

Bitlogix SDS5110N User's Manual

First Edition, August 2009

Table of Contents

Chapter 1	Introduction	1-1
	Overview	1-2
	Package Checklist.....	1-2
	Product Features	1-2
	Product Specifications	1-3
Chapter 2	Getting Started	2-1
	Panel Layout.....	2-2
	Connecting the Hardware	2-2
	Connecting the Power.....	2-2
	Connecting to the Network.....	2-3
	Connecting to a Serial Device	2-3
	LED Indicators	2-3
Chapter 3	Initial IP Address Configuration.....	3-1
	Initializing 5110-N's IP Address.....	3-2
	Factory Default IP Address.....	3-2
	Device Server Administration Suite	3-2
	ARP	3-2
	Telnet Console	3-3
	Serial Console (19200, n, 8, 1)	3-6
Chapter 4	Choosing the Proper Operation Mode	4-1
	Overview	4-2
	Real COM Mode	4-2
	TCP Server Mode	4-3
	TCP Client Mode.....	4-4
	UDP Mode.....	4-4
	Pair Connection Mode.....	4-4
	Ethernet Modem Mode.....	4-5
	Reverse Telnet Mode	4-5
	Disabled Mode.....	4-5
Chapter 5	Web Console Configuration	5-1
	Opening Your Browser	5-2
	Basic Settings	5-4
	Network Settings	5-5
	Serial Settings.....	5-8
	Operating Settings	5-9
	Real COM Mode	5-10
	TCP Server Mode	5-13
	TCP Client Mode.....	5-16
	UDP Mode.....	5-20
	Pair Connection Mode	5-22
	Ethernet Modem Mode	5-24
	Reverse Telnet Mode.....	5-27
	Disabled Mode.....	5-28
	Accessible IP Settings.....	5-28
	Auto Warning Settings.....	5-29
	Auto warning: E-mail and SNMP trap	5-29

	Event Type.....	5-30
	Monitor	5-31
	Monitor Line.....	5-31
	Monitor Async.....	5-32
	Monitor Async-Settings.....	5-32
	Change Password.....	5-32
	Load Factory Default.....	5-33
Chapter 6	Configuring Device Server Administrator.....	6-1
	Overview	6-2
	Installing Device Server Administrator	6-2
	Configuration.....	6-4
	Broadcast Search	6-5
	Unlock Password Protection.....	6-6
	Configuring 5110-N	6-8
	Upgrading the Firmware.....	6-9
	Export Configuration	6-11
	Import Configuration	6-11
	Monitor	6-12
	Port Monitor	6-17
	COM Mapping.....	6-17
	On-line COM Mapping.....	6-18
	Off-line COM Mapping	6-22
	IP Location	6-23
Chapter 7	IP Serial LIB	7-1
	Overview	7-2
	IP Serial LIB Function Groups	7-3
	Example Program	7-3
Appendix A	Pinouts and Cable Wiring.....	A-1
	Port Pinout Diagrams	A-2
	Ethernet Port Pinouts	A-2
	Serial Port Pinouts	A-2
	Cable Wiring Diagrams	A-3
	Ethernet Cables.....	A-3
Appendix B	Well Known Port Numbers	B-1
Appendix C	SNMP Agents with MIB II & RS-232 Like Groups	C-1
Appendix D	Auto IP Report Protocol.....	D-1

1

Introduction

5110-N and 5110-T are advanced, 1-port RS-232 serial device servers that make it easy to network-enable serial devices.

The following topics are covered in this chapter:

- Overview**
- Package Checklist**
- Product Features**
- Product Specifications**

Overview

5110-N serial device servers are designed to make your industrial serial devices Internet ready instantly, and are well-suited for POS security market applications. The compact size of 5110-N device servers makes them the ideal choice for connecting your RS-232 serial devices, such as card readers and payment terminals, to an IP-based Ethernet LAN, making it possible for your software to access serial devices located anywhere on a local LAN, or the Internet.

5110-N supports several operation modes, including TCP Server, TCP Client, UDP Server/Client, Pair Connection, and Ethernet Modem, ensuring the compatibility of network software that uses a standard network API (Winsock, BSD Sockets). In addition, 5110-N's Real COM drivers allow you to set up your COM port software 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.

5110-N device servers support automatic IP configuration protocols (DHCP, BOOTP) and manual configuration via the handy web browser console. Both methods ensure quick and effective installation. With 5110-N's Windows Utility, installation is very straightforward, since all system parameters can be stored and then copied to other device servers simultaneously.

Package Checklist

5110-N products are shipped with the following items:

Standard Accessories

- 1 5110-N serial device server
- Quick Installation Guide
- 5110-N Documentation and Software CD-ROM
- Power Adaptor

Optional Accessories

- DK-35A: DIN-Rail Mounting Kit (35 mm)

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

Product Features

5110-N has the following features:

- Low cost, credit card size
- Makes your serial devices Internet ready
- Easy wall and DIN-Rail mounting
- Real COM driver for Windows
- Versatile socket operation modes: TCP Server, TCP Client, UDP, and Ethernet Modem
- Pair Connection mode for connecting two serial devices over a network without a PC
- Easy-to-use Windows Utility for mass installation
- Auto-detecting 10/100 Mbps Ethernet
- Built-in 15 KV ESD protection for all serial signals
- Supports SNMP MIB-II for network management
- Configuration via web/Telnet/serial console
- Configuration utility automatically finds 5110-N devices on the network
- Supports Reverse Telnet mode
- Displays uptime on the Overview web page of 5110-N Configurator

Product Specifications

LAN

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

5110-N Serial Interface

Interface	RS-232
No. of Ports	1
Port Type	Male DB9
Signals	TxD, RxD, RTS, CTS, DTR, DSR, DCD, GND
Serial Line Protection	15 KV ESD for all signals

Power Line Protection

4 KV Burst (EFT), EN61000-4-4

2 KV Surge, EN61000-4-5

Advanced Built-in Features

Watch Dog Timer

Serial Communication Parameters

Parity	None, Even, Odd, Space, Mark
Data Bits	5, 6, 7, 8
Stop Bit	1, 1.5, 2
Flow Control	RTS/CTS, XON/XOFF, DTR/DSR
Transmission Speed	110 bps to 230.4 Kbps

Software Features

Protocols ICMP, IP, TCP, UDP, DHCP, BOOTP, Telnet, DNS, SNMP, HTTP, SMTP

Utilities Device Server Administrator for Windows 95/98/ME/NT/2000/XP/2003

Real COM Drivers Windows 95/98/ME/NT/2000/XP/2003 Real COM driver

Configuration Web Browser, Serial/Telnet Console, or Windows Utility

Power Requirements

Power Input	12 to 48 VDC
Power Consumption	128.7 mA@12V, 72 mA@24V

Mechanical

Casing	Aluminum case (1 mm)
Dimensions (W × H × D)	50 × 80 × 22 mm (1.97 × 3.15 × 0.87 in)

Environment

Operating Temperature	0 to 55°C (32 to 131°F), 5 to 95%RH, -40 to 75°C(-40 to 167°F) for “-T” versions
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
WARRANTY	5 years

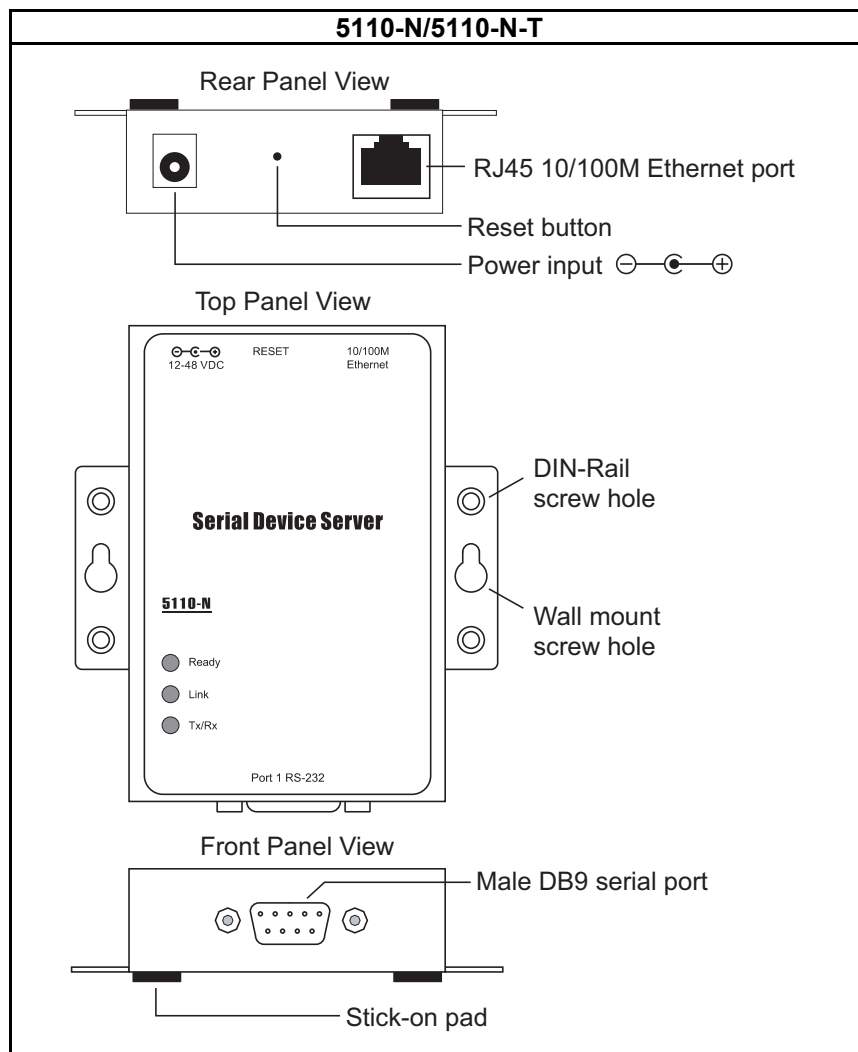
2

Getting Started

This chapter includes information about installing 5110-N. The following topics are covered:

- ❑ **Panel Layout**
- ❑ **Connecting the Hardware**
 - 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 5110-N to serial devices for testing purposes. We cover **Connecting to the Network**, **Connecting to a Serial Device**, and **LED Indicators**.

Connecting the Power

Connect the 12-48VDC power cord with 5110-N's power input. If the power is properly supplied, the **Ready** LED will glow until the system is ready, at which time the **Ready** LED will glow green.

Connecting to the Network

Connect one end of the Ethernet cable to 5110-N's 10/100M Ethernet port and the other end of the cable to the Ethernet network. 5110-N will indicate a valid connection to the Ethernet in the following ways:

- The Ethernet LED glows green when connected to a 100 Mbps Ethernet network.
- The Ethernet LED glows orange 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 5110-N and the serial device. 5110-N's serial port uses the RS-232 interface to transmit data. The port uses a standard male DB9 pin assignment. Refer to Appendix A to see the signal definitions for the port.

LED Indicators

5110-N has 3 LED indicators, as described in the following table.

LED Name	LED Color	LED Function
Ready	Red	Steady on: Power is on and 5110-N is booting up. Blinking: Indicates an IP conflict, or that the DHCP or BOOTP server did not respond properly.
	Green	Steady on: Power is on and 5110-N is functioning normally. Blinking: The device server has been located by Administrator's Location function.
	Off	Power is off, or power error condition exists.
Link	Orange	10 Mbps Ethernet connection
	Green	100 Mbps Ethernet connection
	Off	Ethernet cable is disconnected, or damaged.
Tx/Rx	Orange	Serial port is receiving data.
	Green	Serial port is transmitting data.
	Off	No data is being transmitted or received through the serial port.

Initial IP Address Configuration

When setting up your 5110-N for the first time, you should first configure the device server's IP address. This chapter introduces the methods to configure the device server's IP address. For more details about network settings, see the *Network Settings* section from Chapter 5, *Web Console Configuration*.

This chapter includes the following sections:

- Initializing 5110-N's IP Address**
- Factory Default IP Address**
- Device Server Administration Suite ← recommended configuration method**
- ARP**
- Telnet Console**
- Serial Console (19200, n, 8, 1)**

Initializing 5110-N's IP Address

1. Determine whether your 5110-N needs to use a Static IP or Dynamic IP (either DHCP or BOOTP application).
2. *If 5110-N is used in a Static IP environment*, you can use Device Server Administration Suite, ARP, Web Console, Telnet Console, or Serial Console to configure the new IP address.
3. *If 5110-N is used in a Dynamic IP environment*, you can use Device Server Administration Suite, Web Console, Telnet Console, or Serial Console to configure 5110-N to get an IP address dynamically with DHCP, DHCP/BOOTP, or BOOTP.



ATTENTION

Consult your network administrator on how to reserve a fixed IP address for your 5110-N in the MAC-IP mapping table when using a DHCP Server or BOOTP Server. In most applications, you should assign a fixed IP address to your 5110-N.

Factory Default IP Address

5110-N products 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 access a device configured with a private IP address directly from a public network. For example, you would not be able to ping such a device from an outside Internet connection. 5110-N 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.)

Device Server Administration Suite

Device Server Administration Suite consists of useful utility programs that are used to configure and manage your 5110-Ns.

See Chapter 5 for details on how to install Device Server Administration Suite, and how to use this suite of useful utilities to set up IP addresses and configure your 5110-N serial device servers.

ARP

You can make use of the ARP (Address Resolution Protocol) command to set up an IP address for your 5110-N. The ARP command tells your computer to associate the 5110-N's MAC address with the intended IP address. You must then use Telnet to access the 5110-N, at which point the device server's IP address will be reconfigured.

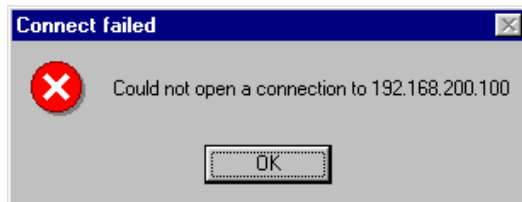


ATTENTION

In order to use this setup method, both your computer and 5110-N must be connected to the same LAN. Or, you may use a cross-over Ethernet cable to connect the 5110-N directly to your computer's Ethernet card. Your 5110-N must be configured with the factory default IP address—192.168.127.254—before executing the ARP command, as described below.

Take the following steps to use ARP to configure the IP address:

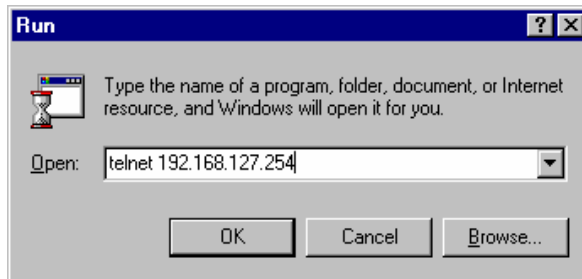
1. Obtain a valid IP address for your 5110-N from your network administrator.
2. Obtain 5110-N's MAC address from the label on its bottom panel.
3. Execute the 'arp -s' command from your computer's MS-DOS prompt by typing:
arp -s 192.168.200.100 00-90-E8-xx-xx-xx
where 192.168.200.100 is the new IP address and 00-90-E8-xx-xx-xx is the MAC address for your 5110-N (be sure to use the numbers determined in steps 1 and 2).
4. Next, execute a special Telnet command by typing:
telnet 192.168.200.100 6000
(be sure to use the IP determined in step 1)
5. After issuing this command, a **Connect failed** message will be displayed, as shown. After the 5110-N reboots, its IP address should be updated to the new address, and you can reconnect using Telnet, Web, or Administrator to check the success of the update.



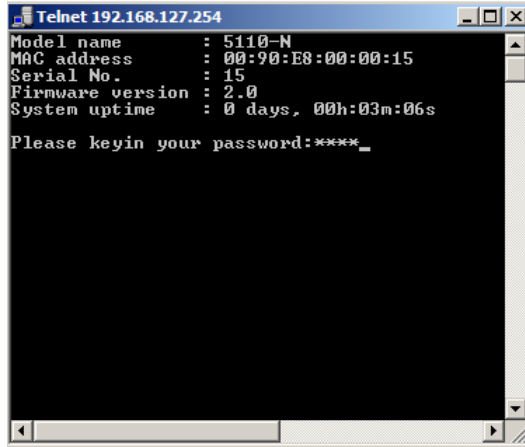
Telnet Console

Depending on how your computer and network are configured, you may find it convenient to use network access to set up your 5110-N's IP address. This can be done using Telnet.

1. From the Windows desktop, click **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**.



- 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 appear only if the 5110-N is password protected.



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

```

<< Main menu >>
(1) Basic settings
(2) Network settings
(3) Serial settings
(4) Operating settings
(5) Accessible IP settings
(6) Auto warning settings
(7) Monitor
(8) Ping
(9) Change password
(a) Load factory default
(v) View settings
(s) Save/Restart
(q) Quit
Key in your selection:

```

- Type **1** to select **IP address** and then press **Enter**.

```

<< Main menu->Network settings >>
(1) IP address
(2) Netmask
(3) Gateway
(4) IP configuration
(5) DNS server 1
(6) DNS server 2
(7) SNMP
(8) SNMP community name
(9) SNMP contact
(a) SNMP location
(b) Auto IP report to IP
(c) Auto IP report to TCP port
(d) Auto IP report period
(v) View settings
(m) Back to main menu
(q) Quit
Key in your selection:

```

- Use the **Backspace** key to erase the current IP address, type in the new IP address, and then press **Enter**.

```
<< Main menu->Network settings >>
(1) IP address
(2) Netmask
(3) Gateway
(4) IP configuration
(5) DNS server 1
(6) DNS server 2
(7) SNMP
(8) SNMP community name
(9) SNMP contact
(a) SNMP location
(b) Auto IP report to IP
(c) Auto IP report to TCP port
(d) Auto IP report period
(v) View settings
(m) Back to main menu
(q) Quit

Key in your selection: 1
IP address: 192.168.127.253
```

- Press any key to continue.

```
<< Main menu->Network settings >>
(1) IP address
(2) Netmask
(3) Gateway
(4) IP configuration
(5) DNS server 1
(6) DNS server 2
(7) SNMP
(8) SNMP community name
(9) SNMP contact
(a) SNMP location
(b) Auto IP report to IP
(c) Auto IP report to TCP port
(d) Auto IP report period
(v) View settings
(m) Back to main menu
(q) Quit

Key in your selection: 1
IP address: 192.168.127.253
Set IP address success

Press any key to continue...
```

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

```
<< Main menu->Network settings >>
(1) IP address
(2) Netmask
(3) Gateway
(4) IP configuration
(5) DNS server 1
(6) DNS server 2
(7) SNMP
(8) SNMP community name
(9) SNMP contact
(a) SNMP location
(b) Auto IP report to IP
(c) Auto IP report to TCP port
(d) Auto IP report period
(v) View settings
(m) Back to main menu
(q) Quit

Key in your selection: m
```

9. Type **s** and then press **Enter** to **Save/Restart** the system.

```
<< Main menu >>
(1) Basic settings
(2) Network settings
(3) Serial settings
(4) Operating settings
(5) Accessible IP settings
(6) Auto warning settings
(7) Monitor
(8) Ping
(9) Change password
(a) Load factory default
(v) View settings
(s) Save/Restart
(q) Quit

Key in your selection: s
```

10. Type **y** and then press **Enter** to save the new IP address and restart 5110-N.

```
Save change?
(y) Yes
(n) No

Key in your selection: y
```

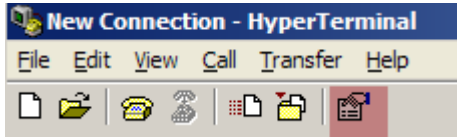
Serial Console (19200, n, 8, 1)

You can use the RS-232 console port to set up the IP address for 5110-N. We suggest using PComm Terminal Emulator, which is available free of charge as part of the PComm Lite program suite (found on the Software CD that comes with the product), to carry out the installation procedure, although other similar utilities may also be used.

