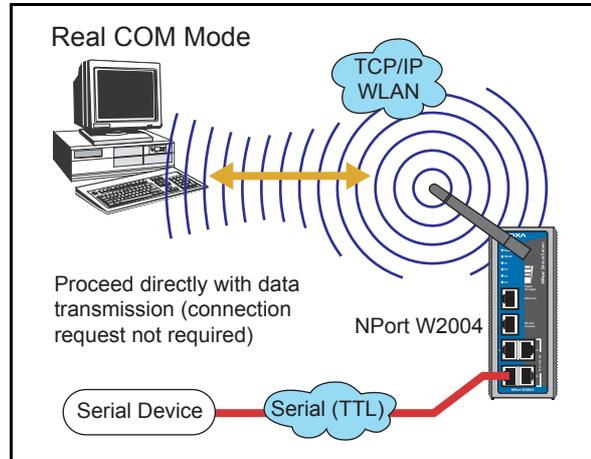
## UDP Mode

Compared to TCP communication, UDP is faster and more efficient. In UDP mode, you can unicast or multicast data from the serial device to one or more host computers. The serial device can also receive data from multiple host computers, making this mode ideal for message display applications.



## Real COM Mode

NPort W2004 comes equipped with COM drivers that work with Windows 95/98/ME/NT/2000/XP systems. The driver establishes a transparent connection between host and serial device by mapping the IP:Port of the NPort W2004's serial port to a local COM port on the host computer. One of the main conveniences of using Real COM Mode is that Real COM 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 host's Ethernet card. At the other end of the connection, the NPort W2004 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 W2004's serial ports.



### ATTENTION

Real COM Mode allows several hosts to have access control of the same NPort W2004. The driver that comes with your NPort W2004 controls host access to attached serial devices by checking the host's IP address. Refer to **Accessible IP Settings** in Chapter 5 for more details.

## Web Console Configuration

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The Web Console is the most user-friendly method available to configure NPort W2004 Series. This chapter introduces the Web Console function groups and function definitions.

The following topics are covered in this chapter:

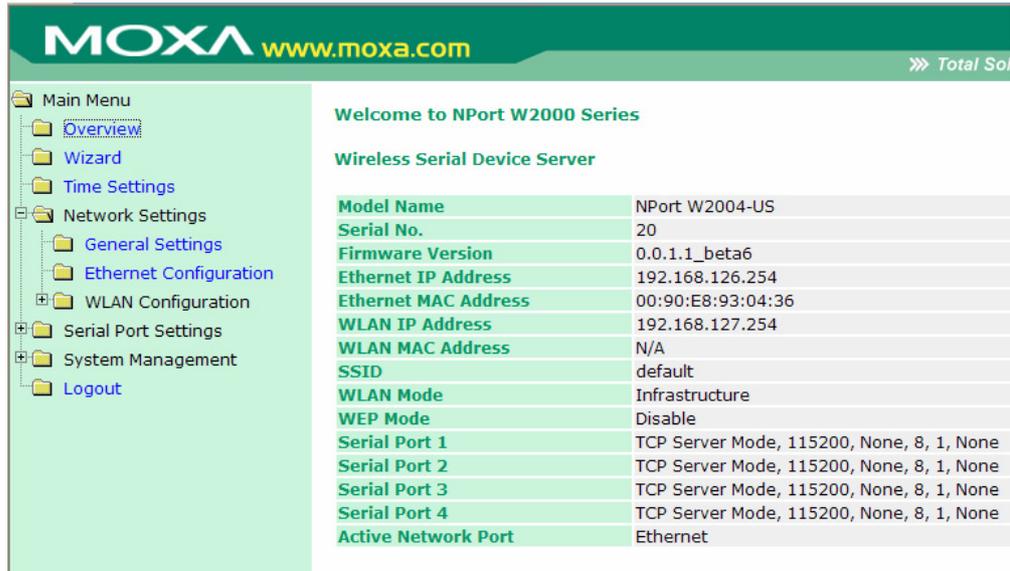
- ❑ **Configuring Your Browser**
- ❑ **Basic Settings**
  - Time Settings
  - Web/Telnet Console
- ❑ **Network Settings**
  - General Settings
  - Ethernet Configuration
  - WLAN Configuration
- ❑ **Serial Port Settings**
  - Operation Modes
  - Communication Parameters
- ❑ **System Management**
  - Accessible IP Settings
  - SNMP Agent
  - Auto Warning Settings
  - System Status
- ❑ **Change Password**
- ❑ **Load Factory Default**
- ❑ **Save/Restart**

**NOTE**

You may use either a cross-over or straight-through Ethernet cable to connect NPort W2004 to a PC, Hub, Switch, or LAN/WAN port. NPort W2004's Ethernet port will auto-detect which type of cable is being used, and then adjust the signals accordingly.



3. Type 192.168.126.254 (the default IP address) in your browser's **Address** box (use the correct IP address if different from the default), and then press **Enter**.
4. Input the password. NPort W2004 allows only one user. The username is set to **admin** and the default password is also set to **admin**. You may NOT change the username, but you can change the password at any time. Note that the login function cannot be disabled.
5. The NPort W2004 homepage will open. On this page, you can see a brief description of the Web Console's nine function groups.



**ATTENTION**

If you can't remember the password, the ONLY way to start configuring NPort W2004 is to load factory defaults by using the Reset button, which is located near the NPort W2004's power jack.

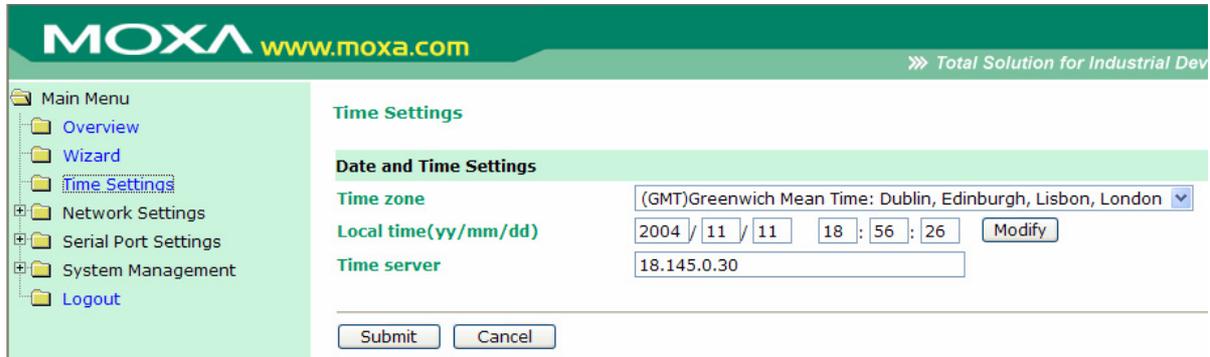


**ATTENTION**

If you use a web browser other than Internet Explorer, remember to Enable the functions to "allow cookies that are stored on your computer" or "allow per-session cookies."

