



SB72EX User's Manual

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Overview of the SB72EX Dual-port Serial to Ethernet Device

The NetBurner SB72EX Dual-port Serial to Ethernet device comes preprogrammed and ready to run on your network. The SB72EX is programmed to convert RS-232, RS-422, RS-485, and TTL data to Ethernet, enabling communication with your serial device over a network or on the Internet. The onboard web server provides easy device configuration using a standard web browser.



Front view of the SB72EX, showing the power input jack, power-on LED, and the Ethernet RJ-45 connector.



Rear view of the SB72EX, showing the two RS-232 (default configuration) serial ports. Port 0 is on the left; Port 1 is on the right.

Configuration

Before you can begin using your SB72EX, three areas of configuration are required:

1. Hardware configuration
2. Network configuration
3. Operational configuration

You will need to tell your SB72EX what type of serial interface you want to use, the network address you want your SB72EX to respond to, the serial data baud rate, and the TCP/IP listening port number.

Hardware Configuration

The SB72EX has two asynchronous UART type serial ports, referred to as Port 0 and Port 1. They are accessed through two DB-9 connectors. Port 0 can be configured for either RS-232 or RS-485 operation (the factory default is RS-232), while Port 1 is permanently configured as a RS-232 port.

Single Port RS-232 Operation: We recommend using Port 1 as the Serial-To-Ethernet data port. Port 0 will default to a “Debug Port” providing status messages on the operation of the SB72EX that can be viewed using a serial terminal program such as the MTTTY utility.

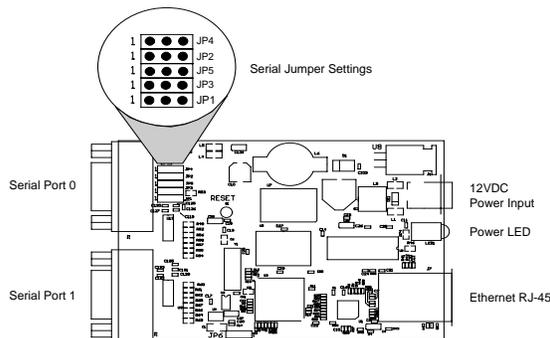
Dual Port RS-232 Operation: Use both Port 0 and Port 1 as data ports. In the software configuration changing Port 0 operation from “Debug” to “RS-232” will disable the status messages.

RS-422 or RS-485 Operation: Configure Port 0 using the settings below. Port 1 can be used as a RS-232 data port, or you can select the Debug option in the software configuration to make Port 1 the Debug port for status messages.

To configure Port 0 as RS-422/485, you will need to open up your SB72EX case and change the position of the five jumpers. (Note: Please take proper ESD precautions. Failure to do so will void your NetBurner Standard Hardware Warranty.)

There are five 3-pin headers that can be jumpered in one of two positions: connecting pins 1 and 2, or connecting pins 2 and 3. The five jumpers are located on the SB72EX board as shown below. Remember, Port 1 is permanently configured as a RS-232 port.

- To configure Port 0 as RS-485: Position each of the five jumpers so they connect pins 2 and 3.
- To configure Port 0 as RS-232 (the default configuration): Position each of the five jumpers so they connect pins 1 and 2.



JP7 - RS-485 Half Duplex Transmit Echo Enable/Disable

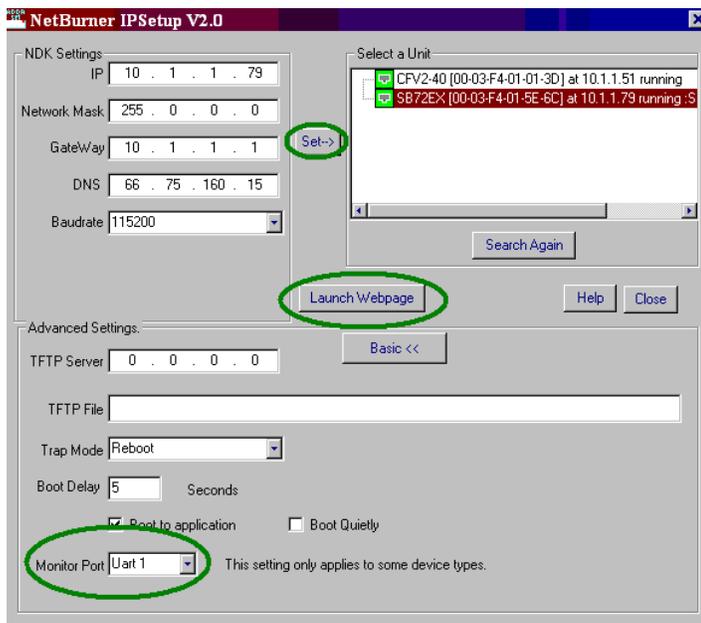
Jumper Placement	Description
Jumper pins 1 and 2	Enables echo of transmitted characters.
Jumper pins 2 and 3	Disables echo of transmitted characters (factory default).

