ND-8511(D)

1 Port RS-232/422/485
To
Ethernet Data Converter
User's Guide

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Product Model			
Environment	OS: Computer Brand: M/B: CPU: Chipset: BIOS: Video Card: NIC: Other:		
Detail Description			
Suggestions for ADLINK			

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1

Introduction

1.1 ND-8511(D) Overview

ADLINK ND-8511(D) is a 1-port RS-232/422/485 to Ethernet data converter. It is a compact sized communication module that allows users to control serial devices (RS-232/422/485) over a TCP/IP-based Ethernet network.

Users may connect host computer systems (Windows98/ME/2000/XP or Linux OSs) to a native serial port through a TCP/IP Ethernet. With one asynchronous serial port connection on one end and a 10/100 Mbps Ethernet connection on the other, ND-8511(D) also allows any device that primarily supports the asynchronous communications protocol to attach to a network. ND-8511(D) works like an add-on single-port serial board to PC servers, but with advantages of the TCP/IP network protocol. With the ND-8511(D), users are able to control asynchronous serial devices from virtually any location.

Serial devices connects through a virtual Ethernet link of the, but are recognized as a real COM port by Windows. ND-8511(D) can be used with existing applications, and comes with a utility program providing a simple step-by-step installation procedure and maintenance wizard that gives users easy access to asynchronous device.

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1.2 Protocol Support

The ND-8511(D) uses the Internet Protocol (IP) for network communications and the Transmission Control Protocol (TCP) to assure that no data is lost or duplicated. Other supported protocols are:

- ARP, UDP, TCP, ICMP, Telnet, TFTP, AutoIP, DHCP, HTTP, and SNMP for network communications and management.
- TCP, UDP, and Telnet for connections to the serial port.
- TFTP for firmware and web page updates.
- IP for addressing, routing, and data block handling over the network.
- User Datagram Protocol (UDP) for typical datagram applications in which devices interact with other devices without maintaining a point-to-point connection
- SMTP for e-mail transmission

1.3 Features

The ND-8511(D) connects serial devices to Ethernet networks using the IP protocol family:

- ATM Machines
- CNC Controllers
- Data Collection Devices
- Universal Power Supply (UPS) Management Units
- Telecommunications Equipment
- Data Display Devices
- Security Alarms and Access Control Devices
- Handheld Instruments
- Modems
- Time/Attendance Clocks and Terminals

The ND-8511(D) connects devices through a TCP data channel or through a Telnet connection to computers or another Device Server. Datagrams can be sent by UDP. The ND-8511(D) contains a web [http] server that allows presentation of custom content and can be easily configured through the server.

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1.4 H/W Specification

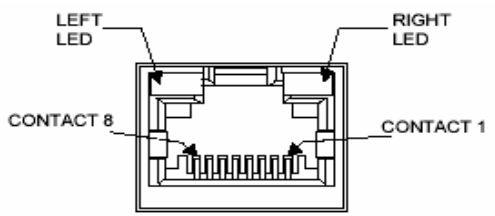
Category	Description
CPU	Lantronix XPort
Serial Interface	7 or 8 data bits; 1-2 stop bits; parity: odd, even, and none; software selectable baudrate (300-230400bps)
Modem Control	DTR, DCD, CTS, RTS
Flow Control	XON/XOFF (software), RTS/CTS (hardware)
Network Interface	RJ45 Ethernet 10base-T or 100base-TX (Auto-sensing)
Compatibility	Ethernet: Version 2.0/IEEE 802.3
Protocols support	ARP, UDP/IP, TCP/IP, Telnet, ICMP, SNMP, DHCP, BOOTP, TFTP, AutoIP, SMTP, and HTTP
Temperature	Operating range: -40ºC-85ºC (40ºF-185ºF)
Relative Humidity	Operating: 5% to 95% non-condensing
Shock/Vibration	Non-operational shock: 500g's, Non-operational vibration:20g's
Power	DC 10V to DC 30V

Difference between ND-8511 and ND-8511D

- ND-8511: RS-232/422/485 protocols supported
- ND-8511D: RS-232 protocol supported

Ethernet Interface

ND-8511(D) RJ45 Connecter front view



Ethernet Interface Signal

Signal name	Contact	Primary Function

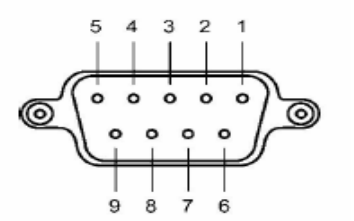
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TX+	1	Differential Ethernet Transmit Data +
TX-	2	Differential Ethernet Transmit Data -
RX+	3	Differential Ethernet Receive Data +
RX-	6	Differential Ethernet Receive Data -
Not Used	4	(Terminated)
Not Used	5	(Terminated)
Not Used	7	(Terminated)
Not Used	8	(Terminated)
SHIELD		Chassis Ground

Ethernet state LEDs

Left LED	Right LED	Meaning
off	Off	No Link
off	Solid Amber	100Base-T Half Duplex Link
off	Blinking Amber	100Base-T Half Duplex ; Activity
off	Solid Green	100Base-T Full Duplex Link
off	Blinking Green	100Base-T Full Duplex; Activity
Solid Amber	Off	10Base-T Half Duplex Link
Blinking Amber	Off	10Base-T Half Duplex ; Activity
Solid Green	Off	10Base-T Full Duplex Link
Blinking Green	Off	10Base-T Full Duplex ; Activity

Serial Interface



DB9 Connecter Pin define

RS-232 Interface

Serial Interface Signal

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PIN	Function Define
1	DCD
2	TXD
3	RXD
4	------
5	GND
6	DTR
7	CTS
8	RTS
9	------

RS-422 Interface

Serial Interface Signal

PIN	Function Define
1	RX-
2	RX+
3	TX+
4	TX-
5	GND
6	------
7	------
8	------
9	------

RS-485 Interface

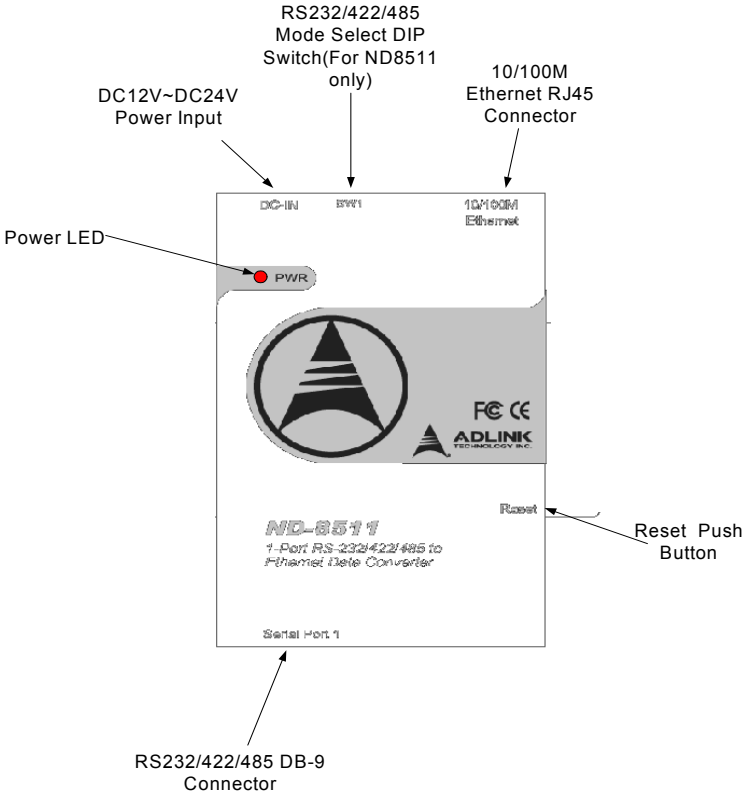
Serial Interface Signal

PIN	Function Define
1	------
2	------
3	DATA+
4	DATA-
5	GND
6	------

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7	------
8	------
9	------

1.5 Form Factor



DIP Setting for ND-8511

Interface	Bit 1	Bit 2
RS-232	OFF	OFF

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RS-485	**ON**	**OFF**
RS-422	**OFF**	**ON**

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1.6 Package Checklist

- One ND-8511 or ND-8511D
- Power Adapter (110V/230V universal)
- NULL MODEM connector
- ADLINK ALL-IN-ONE CD with ND-8511(D) Configuration utility, COM Port re-director utility and User's Guide

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2

Installation

2.1 Install ND-8511(D) Configuration Utility

2.1.1 Install the Utility

1. Insert ADLINK ALL-IN-ONE CD into your CD-ROM drive.
2. Because the ND-8511(D) configuration utility (Installer) need Microsoft .NET Framework component for operation, please install the component first. In the ADLINK ALL-IN-ONE CD, three versions of Microsoft .NET Framework component are provided “ADLINK ALL-IN-ONE CD -> NuDAM -> ND-8511 -> Microsoft .NET Framework”. Please select the correct language version for your system.
3. Go to the “ADLINK ALL-IN-ONE CD -> NuDAM -> ND-8511” directory, Click the ND-8511(D) configuration utility (Installer.msi) to open the installation wizard window.
4. Respond to the installation wizard prompts.

2.1.2 Install the Patch

1. After installing the ND-8511(D) configuration utility (Installer), please go to “ADLINK ALL-IN-ONE CD -> NuDAM -> ND-8511” directory and click the patch file for the configuration utility (ND-8511.exe).
2. Installation wizard will ask you to set the installation directory of the patch file, **please make sure that the directory must be the same of**

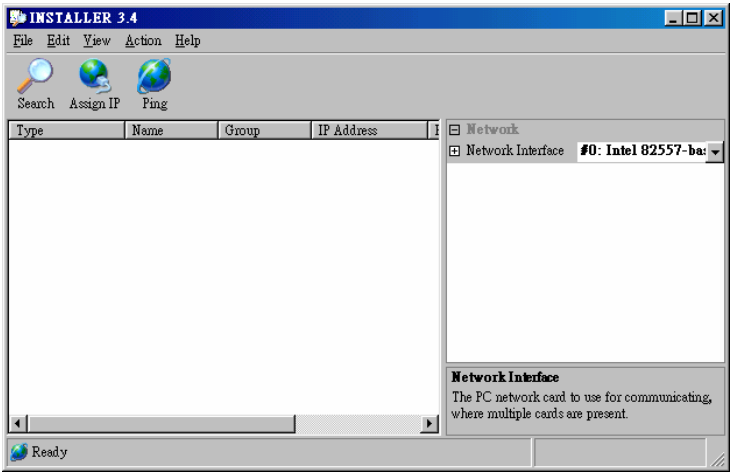
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the installation directory of the ND-8511(D) configuration utility

3. Respond to the installation wizard prompts.

2.1.3 RUN the Installer

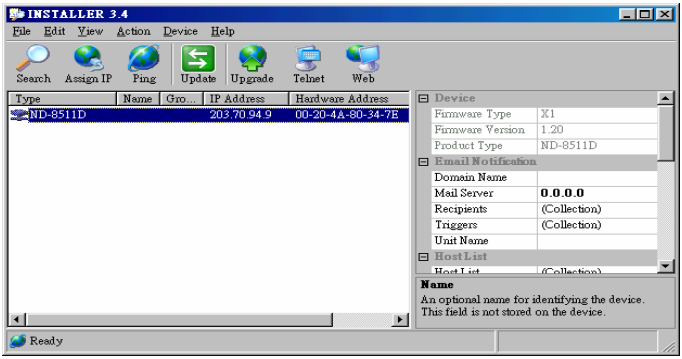
1. Click the Start button on the Task Bar and select "Programs\Installer\Installer" to start the ND-8511(D) configuration utility. The utility main dialog box displays.
2. To search for devices, click the Search icon or select Search Network from the Action menu. (The default settings are IP: 192.168.0.1, Net Mask: 255.255.255.0, Gateway: 192.168.0.254. Users can change host's IP to 192.168.0.xxx to be the same Domain as the ND-8511, and then click the Search icon to find the ND-8511).