NPort W2004 uses cookies only for "password" transmission.

## Time Settings



NPort W2004 has a built-in Real-Time Clock that allows you to add real-time information to functions such as Auto warning “Email” or “SNMP Trap.”



### ATTENTION

First time users should select the time zone first. The Console will display the “real time” according to the time zone compared to GMT. If you would like to modify the real time clock, select “Local time.” NPort W2004’s firmware will modify the GMT time according to the Time Zone.

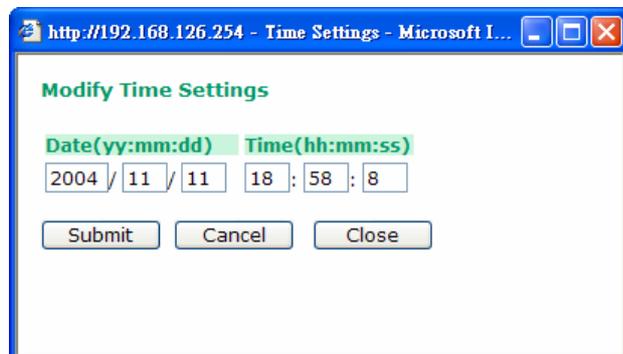
#### Time zone

Setting	Factory Default	Necessity
User selectable time zone	GMT (Greenwich Mean Time)	Optional

#### Local tim (yy/mm/dd)e

Setting	Factory Default	Necessity
User adjustable time (2000/1/1-2037/12/31)	GMT (Greenwich Mean Time)	Optional

Click on the [ **Modify** ] button to open the Modify time settings window to input the correct local time.



**Time server**

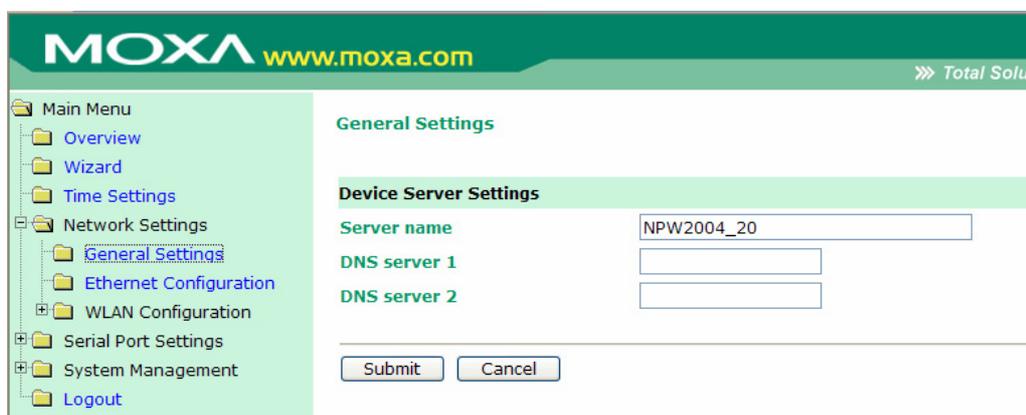
Setting	Factory Default	Necessity
IP Address or Domain Name (E.g., 192.168.1.1, time.stdtime.gov.tw, or time.nist.gov)	None	Optional

NPort W2004 uses SNTP (RFC-1769) for auto time calibration.

Input the correct “Time server” IP address or domain name. Once NPort W2004 is configured with the correct Time server address, NPort W2004 will request time information from the “Time server” every 10 minutes.

## Network Settings

### General Settings



Click on the **General Settings** option to modify the **Server name** and **DNS server** IP addresses or domain names.

**Server name**

Setting	Factory Default	Necessity
<i>Alphanumeric</i>	NPW2004_<Serial No.>	Optional

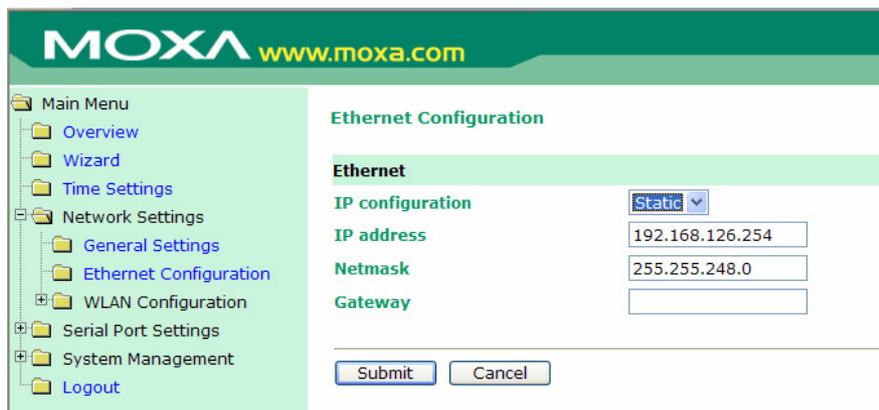
**DNS server 1 / DNS server 2**

Setting	Factory Default	Necessity
E.g., 192.168.1.1 (IP addresses of the form <i>x.x.x.0</i> and <i>x.x.x.255</i> are invalid.)	None	Optional

When a user wishes to visit a particular website, the computer first requests the website’s correct IP address from the Domain Name System (DNS) server, and then the computer uses the response to connect to the website. DNS represents the method used to translate Internet domain names into IP addresses. A domain name is an alphanumeric name, such as moxa.com, that it is easier to remember. A DNS server is a host that translates this kind of text-based domain name into the numeric IP address used to establish a TCP/IP connection.