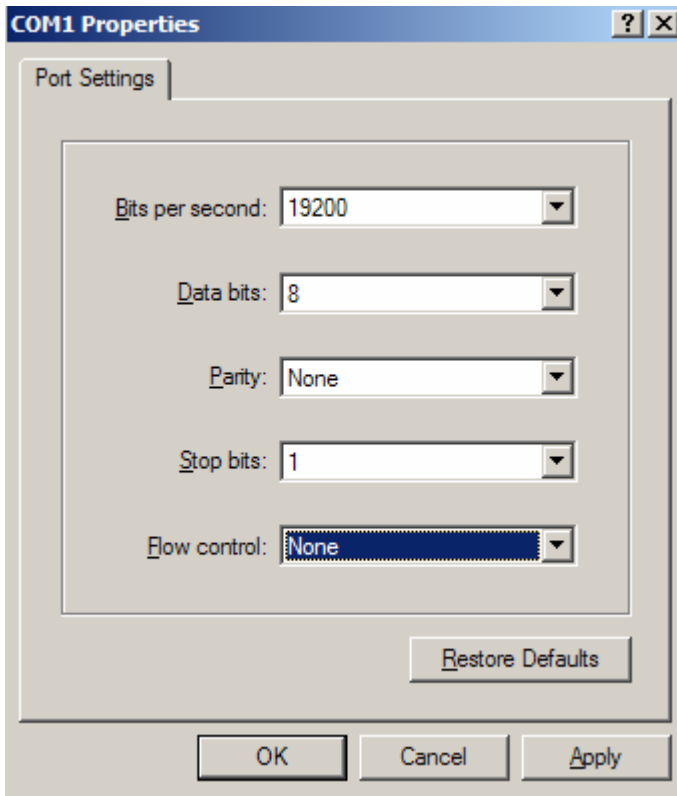
Before you start to configure the 5110-N via serial console, turn off the power and connect the serial cable from 5110-N to your computer's serial port.

1. Connect 5110-N's serial port 1 directly to your computer's male RS-232 serial port.
2. From the Windows desktop click **Start** → **Programs** → **Accessories** → **Communication** → **Hyperterminal**

- When the **Hyperterminal** window opens, first click the **Properties** icon and then click **Configure**.



- 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**.

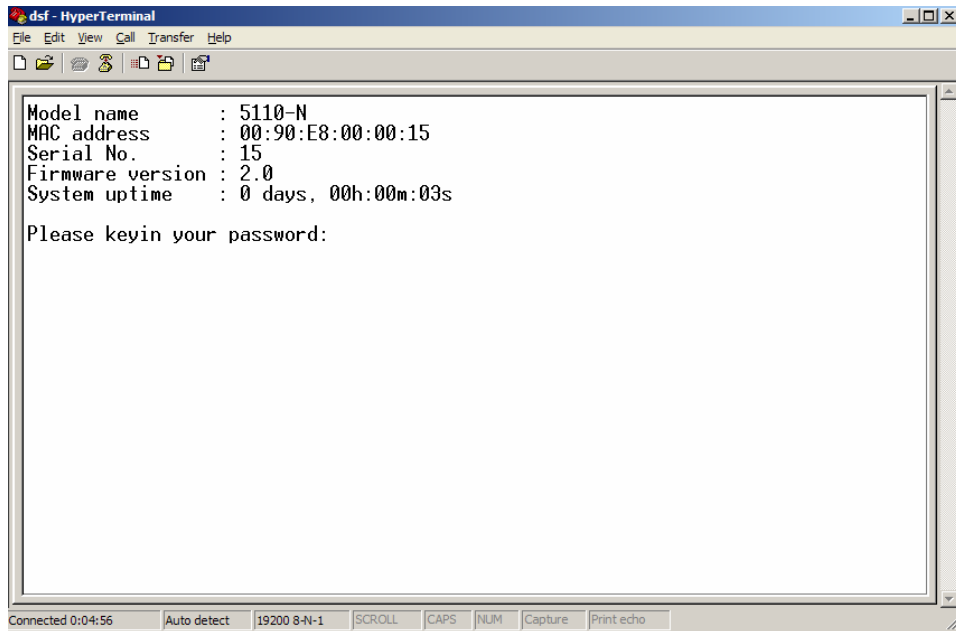


- From the Property window's **Terminal** page, select **ANSI** or **VT100** for **Terminal Type** and then click **OK**. If you select **Dumb Terminal** as the terminal type, some of the console functions—especially the **Monitor** function—may not work properly.
- Press the “`” key continuously and then power on the 5110-N.



- 5110-N will receive the “`” string continuously and then auto switch from data mode to console mode.

- Input the password when prompted. Note that the password page will appear only when the 5110-N has been set up for password protection.

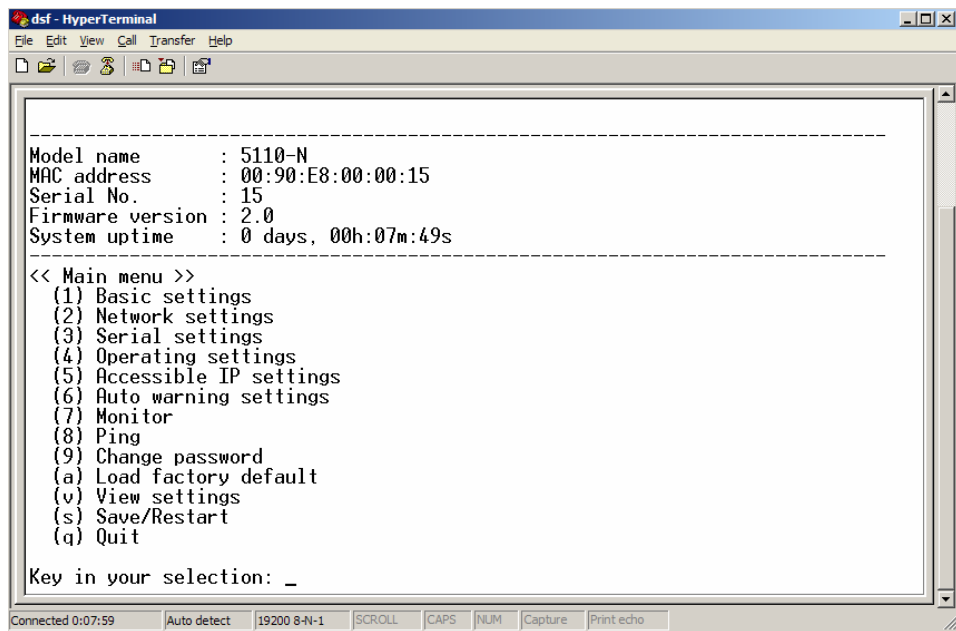


```
dsf - HyperTerminal
File Edit View Call Transfer Help
Model name      : 5110-N
MAC address     : 00:90:E8:00:00:15
Serial No.      : 15
Firmware version : 2.0
System uptime   : 0 days, 00h:00m:03s

Please keyin your password:

Connected 0:04:56  Auto detect  19200 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

- Start configuring the IP address under **Network Settings**. Refer to step 4 in the **Telnet Console** section for the rest of the IP settings.



```
dsf - HyperTerminal
File Edit View Call Transfer Help
-----
Model name      : 5110-N
MAC address     : 00:90:E8:00:00:15
Serial No.      : 15
Firmware version : 2.0
System uptime   : 0 days, 00h:07m:49s
-----
<< Main menu >>
(1) Basic settings
(2) Network settings
(3) Serial settings
(4) Operating settings
(5) Accessible IP settings
(6) Auto warning settings
(7) Monitor
(8) Ping
(9) Change password
(a) Load factory default
(v) View settings
(s) Save/Restart
(q) Quit

