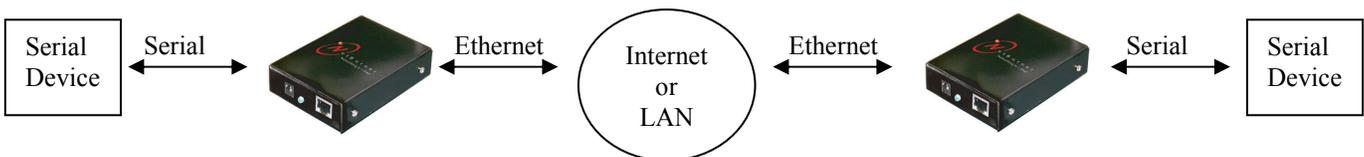

Serial Tunneling with the SB72EX

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Revision 1.0

1. Introduction

Two SB72EX devices can be used to create “serial tunnel” that enables two serial devices to communicate over an IP network, even if both of your serial devices have no network capabilities. The IP connection between the two SB72EX devices will be transparent to the serial devices. The serial connection between the SB72EX and your serial device can be RS-232, RS-422 or RS-485. A common configuration is shown below:



2. Software Configuration Overview

Serial tunneling is usually done using TCP, but you can also use UDP. When using TCP, the SB72EX Serial-to-Ethernet application can be configured to be a TCP Server or a TCP Client.

- **TCP Server mode (default):** The SB72EX will wait for an incoming TCP connection. Once a connection has been made, serial and network data can flow in both directions.
- **TCP Client mode:** The SB72EX creates an outgoing TCP connection to a TCP server. The connection can be established at power-up, which keeps a TCP connection active at all times. Or, a TCP connection can be made only when serial data is available (i.e. serial data is received by the SB72EX serial port).

In order to enable serial tunneling:

- Configure one SB72EX as a Server, and the other as a Client. An analogy would be a telephone call in which one device (the Client) needs to “call” the other device who is listening for the call (the Server).
- Specify the device name or IP Address of the Server in the Client configuration

3. TCP Server Configuration for Incoming Connections

The TCP Server is the first of the two devices that must be configured. Use your web browser to access the web server of the SB72EX device that will be the Server. If the IP address is not known, run the NetBurner IPSetup utility to determine the IP address and type the IP address into the URL field of your web browser, or click on the IPSetup **Launch Webpage** button. In this example we will use serial Port 1 as the data port, and leave serial Port 0 as the debug/status port.

3.1. Network Device IP Settings

The first section of the web page specifies the settings for the device's IP address, mask, gateway and DNS server. The SB72EX TCP Client must always know the IP address of the SB72EX TCP Server (this device), so the Address Mode must be set to "Static", and values for the IP address, mask, gateway and DNS server have been entered. These values can also be entered using the IPSetup utility.

3.2. TCP Server Settings for Incoming Connections

The TCP (or UDP) Server settings section of the web page are outlined in the red rectangle in the screen shot on the next page. Each setting is described below:

System Mode (Protocol)	Selects TCP or UDP as the data transfer protocol
Listen for incoming network connections	Enable Server mode to listen for incoming connections by checking the checkbox for the serial port to be used. Any data received by the network connection will be sent to this serial port. Although both Port 0 and Port 1 are listening, Port 1 will be the data port in this example.
Listening network port	The network port number to listen on for incoming network connections. The defaults are 23 and 24, but any network port number can be used as long as the SB72EX Client device network destination port number is set to the same number.
Disconnect timeout	If no serial or network data is received or transmitted within the specified number of seconds, the TCP connection will be closed. A value of 0 will disable this feature, which is the recommended setting for tunneling.
Override timeout	When the specified number of seconds expires, a new incoming network connection will cause any existing network connection to be closed, and the new connection will become the active one. This feature is very useful in case the SB72EX Client device is reset so that a new TCP connection can be established with the SB72EX server. Do not use a value of 0 for this field.