In order to use NPort W2004's DNS feature, you need to configure the DNS server. Doing so allows NPort W2004 to use a host's domain name to access the host. NPort W2004 provides DNS server 1 and DNS server 2 configuration items to configure the IP address of the DNS server. DNS Server 2 is included for use when DNS sever 1 is unavailable.

## Ethernet Configuration



You must assign a valid IP address to NPort W2004 before it will work in your network environment. Your network system administrator should provide you with an IP address and related settings for your network. The IP address must be unique within the network (otherwise, NPort W2004 will not have a valid connection to the network). First time users should refer to Chapter 3, "Initial IP Address Configuration," for more information.

Choose from two possible "IP configuration" modes—**Static** and **DHCP**—located under the web console screen's **IP configuration** drop-down box.

### IP configuration

Method	Function Definition
Static	User defined IP address, Netmask, Gateway.
DHCP	DHCP Server assigned IP address, Netmask, Gateway, DNS, and Time Server.

### IP address

Setting	Factory Default	Necessity
E.g., 192.168.1.1 (IP addresses of the form <i>x.x.x.0</i> and <i>x.x.x.255</i> are invalid.)	192.168.126.254	Required

An IP address is a number assigned to a network device (such as a computer) as a permanent address on the network. Computers use the IP address to identify and talk to each other over the network. Choose a proper IP address that is unique and valid in your network environment.

### Netmask

Setting	Factory Default	Necessity
E.g., 255.255.255.0	255.255.255.0	Required

A netmask is used to group network hosts into subnets. When a packet is sent out over the network, the NPort W2004 will use the netmask to check whether the desired TCP/IP host specified in the packet is on the same subnet as the NPort. If the address is on the same subnet, a connection is established directly between the NPort W2004 and the host. If the host is not on the same subnet, the packet is sent to the Gateway address.

**Gateway**

Setting	Factory Default	Necessity
E.g., 192.168.1.1	None	Optional

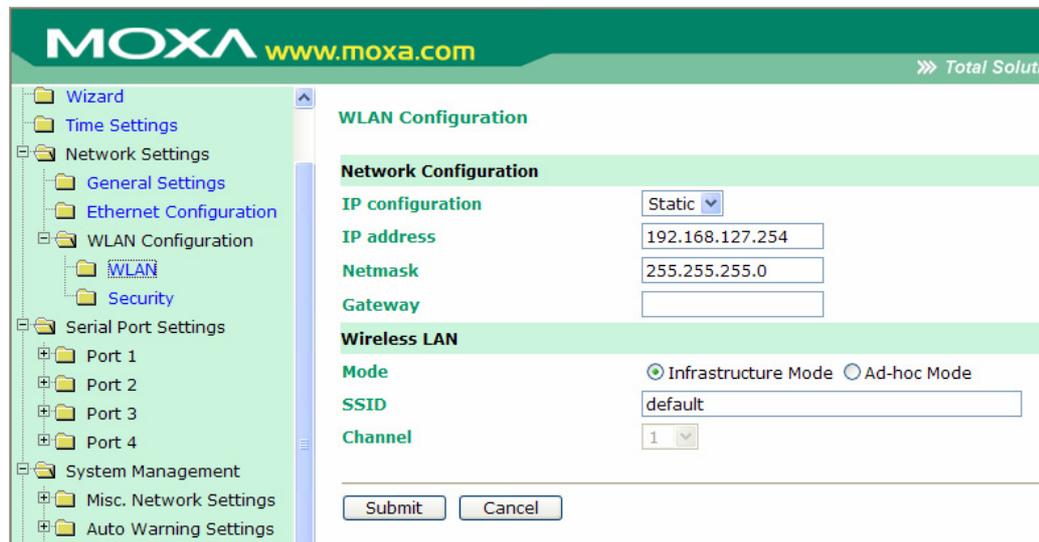
A gateway is a network gateway that acts as an entrance to another network. Usually, the computers that control traffic within the network or at the local Internet service provider are gateway nodes. NPort W2004 needs to know the IP address of your network's default gateway computer in order to communicate with the hosts outside the local network environment. For correct gateway IP address information, consult your network administrator.



**ATTENTION**

In Dynamic IP environments, the firmware will make 3 requests to the DHCP server every 30 seconds until network settings are assigned by the DHCP server. The Timeout for each try increases from 1 second, to 3 seconds, to 5 seconds. If the DHCP Server is unavailable, the firmware will use the default IP address (192.168.126.254), Netmask, and Gateway for IP settings.

**WLAN Configuration**



**Network Configuration**

NPort W2004 supports the IEEE 802.11b wireless network interface.

The supported IP configurations are static and dynamic (DHCP). Users can set up the IP configuration via the serial console, or the Web/Telnet consoles through the NPort's Ethernet

interface.

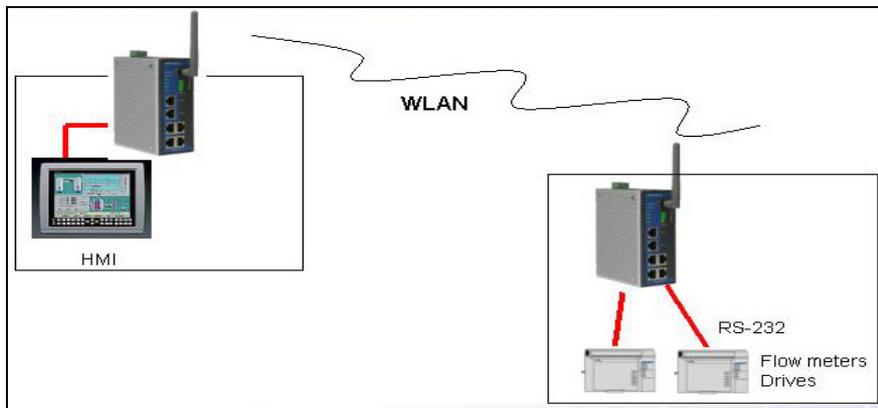
For detailed information about configuring **IP configuration**, **IP address**, **Netmask**, and **Gateway**, see the previous section, "Ethernet Configuration."