Key in your selection: _

Connected 0:07:59  Auto detect  19200 8-N-1  SCROLL  CAPS  NUM  Capture  Print echo
```

Choosing the Proper Operation Mode

In this section, we describe the various 5110-N operation modes. The options include Real COM Mode, which 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.

- Overview**
- Real COM Mode**
- TCP Server Mode**
- TCP Client Mode**
- UDP Mode**
- Pair Connection**
- Ethernet Modem Mode**
- Reverse Telnet Mode**
- Disabled Mode**

Overview

5110-N serial device servers network-enable traditional RS-232 devices, in which 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. Your computer can 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) to collect data from various kinds of instruments. Since 5110-N Serial Device Servers network-enable instruments equipped with an RS-232 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.

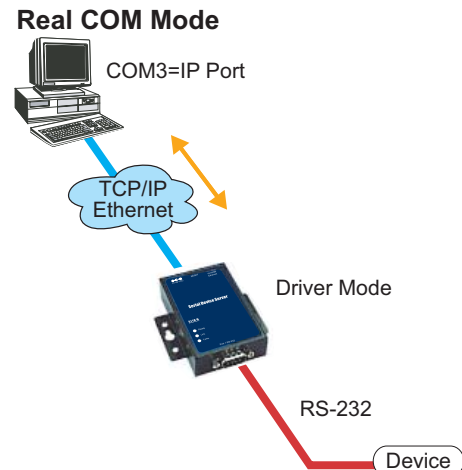
5110-N is an external IP-based network device that allows you to expand the number of serial ports for a host computer on demand. As long as your host computer supports the TCP/IP protocol, you will not be limited by the host computer's bus limitation (such as ISA or PCI), or lack of drivers for various operating systems.

In addition to providing socket access, 5110-N also comes with a Real COM driver that transmits all serial signals intact. This means that your existing COM-based software can be preserved, without needing to invest in additional 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 also allows data to be unicast to only one IP address, or multicast to groups of IP addresses.

Real COM Mode

5110-N comes equipped with COM drivers that work with Windows 95/98/ME/NT/2000/XP. The driver establishes a transparent connection between host and serial device by mapping the IP:Port of the 5110-N's serial port to a local COM port on the host computer. Real COM Mode also supports up to 4 simultaneous connections, so that multiple hosts can collect data from the same serial device at the same time.



**ATTENTION**

The driver used for Real COM Mode is bundled with Device Server Administrator. The driver is installed on your computer automatically when you install the Device Server Administration Suite.

One of the major 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 5110-N accepts the Ethernet frame, unpacks the TCP/IP packet, and then sends it transparently to the appropriate serial device attached to one of the 5110-N's serial ports.

**ATTENTION**

Real COM Mode allows several hosts to have access control to the same 5110-N. The driver that comes with your 5110-N controls host access to attached serial devices by checking the host's IP address. Refer to the **Accessible IP Settings** section of Chapter 5 for more details.

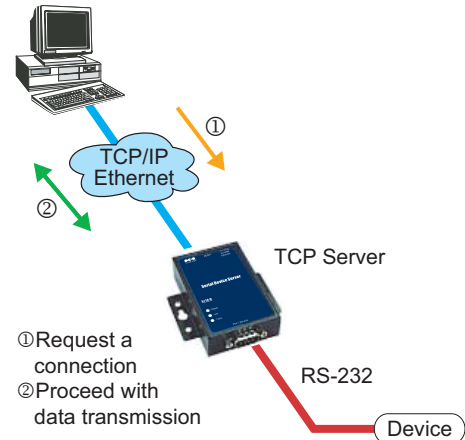
TCP Server Mode

In **TCP Server Mode**, 5110-N is configured with a unique IP:Port combination on a TCP/IP network. In this case, 5110-N waits passively to be contacted by the host computer. After the host computer establishes a connection with the serial device, it can then proceed with data transmission. TCP Server 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 5110-N configured for TCP Server Mode.
2. Once the connection is established, data can be transmitted in both directions—from the host to the 5110-N, and from the 5110-N to the host.

TCP Server Mode



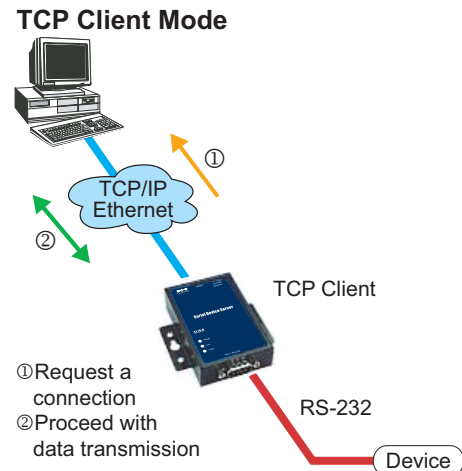
TCP Client Mode

In **TCP Client Mode**, 5110-N can actively establish a TCP connection with a pre-determined host computer when serial data arrives.

After the data has been transferred, 5110-N can disconnect automatically from the host computer by using the **TCP alive check time** or **Inactivity time** settings. Refer to Chapter 5 for detailed configuration instructions.

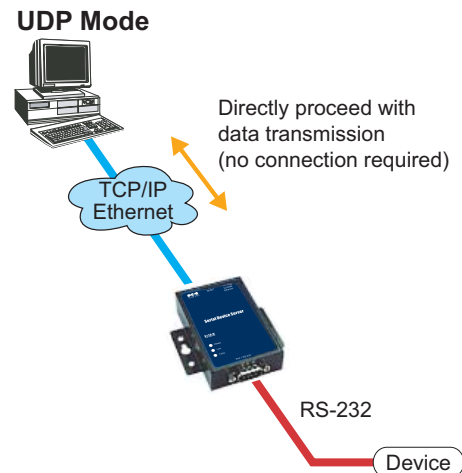
As illustrated in the figure, data transmission proceeds as follows:

1. The 5110-N configured for TCP Client Mode requests a connection from the host.
2. Once the connection is established, data can be transmitted in both directions—from the host to the 5110-N, and from the 5110-N 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 multiple host computers and the serial device can also receive data from one or multiple host computers, making this mode ideal for message display applications.



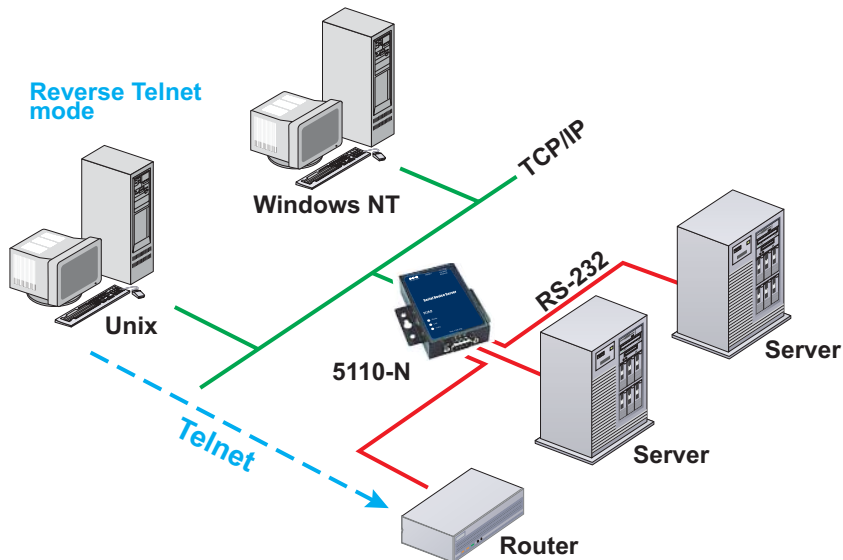
Pair Connection Mode

Pair Connection Mode employs two 5110-N in tandem, and can be used to remove the 15-meter distance limitation imposed by the RS-232 interface. One 5110-N 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 5110-N. The two 5110-N 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 (although it cannot transmit the DCD signal) between the two 5110-N's.

Ethernet Modem Mode

Ethernet Modem Mode is designed for use with legacy operating systems, such as MS-DOS, that do not support TCP/IP Ethernet. By connecting one of 5110-N's serial ports 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.

Reverse Telnet Mode



Console management is commonly used for connecting to Console/AUX or COM ports of routers, switches, and UPS units. Rtelnet works the same as RAW mode in that only one TCP port is listened to after booting up. The system then waits for a host on the network to initiate a connection. The difference is that the RAW mode does not provide the conversion function provided by Telnet. If the connected devices need to use the CR/LF conversion function when controlling, then users must choose Rtelnet mode.

Disabled Mode

When the Operation Mode for a particular port is set to **Disabled**, that port will be disabled.

Web Console Configuration

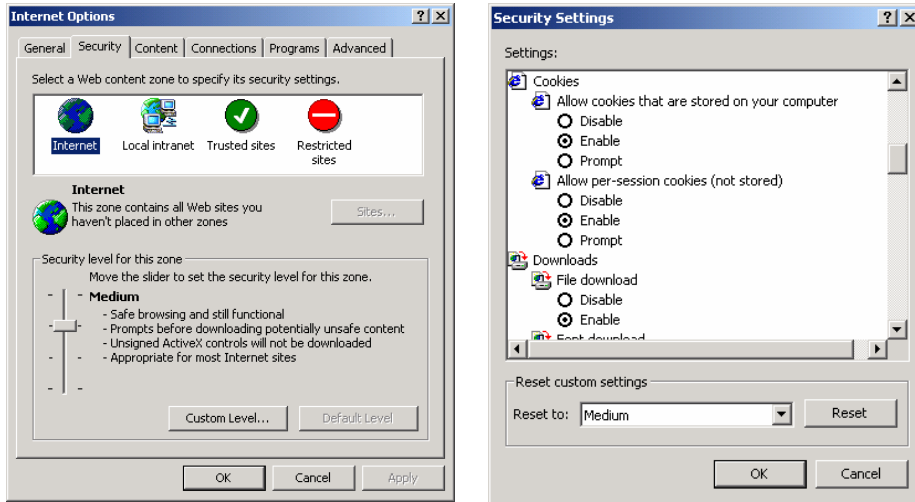
The Web Console is the most user-friendly method available to configure 5110-N. In this chapter, we introduce the Web Console function groups and definitions.

The following topics are covered in this chapter:

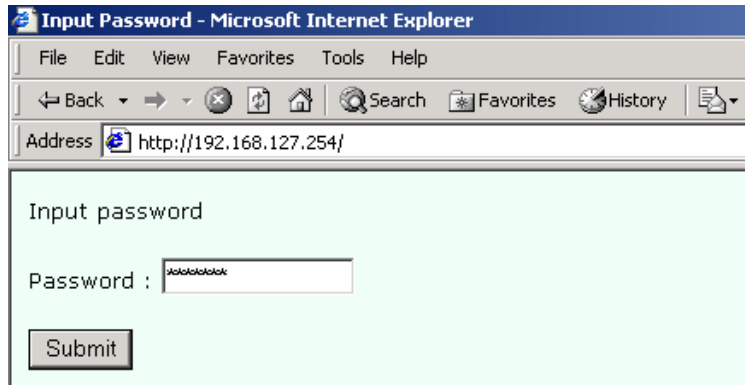
- Opening Your Browser**
- Basic Settings**
- Network Settings**
- Serial Settings**
- Operating Settings**
 - Real COM Mode
 - TCP Server Mode
 - TCP Client Mode
 - UDP Mode
 - Pair Connection Mode
 - Ethernet Modem Mode
 - Reverse Telnet Mode
 - Disabled Mode
- Accessible IP Settings**
- Auto warning Settings**
 - Auto warning: E-mail and SNMP trap
 - Event Type
- Monitor**
 - Monitor Line
 - Monitor Async
 - Monitor Async-Settings
- Change Password**
- Load Factory Default**

Opening Your Browser

1. Open your browser with the cookie function enabled. (To enable your browser for cookies, right click your desktop Internet Explorer icon, select Properties, click the Security tab, and then select the three Enable options as shown.)



2. Type 192 . 168 . 127 . 254 in the **Address** input box (use the correct IP address if different from the default), and then press **Enter**.
3. Input the password if prompted. The password will be transmitted with MD5 encryption over the Ethernet. Note that you will not be prompted to enter the password if the 5110-N is not currently password protected.



ATTENTION

If you use other web browsers, remember to Enable the function to “allow cookies that are stored on your computer” or “allow per-session cookies.” 5110-N uses cookies only for “password” transmission.



ATTENTION

Refer to Chapter 3, “Initial IP Address Configuration,” to see how to configure the IP address. Examples shown in this chapter use the Factory Default IP address (192.168.127.254).

- The 5110-N homepage will open next. 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 5110-N is to load factory defaults by using the Reset button located near the 5110-N's RJ45 Ethernet port. Remember to use Device Server Administrator to export the configuration file when you have finished the configuration. After using the Reset button to load factory defaults, your configuration can be easily reloaded into 5110-N by using the Device Server Administrator Import function. Refer to Chapter 6 for more details about using the Export and Import functions.



ATTENTION

If your 5110-N application requires using password protection, you must enable the cookie function in your browser. If the cookie function is disabled, you will not be allowed to enter the Web Console Screen.

Basic Settings

Server name

Setting	Factory Default	Necessity
1 to 39 characters	[model name]_[Serial No.]	Optional

This option is useful for specifying the location or application of different 5110-Ns.

Web/Telnet Console

The **Disable** option for Web Console and Telnet Console is included for security reasons. In some cases, you may want to Disable one or both of these console utilities as an extra precaution to prevent unauthorized users from accessing your 5110-N. The factory default for both Web console and Telnet console is **Enable**.

Web Console

Setting	Factory Default	Necessity
Enable or Disable	Enable	Required

Telnet console

Setting	Factory Default	Necessity
Enable or Disable	Enable	Required



ATTENTION

If you disable both the Web console and the Telnet console, you can still use Device Server Administrator to configure 5110-N either locally or remotely over the network. Refer to Chapter 6 for more details.

Reset button protect

Setting	Factory Default	Necessity
No or Yes	None	Optional

NOTE: Select the **Yes** option to allow limited use of the Reset Button. In this case, the Reset Button can be used for only 60 seconds. i.e., 60 sec. after booting up, the Reset Button will be disabled automatically.

Network Settings

You must assign a valid IP address to 5110-N 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, 5110-N will not have a valid connection to the network). First time users can refer to Chapter 3, “Initial IP Address Configuration,” for more information.

You can choose from four possible “IP configuration” modes—**Static**, **DHCP**, **DHCP/BOOTP**, and **BOOTP**—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
DHCP/BOOTP	DHCP Server assigned IP address, Netmask, Gateway, DNS, and Time Server, or BOOTP Server assigned IP address (if the DHCP Server does not respond)
BOOTP	BOOTP Server assigns IP address

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.)	192.168.127.254	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 which 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 subnet mask represents all of the network hosts at one geographic location, in one building, or on the same local area network. When a packet is sent out over the network, the 5110-N will use the subnet mask to check whether the desired TCP/IP host specified in the packet is on the local network segment. If the address is on the same network segment as the 5110-N, a connection is established directly from the 5110-N. Otherwise, the connection is established through the given default gateway.

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. 5110-N needs to know the IP address of the default gateway computer in order to communicate with the hosts outside the local network environment. For correct gateway IP address information, consult the network administrator.

IP configuration

Setting	Factory Default	Necessity
Static DHCP DHCP/BOOTP BOOTP	Static	Required

**ATTENTION**

In Dynamic IP environments, the firmware will retry 3 times every 30 seconds until network settings are assigned by the DHCP or BOOTP server. The Timeout for each try increases from 1 second, to 3 seconds, to 5 seconds. If the DHCP/BOOTP Server is unavailable, the firmware will use the default IP address (192.168.127.254), Netmask, and Gateway for IP settings.

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 the user wants to visit a particular website, the computer asks a Domain Name System (DNS) server for the website's correct IP address, and then the computer uses the response to connect to the web server. DNS is the way that Internet domain names are identified and translated into IP addresses. A domain name is an alphanumeric name, such as cutlets.info, that it is usually 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 5110-N's DNS feature, you need to configure the DNS server. Doing so allows 5110-N to use a host's domain name to access the host. 5110-N 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.

5110-N plays the role of DNS client, in the sense that the 5110-N will actively query the DNS server for the IP address associated with a particular domain name. 5110-N functions that support domain names are **Time server**, **Destination IP Address in TCP Client mode**, **Mail Server**, **SNMP trap server**, and **Auto report to IP**.

SNMP Settings

Community name

Setting	Factory Default	Necessity
1 to 39 characters	public	Optional

A community name is a plain-text password mechanism that is used to weakly authenticate queries to agents of managed network devices.

Contact

Setting	Factory Default	Necessity
1 to 39 characters	None	Optional

The SNMP contact information usually includes an emergency contact name and telephone or pager number.

Location

Setting	Factory Default	Necessity
1 to 39 characters (E.g., Floor 1, office 2)	None	Optional

Specify the location string for SNMP agents such as 5110-N. This string is usually set to the street address where the 5110-N is physically located.

IP Address Report

When 5110-N products are used in a dynamic IP environment, users must spend more time with IP management tasks. For example, if 5110-N works as a server (TCP or UDP), then the host, which acts as a client, must know the IP address of the server. If the DHCP server assigns a new IP address to 5110-N, the host must have some way of determining 5110-N's new IP address.

5110-N products help out by periodically reporting their IP address to the IP location server, in case the dynamic IP has changed. The parameters shown below are used to configure the Auto IP report function. There are two ways to develop an "Auto IP report Server" to receive 5110-N's Auto IP report.

1. Use Device Server Administrator's IP Address Report function.
2. Use **Auto IP report protocol**, which can automatically receive the Auto IP report on a regular basis, to help you develop your own software. Refer to Appendix E for the **Auto IP report protocol**.