After you have your SB72EX configured correctly, you must select the corresponding software options using the web interface.

Network Configuration

The Hardware configuration steps described above must be completed correctly before the software configuration can take place.

1. Run the IPSetup Tool (IPSetup.exe) by double clicking its icon. This application can be downloaded from the SB72-EX product page at www.netburner.com. To view the Advance Settings, click on the Advanced button (the button name will change to Basic). In this example, I am using Uart 1 as my Monitor port (screen shot below).
2. Locate your SB72EX in the "Select a Unit" pane by matching its MAC address. The MAC address is located on the bottom of your SB72EX. If your SB72EX device does not appear in the list box, verify the power, speed, and link LEDs are illuminated, and click the Search Again button. If you are still unable to see your SB72EX, remove power, correct any cabling errors, reapply power, and click the Search Again button. Note: IP Setup uses a UDP broadcast protocol similar to BOOTP and will not operate through a router.
3. If your network supports DHCP (factory default): The assigned IP Address will appear in the "Select a Unit" pane. Write down this address. If your network does not support DHCP, configure the IP Address and Network Mask fields as shown in the screen shot below. If you need help selecting values, please read the "Selecting an IP Address" section at the end of this guide. After you have entered all of your values, click the Set button in the center of the IP Setup window to configure your SB72EX with its new parameters. Note: If you do not click the Set button, your values will not be saved. If you have multiple NetBurner devices, make sure you selected your SB72EX in the "Select a Unit" pane (as shown in the screen shot) before you input your information.



Operational Configuration

Once the network parameters have been configured, you can use the web server interface to modify the settings of your SB72EX. To access the web page on your SB72EX, click on the **Launch Webpage** button in IP Setup, or you can open your web browser, and enter the numeric IP Address in the address field (e.g. http://10.1.1.79). **Note:** For the telnet example on page 19, I have set UART 1 as my Monitor Port.

Network Settings

Below is a screen shot of the top section of the first page that you will see when your web browser opens.

Parameter	Description
Device Name (for DHCP)	Your NetBurner SB72EX device. Note: The last four values (in the default name) are the last four digits of the MAC address of your SB72EX.
Device IP Address	Displays the IP Address of your SB72EX device. There are two choices: <ul style="list-style-type: none"> If DHCP (from the “Address Mode” drop down menu) is selected, the SB72EX will obtain its IP Address information automatically, including the Subnet Mask, Gateway, and DNS Server (if applicable). This is the factory default. If Static is selected (from the “Address Mode” drop down menu, as shown), you will need to supply the Static IP Address in the edit text box as shown in the screen shot above.
Device Subnet Mask	If you are using a Static IP Address, enter your IP Subnet mask in this text box as shown in the example above.
Device Gateway	If you are using a Static IP Address, enter the IP Address of your Gateway in this text box as shown in the example above.
DNS Server	If you are using a Static IP Address, enter the IP Address of your DNS Server in this text box as shown in the example above.

Remember to click the **Submit New Settings** button on the bottom of this page to save your settings. If you want the restore your SB72EX to its factory settings (DHCP), click the **Reset To Factory Defaults** button.

Device Connection Settings (TCP mode)

This is the bottom section of the first page that you will see when your web browser opens.

