

RS-232/422/485 Over IP Adapter

1 port RS-232/422/485 Over IP Adapter

NETRS2321E

Instruction Manual



Actual product may vary from photo

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FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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Introduction

Thank you for purchasing a StarTech.com 1 port RS-232/422/485 Over IP Adapter. The ideal solution for remotely controlling serial devices, NETRS2321E offers user-friendly browser-based configuration of network settings, serial port line settings, UART transmit/receive buffer trigger levels and serial port flow control.

Features

- Data transfer rates of up to 115.2 Kb/sec per port
- Remote Telnet configuration
- Upgradeable firmware
- Support for the following network protocols: IP, HTTP, ICMP, TCP

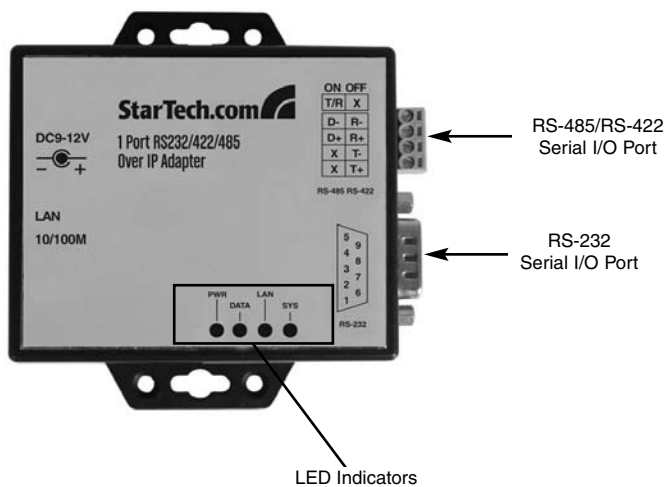
Package contents:

This package should contain:

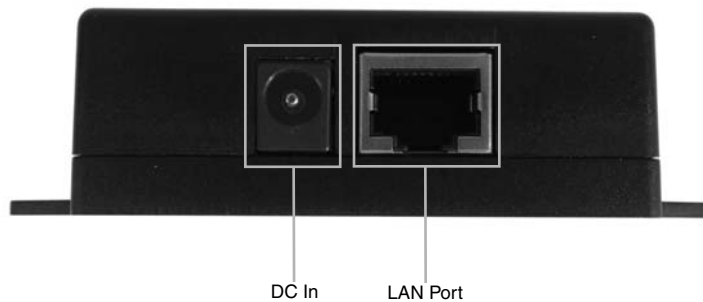
- 1 x 1 port RS-232/422/485 Over IP Adapter
- 1 x Instruction Manual
- 1 x Drive CD
- 1 x Power Adapter (9V DC, 500mA)

Hardware Guide

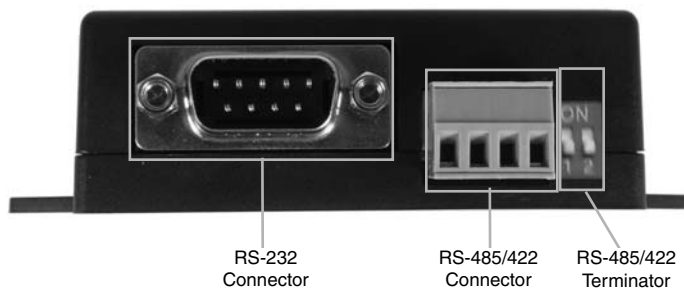
Top View



Left Side View



Right Side View



Hardware Guide - Cont'd

LED Indicators

PWR (Green) - Power indicator

Data (Red) - Data sent and received indicator

10/100 (Green) - Network signal indicator. When illuminated, network connection is present.

LED (Red) - Device status indicator. When operating under normal status, this LED will blink once per second.