Auto report to IP

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

Reports generated by the Auto report function will be automatically sent to this IP address.

Auto report to TCP port

Setting	Factory Default	Necessity
E.g., 4001	4002	Optional

Auto report period

Setting	Factory Default	Necessity
Time interval (in seconds)	10	Optional

Serial Settings

Click **Serial Settings**, located under **Main Menu**, to display serial port settings for port 1.

The screenshot shows the 'Serial Device Server' web console. On the left is a 'Main Menu' sidebar with options like Overview, Basic Settings, Network Settings, Serial Settings, and Port 1. The main area is titled 'Serial Settings' and contains a table with the following data:

Serial Settings								
Alias	Baud rate	Data bits	Stop bits	Parity	FIFO	Flow ctrl	Interface	
Port 1	115200	8	1	None	Enable	RTS/CTS	RS-232	

To modify serial settings for a particular port, click **Port 1** under **Serial Settings**, located under **Main Menu** on the left side of the browser window.

The screenshot shows the 'Serial Device Server' web console with 'Serial Settings' selected. The 'Port 1' sub-menu is active, showing a form for 'Port 01' with the following parameters:

- Port alias: [Text input field]
- Baud rate: 115200 (dropdown)
- Data bits: 8 (dropdown)
- Stop bits: 1 (dropdown)
- Parity: None (dropdown)
- Flow control: RTS/CTS (dropdown)
- FIFO: Enable Disable
- Interface: RS-232 Only

A 'Submit' button is located at the bottom right of the form.

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 5110-N’s serial port.

Serial Parameters



ATTENTION

Check the serial communication parameters in your Serial Device’s user’s manual. You should set up 5110-N’s serial parameters with the same communication parameters used by your serial devices.

Baudrate

Setting	Factory Default	Necessity
110 bps to 230.4 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 are set to 5 bits.

Parity

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

Flow control

Setting	Factory Default	Necessity
None, RTS/CTS, DTR/DSR, Xon/Xoff	RTS/CTS	Required

FIFO

Setting	Factory Default	Necessity
Enable, Disable	Enable	Required

5110-N's serial ports provide a 16-byte FIFO for both 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

Setting	Factory Default	Necessity
RS-232 only	RS-232 only	Required

Operating Settings

Click **Operating Settings**, located under **Main Menu**, to display the operating settings for both of 5110-N's serial ports.

Real COM Mode

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: 5110-N automatically closes the TCP connection if there is no TCP activity for the given time. After the connection is closed, 5110-N starts listening for another Real COM driver connection from another host.

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 5110-N, 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 5110-N serial port.

Max connection 2 to 4:

Allows 2 to 4 host's Real COM drivers to open the specific 5110-N 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 tunnel without control ability. That is, this serial port parameter uses firmware's settings, and does not depend on your application program (AP).

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 send only the data back to the driver on the host.

Data will be sent first-in-first-out when data comes into the 5110-N from the Ethernet interface.

**ATTENTION**

When Max connection is set to 2, 3, or 4, the 5110-N uses 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, 5110-N 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 5110-N's console setting, data communication may not work properly.

Ignore jammed IP

Setting	Factory Default	Necessity
No or Yes	No	Optional

Previously, when Max connections > 1, and the serial device is transmitting data, if any one of the connected hosts is not responding, it will wait until the data has been transmitted successfully before transmitting the second group of data to all hosts. Currently, if you select YES for “Ignore jammed IP,” the host that is not responding will be ignored, but the data will still be transmitted to the other hosts.

Allow driver control

Setting	Factory Default	Necessity
No or Yes	No	Optional

If “max connection” is greater than 1, 5110-N will ignore driver control commands from all connected hosts. However, if you set “Allow driver control” to YES, control commands will be accepted. Note that since 5110-N may get configuration changes from multiple hosts, the most recent command received will take precedence.

Packing length

Setting	Factory Default	Necessity
0 to 1024	0	Optional

Default = 0, The Delimiter Process will be followed, regardless of the length of the data packet. If the data length (in bytes) matches the configured value, the data will be forced out. The data length can be configured for 0 to 1024 bytes. Set this to 0 if you do not need to limit the length.

Delimiter 1

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

Delimiter 2

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

Once the 5110-N receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it to the 5110-N'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 5110-N 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.

Delimiter process

Setting	Factory Default	Necessity
Do nothing Delimiter + 1 Delimiter + 2 Strip Delimiter	Do Nothing	Optional

[Delimiter + 1] or [Delimiter + 2]: The data will be transmitted when an additional byte (for Delimiter +1), or an additional 2 bytes (for Delimiter +2) of data is received after receiving the Delimiter.

[Strip Delimiter]: When the Delimiter is received, the Delimiter is deleted (i.e., stripped), and the remaining data is transmitted.

[Do nothing]: The data will be transmitted when the Delimiter is received.

Force transmit

Setting	Factory Default	Necessity
0 to 65535 ms	0 ms	Optional

0: Disable the force transmit timeout.

1 to 65535: Forces the 5110-N'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 5110-N fetches the serial data from its internal buffer. If data is incoming through the serial port, 5110-N stores the data in the internal buffer. 5110-N 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 timeout to be larger than 8.3 ms, so in this case, it must be greater than or equal to 10 ms.

If the user wants to send a series of characters in the same packet, the serial device attached to 5110-N should send that series of characters during a time interval less than the Force transmit timeout for 5110-N, and the total length of data must be less than or equal to 5110-N's internal buffer size. The serial communication buffer size for 5110-N is 1 KB per port.

TCP Server Mode

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: 5110-N automatically closes the TCP connection if there is no TCP activity for the given time. After the connection is closed, 5110-N 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: 5110-N automatically closes the TCP connection if there is no serial data activity for the given time. After the connection is closed, 5110-N 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 5110-N will check the connection status between the 5110-N and remote host by sending "keep alive" packets periodically. If the remote host does not respond to the packet, 5110-N assumes that the connection was closed down unintentionally. 5110-N will then force the existing TCP connection to close.

**ATTENTION**

The inactivity time should at least be set 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 is 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 only allows 1 connection at a time.

Max. Connection 1:

5110-N only allows 1 host to open the TCP connection to the specific serial port.

Max Connection 2 to 4:

Allows 2 to 4 host's TCP connection request to open this 5110-N serial port, at the same time. When multiple hosts establish a TCP connection to the specific serial port at the same time, 5110-N will duplicate the serial data and transmit to all the hosts. Ethernet data is sent on a first-in-first-out basis to the serial port when data comes into 5110-N from the Ethernet interface.

Ignore jammed IP

Setting	Factory Default	Necessity
No or Yes	No	Optional

Previously, when Max connections > 1, and the serial device is transmitting data, if any one of the connected hosts is not responding, it will wait until the data has been transmitted successfully before transmitting the second group of data to all hosts. Currently, if you select YES for "Ignore jammed IP," the host that is not responding will be ignored, but the data will still be transmitted to the other hosts.

Allow driver control

Setting	Factory Default	Necessity
No or Yes	No	Optional

If "max connection" is greater than 1, 5110-N will ignore driver control commands from all connected hosts. However, if you set "Allow driver control" to YES, control commands will be accepted. Note that since 5110-N may get configuration changes from multiple hosts, the most recent command received will take precedence.

Packing length

Setting	Factory Default	Necessity
0 to 1024	0	Optional

Default = 0, The Delimiter Process will be followed, regardless of the length of the data packet. If the data length (in bytes) matches the configured value, the data will be forced out. The data length can be configured for 0 to 1024 bytes. Set to 0 if you do not need to limit the length.

Delimiter 1

Setting	Factory Default	Necessity
00 to FF	None	Optional

Delimiter 2

Setting	Factory Default	Necessity
00 to FF	None	Optional

Once the 5110-N receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it out through the 5110-N'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 5110-N 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.

Delimiter process

Setting	Factory Default	Necessity
Do nothing Delimiter + 1 Delimiter + 2 Strip Delimiter	Do Nothing	Optional

[Delimiter + 1] or [Delimiter + 2]: The data will be transmitted when an additional byte (for Delimiter +1), or an additional 2 bytes (for Delimiter +2) of data is received after receiving the Delimiter.

[Strip Delimiter]: When the Delimiter is received, the Delimiter is deleted (i.e., stripped), and the remaining data is transmitted.

[Do nothing]: The data will be transmitted when the Delimiter is received.

Force transmit

Setting	Factory Default	Necessity
0 to 65535 ms	0 ms	Optional

0: Disable the force transmit timeout.

1 to 65535: Forces the 5110-N'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 5110-N fetches the serial data from its internal buffer. If data is incoming through the serial port, 5110-N stores the data in the internal buffer. 5110-N 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 timeout to be larger than 8.3 ms, so in this case, it must be greater than or equal to 10 ms.

If the user wants to send a series of characters in the same packet, the serial device attached to 5110-N should send that series of characters during a time interval less than the Force transmit timeout for 5110-N, and the total length of data must be less than or equal to 5110-N's internal buffer size. The serial communication buffer size for 5110-N is 1 KB per port.

Local TCP port

Setting	Factory Default	Necessity
1 to 65535	4001	Required

The “Local TCP port” is the TCP port that 5110-N uses to listen to connections, and that other devices must use to contact 5110-N. 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 5110-N so that the user does not need to configure the program.

TCP Client Mode

Serial Device Server

Operating Settings

Port=01

Operation mode: TCP Client Mode

TCP alive check time: 7 (0 - 99 min)

Inactivity time: 0 (0 - 65535 ms)

Ignore jammed IP: No Yes

Data Packing

Packing length: 0 (0 - 1024)

Delimiter 1: 0 (Hex) Enable

Delimiter 2: 0 (Hex) Enable

Delimiter process: Do Nothing (Processed only when Packing length is 0)

Force transmit: 0 (0 - 65535 ms)

TCP Client Mode

Destination IP Address

Destination IP address 1: 4001

Destination IP address 2: 4001

Destination IP address 3: 4001

Destination IP address 4: 4001

Designated Local Port 1: 5011 (0 - 65535, 0 represents assigned automatically.)

Designated Local Port 2: 5012 (0 - 65535)

Designated Local Port 3: 5013 (0 - 65535)

Designated Local Port 4: 5014 (0 - 65535)

Connection control: Startup/None (Connect on/Disconnect by)

Submit

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: 5110-N automatically closes the TCP connection if there is no TCP activity for the given time.

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: 5110-N automatically closes the TCP connection if there is no serial data activity for the given time.

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 5110-N will check the connection status between the 5110-N and remote host by sending "keep alive" packets periodically. If the remote host does not respond to the packet, 5110-N assumes that the connection was closed down unintentionally. 5110-N will then force the existing TCP connection to close.

**ATTENTION**

The inactivity time should at least be set 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 is completed.

**ATTENTION**

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

Ignore jammed IP

Setting	Factory Default	Necessity
No or Yes	No	Optional

Previously, when Max connections > 1, and the serial device is transmitting data, if any one of the connected hosts is not responding, it will wait until the data has been transmitted successfully before transmitting the second group of data to all hosts. Currently, if you select YES for "Ignore jammed IP," the host that is not responding will be ignored, but the data will still be transmitted to the other hosts.

Packing length

Setting	Factory Default	Necessity
0 to 1024	0	Optional

Default = 0, The Delimiter Process will be followed, regardless of the length of the data packet. If the data length (in bytes) matches the configured value, the data will be forced out. The data length can be configured for 0 to 1024 bytes. Set this to 0 if you do not need to limit the length.

Delimiter 1