2.1.4 Assign IP Address

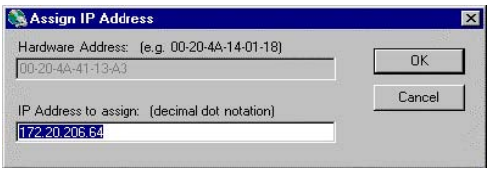
After find ND-8511 as the description on Section 2.1.3, users can now change its IP setting, and search for the ND-8511 again. The following dialog box shows a device found on the network.

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If the ND-8511(D) device doesn't show up after searching, then the device might not have a valid IP address assigned. Please use the Assign IP Address feature to set a specific IP address on the device. To do this, please follow the procedures in “Section 2.1.8 Serial Port Login” to assign the correct IP address.

To change the IP address, first select the device from the list, then click the Assign IP icon or select Assign IP Address from the Action menu. The hardware address and IP address are loaded into the Assign IP Address dialog box.

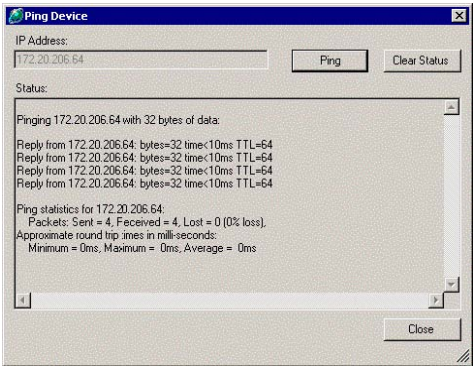


Enter the new IP Address and click OK. The new IP Address will appear in the main window.

2.1.5 Test the IP Address

To test the IP Address, select the device from the main window list, then click the Ping icon, or select Ping from the Action menu. The Ping Device dialog box shows the IP Address of the selected device. Click the Ping button and the results will be displayed in the Status window. Use the Clear Status button to clear the window so you can Ping the device again. Click the Close button to close the dialog box and return to the main window.

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2.1.6 Opening a Configuration Window

To configure the unit via a Web browser, first click on one of the devices listed in the window, then click the Web icon. The Web-Manager window displays in your browser.

To configure the unit via a Telnet session, first click on one of the devices listed in the window, then click the Telnet icon. The Setup Mode window displays.

2.1.7 ARP and Telnet

The unit's IP address must be configured before a network connection is available. If the unit has no IP address, you can use Address Resolution Protocol (ARP) method from UNIX and Windows-based systems to assign a temporary IP address. If you want to initially configure the unit through the network, follow these steps:

1. On a UNIX or Windows-based host, create an entry in the host's ARP table using the intended IP address and the hardware address of the unit, which is found on the product label on the bottom of the unit. arp -s 191.12.3.77 00:20:4a:xx:xx:xx

   Note: For the ARP command to work on Windows 95, the ARP table on the PC must have at least one IP address defined other than its own.

2. If you are using Windows 95, type ARP -A at the DOS command prompt to verify that there is at least one entry in the ARP table. If the local machine is the only entry, ping another IP address on your network to build a new entry in the ARP table; the IP address must be a host other than the machine on which you are working. Once there is at least one

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additional entry in the ARP table, use the following command to ARP an IP address to the unit:

arp -s 191.12.3.77 00-20-4a-xx-xx-xx

3. Open a Telnet connection to port 1. The connection will fail quickly, but the unit will temporarily change its IP address to the one designated in this step.

   telnet 191.12.3.77 1

4. Finally, open a Telnet connection to port 9999, and press Enter within three seconds to go into Setup Mode. If you wait longer than three seconds, the unit will reboot.

   telnet 191.12.3.77 9999

5. Set all required parameters

   Note: The IP address you just set is temporary and will revert to the default value when the unit's power is reset unless you log into the unit and store the changes permanently. Refer to Configuring the Unit on page 4-1 for instructions on permanently configuring the IP address.

2.1.8 Serial Port Login

If you want to initially configure the unit through a serial connection, follow these steps:

1. Connect a console terminal or PC running a terminal emulation program to your unit's serial port. The default serial port settings are 9600 baud, 8 bits, no parity, 1 stop bit, no flow control.

2. To enter Setup Mode, cycle the unit's power (power off and back on). After power-up, the self-test begins. You have one second to enter three lowercase x characters.

   Note: The easiest way to enter Setup Mode is to hold down the x key at the terminal (or emulation) while powering up the unit.

3. At this point, the screen display is the same as when you use a Telnet connection.

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3

Configuration

3.1 Overview

You must configure ND-8511(D) so that it can communicate on a network with your serial device. For example, you must set the way the unit will respond to serial and network traffic, how it will handle serial packets, and when to start or close a connection. You can configure your unit locally or remotely using the following procedures:

- Use Installer to configure ND-8511(D) unit. Some features are only available through the Installer menus.
- Use a standard Web browser to access the unit's internal Web pages and configure the unit over the network. This is the easiest and preferred method.
- Use a Telnet connection to configure the unit over the network.
- Use a terminal or terminal emulation program to access the serial port locally.

The unit's configuration is stored in nonvolatile memory and is retained without power. You can change the configuration at any time. The unit performs a reset after the configuration has been changed and stored.

Note: The menus in this section show a typical device. Your device may have different configuration options.

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3.2 Configuring via Web Browser

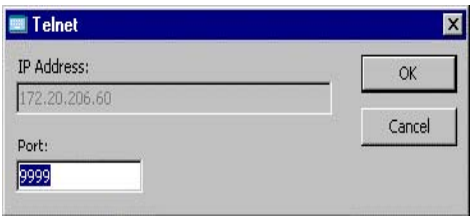
Open your JAVA enabled web browser and enter the IP address. The Web Manager page will display. Go to Web Manager Page for a summary of the menu selections.

3.3 Using Installer

Installer is a powerful software utility for configuring ND-8511(D) from a network connection. This section uses the utility to demonstrate the various methods of configuring a device.

To use Installer, follow the instructions in RUN Installer to search the network and verify your device is active.

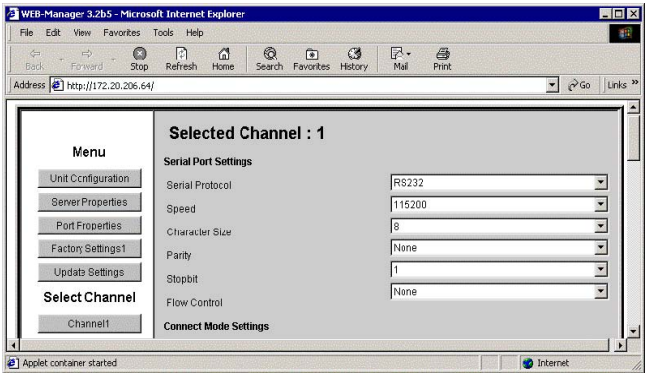
1. To configure the unit via a Web browser, select the device from the main window list, then click the Web icon, or select Web Pages from the Device menu. The Web-Manager window displays in your browser.
2. To configure a device using Telnet, select the device from the main window list, then click the Telnet icon, or select Telnet from the Device menu. Verify the IP Address and Port number and click OK. The configuration menu will appear.



3.4 Web Manager Page

You can start a web browser for configuration by opening your JAVA enabled web browser and entering the IP address or by clicking the Web button on the Installer toolbar. The Web Manager page will display.

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Web Manager has the following buttons:

Unit Configuration
Server Properties
Port Properties
Factory Settings1
Update Settings
Channel1

1. Use the menu (pushbuttons) to navigate to sub pages where you can configure server settings. See explanations of the configuration parameters later in this chapter.

2. When you are finished, click the Update Settings button to save your settings.

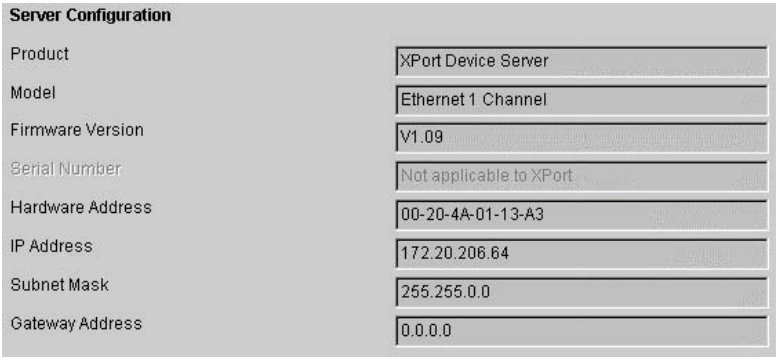
3.4.1 Unit Configuration

Click the Unit Configuration button to display the following dialog box. This page contains the Server Configuration and the Port configuration settings. These are static settings read from the device.

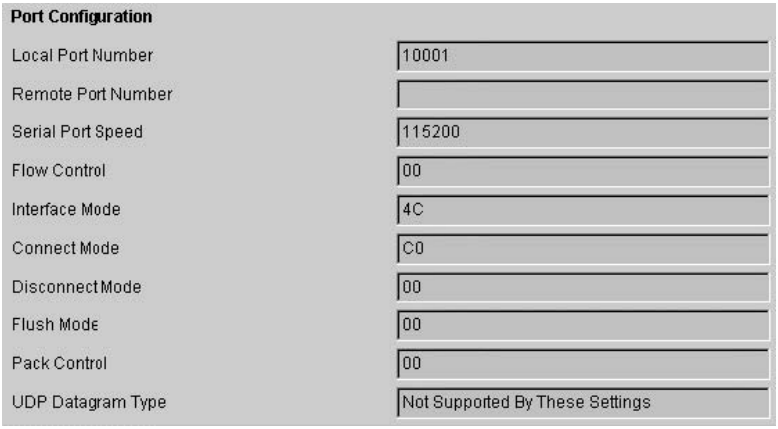
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The following two pictures show the information available in the above screen shot.

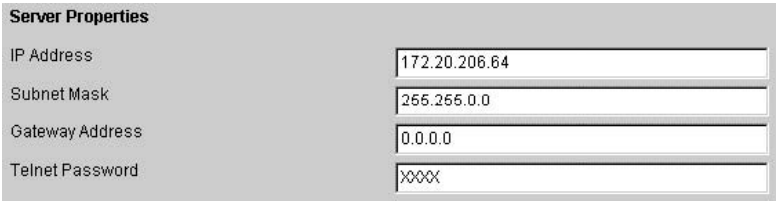


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3.4.2 Server Properties

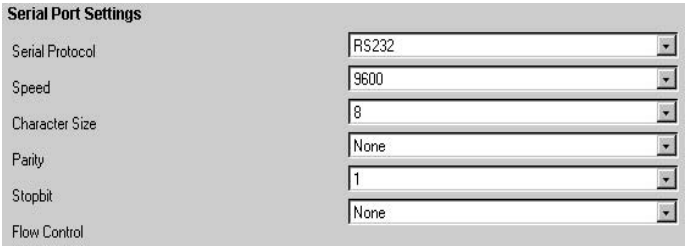
You can change the server properties by editing any of the fields. Lingering over one of the fields will display help messages. Changing the IP address will require you to enter the new IP address in the browser to reload the page.