	Port 0	Port 1
System is set to TCP mode Switch to UDP mode		
Listen for incoming network connections	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Listening network port:	<input type="text" value="23"/>	<input type="text" value="24"/>
Timeout and disconnect after this many seconds of inactivity.	<input type="text" value="60"/>	<input type="text" value="60"/>
Allow new connection if the existing connection has been idle for this many seconds.	<input type="text" value="30"/>	<input type="text" value="30"/>
When to begin making outgoing serial connections:	<input type="text" value="Never"/>	<input type="text" value="Never"/>
Connect on network port:	<input type="text" value="1000"/>	<input type="text" value="1000"/>
Connect to this address:	<input type="text" value="(Enter IP Address)"/>	<input type="text" value="(Enter IP Address)"/>
Timeout and disconnect after this many seconds of inactivity.	<input type="text" value="60"/>	<input type="text" value="60"/>
Retry failed outgoing connections after this many seconds.	<input type="text" value="600"/>	<input type="text" value="600"/>
Use custom packetization logic (below)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Number of characters to accumulate before sending TCP packet:	<input type="text" value="32"/>	<input type="text" value="10"/>
Number msec to wait for accumulated characters: 0 waits forever.	<input type="text" value="100"/>	<input type="text" value="5000"/>
Flush TCP frame when this character is received (Enter NA to disable):	<input type="text" value="NA"/>	<input type="text" value="65"/>
Network Settings on Serial Port - Advanced Serial Settings		
<input type="button" value="Reset To Factory Defaults"/> <input type="button" value="Submit New Settings"/>		

Your choices (for Port 0 and Port 1) for “When to begin making outgoing serial connections:” are:

When to begin making outgoing serial connections:	<input type="text" value="Never"/>	<input type="text" value="Never"/>
Connect on network port:	<input type="text" value="Never"/> <input type="text" value="On power-up"/> <input type="text" value="If serial data received"/>	<input type="text" value="Never"/> <input type="text" value="On power-up"/> <input type="text" value="If serial data received"/>

When you are finished with this section, click the appropriate button at the bottom of the page. **Submit New Settings** will save your settings, and **Reset to Factory Defaults** will restore the factory values. Next, click on the **Advanced Serial Settings** link to enter your serial notification information. **Remember**, if you are only using one port, you can ignore the other port’s section. **Note:** For the telnet example on page 19, the **Listening network port** number for Port 1 is **24** (the default setting).

To view the **Advanced Serial Settings** screen click on its link on the bottom of this page.

Network Settings on Serial Port - [Advanced Serial Settings](#)

Advanced Serial Data Port Settings (for both Port 0 and Port 1)

Advanced Serial

Port 0: Serial Data Notification Settings

Send serial message when TCP connection is established.
Message to send:

Send serial message when TCP connection is lost.
Message to send:

[Message Formatting Codes](#)

Send serial break when incoming TCP connection is established.
Break interval (in tenths of a second):

Send serial break when incoming character is received (2-digit hex, i.e. "02"):

Port 1: Serial Data Notification Settings

Send serial message when TCP connection is established.
Message to send:

Send serial message when TCP connection is lost.
Message to send:

[Message Formatting Codes](#)

Send serial break when incoming TCP connection is established.
Break interval (in tenths of a second):

Send serial break when incoming character is received (2-digit hex, i.e. "02"):

New settings will cause existing connections to be closed

If you want to have a message displayed in the MTTY window (or HyperTerminal) when your TCP connection (e.g. telnet) is established or lost, enter it in this section. Remember to check the appropriate box and click the **Submit New Settings** button to save your settings. The message formatting codes are listed below.

Message Formatting Codes	
Character	Data Item
%	Prints "%"
%r	Line feed (ASCII 10)
%n	Carriage return (ASCII 13)
%x	Any hex value is %X20 (ASCII space)

When finished viewing message formatting codes, click the **Return to Setup Page** button to return to your **Advanced Serial** web page. **Note:** If you are only using one port, you can ignore the other port's section.

Device Connection Settings (UDP mode)

Return to the Network section by clicking on the **Network** link directly above the Advanced Serial section.

[Network](#) | [Serial](#) | [Password](#) | [Diagnostics](#)

Click on the **Switch to UDP mode** link,(directly under your SB72EX settings) to go to the UDP section.