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

Delimiter 2

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

Once the 5110-N receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it to the 5110-N'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 5110-N 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.

Delimiter process

Setting	Factory Default	Necessity
Do nothing Delimiter + 1 Delimiter + 2 Strip Delimiter	Do Nothing	Optional

[Delimiter + 1] or [Delimiter + 2]: The data will be transmitted when an additional byte (for Delimiter +1), or an additional 2 bytes (for Delimiter +2) of data is received after receiving the Delimiter.

[Strip Delimiter]: When the Delimiter is received, the Delimiter is deleted (i.e., stripped), and the remaining data is transmitted.

[Do nothing]: The data will be transmitted when the Delimiter is received.

Force transmit

Setting	Factory Default	Necessity
0 to 65535 ms	0 ms	Optional

0: Disable the force transmit timeout.

1 to 65535: Forces the 5110-N'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 5110-N fetches the serial data from its internal buffer. If data is incoming through the serial port, 5110-N stores the data in the internal buffer. 5110-N 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 timeout to be larger than 8.3 ms, so in this case, it must be greater than or equal to 10 ms.

If the user wants to send a series of characters in the same packet, the serial device attached to 5110-N should send that series of characters during a time interval less than the Force transmit timeout for 5110-N, and the total length of data must be less than or equal to 5110-N's internal buffer size. The serial communication buffer size for 5110-N is 1 KB per port.

Destination IP address 1

Setting	Factory Default	Necessity
IP address or Domain Name (E.g., 192.168.1.1)	None	Required

Allows 5110-N to connect actively to the remote host whose IP address is set by this parameter.

Destination IP address 2/3/4

Setting	Factory Default	Necessity
IP address or Domain Name (E.g., 192.168.1.1)	None	Required

Allows 5110-N to connect actively to the remote host whose IP address is set by this parameter.

**ATTENTION**

Up to 4 connections can be established between 5110-N and hosts. The connection speed or throughput may be low if one of the four connections is slow, since the 1 slow connection will slow down the other 3 connections.

**ATTENTION**

The "Destination IP address" parameter can use both IP address and Domain Name. For some applications, the user may need to send the data actively to the remote destination domain name.

Designated Local Port 1/2/3/4

Setting	Factory Default	Necessity
TCP Port No.	5011 (Port 1) 5012 (Port 2) 5013 (Port 3) 5014 (Port 4)	Required

Connection control

Setting	Factory Default	Necessity
Startup/None, Any Character/None, Any Character/Inactivity Time, DSR ON/DSR OFF, DSR ON/None, DCD ON/DCD OFF, DCD ON/None	Startup/None	Required

The meaning of each of the above settings is given in the table below. In general, both the Connect condition and Disconnect condition are given.

Connect/Disconnect	Description
Startup/None (default)	A TCP connection will be established on startup, and will remain active indefinitely.
Any Character/None	A TCP connection will be established when any character is received from the serial interface, and will remain active indefinitely.

Connect/Disconnect	Description
Any Character/ Inactivity Time	A TCP connection will be established when any character is received from the serial interface, and will be disconnected when the inactivity time out is reached.
DSR On/DSR Off	A TCP connection will be established when a DSR "On" signal is received, and will be disconnected when a DSR "Off" signal is received.
DSR On/None	A TCP connection will be established when a DSR "On" signal is received, and will remain active indefinitely.
DCD On/DCD Off	A TCP connection will be established when a DCD "On" signal is received, and will be disconnected when a DCD "Off" signal is received.
DCD On/None	A TCP connection will be established when a DCD "On" signal is received, and will remain active indefinitely.

UDP Mode

The screenshot shows the 'Serial Device Server' web console configuration page. The left sidebar contains a 'Main Menu' with options like Overview, Basic Settings, Network Settings, Serial Settings, Operating Settings, Accessible IP Settings, Auto Warning Settings, Monitor, Change Password, Load Factory Default, and Save/Restart. The main content area is titled 'Operating Settings' and is divided into several sections: 'Port=01', 'Operation mode' (set to 'UDP Mode'), 'Data Packing' (with fields for Packing length, Delimiter 1, Delimiter 2, Delimiter process, and Force transmit), and 'UDP Mode' (with a table for Destination IP address 1-4 and a Local Listen port field). A 'Submit' button is located at the bottom right of the configuration area.

Packing length

Setting	Factory Default	Necessity
0 to 1024	0	Optional

Default = 0, The Delimiter Process will be followed, regardless of the length of the data packet. If the data length (in bytes) matches the configured value, the data will be forced out. The data length can be configured for 0 to 1024 bytes. Set this to 0 if you do not need to limit the length.

Delimiter 1

Setting	Factory Default	Necessity
00 to FF	None	Optional

Delimiter 2

Setting	Factory Default	Necessity
00 to FF	None	Optional

Once the 5110-N receives both delimiters through its serial port, it immediately packs all data currently in its buffer and sends it out through the 5110-N'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 5110-N 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.

Delimiter process

Setting	Factory Default	Necessity
Do nothing Delimiter + 1 Delimiter + 2 Strip Delimiter	Do Nothing	Optional

[Delimiter + 1] or [Delimiter + 2]: The data will be transmitted when an additional byte (for Delimiter +1), or an additional 2 bytes (for Delimiter +2) of data is received after receiving the Delimiter.

[Strip Delimiter]: When the Delimiter is received, the Delimiter is deleted (i.e., stripped), and the remaining data is transmitted.

[Do nothing]: The data will be transmitted when the Delimiter is received.

Force transmit

Setting	Factory Default	Necessity
0 to 65535 ms	0 ms	Optional

0: Disable the force transmit timeout.

1 to 65535: Forces the 5110-N'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 5110-N fetches the serial data from its internal buffer. If data is incoming through the serial port, 5110-N stores the data in the internal buffer. 5110-N 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 timeout to be larger than 8.3 ms, so in this case, it must be greater than or equal to 10 ms.

If the user wants to send a series of characters in the same packet, the serial device attached to 5110-N should send that series of characters during a time interval less than the Force transmit timeout for 5110-N, and the total length of data must be less than or equal to 5110-N's internal buffer size. The serial communication buffer size for 5110-N is 1 KB per port.

Destination IP address 1

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

Destination IP address 2/3/4

Setting	Factory Default	Necessity
IP address range E.g., Begin: 192.168.1.11 End: 192.168.1.20	Begin: Empty	Optional
	End: Empty	
	Port: 4001	

Local listen port

Setting	Factory Default	Necessity
1 to 65535	4001	Required

The UDP port that 5110-N listens to, and that other devices must use to contact 5110-N. To avoid conflicts with well known UDP ports, the default is set to 4001.

Pair Connection Mode

Pair Connection Mode employs two 5110-N device servers in tandem, and can be used to remove the 15-meter distance limitation imposed by the RS-232 interface. One 5110-N 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 5110-N. The two 5110-N 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 (although it cannot transmit the DCD signal) between the two 5110-N's.

Pair Connection Master Mode

When using Pair Connection Mode, you must select **Pair Connection Master Mode** for the Operation mode of one of the 5110-N device servers. In effect, this 5110-N will be acting as a TCP client.

Serial Device Server

Operating Settings

Port=01

Operation mode: Pair Connection Master Mode

TCP alive check time: 7 (0 - 99 min)

Destination IP address : Port: :4001

Submit

TCP alive check time

Setting	Factory Default	Necessity
0 to 99 min	7 min	Required

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

1 to 99 min: 5110-N closes the TCP connection automatically if there is no TCP activity for the given time.

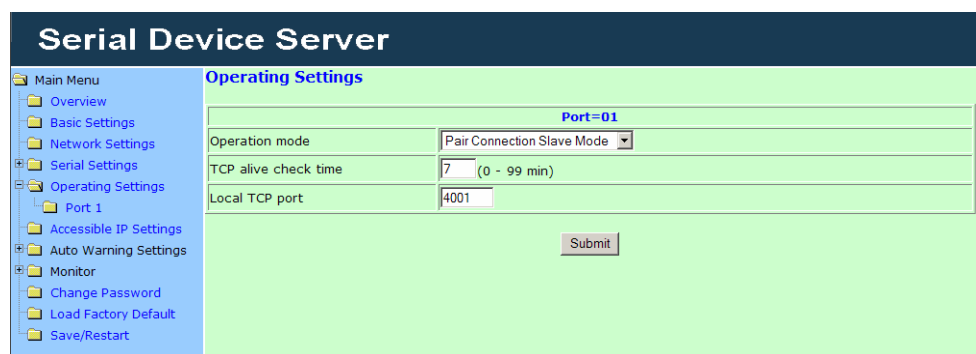
Destination IP address

Setting	Factory Default	Necessity
IP address or Domain Name (E.g., 192.168.1.1)	<i>blank</i>	Optional
TCP port No.	4001	Required

The Pair Connection “Master” will contact the network host that has this IP address. Data will be transmitted through the port No. (4001 by default). Note that you must configure the same TCP port No. for the device server acting as the Pair Connection “Slave.”

Pair Connection Slave Mode

When using Pair Connection Mode, you must select **Pair Connection Slave Mode** for the Operation mode of one of the 5110-N device servers. In effect, this 5110-N will be acting as a TCP server.

**TCP alive check time**

Setting	Factory Default	Necessity
0 to 99 min	7 min	Required

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

1 to 99 min: 5110-N closes the TCP connection automatically if there is no TCP activity for the given time.

Local TCP port

Setting	Factory Default	Necessity
TCP port No. (e.g., 4001)	4001	Required

This Port No. must be the same port No. that you set up for the Pair Connection “Master” device server.

Ethernet Modem Mode

Serial Device Server	
Operating Settings	
Port=01	
Operation mode	Ethernet Modem Mode
TCP alive check time	7 (0 - 99 min)
Local TCP Port	4001
Submit	

Dial-in

5110-N listens for a TCP/IP connection request from the remote Ethernet modem or host. 5110-N's response depends on the ATSO value, as outlined below.

ATSO=0 (default):

5110-N 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 5110-N enters data mode. If no "ATA" command is received, 5110-N will disconnect after sending three "RING" signals.

ATSO ≥ 1:

5110-N 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 5110-N's serial port. After that, 5110-N immediately enters data mode.

Dial-out

5110-N 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. Here <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, 5110-N will send out the "CONNECT <baud>" signal via the serial port and then enter data mode.

Disconnection request from local site

When 5110-Ns is in data mode, the user can drive the DTR signal to OFF, or send "+++" from the local serial port to 5110-N. 5110-N 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 site

After the TCP connection has been shut down by the remote Ethernet modem or PC, 5110-N will send the "NO CARRIER" signal via the serial port and then return to command mode.

AT Commands

5110-N 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, ATIO, ATII1, ATII2	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	

No.	AT command	Description	Remarks
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 "+++"	

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: 5110-N automatically closes the TCP connection if there is no TCP activity for the given time.

Local TCP port

Setting	Factory Default	Necessity
1 to 65535	4001	Required

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.

Reverse Telnet Mode

TCP alive check time

Setting	Factory Default	Necessity
0 to 99 min	7	Optional

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

1 to 99 min: 5110-N closes the TCP connection automatically if there is no TCP activity for the given time.

Inactivity time

Setting	Factory Default	Necessity
0 to 65535 ms	0	Optional

Idle time setting for auto-disconnection. 0 min. means it will never disconnect.

Local TCP port

Setting	Factory Default	Necessity
1 to 65535	4001	Required

Each of 5110-N's serial ports is mapped to a TCP port. To avoid conflicts with common TCP port numbers, set port numbers to 4001 for port 1, 4002 for port 2, etc.

Map <CR-LF>

Setting	Factory Default	Necessity
CR, LF, CR-LF	CR-LF	Required

If data received through 5110-N's Ethernet port is sent using the "enter" command, the data will be transmitted out through the serial port with an added

- (1) "carriage return + line feed" if you select the <CR-LF> option
(i.e., the cursor will jump to the next line, and return to the first character of the line)
- (2) "carriage return" if you select the <CR> option
(i.e., the cursor will return to the first character of the line)
- (3) "line feed" if you select the <LF> option.
(i.e., the cursor will jump to the next line, but not move horizontally)

Disabled Mode

Serial Device Server

Operating Settings

Port=01

Operation mode: Disabled

Submit

When Operation mode is set to Disabled, that particular port will be disabled. Select *Apply the above settings to all serial ports* to apply this setting to the other ports.

Accessible IP Settings

Serial Device Server

Accessible IP Settings

Enable the accessible IP list (Not checking "Enable" will allow all IPs to connect.)

No.	Activate the rule	IP Address	Netmask
1	<input type="checkbox"/>		
2	<input type="checkbox"/>		
3	<input type="checkbox"/>		
4	<input type="checkbox"/>		
5	<input type="checkbox"/>		
6	<input type="checkbox"/>		
7	<input type="checkbox"/>		
8	<input type="checkbox"/>		
9	<input type="checkbox"/>		
10	<input type="checkbox"/>		
11	<input type="checkbox"/>		
12	<input type="checkbox"/>		
13	<input type="checkbox"/>		
14	<input type="checkbox"/>		
15	<input type="checkbox"/>		
16	<input type="checkbox"/>		

Submit

5110-N uses an IP address based filtering method to control access to itself.

Accessible IP Settings allow you to add or block remote host IP addresses to prevent unauthorized access. Access to 5110-N is controlled by IP address. That is, if a host's IP address is in the accessible IP table, then the host will be allowed to access the 5110-N. You can allow one of the following cases by setting the parameter.