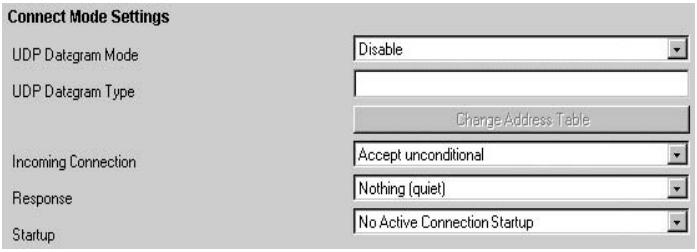
Telnet Password
In the Telnet Password field, enter a password to prevent unauthorized access to the Setup Mode via a Telnet connection to port 9999. The password is limited to 4 characters. (An enhanced password setting of 16 characters is available under Security Settings on the Telnet Setup Mode window.)

3.4.3 Port Properties

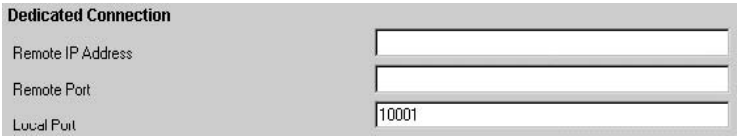
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Serial Protocol: RS232
Speed: 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400
Character Size: 8, 7
Parity: None, Even, Odd
Stop Bit: 1, 2
Flow Control: None, XON/XOFF, XON/XOFF Pass Characters to Host, CTS/RTS (Hardware)

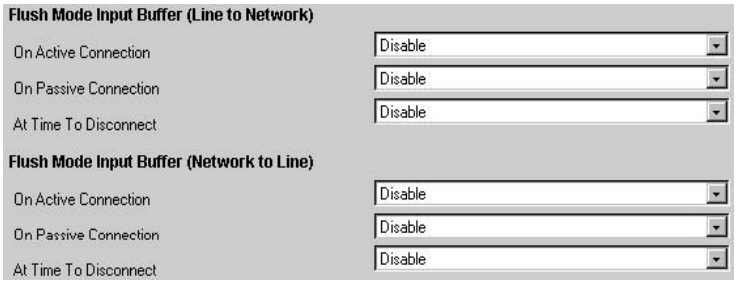


UDP Datagram Mode: Enable, Disable
UDP Datagram Type: (User selectable)
Incoming Connection: Accept unconditional, Accept Incoming/DTR, Never accept incoming
Response: Nothing (quiet), Character Response
Startup: No Active Connection startup, With Any Character, With CR (0x0D) Only, Manual Connection, Autostart, Modem Mode, With Active DTR

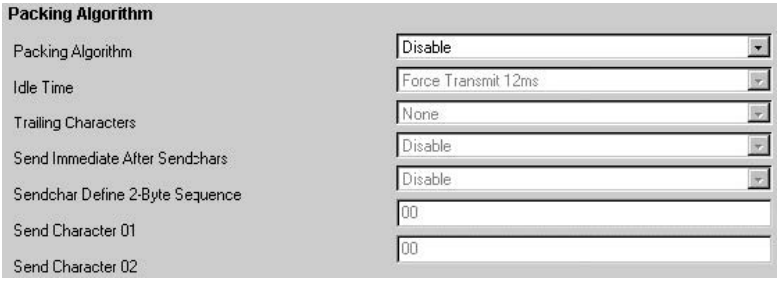


Remote IP Address: (user selectable)
Remote Port: (user selectable)
Local Port: 10001 (default 10001, user selectable)

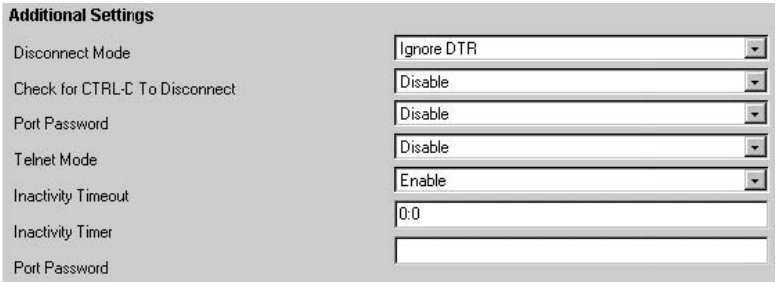
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On Active Connection: Enable, Disable
On Passive Connection: Enable, Disable
At Time To Disconnect: Enable, Disable



Packing Algorithm: Enable, Disable
Idle Time: Force transmit 12 ms, Force transmit 52 ms,
Force Transmit 250 ms, Force Transmit 5000 ms
Trailing Characters: None, One, Two
Send Immediate After Sendchars: Enable, Disable
Sendchar Define2-Byte Sequence: Enable, Disable
Send Character 01: (User Selectable)
Send Character 02: (User Selectable)



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Disconnect Mode: Ignore DTR, With DTR Drop
Check for CTRL-D to Disconnect: Enable, Disable
Port Password: Enable, Disable
Telnet Mode: Enable, Disable
Inactivity Timeout: Enable, Disable
Inactivity Timer: (User Selectable)
Port Password: (User Selectable. Port Password must be enabled)

3.4.4 Factory Settings

Click this button to set Channel1 to the factory default settings.

3.4.5 Update Settings

Click the Update Settings button to send all changed settings to the device.

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3.5 Configuring via the Setup Mode Window

3.5.1 Using a Telnet Connection

To configure the unit over the network, establish a Telnet connection to port 9999.

Note: If you use the Telnet icon on the Installer toolbar OR a serial port login to establish the connection, skip steps 1 and 2.

1. From the Windows Start menu, click Run and type the following command, where x.x.x.x is the IP address and 9999 is the unit's fixed network configuration port number.

   telnet x.x.x.x 9999
   Note: Be sure to include a space between the IP address and 9999.

2. Click OK.

3. The Setup Mode window displays.

   MAC address 00204A4113A3
   Software version 01.0b9 (021219) XPT
   Press Enter to go into Setup Mode

4. To enter the Setup Mode, you must press Enter within 5 seconds. The configuration settings will appear.
5. Select an option on the menu by entering the number of the option in the Your choice ? field and pressing Enter.
6. To enter a value for a parameter, type the value and press Enter, or to confirm a current value, just press Enter.
7. When you are finished, save the new configurations (option 9). The unit will reboot.

```
*** basic parameters
Hardware: Ethernet TPI
IP addr 0.0.0.0/DHCP/BOOTP/AutoIP, no gateway set
DHCP device name : not set

***************** Security ****************
SNMP is enabled
SNMP Community Name: public
Telnet Setup is enabled
```


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```
  TFPT Download is enabled
  Port 77Feh is enabled
  Web Server is enabled
  ECHO is disabled
  Encryption is disabled
  Enhanced Password is disabled

  ***************** Channel 1 *****************
  Baudrate 9600, I/F Mode 4C, Flow 00
  Port 10001
  Remote IP Adr: --- none ---, Port 00000
  Connect Mode : C0 Disconn Mode: 00
  Flush Mode :00

  ***************** Expert *****************
  TCP Keepalive : 45s
  ARP cache timeout : 600s

  ***************** E-mail *****************
  Mail server: 0.0.0.0
  Unit :
  Domain :
  Recipient 1:
  Recipient 2:

  *** Trigger 1
  Serial Sequence: 00,00
  CP1: X
  CP2: X
  CP3: X
Message :
Priority: L
Min. notification interval: 1 s
Re-notification interval : 0 s

*** Trigger 2
Serial Sequence: 00,00
CP1: X
CP2: X
CP3: X
Message :
Priority: L
Min. notification interval: 1 s
Re-notification interval : 0 s

*** Trigger 3
```


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```
Serial Sequence: 00,00
CP1: X
CP2: X
CP3: X
Message :
Priority: L
Min. notification interval: 1 s
Re-notification interval : 0 s

Change Setup:
    0 Server configuration
    1 Channel 1 configuration
    3 E-mail settings
    5 Expert settings
    6 Security
    7 Factory defaults
    8 Exit without save
    9 Save and exit Your choice ?
```

3.5.2 Using the Serial Port

If you want to initially configure the unit through a serial connection, follow these steps:

1. Connect a console terminal or PC running a terminal emulation program to your unit's serial port. The default serial port settings are 9600 baud, 8 bits, no parity, 1 stop bit, no flow control.
2. To enter Setup Mode, reset the unit, either by pushing the red reset button, or cycling the unit's power (power off and back on). The self-test will begin. You have one second to enter three lowercase x characters (xxx).
3. At this point, the screen display is the same as when you use a Telnet connection.

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3.6 Server Configuration (Network Configuration)

These are the unit's basic network parameters. The following parameters are displayed when you select Server configuration.

IP Address : (000) .(000) .(000) .(000)
Set Gateway IP Address (N)
Netmask: Number of Bits for Host Part (0=default) (0)
Change telnet config password (N)

3.6.1 IP Address

The IP address must be set to a unique value in your network.

3.6.2 Set Gateway IP Address

The gateway address, or router, allows communication to other LAN segments. The gateway address should be the IP address of the router connected to the same LAN segment as the unit. The gateway address must be within the local network.

3.6.3 Netmask: Number of Bits for Host Part

A netmask defines the number of bits taken from the IP address that are assigned for the host section.

3.6.4 Change Telnet configuration password

Setting the Telnet configuration password prevents unauthorized access of the setup menu via a Telnet connection to port 9999 or via Web pages. The password is limited to 4 characters. An enhanced password setting of 16 characters is available under Security Settings for Telnet access only.

3.6.5 DHCP Naming

There are 3 methods for assigning DHCP names to these products.

1. Default DHCP name.
   If you do not change the DHCP name, and you are using an IP of 0.0.0.0, then the DHCP name will default to CXXXXXX (XXXXXX is the last 6 digits of the MAC address shown on the label on the bottom/side of the unit). For example, if the MAC address is 00-20-4A-12-34-56, then the default DHCP name is C123456.

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2. Custom DHCP name.
   You can create your own DHCP name on these products. If you are using an IP address of 0.0.0.0, then the last option in "Server configuration" will be "Change DHCP device name". The "Change DHCP device name" option will allow you to change the DHCP name to an alpha numeric name.

   Change DHCP device name (not set)? (N) Y
   Enter new DHCP device name: LTX

3. Numeric DHCP name.
   You are able to change the DHCP name by specifying the last octet of the IP address. When you use this method, the DHCP name will be LTXYY where YY is what you chose for the last octet of the IP address. If the IP address you specify is 0.0.0.12, then the DHCP name will be LTX12. This method will only work with 2 digit numbers (0-99).

3.7 Channel 1 Configuration (Serial Port Parameters)

Using this option, define how the serial port will respond to network and serial communications.