Wiring Architecture

RS-232 Wiring

Serial Device NETRS2321E

RX — TX
 TX — RX
 GND — GND

RS-232(RTS/CTS) Wiring

Serial Device NETRS2321E

RX — TX
 TX — RX
 GND — GND
 RTS — CTS
 CTS — RTS

RS-232 (RTS/CTS, DTR/DSR)Wiring

Serial Device NETRS2321E

RX — TX
 TX — RX
 GND — GND
 RTS — CTS
 CTS — RTS
 DTR — DSR
 DSR — DTR

RS-422 Wiring

Serial Device NETRS2321E

T- — R-
 T+ — R+
 R- — T-
 R+ — T+

RS-485 Wiring

Serial Device NETRS2321E

+ — R-
 — R+
 — T-
 - — T+

Initial IP Configuration

Device Management Utility

The Device Management Utility that is included with NETRS2321E (**EM.exe**) is used to detect and setup the installed adapter. When this tool is installed and activated, it will detect the existence of the installed adapter, and depict its status including IP Address, Subnet Mask, MAC Address and Device ID as shown below. The Setup Tool can only configure one adapter at a time, therefore if there are multiple adapters installed on the network, please ensure that they are not connected (or shut down) prior to installation.

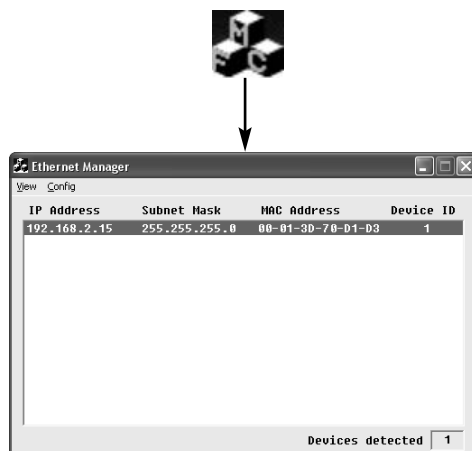
Due to the nature of broadcast UDP packets, **EM** has the following characteristics:

- Broadcast packets are not limited by subnet. Even if the IP Address of the converters and the computer running **EM** do not belong to the same subnet, it will still function correctly.
- Broadcast packet signals cannot be passed through a router. **EM** can only be used to monitor devices with **EM** installed, in the same segment of the LAN.

To begin using the Device Management Utility, copy the file titled **EM.exe** from the Driver CD that accompanied your NETRS2321E purchase, to your desktop. The file can be located in the following path on the Driver CD:

E:\IO_over_IP\Utilities\Em (E: represents the CD/DVD-ROM drive)

Once the file has been copied to the desktop, connect NETRS2321E to your LAN, using the available LAN port. Connect the included Power Adapter (9V DC, 500mA) to the power port provided on NETRS2321E. Wait for a few moments for the device to be detected, and double click on the **EM.exe** icon to launch the application:

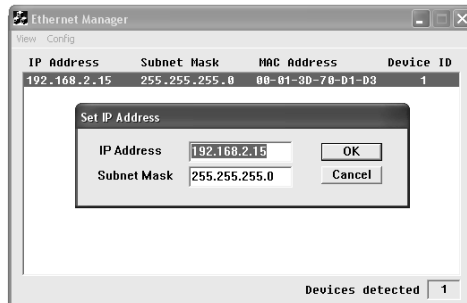


To refresh the status of the adapter network connection, click on **View**, then **Refresh**. This should be performed following any configuration changes.



To configure the IP Address assigned to NETRS2321E, click on **Config**, then **IP Address**. Assign an IP Address with the same Subnet Mask of your computer, ensuring that the address that is assigned is not already in use on the network. When you press the **OK** button, the IP Address will be refreshed within 2-3 seconds.

Please note: Because the Device Management Utility uses broadcast UDP packets, configuration is only allowed when the device's password is left empty.



Web Console Configuration

In addition to basic IP Address and subnet mask, specific device settings can be set using an Internet browser, such as Internet Explorer or Netscape etc.

If the IP Address of the adapter is already known (default is 192.168.0.10), enter it into the browser address line to launch the Login Page.

The Login Page

Once the Login Page has been launched (as shown on page 6), the following will be displayed:

System time elapsed

The time elapsed since the adapter was connected to the LAN will be displayed here

Instruction Manual



Firmware version

The installed firmware will be identified here by date code.

Serial number

The adapter serial number consists of five digits and a unique MAC address used by the network in hexadecimal format.