### Wireless LAN

You may choose from two different WLAN modes—Infrastructure Mode and Ad-hoc Mode—which are illustrated in the following diagrams.

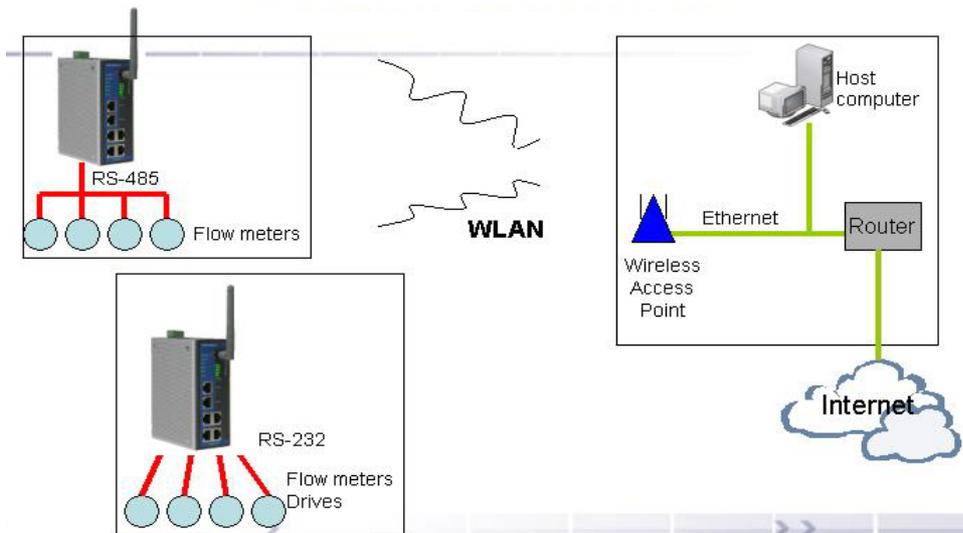
#### Ad-hoc Mode

In the following example, two NPort W2004 devices establish an Ad-hoc peer-to-peer relationship, which means that they communicate with each other directly, without going through an AP (Access Point).



#### Infrastructure Mode

In the following example, the NPort W2004 communicates with the host computer via the AP. The host computer connects to the AP via an Ethernet connection, allowing serial data to be transmitted back and forth between the serial devices and host computer.



**SSID**

Enter the name of the wireless network (SSID) that the W2004 is connected to.

**Channel**

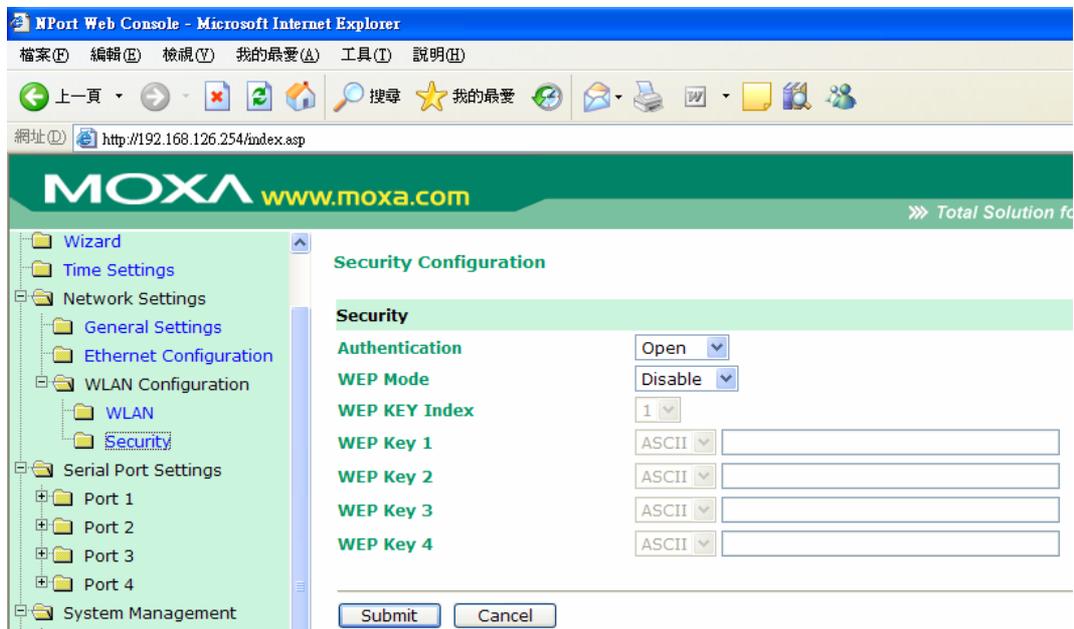
Select a radio channel for the wireless network from the pull-down menu. In infrastructure mode, the AP will specify the channel automatically. In Ad-hoc mode, the user must use the pull-down menu to specify the channel.



**ATTENTION**

Click on the Wizard to configure the WLAN IP address quickly.

**Security**



The wireless network interface supports data encryption (WEP, 64 or 128 bits) and authentication (Open or Shared authentication).

**Authentication**

Select an authentication scheme of **Open** or **Shared** from the pull-down menu.

**WEP Mode**

By default, WEP Mode is **disabled**. When WEP Mode is **enabled**, data packets will be encrypted before send .you can select 64-bit or 128-bit.

**WEP Key 1/2/3/4**

For each of the four WEP Keys, select either **ASCII** or **HEX** format, and then enter the appropriate WEP Key. The WEP Keys are used to help prevent data from being stolen as it is transmitted over public networks. The WEP Key setting(s) for the NPort W2004 must be the same as the WEP Key settings for the AP.