Baudrate (9600)
I/F Mode (4C)
Flow (00)
Port No (10001)
ConnectMode (C0)
Remote IP Address : (000).(000).(000).(000)
Remote Port (00000)
DisConnMode (00)
FlushMode (00)
DisConnTime (00:00) :
SendChar 1 (00)
SendChar 2 (00)

3.7.1 Baudrate

The unit and attached serial device, such as a modem, must agree on a speed or baud rate to use for the serial connection. Valid baud rates are 300, 600, 1200, 2400, 4800, 9600 (default), 19200, 38400, 57600, 115200, and 230400 bits per second.

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3.7.2 I/F (Interface) Mode

The Interface (I/F) Mode is a bit-coded byte that you enter in hexadecimal notation.

I/F Mode Option	7	6	5	4	3	2	1	0
RS-232C							0	0
7 Bit					1	0		
8 Bit					1	1		
No Parity			0	0				
Even Parity			1	1				
Odd Parity			0	1				
1 Stop bit	0	1						
0 Stop bit	1	1						

2 Stop bits are implemented by software. This might have influence on performance. If you attempt to select an I/F Mode bit that pertains to RS-422/485, a warning message will appear.
WARNING: RS-422/485 I/F Modes not supported.

The following table demonstrates how to build some common Interface Mode settings:

Common I/F Mode Setting	Binary	Hex
RS-232C, 8-bit, No Parity, 1 stop bi	0100 1100	4C
RS-232C, 8-bit, No Parity, 1 stop bit	0100 1100	78

3.7.3 Flow

Flow control sets the local handshaking method for stopping serial input/output. Generally, flow control is not required if the connection is used to pass a blocked protocol with block sizes less than 1k (ACK/NAK) and/or speeds of 19200 or less. Use the following table to select Flow Control options:

Flow Control Option	Hex
No flow control	00
XON/XOFF flow control	01
Hardware handshake with RTS/CTS lines	02
XON/XOFF pass characters to host	05

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3.7.4 Port Number

The setting represents the source port number in TCP connections, and is the number used to identify the channel for remote initiating connections. Default setting for Port 1 is 10001. Range: 1-65535 except for the following reserved port numbers:

Port Numbers	Reserved for
1 - 1024	Reserved (well known ports)
9999	Telnet setup
14000-14009	Reserved
30718	Reserved (77FEh)
10000-10999	should be used for DeviceComm Manager (COM1-COM256) or raw socket connections

The port number functions as the TCP/UDP source port number for outgoing packets. Packets sent to the unit with this port number are received to this channel. The port number selected is the Incoming TCP/UDP port and Outgoing TCP/UDP source port. Port 0 is used when you want the outgoing source port to change with each connection.

If the port number is set to 0, the initial value of 5000 will be used to actively establish a connection. Each subsequent connection will increment the number by 1. When the port number reaches 7999, it will wrap back to 5000.

The automatic port increment feature must only be used when this device is the one initiating a connection using TCP. The port must be set to a non-zero value when this is a passive device or when UDP is being used instead of TCP.

3.7.5 Connect Mode

Connect Mode defines how the unit makes a connection, and how it reacts to incoming connections over the network. Enter Connect Mode options in hexadecimal notation.

Connect Mode Option	7	6	5	4	3	2	1	0
Incoming Connection								
Never accept incoming	0	0	0					
Accept with DTR Active	0	1	0					

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Always Accept	1	1	0					
Response								
Nothing (quiet)				0				
Character response (C=connect, D=disconnect, N=unreachable)				1				
Active Startup								
No active startup					0	0	0	0
With any character					0	0	0	1
With DTR Active					0	0	1	0
With Carriage Return (0x0D) only					0	0	1	1
Manual connection					0	1	0	0
Autostart					0	1	0	1
Hostlist	0	0	1	0				
Datagram Type								
Directed UDP					1	1	0	0
Modem Mode								
Full Verbose				1	0	1	1	0
Without Echo				0	0	1	1	0
1-character Response				1	0	1	1	1

INCOMING CONNECTION:

Never Accept Incoming: rejects all external connection attempts.

Accept with DTR Active: accept external connection requests only when the DTR input is asserted. Cannot be used with Modem Mode.

Always Accept: accept any incoming connection when a connection is not already established. This is the default setting.

RESPONSE:

Character Response: a single character is transmitted to the serial port when there is a change in connection state: C = connected, D = disconnected, N = host unreachable. This option is overridden when the Active Start Modem Mode or Active Start Host List is in effect. Default setting is Nothing (quiet).

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ACTIVE STARTUP:
No Active Startup: no attempt to initiate a connection under any circumstance. This is the default setting.

With Any Character: attempts to connect when any character is received from the serial port.

With DTR Active: attempts to connect when the DTR input changes from not asserted to asserted.

With Carriage Return: attempts to connect when a carriage return character is received from the serial port.

Manual Connection: attempts to connect when directed by a command string received from the serial port. The first character of the command string must be a C (ASCII 0x43), and the last character must be either a carriage return (ASCII 0x0D) or a line feed (0x0A). No blanks or space characters in the command string. Between the first and last command string characters must be a full or partial destination IP address and may be a destination port number.

The IP address must be presented in standard dot-decimal notation and may be a partial address, representing the least significant 1, 2 or 3 bytes of the remote IP address. The period is required between each pair of IP address numbers. If present, the port number must follow the IP address, must be presented as a decimal number in the range 1-65535, and must be preceded by a forward slash (ASCII 0x2F). The slash separates the IP address and the port number. If the port number is omitted from a command string, the internally stored remote port number is used to start a connection. For Active Start options requiring internally stored destination IP address and port number, the unit will not attempt a connection if this information is not configured (all zeros).

If a partial IP address is presented in a command string, it will be interpreted to be the least significant bytes of the IP address and will use the internally stored remote IP address to provide the most significant bytes of the IP address.

For example, if the remote IP address already configured in the unit is 129.1.2.3, then an example command string would be C3/7. (This would connect to 129.1.2.3 and port 7.) You may also use a different ending for the connection string. For example, C50.1/23 would connect you to 129.1.50.1 and port 23.

Command String	Result if remote IP is 129.1.2.3 and remote port is 1234
C121.2.4.5/1	Complete override; connection is started with host 121.2.4.5, port 1
C5	Connect to 129.1.2.5, port 1234

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C28.10/12	Connect to 129.1.28.10, port 12

Autostart (Automatic Connection): If autostart is enabled, the unit automatically connects to the remote IP address and remote port specified when the firmware starts.

Hostlist: If you enable this option, the unit scrolls through the hostlist until it connects to a device listed in the hostlist table. Once it connects, the unit stops trying to connect to any others. If this connection fails, the unit continues to scroll through the table until it is able to connect to another IP in the hostlist. Hostlist supports a minimum of 1 and a maximum of 12 entries. Each entry contains the IP address and the port number. The host list will be disabled for Manual Mode and for Modem Mode. The unit will not accept a data connection from a remote device when the host list option is enabled.

Change Setup: 0 Server configuration
1 Channel 1 configuration
5 Expert settings
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choice ?
Baudrate (9600)
I/F Mode (4C)
Flow (00)
Port No (10001)
ConnectMode (21)

Hostlist:
01. IP: 010.010.010.001 Port: 00023
02. IP: 010.010.010.002 Port: 00023
03. IP: 010.010.010.003 Port: 00023
Change Hostlist ? (N)
Hostlist Retrycounter (3)
Hostlist Retrytimeout (250)
DisConnMode (00)
FlushMode (00)
DisConnTime (00:00) :
SendChar 1 (00)
SendChar 2 (00)

To use the Hostlist option, follow these steps:

1. To enable the hostlist, enter a Connect Mode of 0x20 (2X). The menu shows you a list of current entries already defined in the product.
2. To delete, modify, or add an entry, select Yes. If you enter an IP

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address of 0.0.0.0, that entry and all others after it are deleted.

3. After completing the hostlist, repeat the previous step if necessary to edit the hostlist again.
4. For Retrycounter, enter the number of times the ND-8511(D) unit should try to make a good network connection to a hostlist entry that it has successfully ARPed. The range is 1-15, with the default set to 3.
5. For Retrytimeout, enter the number of seconds the unit should wait before failing an attempted connection. The time is stored as units of milliseconds in the range of 1-65535. The default value is 250.

DATAGRAM TYPE:
Datagram Type: When selecting this option, you will be prompted for the Datagram type. Enter 01 for directed or broadcast UDP.
When the UDP option is in effect, the unit will never attempt to initiate a TCP connection because it will use UDP datagrams to send and receive data.

MODEM MODE:
Modem (Emulation) Mode: In Modem Mode, the unit presents a modem interface to the attached serial device. It accepts AT-style modem commands, and handles the modem signals correctly.

Normally there is a modem connected to a local PC and a modem connected to a remote machine. A user must dial from the local PC to the remote machine, accumulating phone charges for each connection. Modem Mode allows you to replace modems with ND-8511(D), and to use an Ethernet connection instead of a phone call, without having to change communications applications and make potentially expensive phone calls.

To select Modem Mode, set the Connect Mode to C6 (no echo), D6 (echo with full verbose), or D7 (echo with 1-character response).

In Modem Mode, echo refers to the echo of all of the characters entered in command mode; it does not mean to echo data that is transferred. Quiet Mode (without echo) refers to the modem not sending an answer to the commands received (or displaying what was typed).

Full Verbose means the unit will echo modem commands and will respond to a command with a message string shown on the following table:

Message	Meaning
OK	Command was executed without error.
CONNECT	A network connection has been established.
DISCONNECT	A network connection has been closed.

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RING n.n.n.n	A remote device, having IP address n.n.n.n, is connecting to this device.

Character Response means the unit will echo modem commands and will respond to a command with a single character response:

Message	Meaning
0	OK
1	Connected
2	Ring
3	No Carrier
4	Ring

Received commands must begin with the two-character sequence AT and must be terminated with a carriage return character. Any character sequence received not starting with AT will be ignored. The unit will only recognize and process single AT-style commands. Compound AT commands shall be treated as unrecognized commands.

If the Full Verbose option is in effect, an unrecognized command string that is otherwise formatted correctly (begins with AT and ends with carriage return) will be responded to with the OK message and no further action will be taken.

If the 1-Character Response option is in effect, unrecognized command strings that are otherwise formatted correctly will be responded to with OK and no further action will be taken.

When an active connection is in effect, the unit will be transferring data and will not process commands received from the serial interface.

When a connection is terminated or lost, the unit will revert to command mode.

When an active connection is in effect, the unit will terminate the connection if the following sequence is received from the attached serial device:

1. No serial data is received for one second.
2. The character sequence +++ is received, with no more than one second between each two characters.
3. No serial data is received for one second after the last + character. At this time the unit will respond affirmatively per the selected echo/response mode.
4. The character string ATH is received, terminated with a carriage return. The unit will respond affirmatively per the selected echo/response mode and drop the network connection. The serial

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interface will revert to accepting command strings.

If the above sequence is not followed as described, the unit will remain in data transfer mode.