Password (Setup login)

This field allows you to enter the administration password for authentication. By default, the password is left empty. If you have changed the password to something other than the default, press and hold the **Reset** button (located next to the RJ45 port) for five seconds. The adapter will power cycle; once it has been re-detected on the network, the password will have been reset to default. Please note that if there are more than three consecutive incorrect password attempts, the login function will be disabled for 15 minutes. During this period, even if the correct password is supplied, the login will not proceed.

The Setup Page



Once the correct password has been entered in the Setup Login password field, click on **Login** to enter the Setup Page, which offers advanced configurability. The elements that can be configured are as follows:

IP Address

Allows you to modify the assigned IP Address of the adapter. Do not enter a value that is already in use on the connected network. If DHCP client mode is enabled, and there is a

DHCP server on the network, this field will automatically be assigned.

Subnet Mask

This field allows configuration of the subnet mask address, to which the adapter is connected. If your subnet mask is provided by an ISP or internal network administrator, please inquire as to what this setting is, and enter it into this field. If DHCP client mode is enabled, and there is a DHCP server on the network, this field will automatically be assigned.

Gateway address

This field contains the gateway or router IP address. If your gateway address is provided by an ISP or internal network administrator, please inquire as to what this setting is, and enter it into this field. If DHCP client mode is enabled, and there is a DHCP server on the network, this field will automatically be assigned.

Network link speed

This field indicates the ethernet physical link speed. "Auto" indicates that the speed has automatically been assigned by the NETRS2321E adapter. You can also specify 10Mbps or 100Mbps, depending on the speed of the hub to which the adapter is connected.

DHCP client

This field will indicate either **enabled** or **disabled** status. Enable DHCP if there is a DHCP server on your network, otherwise, leave this value as disabled.

Socket Port of HTTP Setup

The socket port used to conduct the browser setup. Normally, HTTP protocol uses TCP port 80 for communication. If the field is changed to 81, port 80 will be reserved as an Internet connection.

To enter the browser setup page, "http://x.x.x.x:81" should be entered for port 81, and "http://x.x.x.x" for socket port 80, where x.x.x.x is the NETRS2321E IP address.

Socket port of serial I/O (RS-232/422/485):

Port number: A socket port assigned to the serial port. This 16-bit number ranges from 1 to 65535. Because the numbers below 1000 are used for specific purposes (i.e. 80 is for the http protocol), it is advisable to select a number larger than 1000. Generally, the port number 4660 is used for serial communication. However, you should specify a different port number for each serial port.

Socket type: TCP Server: TCP protocol, passive open, to be connected from TCP clients.

TCP Client: TCP protocol, active open, connect to the TCP Server.

UDP: UDP protocol, connectionless.

Destination setting:

Destination IP Address: The server IP Address and socket port would be connected in TCP client and UDP client mode for a certain server IP Address.

Destination socket port: The server socket port would be connected in TCP Client and UDP Client mode for a certain serial port.

Connection: The connection can be selected in two modes, **Auto** or **Manual**.

Serial I/O setting: Baud rate, parity, data bits, stop bits
 Baud rate: 300 - 115200bps
 Parity: None, Even, Odd
 Data Bits: 7,8
 Stop Bit: 1 or 2

Serial I/O Interface: *RS-232:* TxD, RxD for data stream, no flow control

RS-232 (RTS/CTS): TxD, RxD for data stream, RTS/CTS for flow control

RS-232 (RTS/CTS, DTR/DSR): TxD, RxD for data stream, RTS/CTS for flow control. DTR for socket status, DSR for socket open/close control

RS-485 (Half duplex): Half duplex RS-485 interface

RS-422 (Full duplex): Full duplex RS-422 interface

Packet mode of serial input: Packet mode could be in enabled/disabled mode. If packet mode is enabled, the data input from UART will be deferred until the input buffer is full, or NETRS2321E detects a 10-character packet gap and no more characters have arrived. The block waiting time is extended, to avoid splitting the complete packet.

Device ID: User assigned ID number for NETRS2321E. Available ID range includes 0-65535

Report device ID when connected: In TCP mode, if this parameter is enabled, every time the socket is connected, NETRS2321E will immediately report its device ID in the following formats:

Serial #1 - nnnnnA[LF][CR]
 Serial #2 - nnnnnB[LF][CR]
 Digital I/O - nnnnnC[LF][CR]

The total length is 8 bytes, where “nnnnn” is a 5-digit device ID, assigned by the user; [LF] is decimal 10; [CR] is decimal 13.