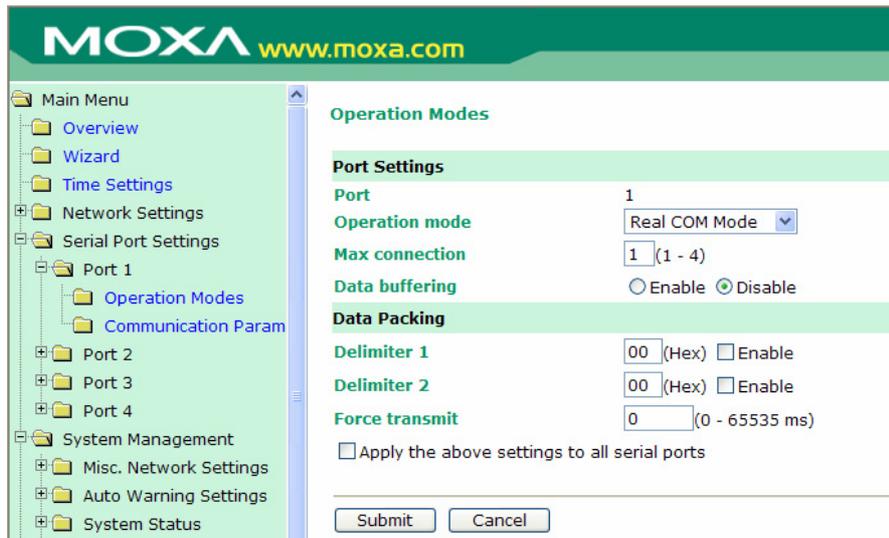
## Serial Port Settings

Serial port settings are configured by port.

### Operation Modes

The Serial Port parameters that appear in the right pane of the browser window when **Serial Port Settings** → **Port 1/2/3/4** → **Operation Modes** is selected are dependent on which of the four operation modes is selected. We consider each operation mode separately.

#### Real COM Mode



#### Port 1/2/3/4

##### Max connection

Setting	Factory Default	Necessity
1, 2, 3, 4	1	Required

**Max connection** is usually used when the user needs to receive data from different hosts simultaneously. The factory default is 1. In this case, only one specific host can access this port of the NPort W2004, and the Real COM driver on that host will have full control over the port.

##### Max connection 1

Allows only 1 host's Real COM driver to open the specific NPort W2004 serial port.

##### Max connection 2 to 4:

Allows 2 to 4 host's Real COM drivers to open the specific NPort W2004 serial port, at the same time. When multiple hosts' Real COM drivers open the serial port at the same time, the COM driver only provides a pure data tunneling without control ability.

Application software that is based on the COM driver will receive a driver response of "success" when the software uses any of the Win32 API functions. The firmware will only send the data back to the driver on the host.

Data will be sent first-in-first-out when data comes into the NPort W2004 from the Ethernet interface.



**ATTENTION**

When **Max connection** is set to 2, 3, or 4, NPort W2004 will use a “multi connection application” (i.e., 2, 3, or 4 hosts are allowed access to the port at the same time). When using a multi connection application, NPort W2004 will use the serial communication parameters set in the console. All of the hosts connected to that port must use the same serial settings. If one of the hosts opens the COM port with parameters that are different from NPort W2004’s console setting, data communication may not work properly.

**Data Packing**

*Delimiter 1/2*

Setting	Factory Default	Necessity
00 to FF (hex)	None	Optional

Once the NPort W2004 receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it to the NPort W2004’s Ethernet port.



**ATTENTION**

Delimiter 2 is optional. If left blank, then Delimiter 1 alone trips clearing of the buffer. If the size of the serial data received is greater than 1 KB, the NPort W2004 will automatically pack the data and send it to the Ethernet. However, to use the delimiter function, you must at least enable Delimiter 1. If Delimiter 1 is left blank and Delimiter 2 is enabled, the delimiter function will not work properly.

*Force transmit*

Setting	Factory Default	Necessity
0 to 65535 ms	0	Optional

0: Disable force transmit timeout.

1 to 65535: Forces the NPort W2004’s TCP/IP protocol software to try to pack serial data received during the specified time into the same data frame.

This parameter defines the time interval during which NPort W2004 fetches the serial data from its internal buffer. If data is incoming through the serial port, NPort W2004 stores the data in the internal buffer. NPort W2004 transmits data stored in the buffer via TCP/IP, but only if the internal buffer is full or if the Force transmit time interval reaches the time specified under Force transmit timeout.

The optimal Force transmit timeout depends on your application, but it must be at least larger than one character interval within the specified baud rate. For example, assume that the serial port is set to 1200 bps, 8 data bits, 1 stop bit, and no parity. In this case, the total number of bits needed to send a character is 10 bits, and the time required to transfer one character is

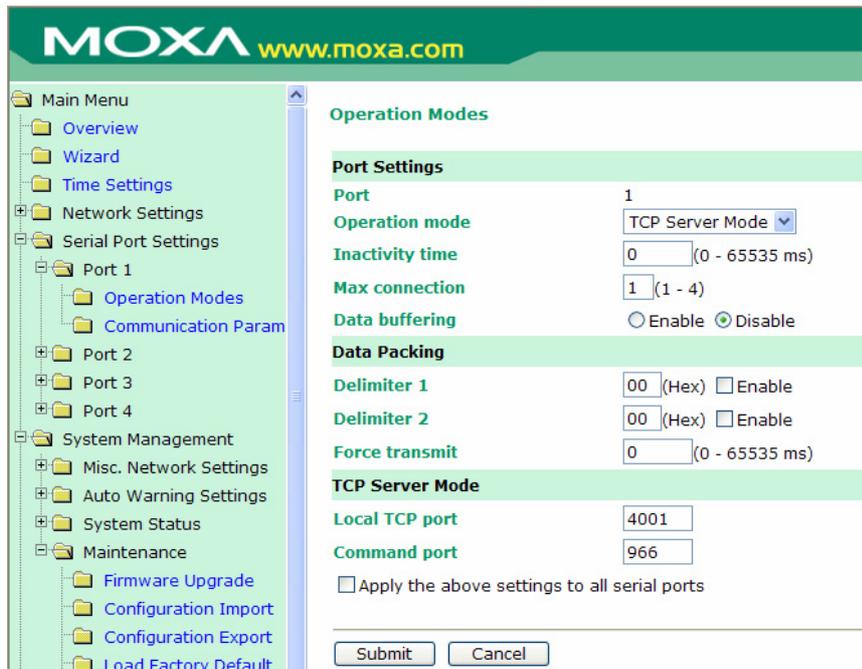
$$( 10 \text{ (bits)} / 1200 \text{ (bits/s)} ) * 1000 \text{ (ms/s)} = 8.3 \text{ ms.}$$

Therefore, you should set Force transmit to be larger than 8.3 ms, so in this case, it must be greater

than or equal to 10 ms.