- **Only one host with a specific IP address can access the 5110-N**
Enter "IP address/255.255.255.255" (e.g., "192.168.1.1/255.255.255.255").
- **Hosts on a specific subnet can access the 5110-N**
Enter "IP address/255.255.255.0" (e.g., "192.168.1.0/255.255.255.0").
- **Any host can access the 5110-N**
Disable this function by deselecting *Enable the accessible IP list*. Refer to the following table

for more configuration examples.

Allowable Hosts	Input format
Any host	Disable
192.168.1.120	192.168.1.120 / 255.255.255.255
192.168.1.1 to 192.168.1.254	192.168.1.0 / 255.255.255.0
192.168.0.1 to 192.168.255.254	192.168.0.0 / 255.255.0.0
192.168.1.1 to 192.168.1.126	192.168.1.0 / 255.255.255.128
192.168.1.129 to 192.168.1.254	192.168.1.128 / 255.255.255.128

Auto Warning Settings

Auto warning: E-mail and SNMP trap

The screenshot shows the 'Serial Device Server' web console. The left sidebar contains a 'Main Menu' with categories like Overview, Basic Settings, Network Settings, Serial Settings, Operating Settings, Accessible IP Settings, Auto Warning Settings, Monitor, Change Password, Load Factory Default, and Save/Restart. The 'Auto Warning Settings' section is expanded to show 'E-mail and SNMP Trap'. The main content area is titled 'Auto warning: Email and SNMP trap' and contains the following fields:

- Mail server:** A text input field.
- My server requires authentication
- User name:** A text input field.
- Password:** A text input field.
- From E-mail address:** A text input field with the value '5110-N_15@yourcompany.com'.
- E-mail address 1:** A text input field.
- E-mail address 2:** A text input field.
- E-mail address 3:** A text input field.
- E-mail address 4:** A text input field.
- SNMP trap server:** A section with a text input field for 'SNMP trap server IP or domain name'.
- Submit:** A button at the bottom right.

Mail Server

Mail server

Setting	Factory Default	Necessity
IP Address or Domain Name	None	Optional

User name

Setting	Factory Default	Necessity
1 to 15 characters	None	Optional

Password

Setting	Factory Default	Necessity
1 to 15 characters	None	Optional

From E-mail address

Setting	Factory Default	Necessity
1 to 63 characters	None	Optional

E-mail address 1/2/3/4

Setting	Factory Default	Necessity
1 to 63 characters	None	Optional



ATTENTION

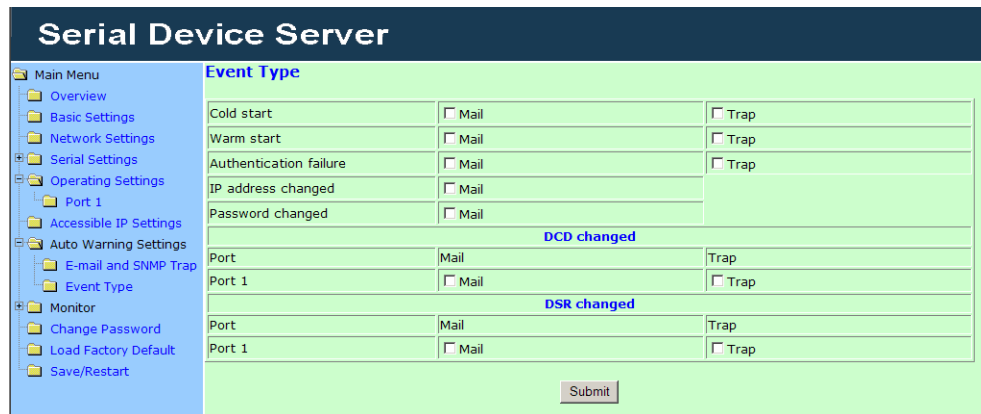
Consult your Network Administrator or ISP for the proper mail server settings. The Auto warning function may not work properly if it is not configured correctly. 5110-N SMTP AUTH supports LOGIN, PLAIN, CRAM-MD5 (RFC 2554).

SNMP Trap Server

SNMP trap server IP or domain name

Setting	Factory Default	Necessity
IP address or Domain Name	None	Optional

Event Type



Cold start

This refers to starting the system from power off (contrast this with warm start). When performing a cold start, 5110-N will automatically issue an Auto warning message by e-mail, or send an SNMP trap after booting up.

Warm start

This refers to restarting the computer without turning the power off. When performing a warm start, 5110-N will automatically send an e-mail, or send an SNMP trap after rebooting.

Authentication failure

The user inputs a wrong password from the Console or Administrator. When authentication failure occurs, 5110-N will immediately send an e-mail or send an SNMP trap.

IP address changed

The user has changed 5110-N's IP address. When the IP address changes, 5110-N will send an e-mail with the new IP address before 5110-N reboots. If the 5110-N is unable to send an e-mail message to the mail server within 15 seconds, 5110-N will reboot anyway, and abort the e-mail auto warning.

Password changed

The user has changed 5110-N's password. When the password changes, 5110-N will send an e-mail with the password changed notice before 5110-N reboots. If the 5110-N is unable to send an e-mail message to the mail server within 15 seconds, 5110-N will reboot anyway, and abort the e-mail auto warning.

DCD changed

The DCD (Data Carrier Detect) signal has changed, indicating that the modem connection status has changed. For example, a DCD change to high means “Connected” between local modem and remote modem. If the DCD signal changes to low, it means that the connection line is down.

When the DCD changes, 5110-N will immediately send an e-mail or send an SNMP trap.

DSR changed

The DSR (Data Set Ready) signal has changed, indicating that the data communication equipment’s power is off. For example, a DSR change to high means that the DCE is powered ON. If the DSR signal changes to low, it means that the DCE is powered off.

When the DSR changes, 5110-N will immediately send an e-mail or send an SNMP trap.

Mail

Setting	Factory Default	Necessity
Enable, Disable	Disable	Optional

This feature helps the administrator manage how the 5110-N sends e-mail to pre-defined e-mail boxes when the enabled events—such as Cold start, Warm start, Authentication failure, etc.—occur. To configure this feature, click on the Event Type Mail checkbox.

Trap

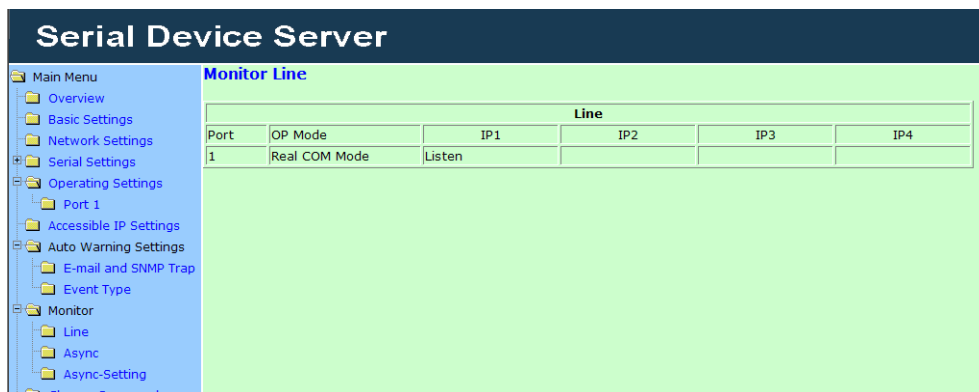
Setting	Factory Default	Necessity
Enable, Disable	Disable	Optional

This feature helps the administrator manage how the 5110-N sends SNMP Trap to a pre-defined SNMP Trap server when the enabled events—such as Cold start, Warm start, Authentication failure, etc.—occur. To configure this feature, select the Event Type Trap option.

Monitor

Monitor Line

Click **Line** under **Monitor** to show the operation mode and status of each TCP/IP connection (IPx) for the serial port.



Monitor Async

Click **Async** under **Monitor** to show the current status of the serial port.

Serial Device Server

Monitor Async

Async							
Port	TxCnt	RxCnt	TxTotalCnt	RxTotalCnt	DSR	CTS	DCD
1	0	0	0	0	OFF	OFF	OFF

Monitor Async-Settings

Click **Async Setting** under **Monitor** to show the run-time settings for the serial port.

Serial Device Server

Monitor Async-Settings

Async-Settings									
Port	Baud rate	Data bits	Stop bits	Parity	FIFO	RTS/CTS	XON/XOFF	DTR/DSR	
1	19200	8	1	None	Enable	OFF	OFF	OFF	

Change Password

Serial Device Server

Change password

Old password :

New password :

Retype password :

Input the “Old password” and “New password” to change the password. Leave the password boxes blank to erase the password. If the password is erased, then 5110-N will not have password protection.

**ATTENTION**

If you forget the password, the **ONLY** way to configure 5110-N is by using the Reset button on 5110-N's casing to load factory defaults.

Remember to export the configuration file using Windows Administrator when you finish the configuration. By using the Import function of Windows Administrator, your configuration can be re-loaded into 5110-N after loading the factory defaults. Refer to Chapter 6 for more details about the Export and Import function.

Load Factory Default



This function will reset all 5110-N's settings to the factory default values. Be warned that previous settings will be lost.

6

Configuring Device Server Administrator

The following topics are covered in this chapter:

- ❑ **Overview**
- ❑ **Installing Device Server Administrator**
- ❑ **Configuration**
 - Broadcast Search
 - Unlock Password Protection
 - Configuring 5110-N
 - Upgrading the Firmware
 - Export Configuration
 - Import Configuration
- ❑ **Monitor**
- ❑ **Port Monitor**
- ❑ **COM Mapping**
 - On-line COM Mapping
 - Off-line COM Mapping
- ❑ **IP Location**

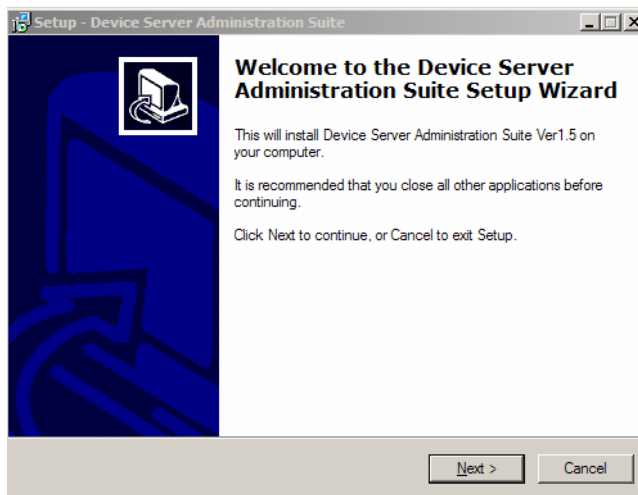
Overview

Device Server Administrator lets you install and configure your 5110-N Series products easily over the network. Five function groups are provided to ease the installation process, allow off-line COM mapping, and provide monitoring and IP location server functions.

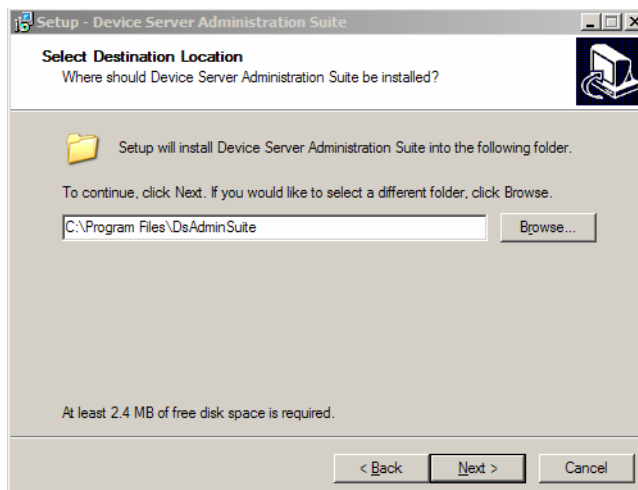
Device Server Administrator is an integrated software suite that bundles Device Server Administrator and the IP Serial Library, and provides everything you need to manage, monitor, and modify your 5110-N from a remote location.

Installing Device Server Administrator

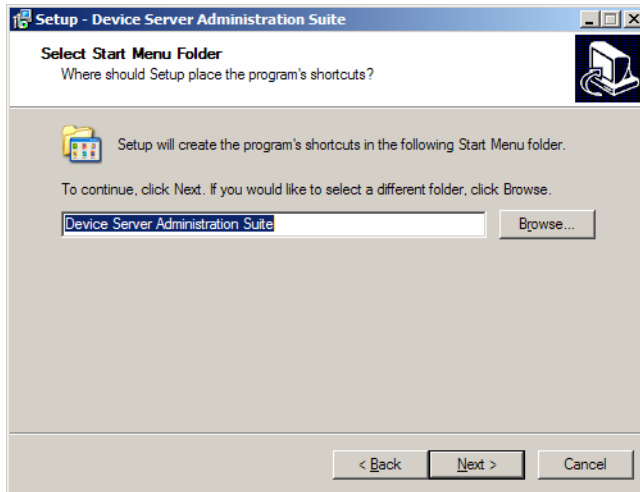
1. Once the Setup program starts running, click **Next** when the **Welcome** window opens, to proceed with the installation.



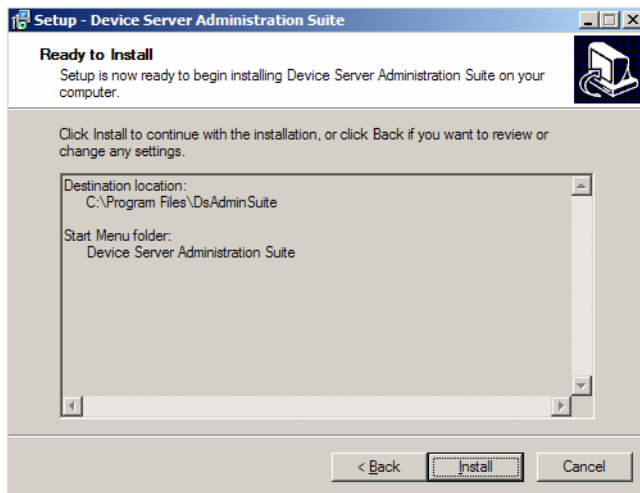
2. Click **Next** to install program files in the default directory, or select an alternative location.



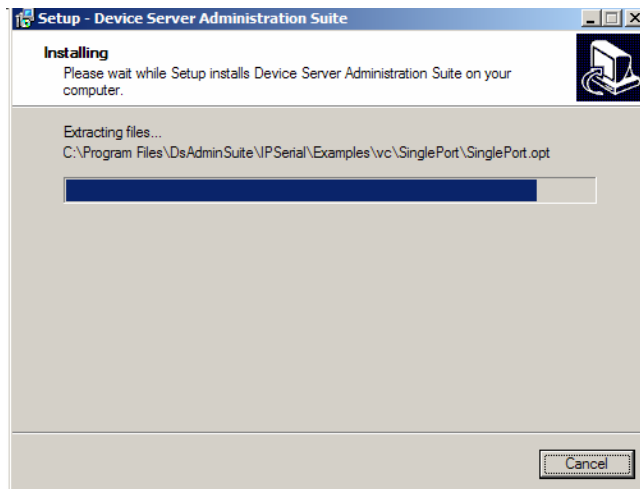
3. Click **Next** to install the program using the default program name, or select a different name.



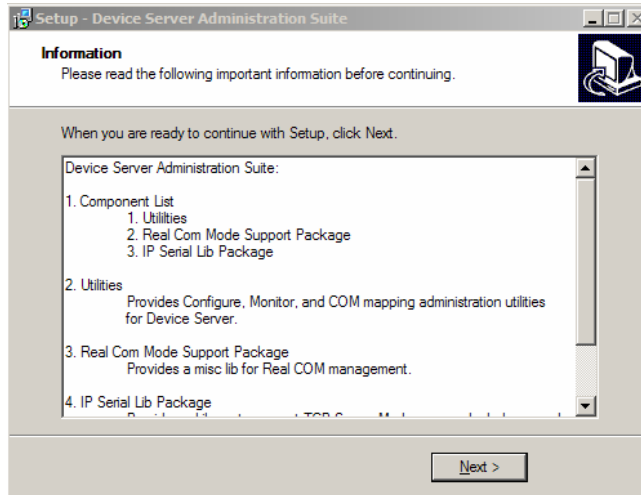
4. Click **Install** to proceed with the installation.



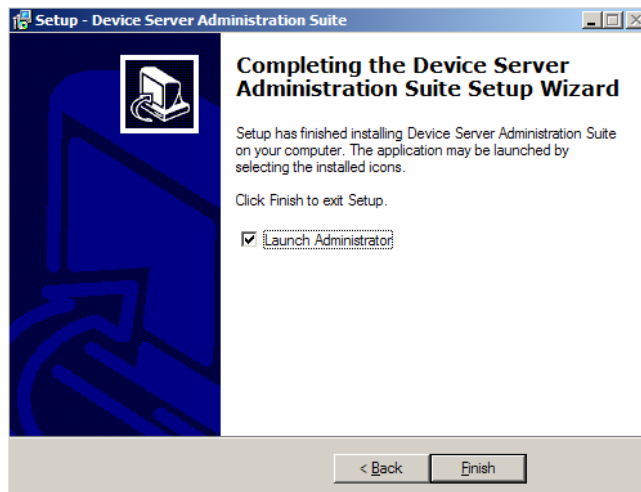
5. The **Installing** window reports the progress of the installation.



6. Click **Next** to read important information about Device Server Administrator, before continuing.



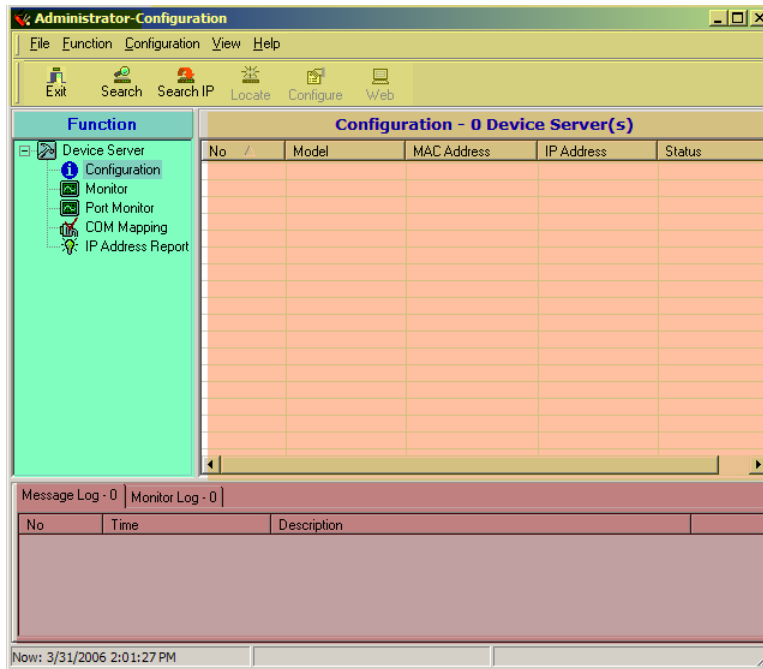
7. Click **Finish** to complete the installation of Device Server Administration Suite.



Configuration

The Administrator-Configuration window is divided into four parts.

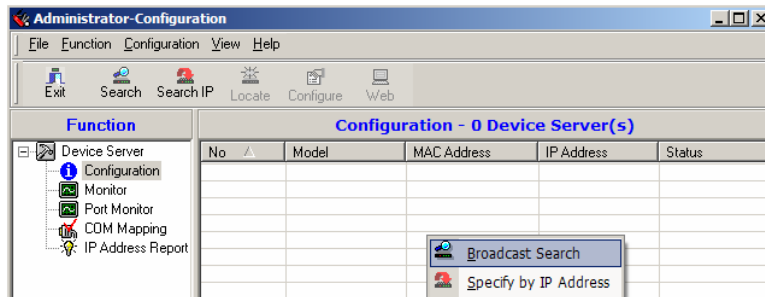
- The top section contains the function list and online help area. (Windows NT does not support this .chm file format.)
- The five Administrator function groups are listed on the left.
- A list of 5110-N serial device servers, each of which can be selected to process user requirements, is displayed on the right.
- The activity Log, which displays messages that record the user's processing history, is shown in the lower section.



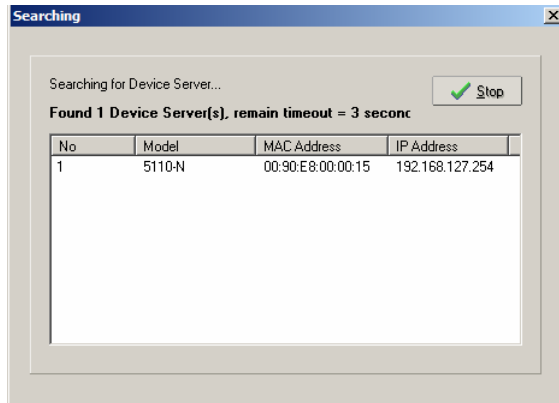
Broadcast Search

The **Broadcast Search** function is used to locate all 5110-Ns that are connected to the same LAN as your computer. Since the Broadcast Search function searches by MAC address and not IP address, all 5110-Ns connected to the LAN will be located, regardless of whether or not they are part of the same subnet as the host.

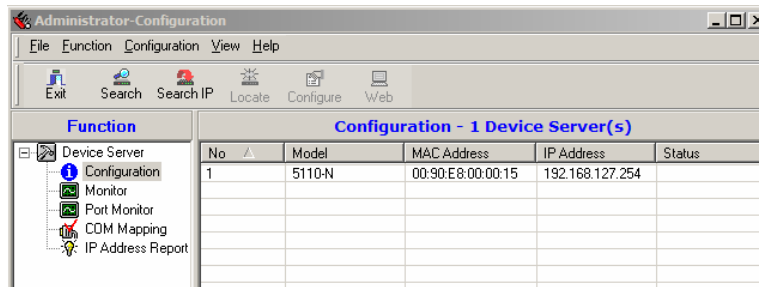
1. Position the cursor in the right middle section of the Administrator window and then click the right mouse button.



2. The Broadcast Search window opens and displays the Model, IP Address, MAC Address, and Progress of the search for that particular device.



- When the search is complete, the Broadcast Search window will close, and the 5110-Ns that were located will be displayed in the right pane of the Administrator window. If the search returns more than one server connected to this network, refer to the MAC address sticker on your server(s) to determine which server(s) are the ones you wish to configure. To configure a 5110-N, place the cursor over the row displaying that 5110-N's information, and then double click the left mouse button.

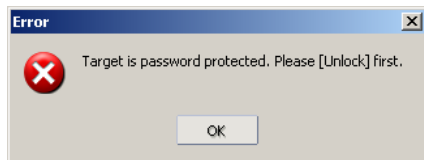


ATTENTION

Before modifying a 5110-N's configuration, use **Broadcast Search** to locate all 5110-Ns connected to the LAN, or use **Specify by IP Address** to locate a particular 5110-N.

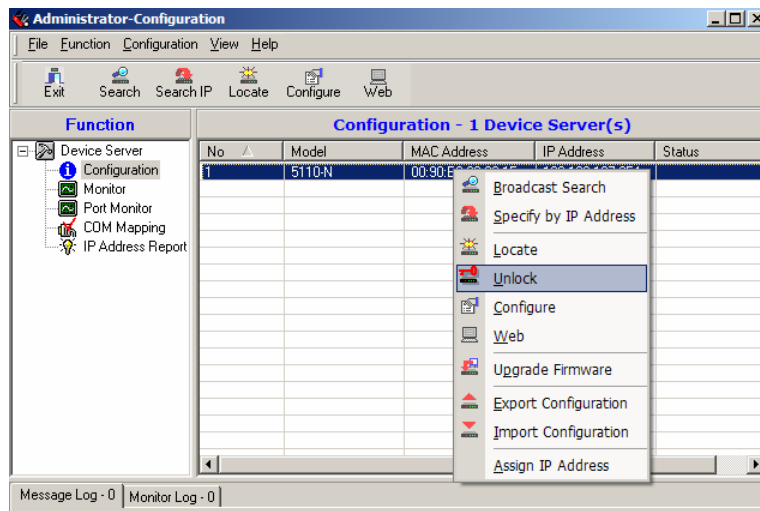
Unlock Password Protection

If the 5110-N is password protected (indicated by "Lock" for Status), you will receive the following error, and you will not be able to use the right click method to open the configuration page.

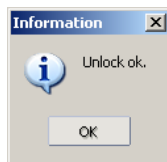
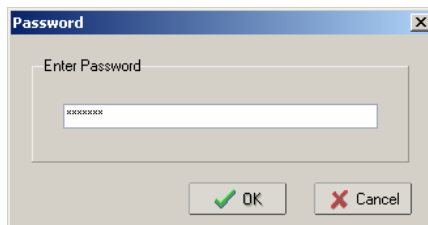


In this case, proceed as follows to "Unlock" the device server.

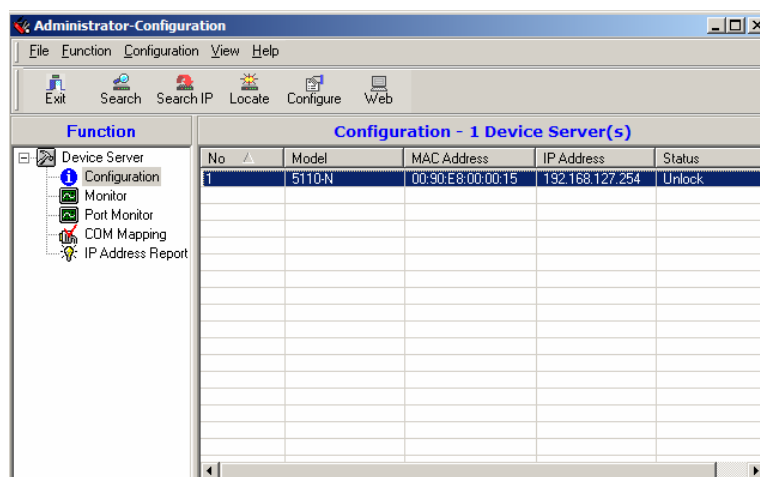
1. Select the 5110-N with “Lock” status, click the right mouse button, and then select **Unlock**.



2. After entering the correct password, the Administrator will display an “Unlock ok” message.



3. The “Lock” status will change to “Unlock,” and the Administrator utility will keep this 5110-N in the Unlock status throughout this Administrator session.



The six status modes are as follows: (note that the term Fixed in these status modes is borrowed from the standard fixed IP address networking terminology):

Lock

The 5110-N is password protected, "Broadcast Search" was used to locate it, and the password has not yet been entered from within the current Administrator session.

Unlock

The 5110-N is password protected, "Broadcast Search" was used to locate it, and the password has been entered from within the current Administrator session. Henceforth, during this Administrator session, activating various utilities for this 5110-N will not require re-entering the server password.

Blank

The 5110-N is not password protected, and "Broadcast Search" was used to locate it.

Fixed

The 5110-N is not password protected, and "Search by IP address" was used to locate it.

Lock Fixed

The 5110-N is password protected, "Specify by IP address" was used to locate it, and the password has not yet been entered from within the current Administrator session.

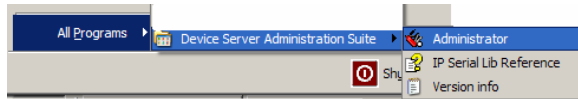
Unlock Fixed

The 5110-N is password protected, "Specify by IP address" was used to locate it, and the password has been entered from within the current Administrator session. Henceforth, during this Administrator session, activating various utilities for this 5110-N will not require re-entering the server password.

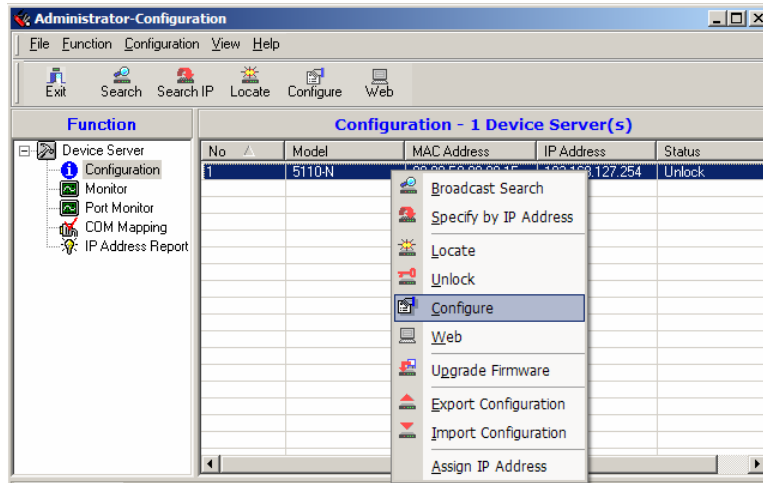
Configuring 5110-N

In this section, we illustrate how to access 5110-N's configuration utility. You should first make sure that you can connect over the network from your computer to the 5110-N.

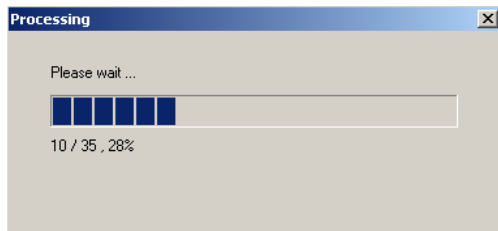
1. To start Device Server Administrator, click **Start → Device Server Administration Suite → Device Server Administrator**.



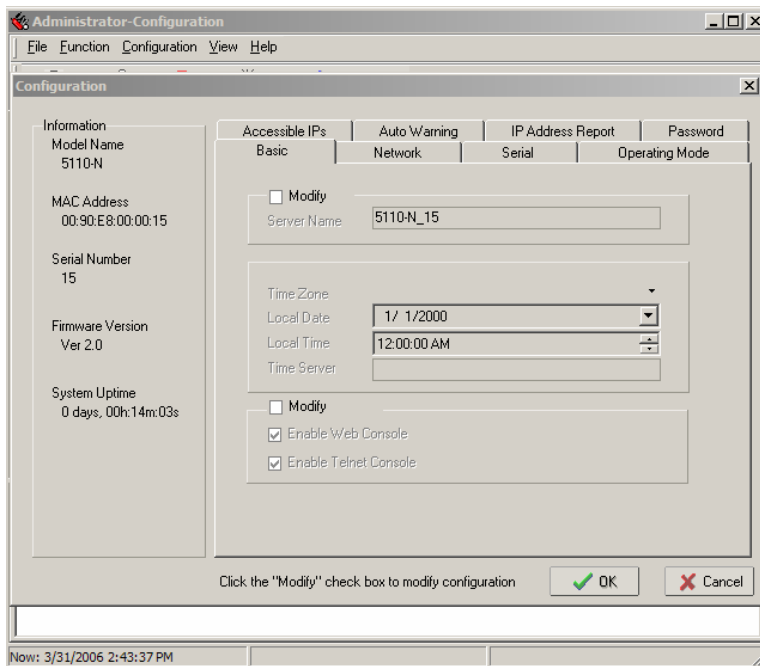
2. Unlock the 5110-N you wish to configure if it is password protected. Right click the 5110-N and select **Configure** to start the configuration.



- The progress bar shows that Administrator is retrieving configuration information from the specific 5110-N.



- Refer to Chapter 5 for each parameter's function definition. To modify the configuration, you must first click the modify box to activate the parameter setting box.



ATTENTION

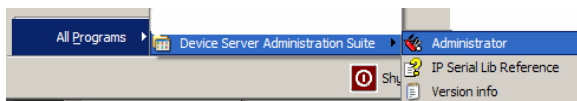
You can simultaneously modify the configurations of multiple 5110-Ns that are of the same model.

