N *e t B u r n e r*

Networking in 1 Day!

NetBurner PK70EX-232
4-Port Serial-to-Ethernet Server

Users Manual

Revision 1.0, January 29, 2008

Table of Contents

1   Overview

The NetBurner PK70EX-232 can network enable up to 4 RS-232 serial devices (or 5 if you use the console port). The device is factory programmed with an application that supports TCP, UDP and web page configuration.

PK70 (Front)

The PK70 has 6 connectors on the front panel:
- One 10/100 Ethernet Port
- Two 7-24 VDC Power Connectors
- One SD/MMC Card Slot
- One Serial Console Port (RS-232 / UART 0)

PK70 (Rear & Side)

The PK70 has one DB37 port on the rear panel, and two led's on the side panel:

- NetBurner 1-to-4 UART Cable Adapter (DB37 to 4 x DB9) for serial ports 1 - 4
- Two bi-color led's (not shown) on side panel

2   Configuration

Before you can begin using your PK70, the following configuration/setup is required:

1. Hardware setup
2. Network configuration
3. Serial port configuration
4. Operational configuration

You will need to tell your PK70 what type of serial interface you want to use, the network address you want your PK70 to respond to, the serial data baud rate, and the TCP/IP listening port number.

2.1   Hardware Setup

1. Connect the NetBurner 1-to-4 UART Cable Adapter to theDB37 port on the rear panel of the PK70, and connect the DB9 connectors to your serial device.
2. Connect the Ethernet cable to the Ethernet port.
3. Connect the external power supply.

2.2   Network Configuration

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

1. Run IPSetup.exe (by double clicking its icon). This program is located on the CD-ROM that came with your PK70. To view the Advance Settings, click on the Advanced button (the button name will change to Basic). In this example, I am using Uart 0 as my Monitor port (screen shot below).


2. Locate your PK70 in the "Select a Unit" pane by matching its MAC address. The MAC address is located on the bottom of your PK70. If your PK70 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 PK70, 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.

Important: IPSetup uses UDP port number 20034. Most firewall programs will prompt you to allow a new application to use network services. If you cannot see your device in IPSetup, try disabling your firewall. If this corrects the problem, you will need to add a rule to your firewall to allow IPSetup to use port 20034. Since IPSetup uses UDP broadcasts, the PC must be on the same LAN as the PK70 device.

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 PK70 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 PK70 in the "Select a Unit" pane (as shown in the screen shot) before you input your information.
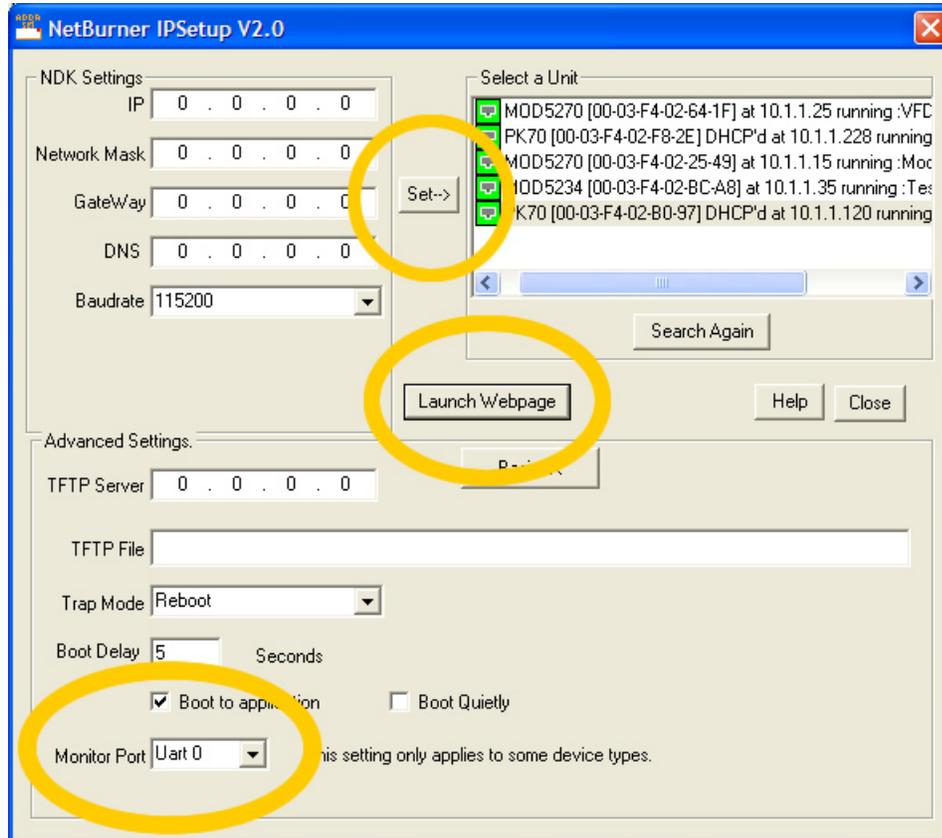
2.3 Operational Configuration

Once the network parameters have been configured, you can use the web server interface to modify the settings of your PK70. To access the web page on your PK70, 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://10.1.1.120).