If you want to send a series of characters in the same packet, the serial device attached to NPort W2004 should send that series of characters during a time interval less than the Force transmit timeout, and the total length of data must be less than or equal to NPort W2004's internal buffer size. The serial communication buffer size for NPort W2004 is 1 KB per port.

### TCP Server Mode



#### Port 1/2/3/4

##### *Inactivity time*

Setting	Factory Default	Necessity
0 to 65535 ms	0 ms	Optional

0 ms: TCP connection is not closed due to an idle serial line.

0-65535 ms: NPort W2004 automatically closes the TCP connection if there is no serial data activity for the given time. After the connection is closed, NPort W2004 starts listening for another host's TCP connection.

This parameter defines the maintenance status as Closed or Listen for the TCP connection. The connection is closed if there is no incoming or outgoing data through the serial port during the specific Inactivity time.

If the Inactivity time is set to 0, the current TCP connection is kept active until a connection close request is received. Although Inactivity time is disabled, the NPort W2004 will check the connection status between the NPort W2004 and remote host by sending "keep alive" packets periodically. If the remote host does not respond to the packet, NPort W2004 assumes that the connection was closed down unintentionally. NPort W2004 will then force the existing TCP connection to close.



**ATTENTION**

The Inactivity time should be set at least larger than that of Force transmit timeout. To prevent the unintended loss of data due to the session being disconnected, it is highly recommended that this value is set large enough so that the intended data transfer can be completed.

**Max connection**

Setting	Factory Default	Necessity
1, 2, 3, 4	1	Required

**Max connection** is usually used when the user needs to receive data from different hosts simultaneously. The factory default is 1. In this case, only one specific host can access this port of the NPort W2004, and the Real COM driver on that host will have full control over the port.

**Max connection 1**

Allows only 1 host's Real COM driver to open the specific NPort W2004 serial port.

**Max connection 2 to 4:**

Allows 2 to 4 host's Real COM drivers to open the specific NPort W2004 serial port, at the same time. When multiple hosts' Real COM drivers open the serial port at the same time, the COM driver only provides a pure data tunneling without control ability.

Application software that is based on the COM driver will receive a driver response of "success" when the software uses any of the Win32 API functions. The firmware will only send the data back to the driver on the host.

Data will be sent first-in-first-out when data comes into the NPort W2004 from the Ethernet interface.



**ATTENTION**

When **Max connection** is set to 2, 3, or 4, NPort W2004 will use a "multi connection application" (i.e., 2, 3, or 4 hosts are allowed access to the port at the same time). When using a multi connection application, NPort W2004 will use the serial communication parameters set in the console. All of the hosts connected to that port must use the same serial settings. If one of the hosts opens the COM port with parameters that are different from NPort W2004's console setting, data communication may not work properly.

**Data Packing**

**Delimiter 1/2**

Setting	Factory Default	Necessity
00 to FF (hex)	None	Optional

Once the NPort W2004 receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it to the NPort W2004's Ethernet port.



**ATTENTION**

Delimiter 2 is optional. If left blank, then Delimiter 1 alone trips clearing of the buffer. If the size of the serial data received is greater than 1 KB, the NPort W2004 will automatically pack the data and send it to the Ethernet. However, to use the delimiter function, you must at least enable Delimiter 1. If Delimiter 1 is left blank and Delimiter 2 is enabled, the delimiter function will not work properly.

***Force transmit***

Setting	Factory Default	Necessity
0 to 65535 ms	0	Optional

0: Disable force transmit timeout.

1 to 65535: Forces the NPort W2004's TCP/IP protocol software to try to pack serial data received during the specified time into the same data frame.

This parameter defines the time interval during which NPort W2004 fetches the serial data from its internal buffer. If data is incoming through the serial port, NPort W2004 stores the data in the internal buffer. NPort W2004 transmits data stored in the buffer via TCP/IP, but only if the internal buffer is full or if the Force transmit time interval reaches the time specified under Force transmit timeout.

The optimal Force transmit timeout depends on your application, but it must be at least larger than one character interval within the specified baud rate. For example, assume that the serial port is set to 1200 bps, 8 data bits, 1 stop bit, and no parity. In this case, the total number of bits needed to send a character is 10 bits, and the time required to transfer one character is

$$( 10 \text{ (bits)} / 1200 \text{ (bits/s)} ) * 1000 \text{ (ms/s)} = 8.3 \text{ ms.}$$

Therefore, you should set Force transmit to be larger than 8.3 ms, so in this case, it must be greater than or equal to 10 ms.

If you want to send a series of characters in the same packet, the serial device attached to NPort W2004 should send that series of characters during a time interval less than the Force transmit timeout, and the total length of data must be less than or equal to NPort W2004's internal buffer size. The serial communication buffer size for NPort W2004 is 1 KB per port.