Modem Mode Command	Function
ATDTx.x.x.x,pppp or ATDTx.x.x.x/pppp	Makes a connection to an IP address (x.x.x.x) and a remote port number (pppp).
ATDTx.x.x.x	Makes a connection to an IP address (x.x.x.x) and the remote port number defined within the unit.
ATD0.0.0.0	Forces the unit into monitor mode if a remote IP address and port number are defined within the unit.
ATD	Forces the unit into monitor mode if a remote IP address and port number are not defined within the unit.
ATDx.x.x.x	Makes a connection to an IP address (x.x.x.x) and the remote port number defined within the unit.
ATH	Hangs up the connection (Entered as +++ATH).
ATDTx.x.x.x,pppp or ATDTx.x.x.x/pppp	Makes a connection to an IP address (x.x.x.x) and a remote port number (pppp).
ATS0=n	Enables or disables connections from the network going to the serial port. n=0 disables the ability to make a connection from the network to the serial port. n=1-9 enables the ability to make a connection from the network to the serial port. n>1-9 is invalid.
ATEn	Enables or disables character echo and responses. n=0 disables character echo and responses. n=1 enables character echo and responses.

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ATVn	Enables 1-character response or full verbose. n=0 enables 1-character response. n=1 enables full verbose.

Note: These AT commands are only recognized as single commands like ATE0 or ATV1; compound commands such as ATE0V1 are not recognized. All other AT commands with Modem Mode set to full verbose acknowledge with an OK, but no action is taken.

3.7.6 Remote IP Address

This is the destination IP address used with an outgoing connection.

3.7.7 Remote Port

The remote TCP port number must be set for the unit to make outgoing connections. This parameter defines the port number on the target host to which a connection is attempted.

Note: To connect an ASCII terminal to a host using the unit for login purposes, use the remote port number 23 (Internet standard port number for Telnet services).

3.7.8 DisConnMode

This determines the conditions under which the unit will cause a network connection to terminate. In DisConnMode (Disconnect Mode), DTR drop either drops the connection or is ignored.

Disconnect Mode Option	7	6	5	4	3	2	1	0
Disconnect with DTR drop	1							
Ignore DTRa	0							
Telnet mode and terminal Type setup		1						
Channel (port) password				1				
Hard disconnect					0			
Disable hard					1			

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disconnect								
State LED off with connection								1
Disconnect with EOT			1					

3.7.9 Flush Mode (Buffer Flushing)

Using this parameter, you can control line handling and network buffers with connection startup and disconnect. You can also select between two different packing algorithms.

Function	7	6	5	4	3	2	1	0
Input Buffer (Serial to Network)								
Clear with a connection that is initiated from the device to the network				1				
Clear with a connection initiated from the network to the device			1					
Clear when the network connection to or from the device is disconnected		1						
Output Buffer (Network to Serial)								
Clear with a connection that is initiated from the device to the network								1
Clear with a connection initiated from the network to the device							1	
Clear when the network connection to or from the device is disconnected						1		

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Alternate Packing Algorithm (Pack Control)								
Enable	1							

3.7.10 Pack Control

Two firmware-selectable packing algorithms define how and when packets are sent to the network. The standard algorithm is optimized for applications in which the unit is used in a local environment, allowing for very small delays for single characters while keeping the packet count low. The alternate packing algorithm minimizes the packet count on the network and is especially useful in applications in a routed Wide Area Network (WAN). Adjusting parameters in this mode can economize the network data stream. Pack control settings are enabled in Flush Mode. Set this value to 00 if specific functions are not needed.

Option	7	6	5	4	3	2	1	0
Idle Time								
Force transmit: 12ms							0	0
Force transmit: 52ms							0	1
Force transmit: 250ms							1	0
Force transmit: 5sec							1	1
Trailing Characters								
None					0	0		
One					0	1		
Two					1	0		
Send Characters								
2-Byte Send Character Sequence				1				
Send Immediately After Send chars			1					

Idle Time: Idle time to "Force transmit" defines how long the unit should wait before sending accumulated characters. This wait period is between characters. If there is an idle period between characters equal to the force transmit set, then the unit will package up the serial data currently in the buffer and send it to the network. For Alternate Packing, the default idle time is 12ms.

Trailing Characters: In some applications, CRC, Checksum, or other trailing characters follow the end-of-sequence character; this option helps to adapt frame transmission to the frame boundary.

Send Characters: If 2-Byte Send Character Sequence is enabled, the

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unit interprets the sendchars as a 2-byte sequence; if not set, they are interpreted independently. If Send Immediately After Characters is not set, any characters already in the serial buffer are included in the transmission after a "transmit" condition is found. If set, the unit sends immediately after recognizing the transmit condition (sendchar or timeout).

Note: A transmission might occur if status information needs to be exchanged or an acknowledgment needs to be sent.

3.7.11 DisConnTime (Inactivity Timeout)

Use this parameter to set an inactivity timeout. The connection is dropped if there is no activity on the serial line before the set time expires. Enter time in the following format: mm:ss, where m is the number of minutes and s is the number of seconds. To disable the inactivity timeout, enter 00:00. Range is 0 (disabled) to 5999 seconds (99 minutes, 59 seconds). Default setting is 0.

3.7.12 Send Characters

You can enter up to two characters in hexadecimal representation in the parameters "sendchar." If a character received on the serial line matches one of these characters, it is sent immediately, along with any awaiting characters, to the TCP connection. This minimizes the response time for specific protocol characters on the serial line (for example, ETX, EOT, etc.). Setting the first sendchar to 00 disables the recognition of the characters. Alternatively, the two characters can be interpreted as a sequence.

3.7.13 Telnet Terminal Type

This parameter appears only if the terminal type option is enabled in Disconnect Mode. If this option is enabled, you can use the terminal name for the Telnet terminal type. Enter only one name. If the terminal type option is enabled, the unit also reacts to the EOR (end of record) and binary options, which can be used for applications like terminal emulation to IBM hosts.

3.7.14 Channel (Port) Password

This parameter appears only if the channel (port) password option is enabled in Disconnect Mode (see DisConnMode on page 4-26). If set, you can set a password on the serial port.

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3.8 E-mail Settings

Note: You can change these settings via Telnet or serial connections only, not on the Web-Manager.

An e-mail can be sent to multiple recipients when a specific trigger event occurs. There are three separate triggers, based on any combination of the configurable pins (PIO) when selected as user I/O functions. A two-byte serial string can also be used to initiate a trigger.

To configure e-mail settings via Installer:

```
***************** E-mail *****************
   Mail server: 0.0.0.0
   Unit:
   Domain:
   Recipient 1:
   Recipient 2:

*** Trigger 1
   Serial Sequence: 00,00
   CP1: X
   CP2: X
   CP3: X
   Message:
   Priority: L
   Min. notification interval: 1 s
   Re-notification interval: 0 s

*** Trigger 2
   Serial Sequence: 00,00
   CP1: X
   CP2: X
   CP3: X
   Message:
   Priority: L
   Min. notification interval: 1 s
   Re-notification interval: 0 s

*** Trigger 3
   Serial Sequence: 00,00
   CP1: X
   CP2: X
   CP3: X
   Message:
   Priority: L
```