3   Network Settings

Below is a screen shot of the top section of the first page that you will see when your web browser opens. Remember to click the **Submit New Settings** button on the bottom of this page to save your settings. If you want the restore your PK70 to its factory settings (DHCP), click the **Reset To Factory Defaults** button.

Parameter	Description
Device Name (for DHCP)	Your NetBurner PK70 device. **Note:** The last four values (in the default name) are the last four digits of the MAC address of your PK70.
Device IP Address	Displays the IP Address of your PK70 device. There are two choices: • If **DHCP** (from the "Address Mode" drop down menu) is selected, the PK70 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.

4 Device Connection Settings (TCP Mode)

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

	Port 1	Port 2	P
System is set to TCP mode Switch to UDP mode			
Listen for incomming network connections	☑	☑	☑
Listening network port:	23	24	25
Timeout and disconnect after this many seconds of inactivity:	60	60	60
Allow new connections if the existing connection has been idle to this many seconds:	30	30	30
When to begin making outgoing network connections:	Never	Never	Never
Connect on network port:	1000	1001	1002
Connect to this address:	(Enter IP Address)	(Enter IP Address)	(Enter IP Add
Timeout and disconnect after this many seconds of inactivity:	60	60	60
Retry failed outgoing connections after this many seconds:	600	600	600
Use custom TCP packtization logic (below)	☐	☐	☐
Number of characters to accumulate before sending TCP packet:	32	32	32
Number of msec to wait for accumulated characters 0 waits forever:	100	100	100
Flush TCP frame when this character is received. (enter NA to disable):	NA	NA	NA
	Setup Advanced serial messages.	Setup Advanced serial messages.	Setup Advanc messages.
Reset All ports to default	Submit New Port 1 Values	Submit New Port 2 Values	Submit New

Firmware Version: PK70 Quad Serial V1.0 Jan 7 2008 OS:2.0

Your choices for "**When to begin making outgoing serial connections**:" are:

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 users manual telnet example, 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.

Setup Advanced serial messages.

5   Advanced Serial Data Port Settings

Advanced settings for Port 1

☐	Send serial message when TCP connection is established.	Message to send:	
☐	Send serial message when TCP connection is lost. Message Formatting Codes	Message to send:	
☐	Send serial break when incomming TCP connection is established.	Break interval (in tenths of a second):	20
☐	Send serial break when incomming character is received (2-digit hex, i.e. "02"):	02	
Submit New Port 1 Values			

Advanced settings for Port 2

☐	Send serial message when TCP connection is established.	Message to send:	
☐	Send serial message when TCP connection is lost. Message Formatting Codes	Message to send:	

If you want to have a message displayed in the MTTTY 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.

6   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 before you're the port 1 settings) to go to the UDP section.

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

When you are finished with this section, click the appropriate button at the bottom. **Submit New Port X Values** 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.

7 Serial Configuration

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 Port X Values** button to save your changes. **Note:** If you are only using one port, you can ignore the other port's section.

Select the appropriate **Port Operating Mode** from the drop down menu.

Select the appropriate data **Baud Rate** from the drop down menu. Your host computer and your attached PK70 **must** agree on a speed or baud rate to use for the serial connection. The factory default is **115200**.

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**).

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 PK70 (the recommended setting is **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).

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

Serial Port Settings	Port 1	Port 2	Port 3	
Port Operating Mode:	RS-232	RS-232	RS-232	RS-232
Baudrate:	115200	115200	115200	115200
Data Bits:	8	8	8	8
Parity:	None	None	None	None
Stop Bits:	1	1	1	1
Flow Control:	None	None	None	None
Reset All ports to default	None / XON/XOFF / RTS/CTS	ort 1 Values / Submit New Port 2 Values	Submit New Port 3 Values	Subm

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.