~~System is set to TCP mode~~
[Switch to UDP mode](#)

You will see “System is set to UDP mode” after you click the **Switch to UDP mode** link

System is set to UDP mode Switch to TCP mode		
	Port 0	Port 1
Incomming port:	<input type="text" value="23"/>	<input type="text" value="24"/>
Outgoing port:	<input type="text" value="1000"/>	<input type="text" value="1000"/>
Send output to this address:	<input type="text" value="(Enter IP Address)"/>	<input type="text" value="(Enter IP Address)"/>
Learn outbound address from last incomming packet	<input type="checkbox"/>	<input type="checkbox"/>
Number of characters to accumulate before sending UDP packet:	<input type="text" value="32"/>	<input type="text" value="32"/>
Number msec to wait for accumulated characters: 0 waits forever.	<input type="text" value="100"/>	<input type="text" value="100"/>
Send UDP frame when this character is received: (Enter NA to disable)	<input type="text" value="NA"/>	<input type="text" value="NA"/>
	<input type="button" value="Reset To Factory Defaults"/>	<input type="button" value="Submit New Settings"/>

When you are finished with this section, click the appropriate button at the bottom. **Submit New Settings** will save your settings, and **Reset to Factory Defaults** will restore the factory values. Enter your valid destination IP address as a numeric address separated by periods. **Remember**, if you are only using one port, you can ignore the other port’s section.

Serial Configuration (for Port 0 and Port 1)

Click the **Serial** link at the top of the page to view the Serial page. When you are finished, remember to click the **Submit New Settings** button to save your changes. Note: If you are only using one port, you can ignore the other port's section.

[Network](#) | [Serial](#) | [Password](#) | [Diagnostics](#)

Serial

Serial Port Settings - Jumper Configuration

	Port 0	Port 1
Data Port Settings (If both are DEBUG, defaults to Port 0):	RS-232	DEBUG
Data Baud Rate:	115200	115200
Data Bits:	8	8
Data Parity:	None	None
Stop Bits:	1	1
Flow Control:	None	None

[Submit New Settings](#)

Select the appropriate **Data Port Setting** from the drop down menu. Remember, Port 1 is permanently configured as a RS-232 port.

Serial

Serial Port Settings - Jumper Configuration

	Port 0	Port 1
Data Port Settings (If both are DEBUG, defaults to Port 0):	RS-232	DEBUG
Data Baud Rate:	115200	115200
Data Bits:	8	8
Data Parity:	None	None
Stop Bits:	1	1
Flow Control:	None	None

Select the appropriate **Data Baud Rate** from the drop down menu. Your host computer and your attached SB72EX must agree on a speed or baud rate to use for the serial connection. The factory default is 115200.

Serial

Serial Port Settings - Jumper Configuration

	Port 0	Port 1
Data Port Settings (If both are DEBUG, defaults to Port 0):	RS-232	DEBUG
Data Baud Rate:	115200	115200
Data Bits:	8	8
Data Parity:	None	None
Stop Bits:	1	1
Flow Control:	None	None

Select the appropriate **Data Bits** value from the drop down menu. The data bits are the number of bits in a transmitted data package (the recommended setting is 8).

	Port 0	Port 1
Data Port Settings (If both are DEBUG, defaults to Port 0):	RS-232	DEBUG
Data Baud Rate:	115200	115200
Data Bits:	8	8
Data Parity:	7	7
Stop Bits:	6	6
Flow Control:	None	None

Select the appropriate **Data Parity** value from the drop down menu. This feature checks whether data has been lost or written over when transmitted between your host computer and your SB72EX (the recommended setting is **None**).

	Port 0	Port 1
Data Port Settings (If both are DEBUG, defaults to Port 0):	RS-232	DEBUG
Data Baud Rate:	115200	115200
Data Bits:	8	8
Data Parity:	None	None
Stop Bits:	Odd	Odd
Flow Control:	None	None

Select the appropriate **Stop Bits** value from the drop down menu. The stop bit follows the data and parity bits in serial communication. It indicates the end of transmission (the recommended setting is 1).

	Port 0	Port 1
Data Port Settings (If both are DEBUG, defaults to Port 0):	RS-232	DEBUG
Data Baud Rate:	115200	115200
Data Bits:	8	8
Data Parity:	None	None
Stop Bits:	1	1
Flow Control:	2	2

For **Flow Control**, the default setting is **None**. If you are using flow control, set this option appropriately.