Network

Device Name (for DHCP)

	Static Settings	DHCP Assigned Values	Address Mode
Device IP Address	<input type="text" value="10.1.1.55"/>		Static <input type="button" value="v"/>
Device Subnet Mask	<input type="text" value="255.255.255.0"/>		
Device Gateway	<input type="text" value="10.1.1.1"/>		
DNS Server	<input type="text" value="66.1.2.3"/>		

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

Port 0

Port 1

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="0"/>
Allow new connection if the existing connection has been idle for this many seconds.	<input type="text" value="30"/>	<input type="text" value="300"/>

When to begin making outgoing serial connections:	<input type="button" value="v"/> Never	<input type="button" value="v"/> 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"/>

Screen shot of example settings for the TCP Server to process incoming connections

4. TCP Client Settings for Outgoing Connections

This is the second of the two devices that must be configured. Use your web browser to access the configuration page of the SB72EX device that will be the Client (the Client makes the outgoing connection to the SB72EX Server). If the IP address is unknown, run the NetBurner IPSetup utility to determine the IP address and type it into the URL field of the web browser, or click on the IPSetup **Launch Webpage** button. In this example we will use serial Port 1 as the data port, and serial Port 0 as the debug/status serial port.

4.1. Network Device IP Settings

The first section of the web page specifies the settings for the device's IP address, mask, gateway and DNS server. The SB72EX TCP Client must always know the IP address of the SB72EX TCP Server, but the IP address of the Client can change. Although a static IP address could be assigned to the Client, in this example the Address Mode is set to "DHCP" to illustrate the operation of DHCP. The values in the edit fields for the IP address, mask, gateway and DNS server are 0.0.0.0. If a DHCP server exists on your network, the DHCP assigned values will be shown in the "DHCP Assigned Values" column.

4.2. TCP Client Configuration

The second SB72EX must be configured to be a TCP Client so it can connect to the SB72EX TCP Server. The Client settings section of the web page is outlined in the red rectangle in the screen shot on the next page. We will be configuring serial Port 1 to connect to the SB72EX TCP Server serial Port 1, which is listening at IP address 10.1.1.55 on network port number 24. Each setting is described below:

System Mode (Protocol)	Selects TCP or UDP as the data transfer protocol
Listen for incoming network connections	Disable Server mode by unchecking the checkbox for the serial port to be used, in this case serial Port 1. Once this box is unchecked, the server settings will have no effect.
When to make outgoing connections	There are 3 modes: <ul style="list-style-type: none">• Never: Used only for TCP Server mode.• On Power Up: Creates a permanent TCP connection to the Server. This setting enables bidirectional communication at any time.• If Serial Data Received: A TCP connection is created whenever serial data is available. Once data has been sent to the Server, the TCP connection is closed.
Connect to this address	The IP address of the TCP Server.
Connect on network port	The network port number that the TCP Server is listening on. In this example, we used the default value of 24 for serial Port 1 of the TCP Server.
Inactivity Disconnect timeout	Set to 0 to disable. This is the Client device, so it is in control of making the outgoing connection.
Retry timeout	Specifies the number of seconds to wait before retrying a failed connection to the TCP Server.

Network

Device Name (for DHCP)

	Static Settings	DHCP Assigned Values	Address Mode
Device IP Address	<input type="text" value="0.0.0.0"/>	(10.1.1.192)	DHCP <input type="button" value="v"/>
Device Subnet Mask	<input type="text" value="0.0.0.0"/>	(255.255.255.0)	
Device Gateway	<input type="text" value="0.0.0.0"/>	(10.1.1.1)	
DNS Server	<input type="text" value="0.0.0.0"/>	(66.75.160.15)	

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

	Port 0	Port 1
Listen for incoming network connections	<input checked="" type="checkbox"/>	<input 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="0"/>
Allow new connection if the existing connection has been idle for this many seconds.	<input type="text" value="30"/>	<input type="text" value="300"/>

When to begin making outgoing serial connections:	<input type="text" value="Never"/> <input type="button" value="v"/>	<input type="text" value="On power-up"/> <input type="button" value="v"/>
Connect on network port:	<input type="text" value="1000"/>	<input type="text" value="24"/>
Connect to this address:	<input type="text" value="(Enter IP Address)"/>	<input type="text" value="10.1.1.55"/>
Timeout and disconnect after this many seconds of inactivity.	<input type="text" value="60"/>	<input type="text" value="0"/>
Retry failed outgoing connections after this many seconds.	<input type="text" value="600"/>	<input type="text" value="10"/>

5. Custom Packetization, Serial Settings and Passwords

The focus of this document is the network configuration for serial tunneling. The SB72EX also has customer packetization to format the serial data stream, many serial port options, and password protection of the configuration web pages. For more information on these topics please refer to the SB72EX Users Guide.

6. Testing

Once you have completed the software configuration, a simple test is to run two instances of the MTTY program on one computer with two serial ports. Connect each serial port to the Port 1 serial port of each SB72EX. Any characters you type in one MTTY window should be sent to the other MTTY window.