**TCP Server Mode**

***Local TCP Port***

Setting	Factory Default	Necessity
1 to 65535	4001	Required

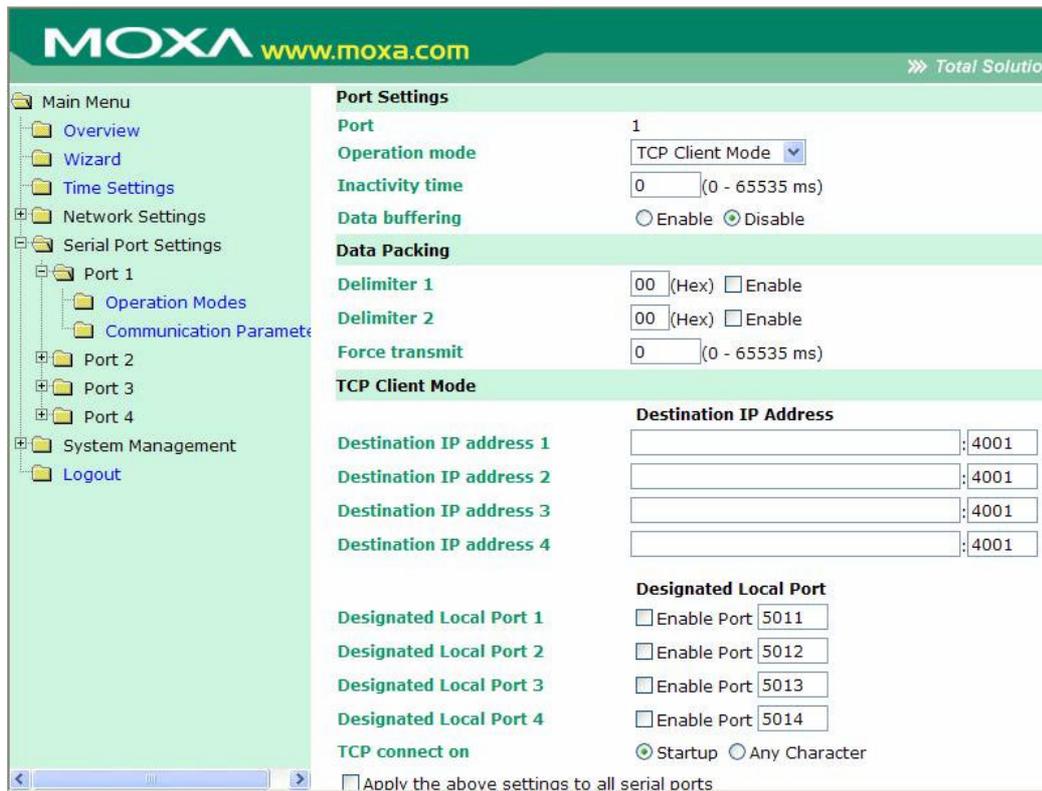
The "Local TCP port" is the TCP port that NPort W2004 uses to listen to connections, and that other devices must use to contact NPort W2004. To avoid conflicts with well known TCP ports, the default is set to 4001.

**Command port**

Setting	Factory Default	Necessity
1 to 65535	966	Optional

The “Command port” is a listen TCP port for IP-Serial Lib commands from the host. In order to prevent a TCP port conflict with other applications, the user can set the Command port to another port if needed. IP-Serial Lib will automatically check the Command Port on NPort W2004 so that the user does not need to configure the program.

**TCP Client Mode**



**Port 1/2/3/4**

**TCP alive check time**

Setting	Factory Default	Necessity
0 to 99 min	7 min	Optional

0 min: TCP connection is not closed due to an idle TCP connection.

1 to 99 min: NPort W2004 automatically closes the TCP connection if there is no TCP activity for the given time. After the connection is closed, NPort W2004 starts listening for another host's TCP connection.

**Inactivity time**

Setting	Factory Default	Necessity
0 to 65535 ms	0 ms	Optional

0 ms: TCP connection is not closed due to an idle serial line.

0-65535 ms: NPort W2004 automatically closes the TCP connection if there is no serial data activity for the given time. After the connection is closed, NPort W2004 starts listening for another host's TCP connection.

This parameter defines the maintenance status as Closed or Listen for the TCP connection. The connection is closed if there is no incoming or outgoing data through the serial port during the specific Inactivity time.

If the Inactivity time is set to 0, the current TCP connection is kept active until a connection close request is received. Although Inactivity time is disabled, the NPort W2004 will check the connection status between the NPort W2004 and remote host by sending "keep alive" packets periodically. If the remote host does not respond to the packet, NPort W2004 assumes that the connection was closed down unintentionally. NPort W2004 will then force the existing TCP connection to close.



**ATTENTION**

The Inactivity time should be set at least larger than that of Force transmit timeout. To prevent the unintended loss of data due to the session being disconnected, it is highly recommended that this value is set large enough so that the intended data transfer can be completed.



**ATTENTION**

Inactivity time is ONLY active when "TCP connect on" is set to "Any character."

**Data Packing**

*Delimiter 1/2*

Setting	Factory Default	Necessity
00 to FF (hex)	None	Optional

Once the NPort W2004 receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it to the NPort W2004's Ethernet port.



**ATTENTION**

Delimiter 2 is optional. If left blank, then Delimiter 1 alone trips clearing of the buffer. If the size of the serial data received is greater than 1 KB, the NPort W2004 will automatically pack the data and send it to the Ethernet. However, to use the delimiter function, you must at least enable Delimiter 1. If Delimiter 1 is left blank and Delimiter 2 is enabled, the delimiter function will not work properly.

**Force transmit**

Setting	Factory Default	Necessity
0 to 65535 ms	0	Optional

0: Disable force transmit timeout.

1 to 65535: Forces the NPort W2004's TCP/IP protocol software to try to pack serial data received during the specified time into the same data frame.

This parameter defines the time interval during which NPort W2004 fetches the serial data from its internal buffer. If data is incoming through the serial port, NPort W2004 stores the data in the internal buffer. NPort W2004 transmits data stored in the buffer via TCP/IP, but only if the internal buffer is full or if the Force transmit time interval reaches the time specified under Force transmit timeout.

The optimal Force transmit timeout depends on your application, but it must be at least larger than one character interval within the specified baud rate. For example, assume that the serial port is set to 1200 bps, 8 data bits, 1 stop bit, and no parity. In this case, the total number of bits needed to send a character is 10 bits, and the time required to transfer one character is

$$(10 \text{ (bits)} / 1200 \text{ (bits/s)}) * 1000 \text{ (ms/s)} = 8.3 \text{ ms.}$$

Therefore, you should set Force transmit to be larger than 8.3 ms, so in this case, it must be greater than or equal to 10 ms.

If you want to send a series of characters in the same packet, the serial device attached to NPort W2004 should send that series of characters during a time interval less than the Force transmit timeout, and the total length of data must be less than or equal to NPort W2004's internal buffer size. The serial communication buffer size for NPort W2004 is 1 KB per port.

**TCP Client Mode****Destination IP address 1/2/3/4**

Setting	Factory Default	Necessity
IP address or Domain Name	None	Required

**ATTENTION**

Inactivity time is ONLY active when "TCP connect on" is set to "Any character."

## UDP Mode

### Data Packing

#### Delimiter 1/2

Setting	Factory Default	Necessity
00 to FF (hex)	None	Optional

Once the NPort W2004 receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it to the NPort W2004's Ethernet port.