	Port 0	Port 1
Data Port Settings (If both are DEBUG, defaults to Port 0):	RS-232	DEBUG
Data Baud Rate:	115200	115200
Data Bits:	8	8
Data Parity:	None	None
Stop Bits:	1	1
Flow Control:	None None XON/XOFF RTS/CTS	None None XON/XOFF RTS/CTS

[Submit New Settings](#)

Note: You must click the **Submit New Settings** button on the bottom of this page to save your settings. Remember, if you are only using one port, you can ignore the other port's section.

Serial Port Jumper Configuration

Click the **Jumper Configuration** link on this page to view Port 0 and Port 1 jumper configuration and pinout information.

Serial

[Serial Port Settings](#) - [Jumper Configuration](#)

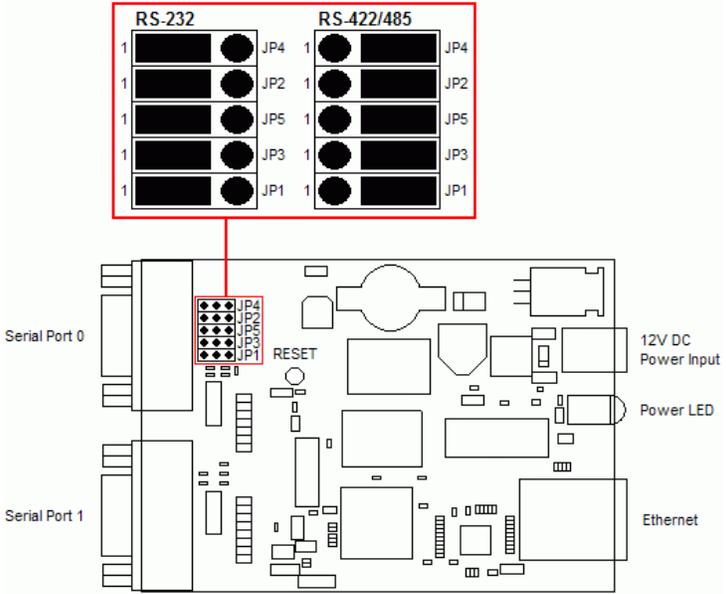
	Port 0	Port 1
Data Port Settings (If both are DEBUG, defaults to Port 0):	RS-232	DEBUG
Data Baud Rate:	115200	115200
Data Bits:	8	8
Data Parity:	None	None
Stop Bits:	1	1
Flow Control:	None	None

[Submit New Settings](#)

Note: To get back to the Serial section after viewing this page, click on the **Return to Setup Page** button directly above the SB72EX diagram.

[Return to Setup Page](#)

Port 0 can be configured for either RS-232 or RS-422/485.
 Port 1 is always configured for RS-232.



SB72EX Pinout Information

Serial Port 0 Pinout		
Pin	RS-232	RS-422/485
1	CD (in)	-
2	Rx (in)	B Tx and Half-Duplex Rx
3	Tx (out)	A Tx and Half-Duplex Rx
4	DTR (out)	-
5	Ground	Ground
6	DSR (in)	B/Z Rx for Full-Duplex
7	RTS (out)	A/Y Rx for Full-Duplex
8	CTS (in)	-
9	RI (in)	-

Serial Port 1 Pinout	
Pin	RS-232
1	CD (in)
2	Rx (in)
3	Tx (out)
4	DTR (out)
5	Ground
6	DSR (in)
7	RTS (out)
8	CTS (in)
9	RI (in)

[Return to Setup Page](#)

Click the **Return to Setup Page** button to return to the Serial section.

Password Setup Section

Click on the Password link to password protect your web server: Type in your user name, your password, confirm your password, and click the **Submit New Settings** button to save your user name and password.

[Network](#) | [Serial](#) | [Password](#) | [Diagnostics](#)

Password

User Name:

Password: (Leave blank for no password)

Repeat Password:

Diagnostics Section

Click the **Diagnostics** link to view the available options. To get back to the Networking section, click the **Back to Ethernet & Serial Configuration** link.