Submit New Port 1 Values

8   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. MTTTY). Remember you **must** use a NULL modem able to connect your PK70 to your host computer. To run this test, configure your system as one of the two examples shown below:
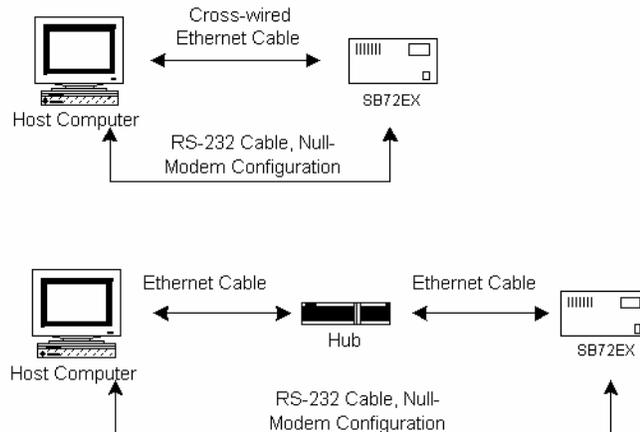
The objective of this example is to use a single host computer running telnet and a serial terminal program to send data in either direction. Therefore, if you type text in the telnet window, it should appear in the serial terminal window and visa versa. For a serial terminal, you can use MTTTY (which is included in your NetBurner PK70 CD-ROM) or HyperTerminal.

In the following example, an IP Address of **10.1.1.79** will be used for the PK70. **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 MTTTY. Set the baud rate to the value you assigned to the PK70 during configuration. To use MTTTY (with the factory default settings):

   - Connect your **NULL modem cable** from Port 0 on your PK70 to your host computer's serial port. Remember, a standard serial cable will not work.

   - Run Mttty.exe (by double clicking its icon), which is located on the CD-ROM that came with your PK70. When the MTTTY window appears use the factory default setting shown below:

     o The **Port** setting is the communication port that you connected the NULL modem cable to on your host computer.
     o The host computer and the attached PK70 must agree on a speed or baud rate to use for the serial connection.

- o **Parity** checks whether the data has been lost or written over when transmitted between your host computer and your PK70.
- o **Data Bits** are the number of bits in a transmitted data package.
- o The **Stop bit** follows the data and parity bits in serial communication. It indicates the end of transmission.

- Click the MTTTY **Connect** button.
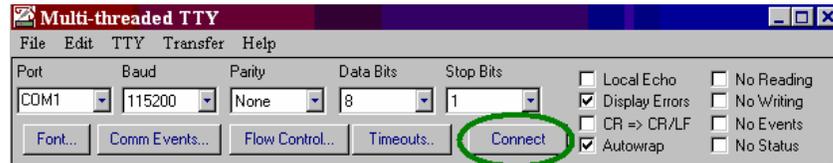
- Remove and reapply power to your PK70 EX.

- The PK70 factory application will boot.
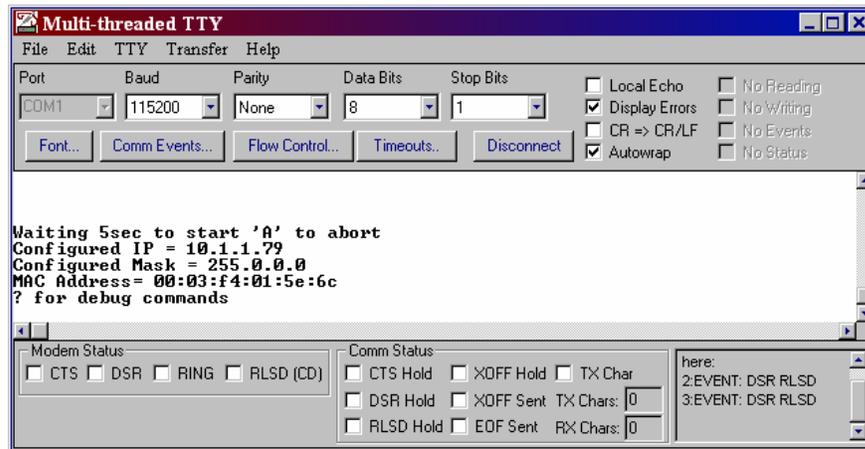
5. Run Telnet by typing: telnet 10.1.1.79 **24** after the prompt, and press the **Enter** key. **Note:** This assumes a port number of **24**. You **must** replace this port number with the listening port number that you assigned in the "Device Connection Settings (TCP mode)" section. **Remember** to 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.

9   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.

9.1   Resetting a Password

Web page password protection is offered as an option with the NetBurner Serial-to-Ethernet application. If a password is forgotten, the following procedure can be used to reset the password.