### ATTENTION

Delimiter 2 is optional. If left blank, then Delimiter 1 alone trips clearing of the buffer. If the size of the serial data received is greater than 1 KB, the NPort W2004 will automatically pack the data and send it to the Ethernet. However, to use the delimiter function, you must at least enable Delimiter 1. If Delimiter 1 is left blank and Delimiter 2 is enabled, the delimiter function will not work properly.

#### Force transmit

Setting	Factory Default	Necessity
0 to 65535 ms	0	Optional

0: Disable force transmit timeout.

1 to 65535: Forces the NPort W2004's TCP/IP protocol software to try to pack serial data received

during the specified time into the same data frame.

This parameter defines the time interval during which NPort W2004 fetches the serial data from its internal buffer. If data is incoming through the serial port, NPort W2004 stores the data in the internal buffer. NPort W2004 transmits data stored in the buffer via TCP/IP, but only if the internal buffer is full or if the Force transmit time interval reaches the time specified under Force transmit timeout.

The optimal Force transmit timeout depends on your application, but it must be at least larger than one character interval within the specified baud rate. For example, assume that the serial port is set to 1200 bps, 8 data bits, 1 stop bit, and no parity. In this case, the total number of bits needed to send a character is 10 bits, and the time required to transfer one character is

$$( 10 \text{ (bits)} / 1200 \text{ (bits/s)} ) * 1000 \text{ (ms/s)} = 8.3 \text{ ms.}$$

Therefore, you should set Force transmit to be larger than 8.3 ms, so in this case, it must be greater than or equal to 10 ms.

If you want to send a series of characters in the same packet, the serial device attached to NPort W2004 should send that series of characters during a time interval less than the Force transmit timeout, and the total length of data must be less than or equal to NPort W2004's internal buffer size. The serial communication buffer size for NPort W2004 is 1 KB per port.

**UDP Mode**

*Destination IP address 1*

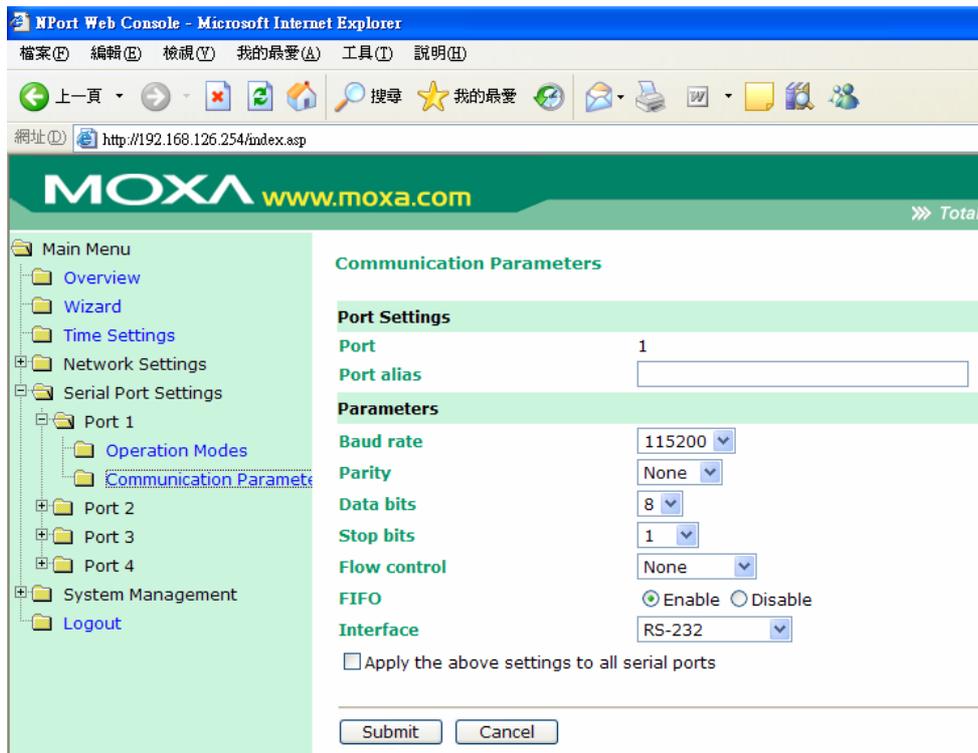
Setting	Factory Default	Necessity
IP address range	Begin: Empty	Required
E.g. Begin: 192.168.1.1	End: Empty	
End: 192.168.1.10	Port: 4001	

*Destination IP address 2/3/4*

Setting	Factory Default	Necessity
IP address range	Begin: Empty	Optional
E.g. Begin: 192.168.1.11 End: 192.168.1.20		

Allows NPort W2004 to connect actively to the remote host whose IP address is set by this parameter.

Communication Parameters



**Port 1/2/3/4**

**Port alias**

Setting	Factory Default	Necessity
1 to 15 characters (e.g., PLC-No. 1)	None	Optional

“Port alias” is included to allow easy identification of the serial devices that are connected to NPort W2004’s serial port.

**Serial Parameters**



**ATTENTION**

Check the serial communication parameters in your Serial Device’s user’s manual. You should set up NPort W2004’s serial parameters with the same communication parameters used by your serial devices.

**Baud Rate**

Setting	Factory Default	Necessity
50 bps to 460.8 Kbps	115.2 Kbps	Required

**Data Bits**

Setting	Factory Default	Necessity
5, 6, 7, 8	8	Required

When the user sets Data bits to 5 bits, the Stop bits setting will automatically change to 1.5 bits.

**Stop Bits**

Setting	Factory Default	Necessity
1, 1.5, 2	1	Required

Stop bits will be set to 1.5 when Data bits is set to 5 bits.

**Parity**

Setting	Factory Default	Necessity
None, Odd, Even, Space, Mark	None	Required

**Flow Control**

Setting	Factory Default	Necessity
None, RTS/CTS, XON/XOFF	RTS/CTS	Required

**FIFO**

Setting	Factory Default	Necessity
Enable, Disable	Enable	Required

NPort 2004's serial ports provide a 16-byte FIFO both in the Tx and Rx directions. To prevent data loss during communication, disable the FIFO setting when your serial device does not have a FIFO.

**Interface**

Model	Ports	Settings	Factory Default	Necessity
NPort W2004	4	RS-232/422/485	RS-232	Required

## System Management

### Misc. Network Settings

#### Console Settings