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```
Min. notification interval: 1 s
Re-notification interval: 0 s
```

3.8.1 E-mail Setup

E-mail setup requires you to set up the e-mail server location as follows:

Mail server: The IP address in decimal-dot notation.
Unit: The user name used by the ND-8511(D). to send e-mail messages
Domain: The Domain name of your e-mail server
Recipient 1: Full e-mail address of the recipient.
Recipient 2: Full e-mail address of the second recipient.

3.8.2 Trigger Setup

A trigger event can occur by receiving two bytes of a specified sequence on the serial port, or by a specified combination of conditions on the configurable pins. If the serial sequence is set to 00,00 then it is disabled. At the Serial Sequence prompt, enter the ASCII Hex value. Example: A two byte sequence of 12 would be 0x31,0x32.

If the configurable pins are all set to X (Don't Care) then they are disabled. If both the serial sequence and the configurable pins are disabled, the trigger is disabled.

The configurable pins can be set to A = active, I = Inactive, or X = Don't Care. Active can mean Active Low or Active High. The configurable pin setting can only be changed using Installer.

Message: Enter the subject line of the e-mail.

Priority: L is for normal priority, H is for High Priority.

Min. notification interval: The minimum time allowed between individual triggers. If a trigger event occurs faster than the minimum interval, the trigger will be ignored.

Re-notification interval: If a single trigger event stays asserted, then an e-mail message will be sent at this time interval. Each trigger is independent from the others. Each condition within an individual trigger must be met before the e-mail will be sent.

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3.9 Expert Settings

Note: You can change these settings via Telnet or serial connections only, not on the Web-Manager.

These parameters should only be changed if you are an expert and definitely know the consequences the changes might have.

TCP Keepalive time in s (1s ¡V 65s; 0s=disable): (0)
ARP Cache timeout in s (1s ¡V 600s) : (600) ?

3.9.1 TCP Keepalive time in seconds

This option allows you to change how many seconds the unit will wait during a silent connection before attempting to see if the currently connected network device is still on the network. If the unit then gets no response, it will drop that connection.

3.9.2 ARP Cache timeout in seconds

Whenever the unit communicates with another device on the network, it will add an entry into its ARP table. The ARP Cache timeout option allows you to define how many seconds (1-600) the unit will wait before timing out this table.

3.10 Security Settings

Note: You can change these settings via Telnet or serial connections only, not on the Web-Manager. We recommend that you set security over the dedicated network or over the serial setup. If you set parameters over the network (Telnet 9999), someone else could capture these settings.

Disable SNMP (N)
SNMP Community Name (public):
Disable Telnet Setup (N)
Disable TFTP Firmware Update (N)
Disable Port 77FEh (N)
Disable Web Server (N)
Disable ECHO ports (Y)
Enable Encryption (N)
Enable Enhanced Password (N)

3.10.1 Disable SNMP

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This setting allows you to disable the SNMP protocol on the unit for security reasons.

3.10.2 SNMP Community Name

This option allows you to change the SNMP Community Name on the unit. This allows for ease of management, and possibly some security. If someone tries to violate security but doesn't know what community to connect to, that person will be unable to get the SNMP community information from the unit. The name is a string of 1 to 13 characters plus a null-terminator (14 bytes total). The default setting is public.

3.10.3 Disable Telnet Setup

This setting defaults to the N (No) option. The Y (Yes) option disables access to this Configuration Menu by Telnet (port 9999). It only allows access locally via the Web pages and the serial port of the unit.

3.10.4 Disable TFTP Firmware Upgrade

This setting defaults to the N (No) option. The Y (Yes) option disables the use of TFTP to perform network firmware upgrades. With this option, firmware upgrades can be downloaded over the serial port using Installer's Recover Firmware procedure.

3.10.5 Disable Port 77FE (Hex)

Port 77FE is a setting that allows Installer, Web Pages, and custom programs to configure the unit remotely. You may wish to disable this capability for security purposes.

The default setting is the N (No) option, which enables remote configuration. You can configure the unit by using ND-8511(D). Installer, Web pages, Telnet, or serial configuration. The Y (Yes) option disables remote configuration and Web pages.

Note: The Yes option disables many of the GUI tools for configuring the Device Server, including the embedded Web Page Configuration tool.

3.10.6 Disable Web Server

This setting defaults to the N (option). The Y (Yes) option disables web

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server.

3.10.7 Disable ECHO Ports

Controls whether the serial port will echo characters it receives.

3.10.8 Enable Enhanced Password

This setting defaults to the N (option), which allows you to set a 4-character password that protects the Configuration Menu via Telnet and Web pages. The Y (Yes) option allows you to set an extended security password of 16 characters for protecting Telnet access.

3.11 Factory Defaults

Select 7 to reset the unit's Channel 1 configuration, E-mail settings, and Expert settings to the factory default settings. The server configurations (IP address information) remain unchanged.

3.12 Exit Configuration Mode

Select 8 to exit the configuration mode without saving any changes or rebooting. Select 9 to save all changes and reboot the device. All values are stored in nonvolatile memory.

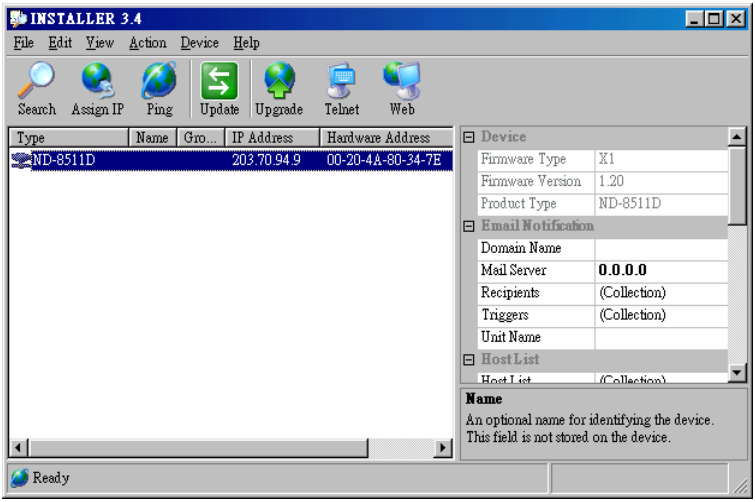
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4

Using Installer

Installer is a Windows-based utility for configuring ND-8511(D) devices. It supports several functions such as setting network parameters, upgrading firmware, and uploading web pages.

The user interface is split into several areas. The List on the left contains devices on the network. The Property Grid on the right displays various settings that can be changed for items selected in the List. The Toolbar at the top includes buttons to perform common tasks. The Status Bar at the bottom indicates the status and progress of any pending tasks.



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4.1 Adding Devices to the List

When the program starts up, the List will be blank. In order to configure a device, you need to add it to the List. There are several options for adding items to the list, based on your particular network configuration.

4.1.1 Search for Device

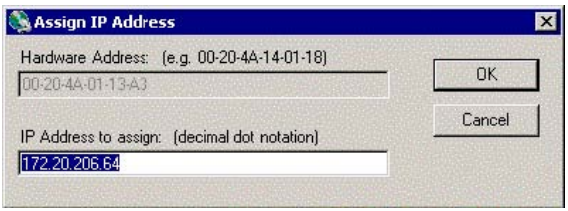
If the devices you are using are within the same local area network as your PC (within the same subnet), use the Search command. Click the Search button on the Toolbar to find all devices on the local network and add them to the list. It may take several seconds to find all of the devices.

If ND-8511(D) device doesn't show up after searching, then the device might not have a valid IP address assigned. Please use the Assign IP Address feature to set a specific IP address on the device. To do this, please follow the procedures in “Section 2.1.8 Serial Port Login” section to assign a correct IP address for the device.

If your PC has more than one network adapter, you can select it from the Property Grid. All commands will use whichever adapter is selected. With nothing selected in the List, click the Network Interface field in the Property Grid, click on the drop-down arrow of the field, and select the appropriate adapter. By clicking on the plus sign to the left of the field, you can view the settings for the selected adapter.

4.1.2 Assign IP Address

If your local network uses static IP address (no DHCP server is present), use the Click the Assign IP button on the Toolbar. Assign IP Address command to assign a static IP address to a device. To make the device use DHCP, enter 0.0.0.0 for the IP address.

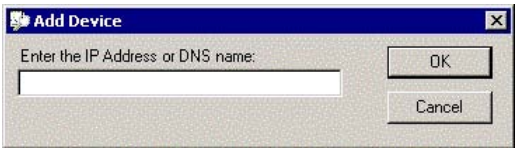


Click OK to assign the IP address. It takes approximately 10 seconds for the IP Address to be set on the device and verified, after the unit has rebooted, and then added to the List if not already there.

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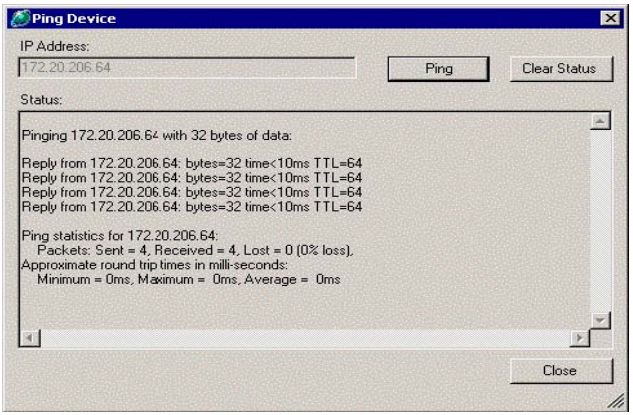
4.1.3 Add Remote Device

To add a remote device (a device that is not within the same subnet), select the Add Remote Device command from the Action menu. A dialog box will prompt for the IP address. Enter the IP address and click OK. If the device was found successfully, it will be added to the list.



4.1.4 Ping

To detect if a device is online and the network is functional, use the Ping command. Click the Ping button on the Toolbar.



A dialog box will prompt for the IP address. Enter the IP address of the device you are trying to reach and click the Ping button. Within several seconds, the Status area will display the results of the ping. Click Clear Status to clear the display. Click Close when you are done, to close the dialog box.

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4.2 Setting Parameters

Once one or more devices are present in the List, you may view or edit various settings for each device. See the Device Configuration. Click on the device in the List that you wish to edit. The Property Grid will display a list of fields for the device, some of which may be modified. The list of fields may take up more room than there is available on the screen, in which case you'll need to use the scrollbars.

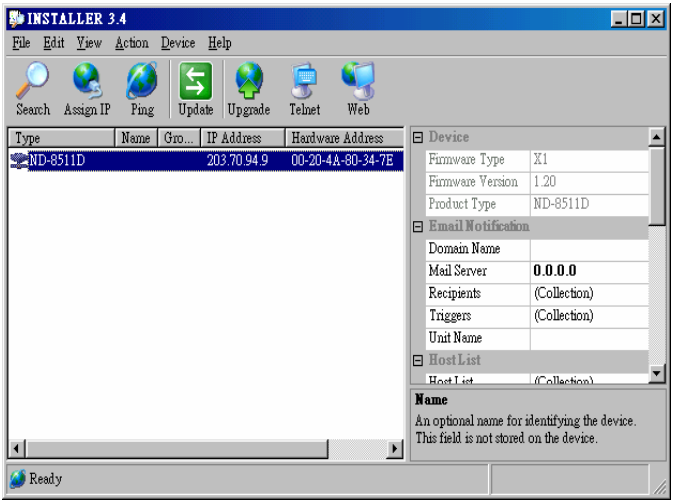
The fields are grouped together into categories, where each category has a gray background. Categories can be expanded and collapsed by clicking on the expansion button (a square containing a plus or minus) to the left of the category name. Some fields also contain expansion buttons and can be expanded to show subsets of information.

If a field is black or empty, it can be changed. If the value of a field is bold, that indicates that the value differs from the factory setting.

To edit a field, click anywhere on the row of the field.

Simple fields (such as text, numbers, and IP addresses) can be changed by typing directly within the field.

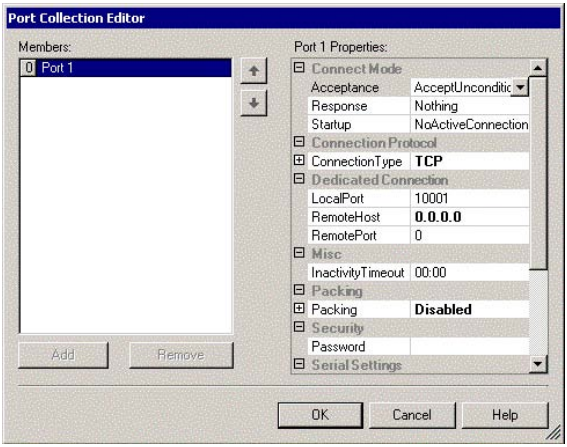
Selection fields allow selection of an option from a list. Click the down-arrow button on the right of the field to present a list of options. Then click on the option from the drop-down list to select it.



Collection fields consist of one or more items that are configured in a separate dialog box. Click the browse button to the right of the field to display a dialog

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box. The Collection Editor dialog box allows selection of an item from a list on the left, and editing of fields using a Property Grid on the right. Some collections allow re-ordering of items, in which case the up-arrow and down-arrow buttons may be used to change the order of items. Some collections may also allow items to be added or removed by clicking the Add and Remove buttons. If a button is disabled (gray), that indicates that the particular collection does not support modification in that way.



When fields are changed on a device, the changes are not immediately sent to the device, but are cached. Devices are marked in bold in the List to indicate that changes have been made. To commit changes made to devices, select the device(s) in the List and click the Update button on the Toolbar. If any changes have been made, they will be sent to the device. It may take 10 seconds or up to a minute to commit changes, depending on which fields were changed.

When a device is in the process of updating, the Status column of the list will indicate “Busy”. The Status Bar at the bottom of the screen will indicate the progress of the update. While a device is being updated, fields may not be modified. The Property Grid will momentarily disappear while such a device is selected.

After sending any pending changes to the device, the program then reads the current configuration back from the device and updates any fields that may have changed. The device is no longer marked bold in the List until a field is changed again.

All fields are stored on devices themselves with the exception of three fields: Name, Group, and Comments. These fields are kept locally on the PC and are stored with saved device lists.

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4.3 List View

The List can show devices in the form of a table or as icons. To change the view mode, go to the View menu and select either Icons or Details.

When the List is in Details mode, items can be sorted by particular columns, in ascending or descending order. To sort the list, click on the column that is to be sorted. The first time you click on a column, it will sort in ascending order. To sort in descending order, click on the same column again.

Devices within the List may be selected individually or along with other devices. To select a single device, just click on it. To select a consecutive group of devices, click on the first device, then hold down the Shift key and click on the last device of the group. To select or deselect other devices as part of a multiple selection, hold down the Control key and click on a device.

You may also select multiple devices by clicking and dragging on the background of the List to form a fencing rectangle. Once you release the mouse, all devices overlapping the rectangle become selected.

To select all devices in the list, choose the Select All command from the Edit menu.

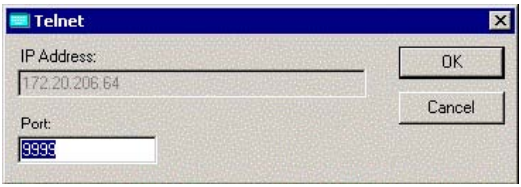
To deselect all devices (and show network options instead), click on the background of the list.

When multiple devices are selected at the same time, some options may be limited. The fields listed in the Property Grid become limited to those that are common to all selected devices and support multiple device editing. The Upgrade, Telnet, and Web commands are not available for multiple selections.

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4.4 Telnet

You can also configure a device by text-based configuration over Telnet. Select a device in the List and click the Telnet button on the Toolbar. A dialog box will prompt for the port number.



The Port defaults to whatever port the particular device model uses for accessing its configuration interface, though may be changed to any other port that may be supported on the device. Click OK to proceed.

A Telnet window will appear, using the default telnet program of the operating system. Follow the instructions that appear in the window. For detailed information, refer to the Configuring via the Setup Mode Window section within the product documentation.

4.5 Web Interface

To display the web interface for a device, select the device in the List and click the Web button on the Toolbar. By default, most devices will support a web interface that allows the user to change configuration settings.

4.6 Loading and Saving

The list of devices may be saved for later use, typically for documenting specific configurations.

To save the list of devices, choose the Save command from the File menu. If the particular list has not been saved before, a dialog box will prompt for a file name.

To save the list of devices to a file other than the current one (if any), choose the Save As command from the file menu and specify the file in the dialog box that appears.

To load a previously saved list, choose the Open command from the

File menu and specify the file in the dialog box that appears.

To clear the list and disassociate any current file, choose the New

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command from the File menu.

4.7 Device Configuration Reference

Device configuration information is stored in flash memory and is read and displayed in the properties section on the right side of the Installer window. This section describes some of those options in detail.

4.7.1 E-mail Notification

E-mail notification setup can be done via Telnet, serial port, or Installer.



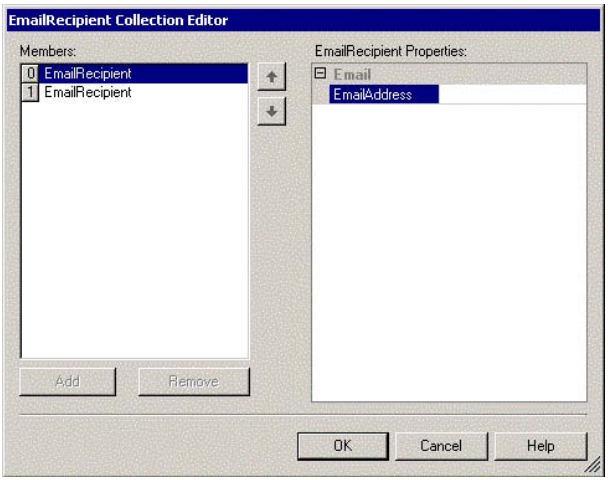
Domain Name: Domain name of your e-mail server.
MailServer: The IP address of the mail server.
Recipients: E-mail addresses of the recipients.
Triggers: Events that trigger an e-mail.
Unit Name: Name used by the ND-8511(D) to send e-mail messages. This name and the Domain Name are combined to give you the e-mail address of the sender.

To configure e-mail properly, you will need to make entries in the e-mail recipient's collection, the e-mail triggers collection, Domain Name, Mail Server, and the Network.

4.7.2 E-mail Recipients Collection

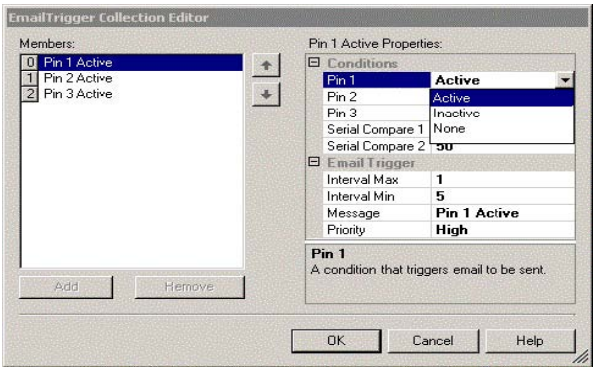
This collection contains the e-mail addresses of the e-mail recipient. When you click on the Recipients field, a browse button appears. Click the button to display the E-mail Recipients collection dialog box. Enter the E-mail address for each recipient.

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4.7.3 E-mail Triggers Collection

When you click on the Triggers field, a browse button appears. Click the button to display the E-mail Trigger collection dialog box.



A trigger event can occur by receiving two bytes of a specified sequence on the serial port, or by a specified combination of conditions on the configurable pins. If the serial sequence is set to 0 then it is disabled. In the Serial Compare fields, enter the ASCII Hex values. Example: A two byte sequence of 12 would be entered as 31 in Serial Compare 1 and 32 in Serial Compare 2.

If the configurable pins are all set to None then they are disabled. If both the

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serial sequence and the configurable pins are disabled, the trigger is disabled.

The configurable pins can be set to Active, Inactive, or None. Active means Active Low or Active High.

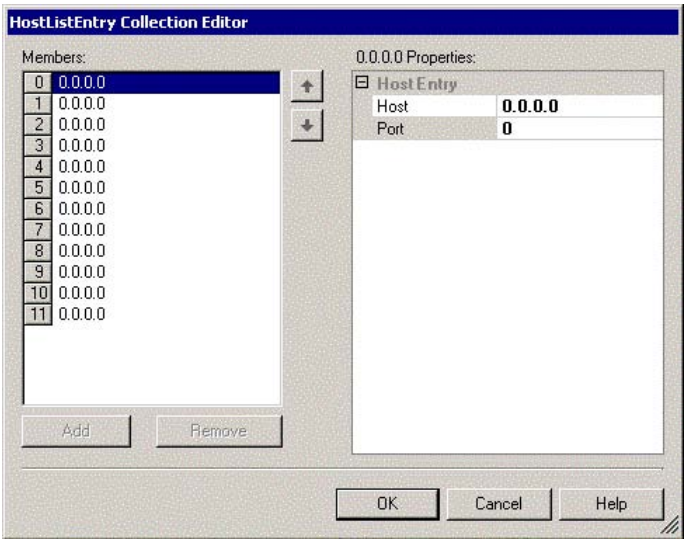
Message : Enter the subject line of the e-mail. This entry also appears in the members list in the left window and becomes the subject line of the e-mail.
Priority: L is for normal priority, H is for High Priority.
Interval Max: is the minimum time allowed between individual triggers. If a trigger event occurs faster than the minimum interval, the trigger will be ignored.
Interval Min: If a single trigger event stays asserted, then an e-mail message will be sent at this time interval.
Each trigger: is independent from the others. Each condition within an individual trigger must be met before the e-mail will be sent.

4.7.4 Host List

When you click on the Host List field, a browse button appears. Click the button to display the Host List Entry collection dialog box. Enter the IP address and Port number for each entry in the list. See Connect Mode on page 4-18 for additional hostlist information.

The ND-8511(D) scrolls through the hostlist until it connects to a device listed in the hostlist table. Once it connects, the unit stops trying to connect to any others. If this connection fails, the unit continues to scroll through the table until it is able to connect to another IP in the hostlist.

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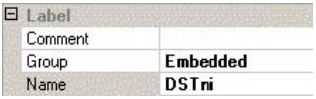


For RetryCounter, enter the number of times the ND-8511(D) should try to make a good network connection to a hostlist entry that it has successfully ARPed. The range is 1-15.

For RetryTimeout, enter the number of seconds the ND-8511(D) should wait before failing an attempted connection. The time is stored as units of milliseconds in the range of 1-65535. The default value is 250.

4.7.5 Label

This section allows you to add descriptive labels to each device on the network. Select the label field, type in the new label and press Enter. The field is immediately updated.



4.7.6 Network

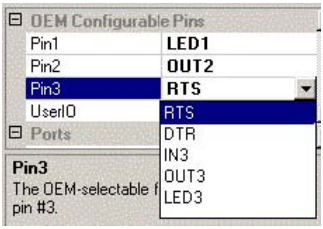
This section displays the device IP address and hardware MAC address. To configure e-mail notification properly, you must select the gateway IP address and the Subnet parameters.

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4.7.7 OEM Configurable Pins

When clicking on one of the pins, a drop-down list button appears. Click the button to display a list of options for that button.



Once you have the pins configured, click the Update button on the toolbar. While writing the new configuration information to the ND-8511(D), the property grid will disappear.

Three of the ND-8511(D) serial pins are under software control and may be configured to support different customer requirements. Configurable pin number 1 provides a choice of the following functions: CTS, IN1, OUT1, and LED1. Configurable pin number 2 provides a choice of the following functions: DCD, IN2, and OUT2. Configurable pin number 3 provides a choice of the following functions: RTS, DTR, IN3, OUT3, and LED3.

Signal Name	Pin	Function
CP1	6	Default setting: IN1. Optional settings: CTS, OUT1, LED1. Flow control; to CTS of attached device or Programmable Digital I/O
CP2	7	Default setting: IN2. Optional settings: DCD, OUT2. Handshake; to DCD of attached device or Programmable Digital I/O
CP3	8	Default setting: IN3. Optional settings: RTS, DTR, OUT3, LED3. Flow control; to RTS of attached device, or Programmable Digital I/O

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Setting CP1, CP2, and CP3 in Installer must be the same as the hardware configuration. Define the function of three pins first, configure the software settings through Installer, then open the chassis of ND-8511(D) to configure the hardware jumper settings. The default hardware jumper settings are: CP1: GPIO PIN1, CP2: GPIO PIN2, and CP3: GPIO PIN3. Others as follows:

Signal	J1	J7	J8	J9	J10	J11	J12	J13
RTS	1-2	X	X	X	X	1-2	1-2	X
DTR	2-3	X	X	X	X	1-2	X	1-2
DCD	X	X	X	1-2	1-2	X	X	X
CTS	X	1-2	1-2	X	X	X	X	X
GPIO PIN1	X	2-3	2-3	X	X	X	X	X
GPIO PIN2	X	X	X	2-3	2-3	X	X	X
GPIO PIN3	X	X	X	X	X	2-3	2-3	X

X is don't care.

The function of each configurable pin is configured independently from that of the other two pins. When a pin is configured to be one of the control signals CTS, DCD, RTS, or DTR, its state is managed by the serial control logic.

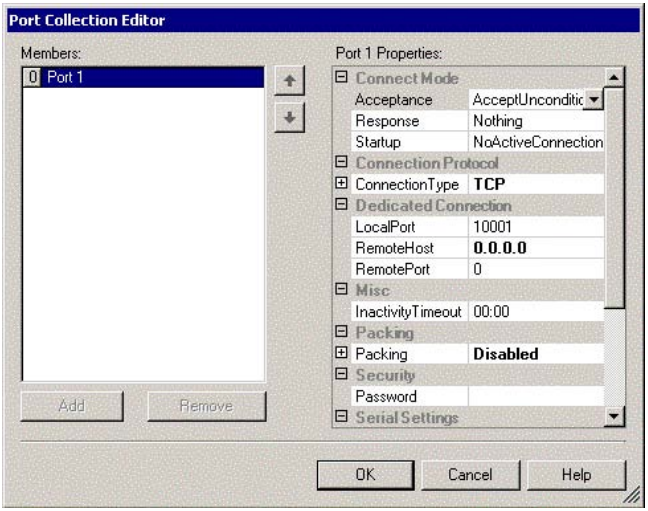
When a configurable pin is configured to be a general input like IN1, IN2 or IN3 that pin will report the current state of the signal connected to it. When a configurable pin is configured to be a general output like OUT1, OUT2 or OUT3 that pin will drive a signal level on the line or device connected to it.

The UserIO option is used to select the Active state of the pins as Active Low or Active High. The default setting is Active Low. By setting SW1 switches to route ND-8511(D) signals to the LEDs, an active low signal will light the LED.

4.7.8 Ports

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The Ports section is used to configure the ND-8511(D) serial port parameters. When you click on the Ports field, a browse button appears. Click the button to display the Port Collection Editor dialog box.



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5

Network Configuration using UDP

5.1 UDP Datagrams

The Device Server can also be configured or queried over the network using UDP datagrams. The Device Server has a UDP listener set for port 30718 (77FE Hex). Responses from the Device Server are returned to the source port of the UDP packet.

The first three bytes of the UDP data block should be set to zero. The fourth byte selects the function as described in the following table:

Byte	Command	Parameters	Notes
03	Node Reset	2 bytes, software type	These 2 bytes are used to prevent type accidental reset of the Device Server. (Value for standard ND-8511(D). firmware: 58 31 [Hex], X1)
F6	Query for Firmware Version	None	The Device Server responds with the F7 block below.
F7	Firmware Information	First 16 bytes of the the firmware image, 4 bytes device Information and	The first 16 bytes of the firmware image contain the software type (offset 4,5) and checksum (offset 14,15). The last two bytes of the device information contain the

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		serial number , 6 bytes of MAC address	serial number. The last six bytes are the MAC address.
F8	Query for Setup Record	None	The Device Server responds with the F9 block below.
F9	Configuration Readback	120 byte setup record (see Setup Records on page E-7)	n/a
FA	Set Configuration	120 byte setup record (see Setup Records on page E-7)	The IP address (byte 0-3) will not be overridden using FA. See FD for this functionality.
FB	Configuration Change Acknowledge	None	This block is sent back to the host requesting a configuration change (FB). After sending out this block, the Device Server resets and uses the new
FC	Set IP Address	First 8 bytes must be set to the string IPSETUP (Hex 49 50 2D 53 45 54 55 50). Next 2 bytes have to be set to 00. Next 2 bytes must contain the serial number. Next 4 bytes have to be the new IP address.	This block can be sent as a broadcast, because the serial number is unique. It provides one method to set the IP address of the Device Server if is on the local network and the serial number is known. Remember, broadcasts are only 'heard' on the subnet on which they are generated. No reply is sent by the Device Server, which restarts using the new IP address after the block is received. Example (all in Hex): 49 50 2D 63 45 54 55 50 00 00 2A 12 81 00 01 02 IP address of the node with serial number 42-18 set to 129.0.1.2
FD	Set Configuration and IP Address	Same as FA, but changes IP address as well (bytes 0-3).	n/a

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5.2 Configuring Multiple Devices

When configuring a number of Device Servers identically, it is useful to create a template setup record. The setup record can then be sent to the 'target' Device Servers from a ¡§master¡¨ Device Server via 'cut and paste' or UDP.

Device Servers use a 120-byte setup record in Intel Hex format. This format facilitates the transfer of binary data using ASCII characters. See Setup Recordsand The Intel Hex Format for information about setup records and converting them to Intel Hex format.