[Network](#) | [Serial](#) | [Password](#) | [Diagnostics](#)

[Arp cache](#)
[Data Counters](#)
[Show processor Tasks](#)
[Dump SNMP tree](#)
[Dump Uart State](#)
[Dump Config Record State](#)

[Back to Ethernet & Serial Configuration](#)

Specifications

Input Power Requirements

Input Range: 7 – 30VDC
Suggested Power Source: 12VDC @ 500mA
Operating Range: Commercial 0 – 70C

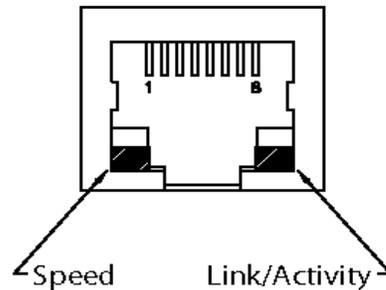
Power Connector

The power input is a standard 2.1mm P5 type input jack. The center is positive, and the outer shell is negative.

Pin	Signal
Center	7 – 30VDC
Shell	GND

LEDs

- Power LED: Illuminated while power is applied.
- LED1 on RJ-45: Ethernet speed - 10 or 100
- LED2 on RJ-45: Link and data activity

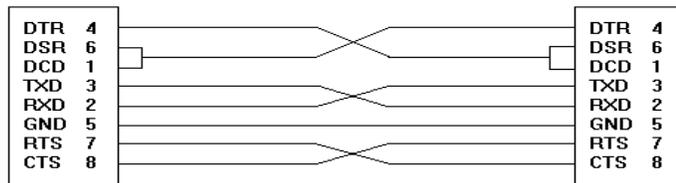


Mechanical

Dimensions: 4.1" x 3.125" x 1.0"

RS-232 NULL Modem Wiring

The following table and diagram shows how to create a null modem cable/adapter for RS-232 connections. **IMPORTANT:** A null modem cable is required if you are connecting your SB72EX to a single computer. A standard serial cable will not work!



Network IP Address Configuration

If you are part of an existing network, are not using DHCP, stop reading now, and go get a Static IP Address and Network Mask address from your network administrator. If you follow the advice in this paragraph on an existing network without an assigned Static IP Address, your Network Administrator will hunt you down....

IP Addresses are used to route packets from place to place on an Intranet/Internet. If you are **not** part of an established network, and your Ethernet segment is isolated, you can choose just about any IP Address you desire. The "powers that be" have actually set aside some addresses for isolated networks. They are documented in RFC1918. The reserved ranges are:

Class A: 10.0.0.0 to 10.255.255.255

Class B: 172.16.0.0 to 172.31.255.255

Class C: 192.168.0.0 to 192.168.255.255

If you are doing development on an isolated network, you can use the following addresses:

- Set your host computer's Network Adapter Card IP Address to 10.1.1.10

Note: Only change the Network Adapter Card; do **not** change your Dial-Up Adapter settings.

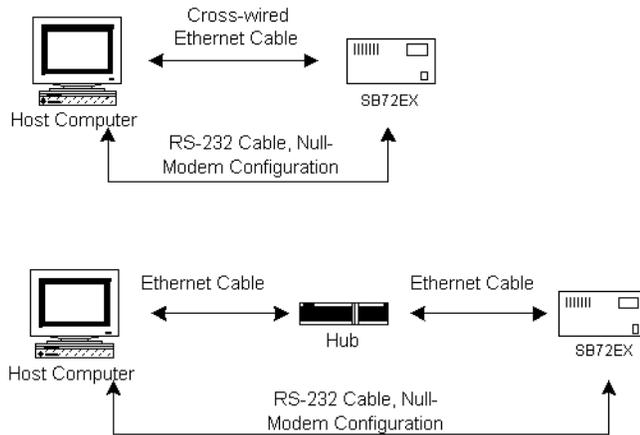
- Set the Static IP Address of your SB72EX to 10.1.1.11
- Set the Network Mask address for both your host computer network and your SB72EX to 255.255.255.0

Web Browsers and Proxy Servers

If you are working on a corporate LAN that uses a proxy server for Internet web browsing, you will need to exclude the IP Address of your SB72EX in your web browser's proxy server settings/preferences. Otherwise, an attempt to connect to a web page on the LAN will fail because the proxy server will attempt to route the request outside the LAN. For most web browsers, this can be accomplished in the advanced settings for the proxy server configuration. Set the Network Mask for your host computer's network adapter and your SB72EX to 255.255.255.0.