Setup password: Administration password used to login to the Controller Setup page. It may be left as empty, or up to 15 characters long.

Access password: During socket connection, the Access/Authentication password may be empty or up to entered as 15 characters long. If the Access password is left empty, authentication is disabled. Otherwise, the authentication will proceed as normal. If authentication fails, or no password is supplied within 10 seconds, the socket will be closed.

Controller Updated

Once you have entered the necessary parameters, press the Update button. NETRS2321E will save all parameters in internal non-volatile memory and then reboot. It will take roughly 5 or 10 seconds to complete the whole process following which a new login page will be presented, indicating that the Controller has been updated and that NETRS2321E is restarting.

You can re-login and check if all parameters have been correctly saved. Once you have confirmed accuracy, you can close the browser.

Please note: If the domain under which NETRS2321E is operating is different from that of the computer running the browser, the login page won't appear unless the NETRS2321E Gateway Address has correctly been set.

Factory Default Setting

If you forget the setup password, or have incorrect settings making the converter inoperable, reset the settings to factory default:

You can remove power from NETRS2321E and use any point tip to push the Reset button (next to the RJ45 port) and hold it for 5 seconds. This will automatically turn NETRS2321E back on, and reset the password to default.

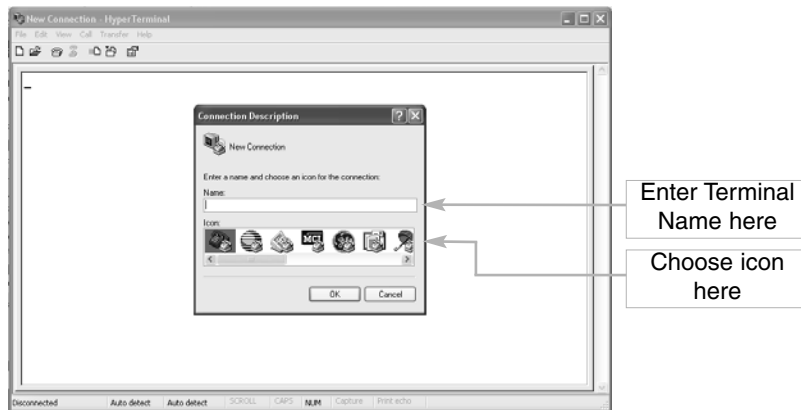
Self-Testing

Hyper Terminal for TCP/IP WinSock

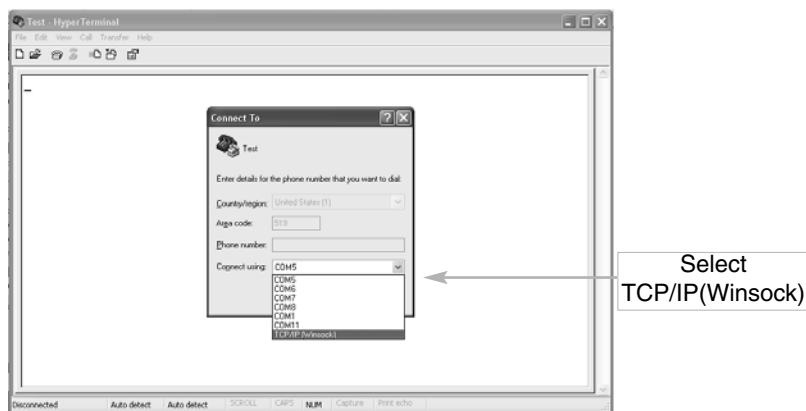
After completing the wiring and parameter settings, it is advisable to confirm that all settings are correct.

To use a single computer to test if NETRS2321E is performing properly:

- 1) Initiate a Hyper Terminal from the Start Menu in Windows. This can be done by clicking on the Start button, selecting All Programs, then Accessories, Communications and finally Hyper Terminal.
- 2) Provide a terminal name, choose an icon to represent the connection and click on OK.