```
:20000010AC10C81D00001000000000000AC10010B4C0200001127000
    000000000C0000000
11
:200020100000000000000000000000000000000000000000000000000
    00000000000000000B0
:200040104C020000122700000000000C000000000000000000000000
    0000000000000000049
:18006010000000000000000000000000000000000000000000000000
    078
:00000001FF
```

5.2.1 Acquiring a Valid Setup Record

There are a number of ways to acquire a valid setup record: Copy the setup record of a properly configured Device Server via Monitor Mode (easiest method).

Request the setup record of a properly configured Device Server via another Device Server on the network. Build the setup record in software.

From a host PC, request the setup record of a properly configured Device Server via UDP.

To copy the setup record of a properly configured Device Server:

1. Configure a master Device Server with the desired parameters.
2. Enter Monitor Mode on the master Device Server
3. At the prompt, enter GC followed by a carriage return. The Device Server will respond with its setup record in Intel Hex format.
4. Copy the setup record into a text file and save it for future use.

To request the setup record of a properly configured Device Server via another Device Server on the network:

1. Make sure that both units are plugged onto the network properly.
2. Enter Monitor Mode (with network support enabled) on the unit that is not properly configured. (see Monitor Mode on page 8-1)

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3. Issue the command GC x.x.x.x followed by a carriage return, where x.x.x.x is the IP address of the properly configured device. The properly configured device will respond by sending its setup record to the unit you are currently on. This configuration will be displayed in Intel HEX format.
4. Copy that HEX string, and then issue the command SC. Now paste the copied string. The unit will not reboot on its own. You must reboot the unit before the settings take effect. To build the setup record in software:
5. Create a 120-byte setup record.
6. Convert it to an Intel Hex record
7. Copy the setup record into a text file and save it for future use.

To request the setup record of a properly configured Device Server via UDP:

1. Configure a Device Server with the desired parameters and place it on the network.
2. From a host PC, send the F8 datagram to the Device Server. The Device Server responds with the F9 datagram, which includes its setup record.
3. Send a previously saved setup record from a host PC via UDP.

5.2.2 Sending a Setup Record

There are also a number of ways to send a setup record to a Device Server: Send a previously saved setup record via Monitor Mode (easiest method).

Send the setup record of a properly configured Device Server to another Device Server on the network. Send a previously saved setup record from a host PC via UDP.

To send a setup record via Monitor Mode:

1. Configure a “master” Device Server with the desired parameters and place it on the network.
2. Place another Device Server (the ¡§target¡¨) on the network.
3. Enter Monitor Mode (with network support enabled) on the master Device Server
4. At the prompt, enter SC x.x.x.x, followed by a carriage return.
5. Send the setup record to the target Device Server.

To send a previously saved setup record to a Device Server via UDP, from a host PC, send the FA (or FD) datagram to the “target” Device Server.

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5.2.3 The Intel Hex Format

With this format, 8-bit binary data can be sent and received as ASCII text. The transmission is blocked in records, and every record has its own checksum. The record begins with a colon (:) and consists of a block length (2-character Hex), a 16-bit address (4-character Hex), and a block type (2-character Hex). It is built by adding all binary 8-bit values and taking the complement, so adding all byte values (including length, address, and type) should yield zero.

Example:

```
00000001FF
End record, type 01, length 00, address 00 00,
     checksum FF.
01002000805F
Data record consisting of one byte (value 80 Hex)
for address 0020 (32 decimal).
```

For communication with the node, the following block types are defined:

Option	Hex
Data block program memory (firmware)	00
End record	01
Data block configuration memory	10

To get and set the node configuration, 120 bytes should be exchanged at once in 32-Byte records. The IP address in the record (bytes 0 to 3) will be ignored (unless the UDP FD command is being used).

5.2.4 Calculating the Checksum

As mentioned in Table 25 - Block Types above, the last two characters of an Intel Hex setup record represent a checksum of the data in the line. Since the checksum is a two-digit hexadecimal value, it can represent a value from 0 to 255. The checksum is calculated by summing the value of the data on the line and taking the two's complement of the sum.

Example:

```
0300300002337A1E
Record length: 03 (3 bytes of data)
Address: 0030 (the 3 bytes will be stored at 0030,
        0031, and 0032)
Record Type: 00 (normal data)
Data: 02, 33, 7A
Checksum: 1E
```


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```
03 + 00 + 30 + 00+ 02 + 33 + 7A = E2
The two's complement of E2 is 1E.
```

5.2.5 Calculating the Two's Complement

The two's complement of a number is the value that must be added to the number to reach a Hexadecimal value of 100 (256 in decimal). In the example above, E2 + 1E = 100.

You can also calculate the two's complement by subtracting the sum from 100. Using the example above again, 100 - E2 = 1E. It may help to use a scientific calculator.

5.3 Setup Records

A setup record consists of 120 bytes. They are transmitted at once from and to the node. Unused bytes should be initialized as 00. Construction defines the structure of a setup record:

Byte(s)	Function
00-03	IP address of the unit (x.x.x.x)
04	Reserved (0)
05	Flag BYTE Bit 7: Reserved (0) Bit 6: Set 1 for AUI, 0 for 10BASE-T (CoBox-Micro only) Bits 5-0: Reserved (0)
06	Number of host bits for subnetting; if 0, matching standard netmask for Class A, B, C is used
07	Reserved (0)
08-11	Telnet configuration password (0 if not used)
12-15	Gateway IP address (0,0,0,0 if not used)
16-63	48-byte Channel 1 parameters; parameter setup Channel 1 (see Table E-4: Channel Parameters)
64-111	48-byte Channel 2 parameters; parameter setup Channel 2 (see Table E-4: Channel Parameters))
112-119	Reserved (0)

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5.3.1 Channel Parameters

Use the following table to select setup record parameters for Channels 1:

Byte(s) (Channel 1)	Function
16	Interface Mode
17	Line Speed Bits 7-5: Reserved Bits 4-0: Baud Rate
18	Flow Control
19	Reserved
20-21	Own TCP port low-byte, high-byte (Intel)
22-23	Remote TCP port low byte, high-byte (Intel)
24-27	Remote IP address (low/high low/high)
28	Connect Mode
29	Disconnect Mode
30	Disconnect w/ inactivity time-out, minutes (00 if unused)
31	Disconnect w/ inactivity time-out, seconds (00 if unused)
32-33	Characters to trigger send immediately (sendchar)
34	Flush mode
35	Pack Control
36-47	Reserved (0)
48-63	a) Terminal name for Telnet terminal type option (15 characters max), 0-terminated. If set and Bit 6 in Disconnect Mode is set, Telnet connection will be assumed. b) Password for Passworded Socket Connection (Bit 4 in Disconnect Mode Set)

5.3.2 Baud Rate

The Device Server and attached serial device must agree on a speed or baud rate to use for the serial connection. Use the following table to select Baud Rate settings:

Speed(bps)	Hex
38400	00
19200	01
9600	02
4800	03
2400	04
1200	05
600	06

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300	07
115200	08
57600	09
230400	0A

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1. Before using ADLINK's products please read the user manual and follow the instructions exactly. When sending in damaged products for repair, please attach an RMA application form which can be downloaded from: http://rma.adlinktech.com/policy/.

2. All ADLINK products come with a limited two-year warranty, one year for products bought in China.

    - The warranty period starts on the day the product is shipped from ADLINK's factory.
    - Peripherals and third-party products not manufactured by ADLINK will be covered by the original manufacturers' warranty.
    - For products containing storage devices (hard drives, flash cards, etc.), please back up your data before sending them for repair. ADLINK is not responsible for any loss of data.
    - Please ensure the use of properly licensed software with our systems. ADLINK does not condone the use of pirated software and will not service systems using such software. ADLINK will not be held legally responsible for products shipped with unlicensed software installed by the user.
    - For general repairs, please do not include peripheral accessories. If peripherals need to be included, be certain to specify which items you sent on the RMA Request & Confirmation Form. ADLINK is not responsible for items not listed on the RMA Request & Confirmation Form.

3. Our repair service is not covered by ADLINK's guarantee in the following situations:

    - Damage caused by not following instructions in the User's Manual.
    - Damage caused by carelessness on the user's part during product transportation.
    - Damage caused by fire, earthquakes, floods, lightening, pollution, other acts of God, and/or incorrect usage of voltage transformers.

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- Damage caused by inappropriate storage environments such as with high temperatures, high humidity, or volatile chemicals.
- Damage caused by leakage of battery fluid during or after change of batteries by customer/user.
- Damage from improper repair by unauthorized ADLINK technicians.
- Products with altered and/or damaged serial numbers are not entitled to our service.
- This warranty is not transferable or extendible.
- Other categories not protected under our warranty.

4. Customers are responsible for all fees necessary to transport damaged products to ADLINK.

For further questions, please e-mail our FAE staff: service@adlinktech.com

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