To select multiple 5110-Ns, hold down the Ctrl key when selecting additional 5110-Ns, or hold down the Shift key to select a group of 5110-Ns.

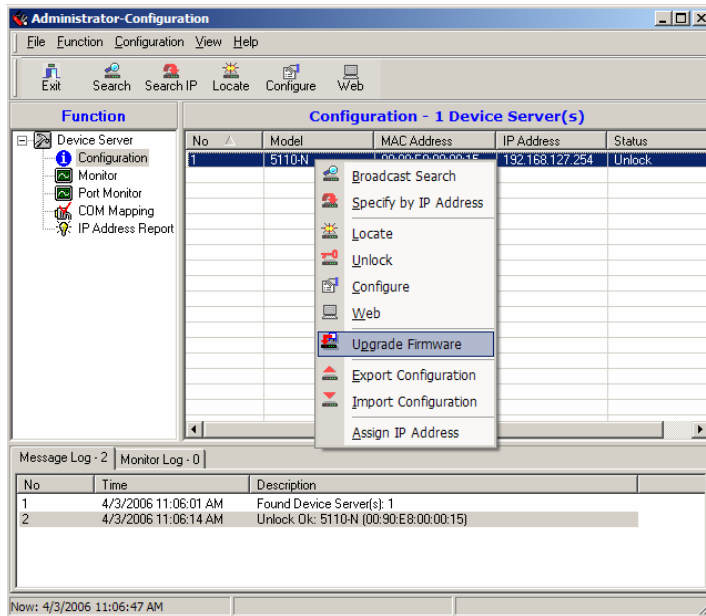
Upgrading the Firmware

Follow these steps to upgrade the firmware of 5110-N.

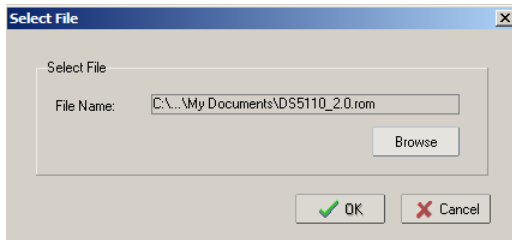
- To start Device Server Administrator, click **Start** → **Device Server Administration Suite** → **Device Server Administrator**.



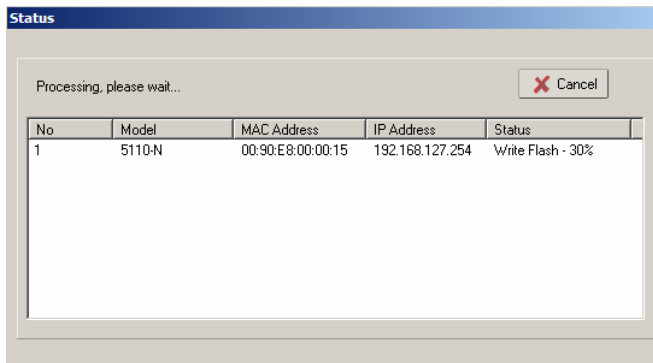
2. Unlock the 5110-N you wish to configure if it is password protected. Right click a specific 5110-N and select the **Upgrade Firmware** function to start upgrading the firmware.



3. Select the correct ROM file to download.



4. Wait while the Upgrade Firmware action is processed.

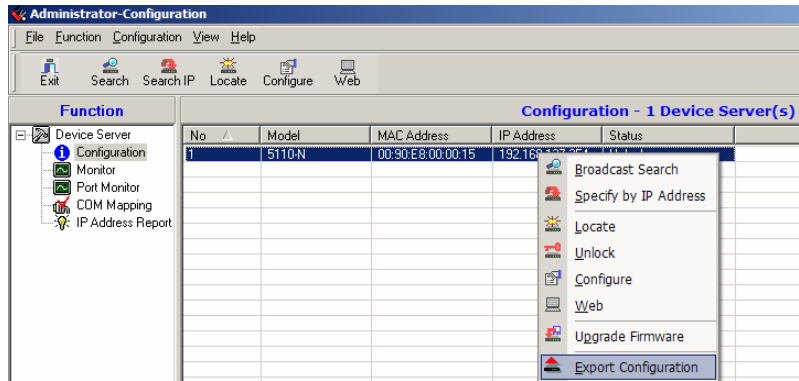


ATTENTION

You can simultaneously upgrade the firmware of multiple 5110-Ns that are of the same model. To select multiple 5110-Ns, hold down the Ctrl key when selecting an additional 5110-N, or hold down the Shift key to select a block of 5110-Ns.

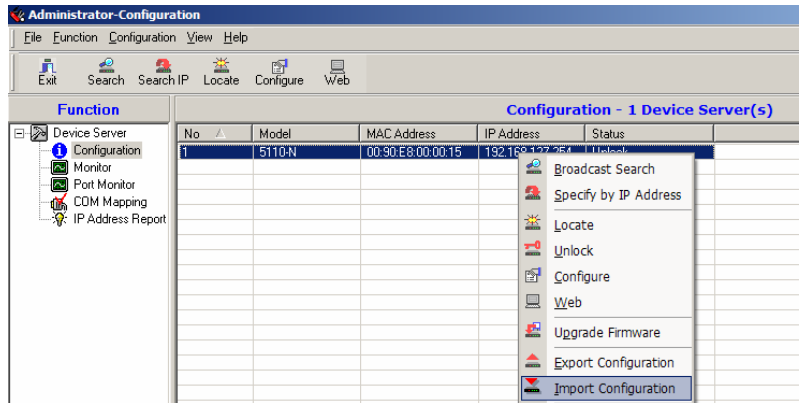
Export Configuration

To export the configuration of a 5110-N, right click the 5110-N and select **Export Configuration** and then follow the onscreen instructions. The Export Configuration function is a handy tool that can be used to produce a text file containing the current configuration of a particular 5110-N.



Import Configuration

The Import Configuration function is used to import a 5110-N configuration from a file into one or more of the same model 5110-N. To import a configuration, first select the target servers, click the right mouse button, and then select **Import Configuration**. Follow the onscreen instructions to locate the configuration file and start downloading the file.



ATTENTION

You can simultaneously import the same configuration file into multiple 5110-Ns that are of the same model.

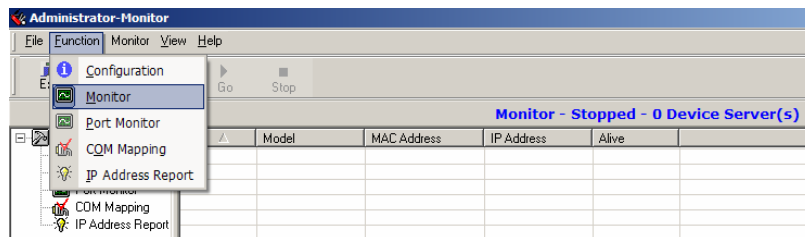
To select multiple 5110-Ns, hold down the Ctrl key when selecting an additional 5110-N, or hold down the Shift key to select a block of 5110-Ns.

Monitor

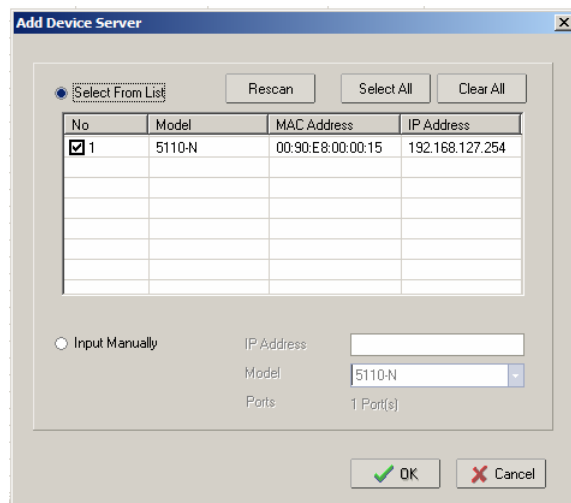
Use one of the following two methods to start the Monitor function.

Broadcast Search → Monitor → Add Target

1. With **Configuration** selected under **Function**, use **Broadcast Search** to locate all 5110-N's on your LAN.

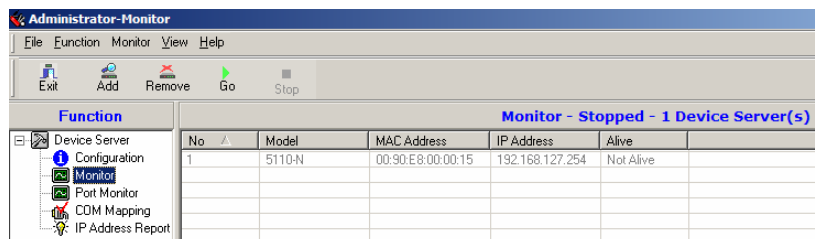


2. Next, click **Monitor → Add Target** and select your targets from the list, and then click **OK**.

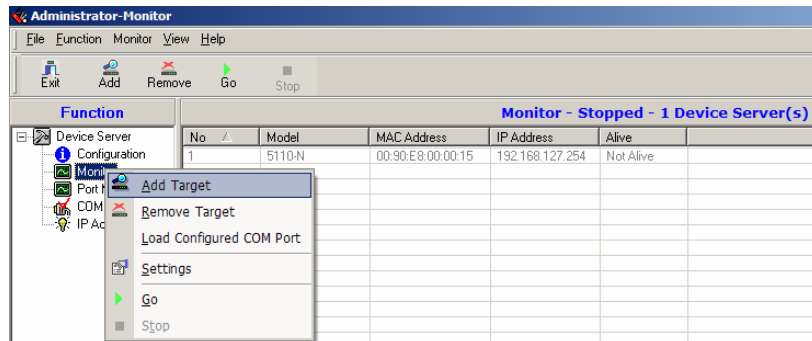


Monitor → Add Target → Rescan

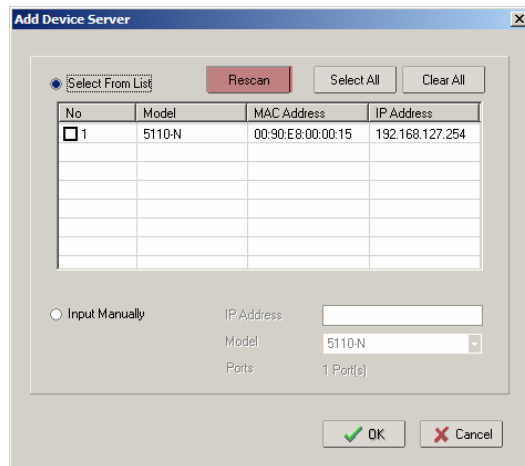
1. Click **Monitor** under **Function**.



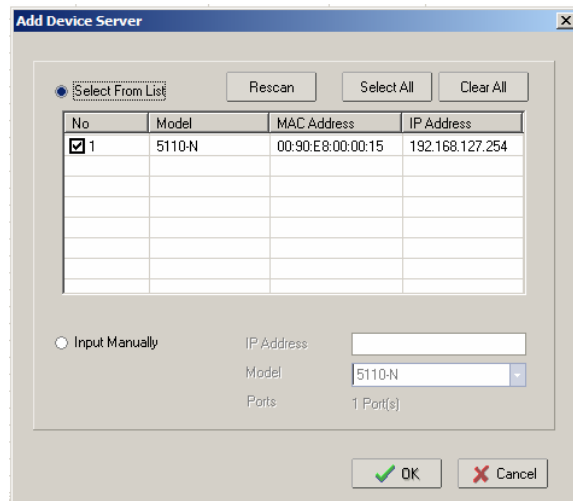
- Click **Monitor** → **Add Target** from the menu bar, or click the right mouse button and select **Add Target**.



- Click **Rescan**.

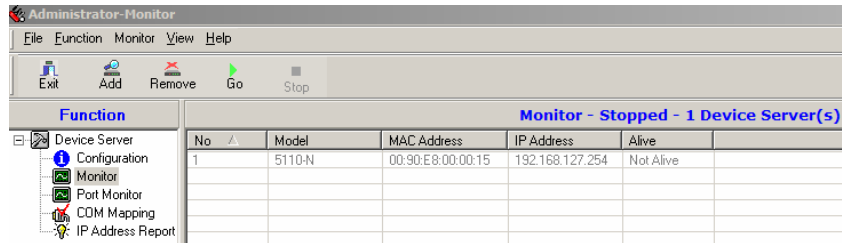


- Select your targets from the list, and then click **OK**.

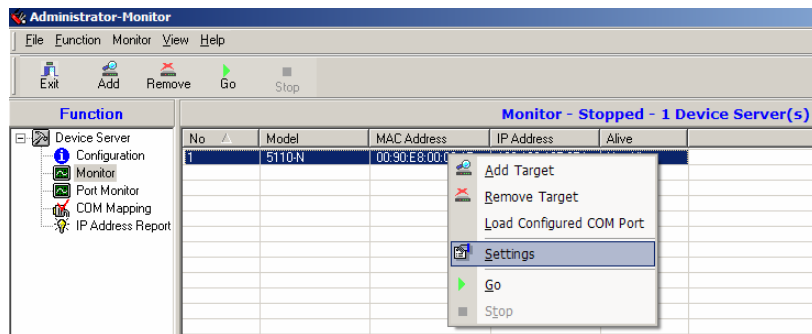


Once the Monitor function is running:

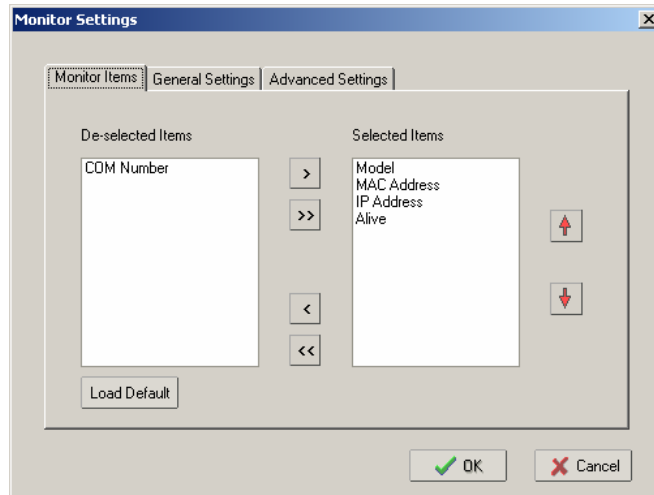
1. The 5110-N list will appear on the Monitor screen.



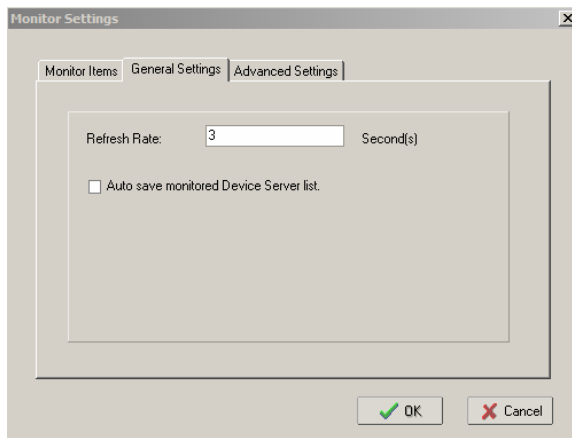
2. Right click the panel and select **Settings**.



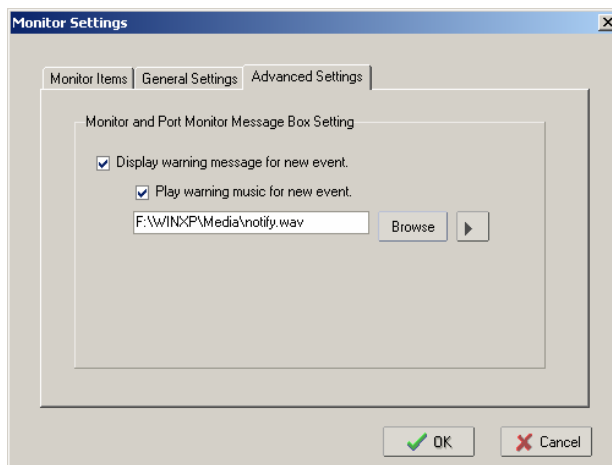
3. Select or de-select **Monitor Items**. Use the single arrowhead buttons to move highlighted items from one box to the other. Use the double arrowhead buttons to move all items in one box to the other.



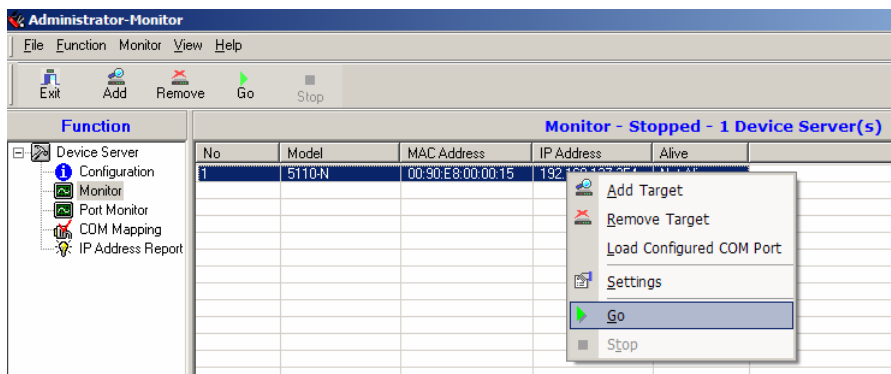
4. Select a **Refresh Rate** (the default is 3 seconds) on the **General Settings** page.



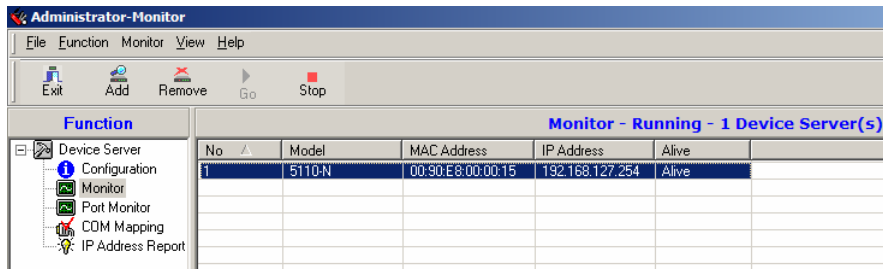
5. On the **Advanced Settings** page, select **Display warning message for new event** and/or **Play warning music for new event**. In the second case, you must enter the path to the WAV file that you want to be played. "New event" means that one of the 5110-Ns in the monitor is "Alive" or "Not Alive," or has lost connection with the Monitor program.



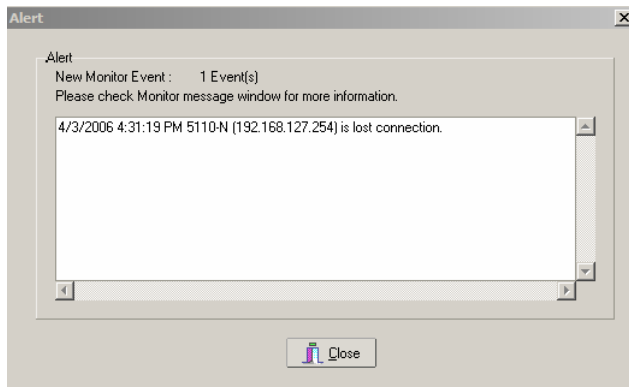
6. Right click the 5110-N list section and select **Go** to start Monitoring the 5110-N.



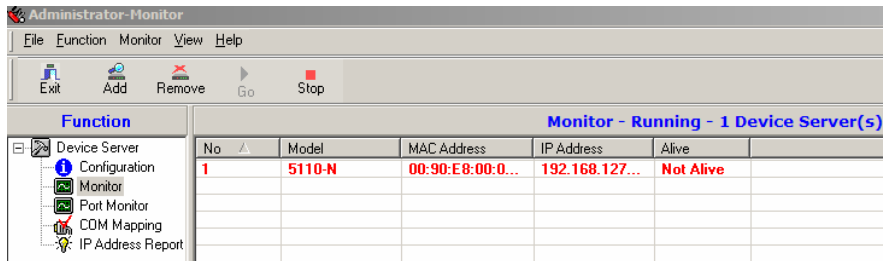
- For this example, the 5110-Ns shown in the list will be monitored.



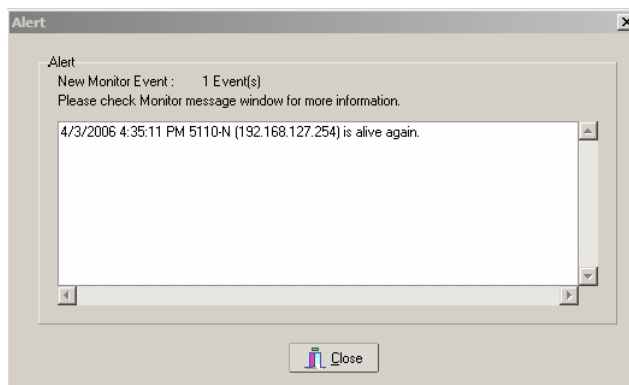
- When one of the 5110-Ns loses connection with the Monitor program, a warning alert will display automatically. The warning music will be played at the same time.



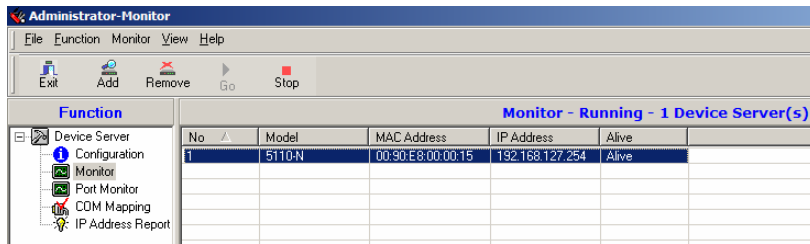
- In the Monitor screen, you can see the 5110-Ns that are "Not Alive". They are shown in red.



- If the 5110-N gets reconnected, an alert will be displayed to remind the user that the 5110-N is now "Alive."

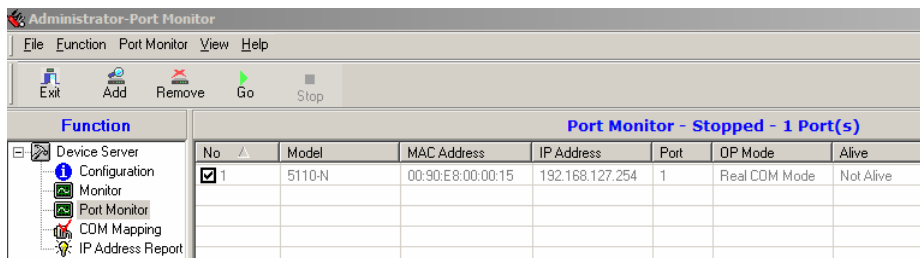


- The 5110-Ns that were reconnected, and are now “Alive,” will be shown in black.

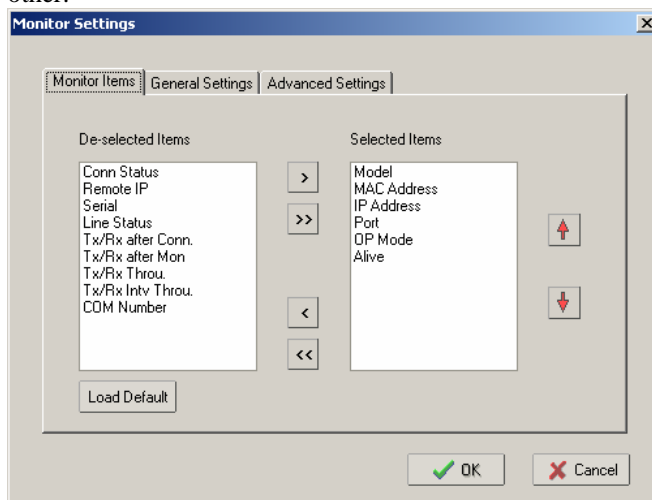


Port Monitor

The process described here is the same as in the previous “Monitor” section. The only difference is that you can select more items under Port Monitor than under Monitor.



Select or de-select **Monitor Items**. Use the single arrowhead buttons to move highlighted items from one box to the other. Use the double arrowhead buttons to move all items in one box to the other.



COM Mapping

Windows Administration Suite comes with Windows 95/98/ME/NT/2000/XP Real COM drivers. After you install Device Server Administration Suite, there are two ways to set up the 5110-N serial port as your host’s remote COM port.

The first way is with **On-line COM Mapping**. On-line COM Mapping will check to make sure that the 5110-N is connected correctly to the network, and then install the driver on the host computer.

The second way is with **Off-line COM Installation**, without first connecting the 5110-N to the network. Off-line COM Mapping can decrease the system integrator's effort by solving different field problems. Via off-line installation, users can first process software installation for the host, and then install the 5110-N to different fields.

Use the following procedure to map COM ports:

1. On-line COM Mapping:

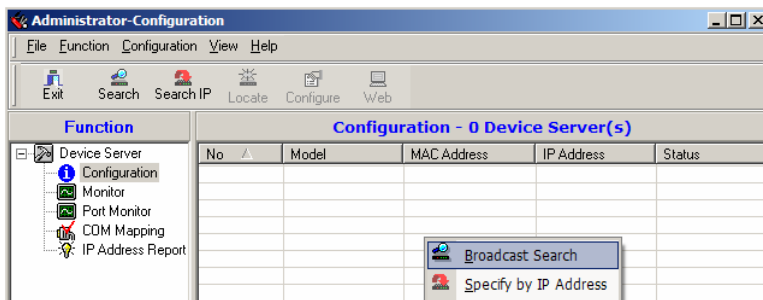
Connect 5110-N to the network → Set 5110-N to the proper IP address → Map COMs to your host → Apply Change.

2. Off-line COM Mapping:

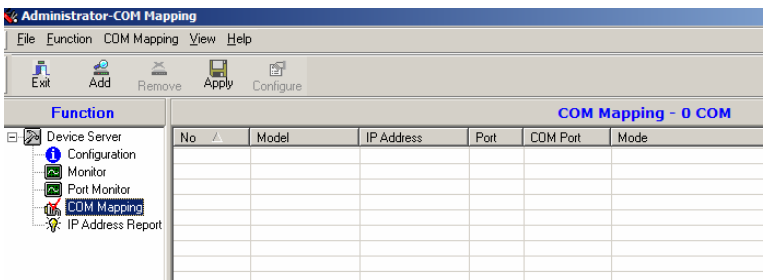
Map COMs to your host → Apply Change → Connect 5110-N to the network → Configure 5110-N's IP address.

On-line COM Mapping

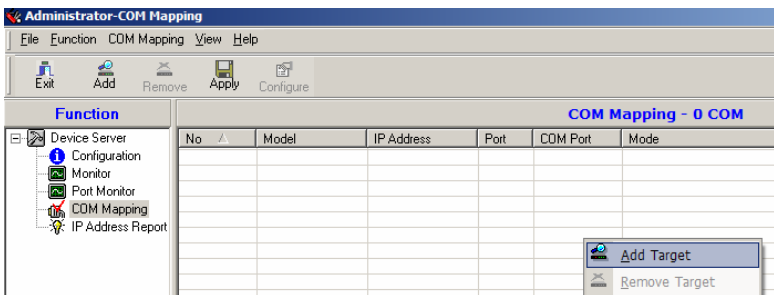
1. **Broadcast Search** for 5110-Ns on the network.



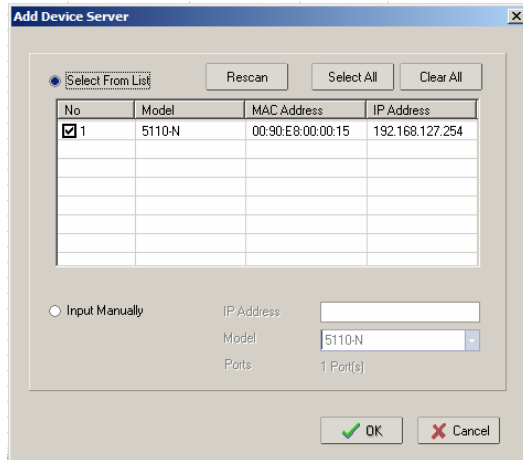
2. Select the **COM Mapping** function group.



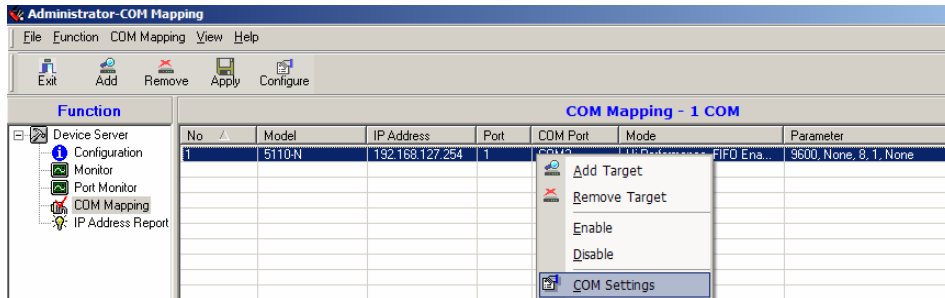
3. Add the target to which you would like to map COM ports.



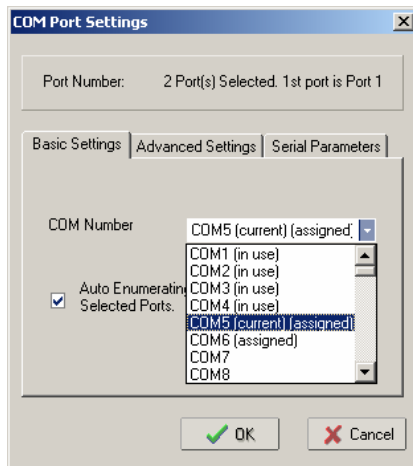
- The 5110-N list that appears is the list generated by the previous Broadcast Search. Select the 5110-N to which you would like to map COM ports.

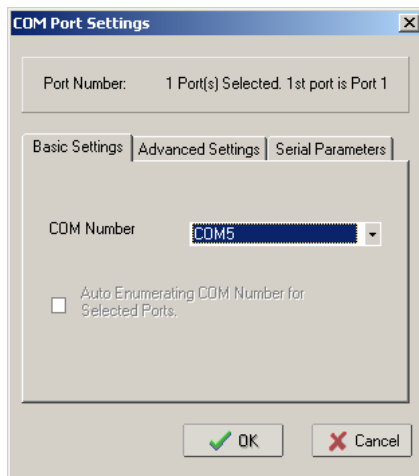


- Select **COM Settings** to modify COM No., default setting, etc.



- Select the COM No. The COM ports that are “In use” or “Assigned” will also be indicated in this drop-down list. If you select multiple serial ports or multiple 5110-Ns, remember to check the “Auto Enumerating” function to use the COM No. you select as the first COM No.





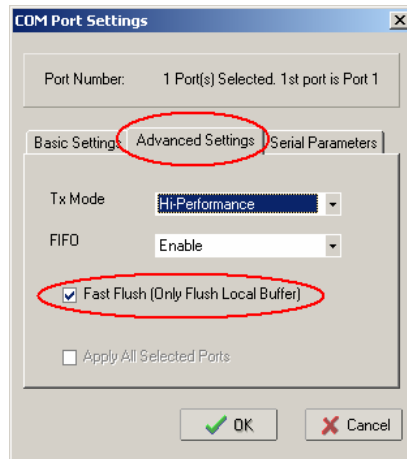
7. **Hi-performance** mode is the default for Tx mode. If the driver completes sending data out to the 5110-N, the driver will reply with a “Tx Empty” message to the program.

Under **classical mode**, the driver will not notify the user’s program that Tx is completed until all Tx data has been sent out from the 5110-N; this mode will cause lower throughput. If you want to ensure that all data is sent out before further processing, classical mode is recommended.

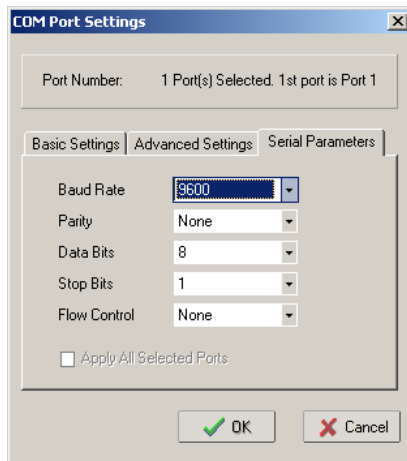
Enable/Disable Tx/Rx FIFO. If disabled, 5110-N will send one byte each time the Tx FIFO becomes empty; and an Rx interrupt will be generated for each incoming byte. This will result in a faster response and lower throughput. If you want to use XON/XOFF flow control, we recommend setting FIFO to Disable.

Fast Flush (only flush local buffer)

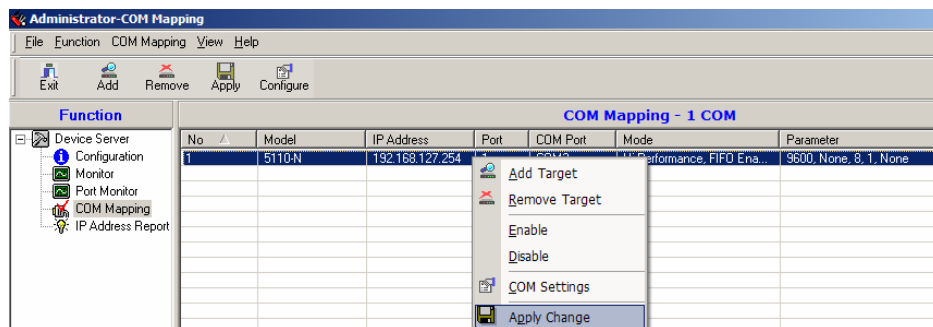
- We have added one optional Fast Flush function to the new 5110-N Real COM driver. **Device Server Administrator Suite for 2G 5110-N** adds it after version 1.2.
- For some applications, the user’s program will use the Win32 “PurgeComm()” function before it reads or writes data. With our design, after the program uses this Purge Comm() function, the 5110-N driver will keep querying 5110-N’s firmware several times to make sure there is really no data queued in the 5110-N firmware buffer, rather than just flushing the local buffer. This kind of design is used because of some special considerations. However, it might take more time (in the order of several hundred milliseconds) than a native COM1, because it needs to work via Ethernet. This is the reason why the native COM ports on the motherboard can work fast with this function call, but 5110-N requires much more time. In order to accommodate other applications that require a faster response time, the new 5110-N driver implements a new “Fast Flush” option. Note that by default, this function is disabled.
- Make sure there are some “PurgeComm()” functions being used in your application program. In this kind of situation, you might find that your 5110-N performs poorly than when using the native COM1 port. Once you have enabled the “Fast Flush” function, you can check to see if there has been an improvement in performance.
- By default, the optional “Fast Flush” function is disabled. If you would like to enable this function, from the Device Server Administrator Suite, double click the COM ports that are mapped to the 5110-N, and then select the “Fast Flush” option. You should find that when “Fast Flush” is enabled, the 5110-N driver will work faster with “PurgeComm().”



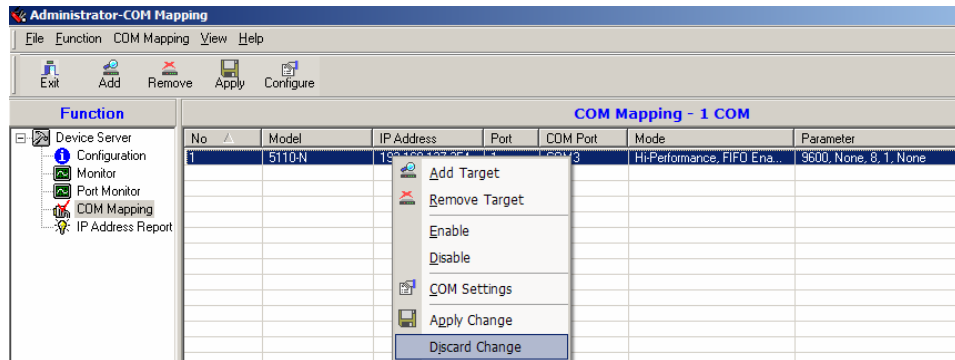
- The Serial Parameter settings shown here are the default settings when the 5110-N is powered on. However, the program can redefine the serial parameters to different values after the program opens the port via Win 32 API.



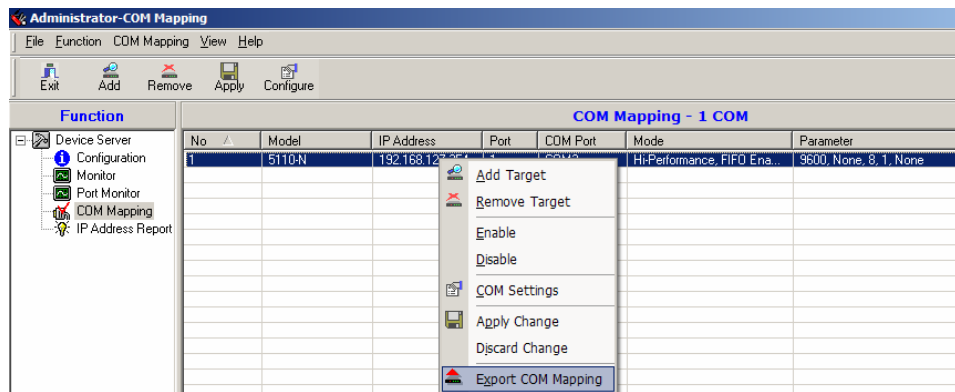
- After setting the COM Mapping, remember to select **Apply Change** to save the information in the host system registry. The host computer will not have the ability to use the COM port until after **Apply Change** is selected.



10. Select **Discard Change** to discard the COM Mapping information changes.

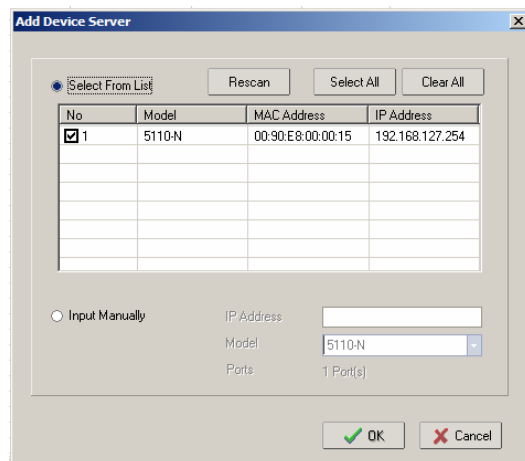


11. To save the configuration to a text file, select **Export COM Mapping**. You will then be able to import this configuration file to another host and use the same COM Mapping settings on the other host.

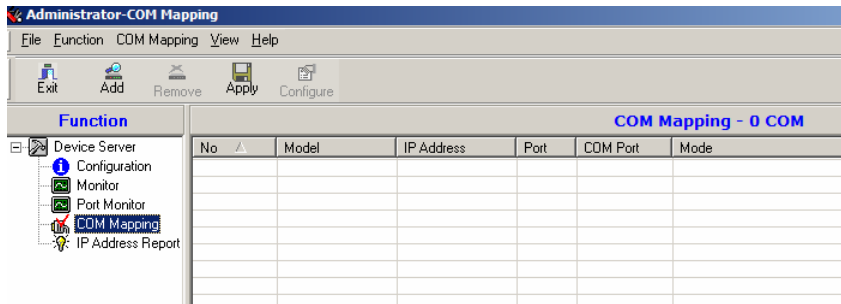


Off-line COM Mapping

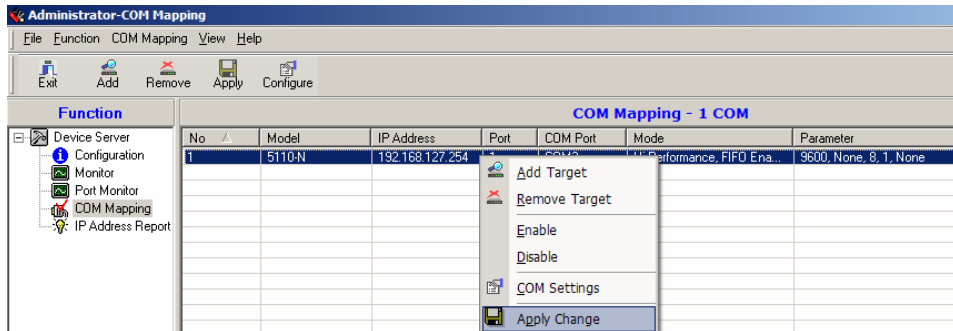
1. Add a target by inputting the IP address and selecting the Model Name without physically connecting the 5110-N to the network.



2. Modify the port settings as needed.



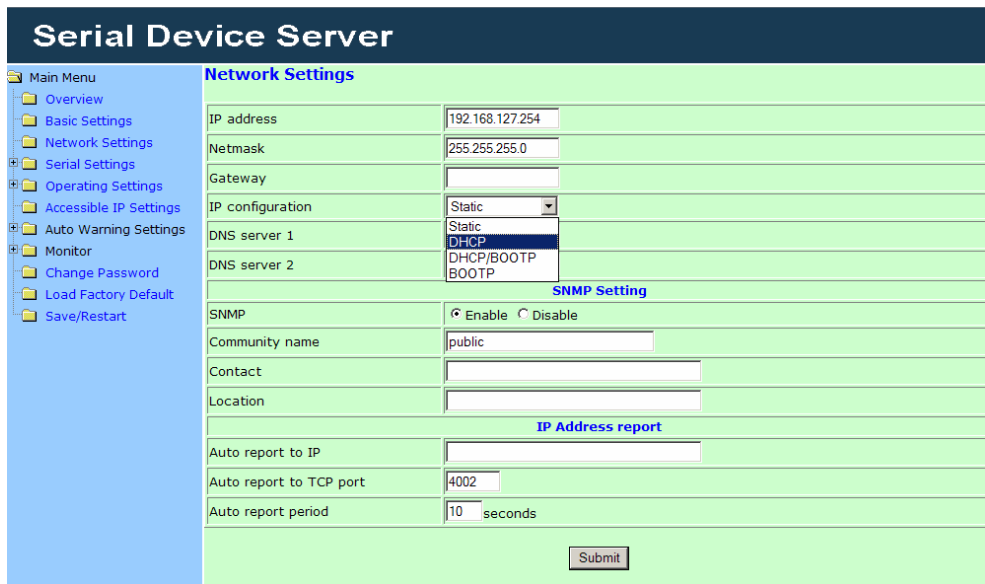
3. Right click the 5110-N list section and select **Apply Change**.



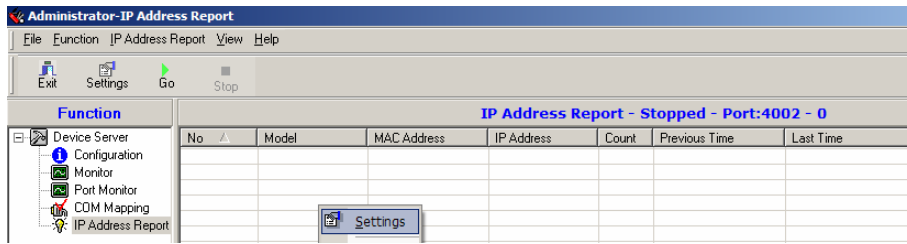
IP Location

When 5110-N is used in a dynamic IP environment, users must spend more time with IP management tasks. 5110-N Series products help out by periodically reporting their IP address to the IP location server, in case the dynamic IP has changed.

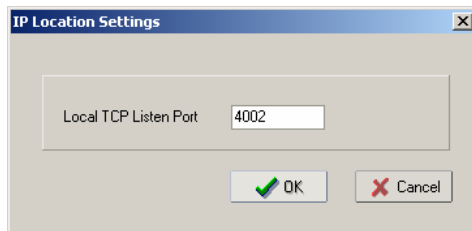
1. Configure 5110-N with Dynamic IP settings (DHCP, BOOTP, or DHCP/BOOTP). Assign the remote Auto IP report server's IP address and UDP port.



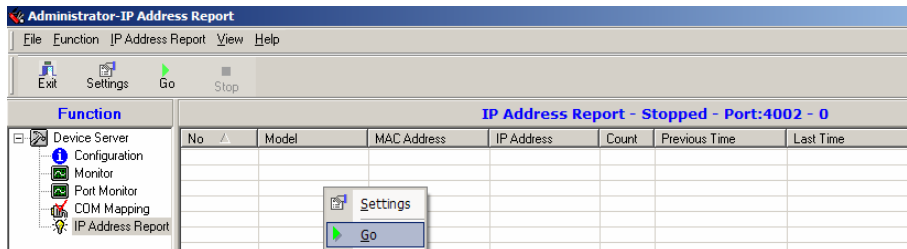
2. Select **IP Location Report** and click the right mouse button to select **Settings**.



3. Configure the Local Listen Port to be the same as the 5110-N's "Auto report to UDP port" setting.



4. Click **Go** to start receiving the Auto IP address report from the 5110-N.



7

IP Serial LIB

The following topics are covered in this chapter:

- ❑ **Overview**
- ❑ **IP Serial LIB Function Groups**
- ❑ **Example Program**

Overview

What is IP Serial Library?

IP Serial Library is a Windows library with frequently used serial command sets and subroutines. IP Serial Library is designed to reduce the complexity and poor efficiency of serial communication over TCP/IP. For example, Telnet can only transfer data, but it cannot monitor or configure the serial line's parameters.

Why Use IP Serial Library?

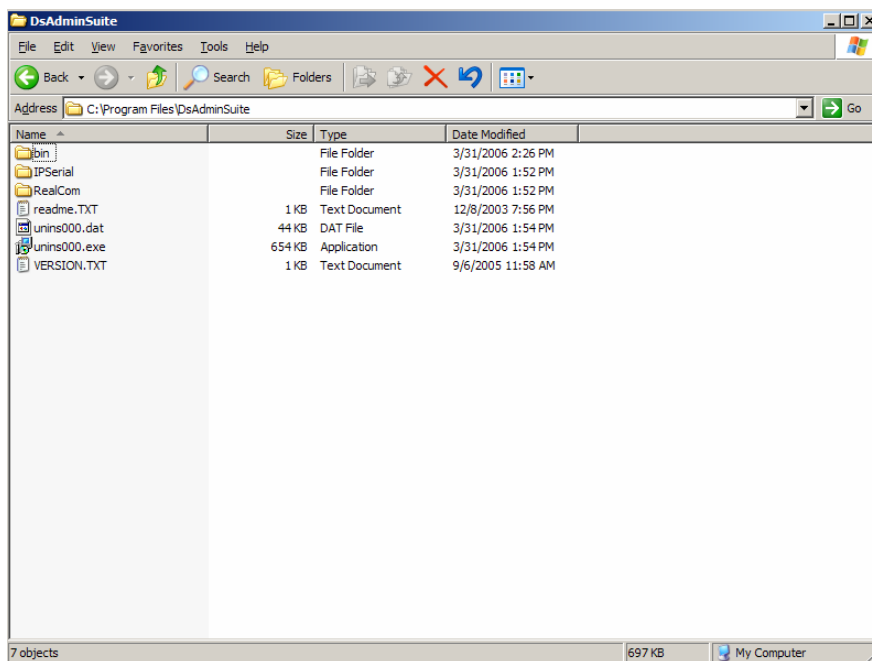
For programmers who are familiar with serial communication, IP Serial Library provides well-designed function calls that have the same style as the PComm Library.

IP Serial Library is amazingly simple and easy to understand. By including it in your VB, C, or Delphi programming environment, you can program your own TCP/IP applications with the ability to control serial communication parameters.

5110-N uses 2 TCP ports for communication between the 5110-N and host computer's Real COM driver. 5110-N uses a data port and command port to provide pure data transfer without the necessity of decoding and encoding. Compared to using only one TCP port to control serial communication (such as RFC 2217), IP Serial Library uses a command port to communicate with 5110-N from the user's program. IP Serial Library not only runs with excellent efficiency but also runs without any decoding or encoding problems.

How to install IP Serial Library

IP Serial Lib comes with the Device Server Administration Suite. Refer to the IP Serial directory for more details about the function definitions.



IP Serial LIB Function Groups

Server Control	Port Control	Input/Output Data	Port Status Inquiry	Miscellaneous
nsio_init	nsio_open	nsio_read	nsio_lstatus	nsio_break
nsio_end	nsio_close	nsio_SetReadTimeouts	nsio_data_status	nsio_break_on
nsio_resetserver	nsio_ioctl	nsio_write		nsio_break_off
nsio_checkalive	nsio_flowctrl	nsio_SetWriteTimeouts		nsio_breakcount
	nsio_DTR			
	nsio_RTS			
	nsio_lctrl			
	nsio_baud			
	nsio_resetport			

Example Program