Testing with a Telnet Connection

One quick way to test the functionality of your Serial-to-Ethernet connection is with the Telnet program and an RS-232 Serial terminal program (e.g. MTTY). Remember you must use a NULL modem able to connect your SB72EX to your host computer. To run this test, configure your system as one of the two examples shown below:



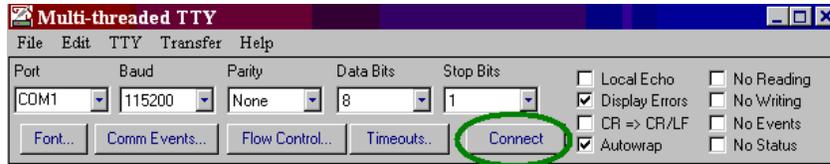
The objective of this example is to use a single host computer running telnet and a serial terminal program to send data in either direction. Therefore, if you type text in the telnet window, it should appear in the serial terminal window and visa versa. For a serial terminal, you can use MTTY (which can be downloaded from the SB72-EX product page at www.netburner.com) or HyperTerminal.

In the following example, an IP Address of 10.1.1.79 will be used for the SB72EX. Note: Replace this number with the specific IP Address you assigned (if using a Static IP Address) during configuration.

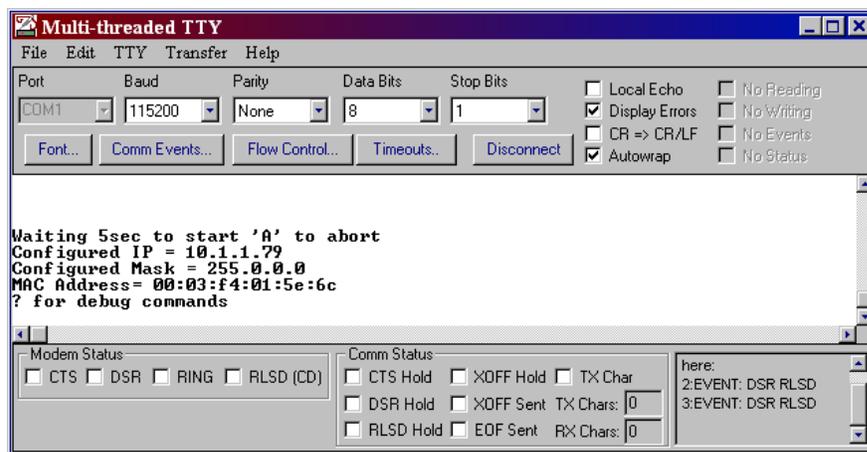
Procedure

1. Connect your hardware in one of the above configurations.
2. Open a command prompt window on your host computer.
3. Verify everything is connected correctly by executing the command **ping 10.1.1.79** and pressing the **Enter** key on your keyboard. You will see a valid ping response. Remember to substitute your IP Address for our example IP Address (i.e.10.1.1.79).
4. Run either HyperTerminal or MTTY. Set the baud rate to the value you assigned to the SB72EX during configuration. To use MTTY (with the factory default settings):
 - Connect your NULL modem cable from Port 0 on your SB72EX to your host computer's serial port. Remember, a standard serial cable will not work.
 - Run MTTY (Mtty.exe) by double clicking its icon. This application can be downloaded from the SB72-EX product page at www.netburner.com. When the MTTY window appears use the factory default setting shown below:
 - The Port setting is the communication port that you connected the NULL modem cable to on your host computer.
 - The host computer and the attached SB72EX must agree on a speed or baud rate to use for the serial connection.
 - Parity checks whether the data has been lost or written over when transmitted between your host computer and your SB72EX.

- **Data Bits** are the number of bits in a transmitted data package.
 - The **Stop bit** follows the data and parity bits in serial communication. It indicates the end of transmission.
- Click the MTTY **Connect** button.



- Remove and reapply power to your SB72 EX.
- The SB72EX factory application will boot.



5. Run Telnet by typing: “telnet 10.1.1.79 24” after the prompt, and press the Enter key. Note: This assumes a port number of 24. You must replace this port number with the listening port number that you assigned in the “Device Connection Settings (TCP mode)” section. Remember to substitute your IP Address for our example IP Address (i.e.10.1.1.79).



6. At this point, anything you type in the Telnet window should appear in the serial terminal window and vice versa.