- 3) At the “Connect to” screen that follows, select the TCP/IP(Winsock) option, and click OK. Enter the NETRS2321E IP Address in the Host Address Field, and the Socket port number set for Serial Port 1 in the Port number field (e.g. 4660). The Socket type of Serial Port 1 should be TCP Server:



Once the necessary settings have been made, click on OK. The Hyper Terminal window will appear - if all settings are correct, the time clock at the lower left corner of the terminal window will indicate "connected" and the hh:mm:ss timer will begin counting.

Hyper Terminal for COM Port

Initiate another Hyper Terminal connection as a COM Port Terminal. To do so, follow the steps listed on pg. 10 (see HyperTerminal for TCP Winsock), used to create a Hyper Terminal for TCP/IP WinSock, but instead of selecting TCP/IP (Winsock), select COM 1 (or another COM Port). Set the COM port Properties such that they are identical to those set for the Serial port.

Data Transmission

Once the Hyper Terminals have been setup for both COM Port and TCP/IP Winsock, type any characters in the COM Port Terminal and verify that the typed characters are also displayed in the TCP/IP Winsock terminal. Alternatively, check if the characters typed in the TCP/IP WinSock Terminal are also displayed in the COM Port Terminal. If yes, then all settings are correct, and the converter can operate properly.

Troubleshooting

If the Device Management Utility (EM.exe) doesn't detect the converter on the network:

Please verify:

- The power is properly connected to NETRS2321E
- The network cable is properly connected between NETRS2321E and the hub
- There is no firewall interference. If the computer you are using is Windows XP, the Windows Firewall function may be enabled, which will block the Device Management Utility from detecting the NETRS2321E IP Address. Therefore, you may temporarily disable the Windows Firewall function, and re-enable it once the necessary parameters have been configured.

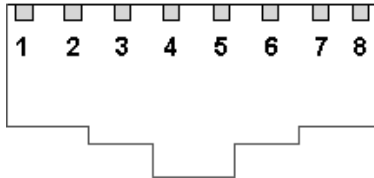
If you are having trouble setting up NETRS2321E using Internet Explorer:

Please verify that the network domain of your PC is the same as that of the converter.

Pin outs and Cable Wiring

RJ45 Pin Assignment

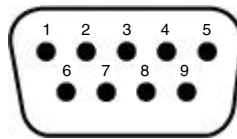
Pin	Signal
1	Tx+
2	Tx-
3	Rx+
6	Rx



RS-232 Pin Assignment

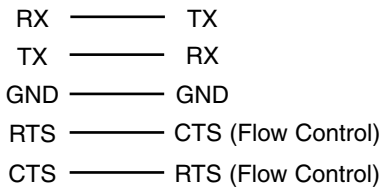
The pin assignment scheme for a 9-pin male connector on a DTE:

Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	NONE



RS-232 Wiring Diagram

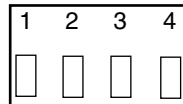
Serial Device NETRS2321E



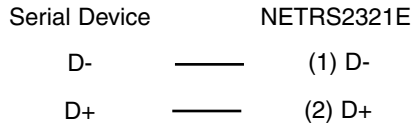
RS-422 Pin Assignment

The pin assignment scheme for a 4-pin RS-422 connection:

Serial Device	NETRS2321E
R-	(2) T-
R+	(1) T+
T-	(4) R-
T+	(3) R+



RS-485 Wiring Diagram



Specifications

CPU	8-bits CPU , 36.864 MHz
RAM	32 K Bytes
ROM	64 K Bytes
Network Port	RJ-45 Connector
Network Speed	10/100M bps(AUTO DETECT)
Network Protocols	ARP, IP, ICMP, UDP, TCP, HTTP, DHCP
Network Mode	TCP Server/TCP Client ; UDP
Network Setup	HTTP Browser (IE & Netscape) , Com port
Network Security	Setup Password and Connect Password
Serial Port	RS232 / 422 / 485 * 1-Port
Serial communication Speed	300 bps?115.2 K bps
Parity	None, Odd, Even
Data Bit	7, 8
Stop Bit	1, 2
Power	Switching Power CKT , DC 7 ~15V , 500mA
LED Indicators	
SYS	LED1
DATA	LED2
LAN	LED3
YSY	LED4
Operating temperature	0° - 60°C
Storage temperature	-10°C - 70°C
Dimensions	W x L x H : 90 x 90 x 26 mm
Weight	105 g

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