1. Connect the console serial port (default is Port 0) on the PK70 to your computer.
2. Run the NetBurner MTTTY serial terminal (or any serial terminal program) on the PC.
3. Reboot the PK70 by removing the power cord and plugging it back in. When you see the message "Waiting 2 sec to abort...", type a capital 'A' on the PC to abort the boot. You should now be at a NB> prompt.
4. Type "setup". When the menu appears, set the TFTP Server name to "RESETPASSWORD". Save and exit the boot monitor. The password is now cleared
5. Enter the boot monitor again, type "setup", and delete the TFTP Server name "RESETPASSWORD" so passwords can be enabled again.

10 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 Config Record State
Ping:

Back to Ethernet & Serial Configuration
Firmware Version: PK70 Quad Serial V1.0 Jan 7 2008 OS:2.0

11 Specifications

11.1 Input Power Requirements

DC Input Range: 7 – 24VDC
Suggested Power Source: 12V @ 500mA
Operating Range: Commercial 0 – 70C

11.2 Power Connector

The Power LED is illuminated while power is applied. There are two input power connectors:

- A standard 2.1mm P5 input jack. The center is positive and the outer shell is negative.

Pin	Signal
Center	Positive
Shell	Negative

- A 2-pin quick-disconnect terminal block

Pin	Signal
1	Negative
2	Positive

11.3 DB-9 RS232 Serial Connector (Ports 1-4)

The DB9 on the front of the PK70 provides a RS-232 serial port from UART0 on the 5270 microprocessor. In the default software configuration, UART0 is the serial debug port, and can be used as a serial terminal interface.

Pin	Signal	Pin	Signal
1	n/c	2	TX
3	RX	4	n/c
5	GND	6	n/c
7	RTS	8	CTS
9	n/c		

11.4 RJ-45 Connector

- LED1 on RJ-45: Ethernet speed - 10 or 100
- LED2 on RJ-45: Link and data activity

Speed   Link/Activity
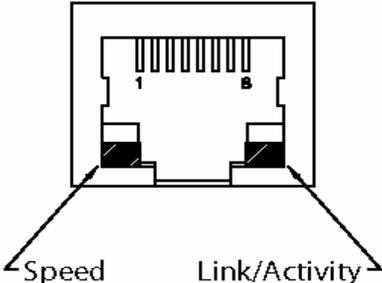
Pin	Signal	Pin	Signal
1	TX+	2	TX-
3	RX+	4	n/c
5	n/c	6	RX-
7	n/c	8	n/c

11.5 Mechanical

4.4" x 3.9" x 1.2"

12   RS-232 NULL Modem Wiring

The Console serial port on the PK70 is already cross-wired, so you can connect a straight-through serial cable between your PC and the PK70. A null-modem adapter is not required for the console port. On the console port, pin 2 is transmit, and pin 3 is receive.
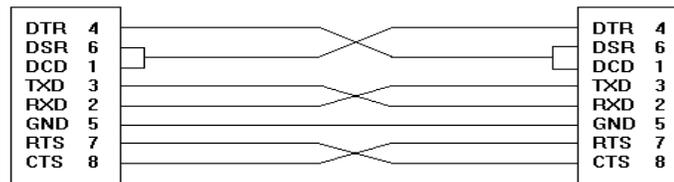
If you want to connect one of the 4 serial ports on the DB37 to 4 x DB9 cable, you will need a null modem adapter. Pin 2 is receive and pin 3 is transmit. This is the same pin configuration as a standard PC type serial port.

The following table and diagram shows how to create a null modem cable/adapter for RS-232 connections.

```
DTR  4                                      DTR  4
DSR  6                                      DSR  6
DCD  1                                      DCD  1
TXD  3                                      TXD  3
RXD  2                                      RXD  2
GND  5                                      GND  5
RTS  7                                      RTS  7
CTS  8                                      CTS  8
```

13   Network IP Address Configuration

If you are part of an existing network, are not using DHCP, stop reading now, and get a Static IP Address and Network Mask address from your network administrator.

IP Addresses are used to route packets from place to place on an Intranet/Internet. If you are going to put the PK70 directly on the Internet, then you will need to acquire an IP address. If you are on a LAN you will normally choose an IP address from one of the groups below which are set aside for local networks.

Class A: IP Address range: 10.0.0.0 to 10.255.255.255, Mask 255.0.0.0
Class B: IP Address range: 172.16.0.0 to 172.31.255.255, Mask 255.255.0.0
Class C: IP Address range: 192.168.0.0 to 192.168.255.255, Mask 255.255.255.0

14   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 PK70 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 PK70 to 255.255.255.0.