```

char 5110-N-Nip="192.168.1.10";
char buffer[255];
int port = 1;
int portid;
nsio_init();
portid = nsio_open(5110-Nip, port);
nsio_ioctl(portid, B9600, (BIT_8 | STOP_1 |
P_NONE) );
sleep(1000);
nsio_read(port, buffer, 200);
nsio_close(portid);
nsio_end();
/*data buffer, 255 chars */
/*1st port */
/* port handle */
/*initial IP Serial Library */
/*1st port, 5110-N IP=192.168.1.10 */
/*set 9600, N81 */
/* wait for 1000 ms for data */
/* read 200 bytes from port 1 */
/* close this serial port */
/* close IP Serial Library */

```

A

Pinouts and Cable Wiring

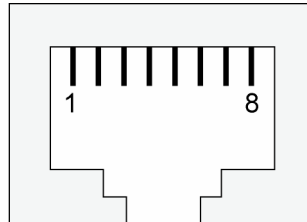
The following topics are covered in this appendix:

- ❑ **Port Pinout Diagrams**
 - Ethernet Port Pinouts
 - Serial Port Pinouts
- ❑ **Cable Wiring Diagrams**
 - Ethernet Cables
 - Serial Cables

Port Pinout Diagrams

Ethernet Port Pinouts

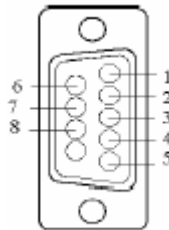
Pin	Signal
1	Tx+
2	Tx-
3	Rx+
6	Rx-



Serial Port Pinouts

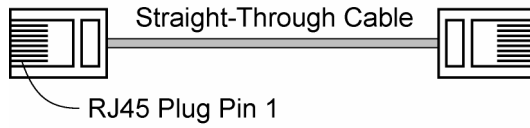
PIN	SIGNAL
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS

DB9 Male RS-232 port pinouts for 5110-N/5110-N-T

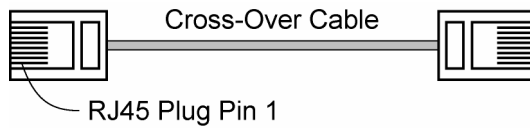
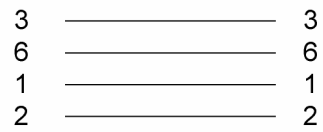


Cable Wiring Diagrams

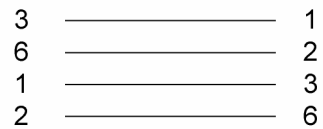
Ethernet Cables



Cable Wiring



Cable Wiring



B

Well Known Port Numbers

In this appendix, which is included for your reference, we provide a list of Well Known port numbers that may cause network problems if you set 5110-N to one of these ports. Refer to RFC 1700 for Well Known port numbers, or refer to the following introduction from the IANA.

The port numbers are divided into three ranges: the Well Known Ports, the Registered Ports, and the Dynamic and/or Private Ports.

The Well Known Ports range from 0 through 1023.

The Registered Ports range from 1024 through 49151.

The Dynamic and/or Private Ports range from 49152 through 65535.

The Well Known Ports are assigned by the IANA, and on most systems, can only be used by system processes or by programs executed by privileged users. The following table shows famous port numbers among the well-known port numbers. For more details, please visit the IANA website at <http://www.iana.org/assignments/port-numbers>.

TCP Socket	Application Service
0	Reserved
1	TCP Port Service Multiplexer
2	Management Utility
7	Echo
9	Discard
11	Active Users (systat)
13	Daytime
15	Netstat
20	FTP data port
21	FTP CONTROL port
23	Telnet
25	SMTP (Simple Mail Transfer Protocol)
37	Time (Time Server)
42	Host name server (names server)
43	Whois (nickname)

TCP Socket	Application Service
49	(Login Host Protocol) (Login)
53	Domain Name Server (domain)
79	Finger protocol (Finger)
80	World Wide Web HTTP
119	Network news Transfer Protocol (NNTP)
123	Network Time Protocol
213	IPX
160 – 223	Reserved for future use

UDP Socket	Application Service
0	Reserved
2	Management Utility
7	Echo
9	Discard
11	Active Users (systat)
13	Daytime
35	Any private printer server
39	Resource Location Protocol
42	Host name server (names server)
43	Whois (nickname)
49	(Login Host Protocol) (Login)
53	Domain Name Server (domain)
69	Trivial Transfer Protocol (TETP)
70	Gopher Protocol
79	Finger Protocol
80	World Wide Web HTTP
107	Remote Telnet Service
111	Sun Remote Procedure Call (Sunrpc)
119	Network news Transfer Protocol (NNTP)
123	Network Time protocol (NTP)
161	SNMP (Simple Network Mail Protocol)
162	SNMP Traps
213	IPX (Used for IP Tunneling)

C

SNMP Agents with MIB II & RS-232 Like Groups

5110-N has built-in SNMP (Simple Network Management Protocol) agent software that supports SNMP Trap, RFC1317 RS-232 like groups and RFC 1213 MIB-II. The following table lists the standard MIB-II groups, as well as the variable implementation for 5110-N.

RFC1213 MIB-II supported SNMP variables:

System MIB	Interfaces MIB	IP MIB	ICMP MIB
SysDescr	ifNumber	ipForwarding	IcmpInMsgs
SysObjectID	ifIndex	ipDefaultTTL	IcmpInErrors
SysUpTime	ifDescr	ipInreceives	IcmpInDestUnreachs
SysContact	ifType	ipInHdrErrors	IcmpInTimeExcds
SysName	ifMtu	ipInAddrErrors	IcmpInParmProbs
SysLocation	ifSpeed	ipForwDatagrams	IcmpInSrcQuenchs
SysServices	ifPhysAddress	ipInUnknownProtos	IcmpInRedirects
	ifAdminStatus	ipInDiscards	IcmpInEchos
	ifOperStatus	ipInDelivers	IcmpInEchoReps
	ifLastChange	ipOutRequests	IcmpInTimestamps
	ifInOctets	ipOutDiscards	IcmpTimestampReps
	ifInUcastPkts	ipOutNoRoutes	IcmpInAddrMasks
	ifInNUcastPkts	ipReasmTimeout	IcmpOutMsgs
	ifInDiscards	ipReasmReqds	IcmpOutErrors
	ifInErrors	ipReasmOKs	IcmpOutDestUnreachs

System MIB	Interfaces MIB	IP MIB	ICMP MIB
SysServices	ifInUnknownProtos	ipReasmFails	IcmpOutTimeExcds
	ifOutOctets	ipFragOKs	IcmpOutParmProbs
	ifOutUcastPkts	ipFragFails	IcmpOutSrcQuenchs
	ifOutNUcastPkts	ipFragCreates	IcmpOutRedirects
	ifOutDiscards	ipAdEntAddr	IcmpOutEchos
	ifOutErrors	ipAdEntIfIndex	IcmpOutEchoReps
	ifOutQLen	ipAdEntNetMask	IcmpOutTimestamps
	ifSpecific	ipAdEntBcastAddr	IcmpOutTimestampReps
		ipAdEntReasmMaxSize	IcmpOutAddrMasks
		IpNetToMediaIfIndex	IcmpOutAddrMaskReps
		IpNetToMediaPhysAddress	
		IpNetToMediaNetAddress	
		IpNetToMediaType	
		IpRoutingDiscards	

UDP MIB	TCP MIB	SNMP MIB
UdpInDatagrams	tcpRtoAlgorithm	snmpInPkts
UdpNoPorts	tcpRtoMin	snmpOutPkts
UdpInErrors	tcpRtoMax	snmpInBadVersions
UdpOutDatagrams	tcpMaxConn	snmpInBadCommunityNames
UdpLocalAddress	tcpActiveOpens	snmpInASNParseErrs
UdpLocalPort	tcpPassiveOpens	snmpInTooBig
	tcpAttempFails	snmpInNoSuchNames
Address Translation MIB	tcpEstabResets	snmpInBadValues
AtIfIndex	tcpCurrEstab	snmpInReadOnlys
AtPhysAddress	tcpInSegs	snmpInGenErrs
AtNetAddress	tcpOutSegs	snmpInTotalReqVars
Address Translation MIB	TCP MIB	SNMP MIB
AtNetAddress	tcpRetransSegs	snmpInTotalSetVars
	tcpConnState	snmpInGetRequests
	tcpConnLocalAddress	snmpInGetNexts
	tcpConnLocalPort	snmpInSetRequests
	tcpConnRemAddress	snmpInGetResponses
	tcpConnRemPort	snmpInTraps

	tcpInErrs	snmpOutTooBigs
	tcpOutRsts	snmpOutNoSuchNames
		snmpOutBadValues
		snmpOutGenErrs
		snmpOutGetRequests
		snmpOutGetNexts
		snmpOutSetRequests
		snmpOutGetResponses
		snmpOutTraps
		snmpEnableAuthenTraps

RFC1317: RS-232 MIB objects

Generic RS-232-like Group	RS-232-like General Port Table	RS-232-like Asynchronous Port Group
rs232Number	rs232PortTable	rs232AsyncPortTable
	rs232PortEntry	rs232AsyncPortEntry
	rs232PortIndex	rs232AsyncPortIndex
	rs232PortType	rs232AsyncPortBits
	rs232PortInSigNumber	rs232AsyncPortStopBits
	rs232PortOutSigNumber	rs232AsyncPortParity
	rs232PortInSpeed	
	rs232PortOutSpeed	

The Input Signal Table	The Output Signal Table
rs232InSigTable	rs232OutSigTable
rs232InSigEntry	rs232OutSigEntry
rs232InSigPortIndex	rs232OutSigPortIndex
rs232InSigName	rs232OutSigName
rs232InSigState	rs232OutSigState

D

Auto IP Report Protocol

5110-N Series provides several ways to configure Ethernet IP addresses. One of them is by using the DHCP Client. When you set up the 5110-N to use the DHCP Client to configure Ethernet IP addresses, the 5110-N automatically sends a DHCP request over the Ethernet to find the DHCP Server. The DHCP Server sends an available IP address to the 5110-N. The 5110-N uses this IP address for a period of time after receiving it. After the IP lease expires, the 5110-N sends a DHCP request again to the DHCP Server. Once the DHCP Server realizes that this IP address is to be released to another DHCP Client, it sends the 5110-N a different IP address. For this reason, users sometimes find that the 5110-N uses different IP addresses, and not a fixed IP address.

In order to know the IP address that the 5110-N is using, you need to set up parameters in Network Settings via Web browser. The following figure shows the 5110-N Web console configuration window. Enter the IP address and the Port number of the PC to which you want to send this information.

The screenshot shows the 'Serial Device Server' web console. The left sidebar contains a 'Main Menu' with options: Overview, Basic Settings, Network Settings, Serial Settings, Operating Settings, Accessible IP Settings, Auto Warning Settings, Monitor, Change Password, Load Factory Default, and Save/Restart. The main content area is titled 'Network Settings' and contains the following configuration fields:

IP address	192.168.127.254
Netmask	255.255.255.0
Gateway	
IP configuration	Static
DNS server 1	Static
DNS server 2	DHCP/BOOTP
SNMP Setting	
SNMP	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Community name	public
Contact	
Location	
IP Address report	
Auto report to IP	
Auto report to TCP port	4002
Auto report period	10 seconds

Auto IP Report Format

"", 4 bytes	Info[0]	Info[1]	...	Info[n]
-------------	---------	---------	-----	---------

Info [n]

Field	ID	Length	Data
Length	1	1	Variable, Length is "Length Field"

ID List

ID Value	Description	Length	Note
1	Server Name	Variable	ASCII char
2	Hardware ID	2	Little-endian
3	MAC Address	6	6 bytes MAC address. If the MAC address is "00-90-E8-01-02-03", then MAC[0] is 0, MAC[1] is 0x90(hex), MAC[2] is 0xE8(hex), and so on.
4	Serial Number	4, DWORD	Little-endian
5	IP Address	4, DWORD	Little-endian
6	Netmask	4, DWORD	Little-endian
7	Default Gateway	4, DWORD	Little-endian
8	Firmware Version	4, DWORD	Little-endian Ver1.3.4 = 0x0103040
9	AP ID	4, DWORD	Little-endian

AP ID & Hardware ID Mapping Table

AP ID	Hardware ID	Product
Undefined	Undefined	5110-N
0x80005000	0x0504	5110-N 5410
0x80005000	0x0534	5110-N 5430
0x80005000	0x1534	5110-N 5430I
0x80000312	0x0312	5110-N 5230
0x80000312	0x0322	5110-N 5210
0x80000312	0x0332	5110-N 5232
0x80000312	0x1332	5110-N 5232I
0x80005610	0x5618	5110-N 5610-8
0x80005610	0x5613	5110-N 5610-16
0x80005610	0x5638	5110-N 5630-8
0x80005610	0x5633	5110-N 5630-16