USER'S MANUAL

PH232Ex1

RS-232 SERIAL TO ETHERNET TERMINAL SERVER/CLIENT

IPEX

(IP Electronix)

14 January 2022

Doc No: PH232Ex1-UM-001

CONTENTS

1. INTRODUCTION

IPEX PH232Ex1 bidirectional communication terminal server/client is a simple solution for connecting serial devices to a network which results in having 1 RS-232 serial port over Ethernet network. This converter uses transparent communicate protocol, so it is not required to understand complex Ethernet TCP/IP protocol, and no modification in serial programs is needed. It operates as a Real COM, TCP Server, TCP Client, UDP Server and UDP Client Full-Duplex converter and supports bidirectional connection.

PH232Ex1 is designed for industrial usage and is useful for connecting any device with a serial interface to a computer via Ethernet supported network like LAN, WAN … and can be used in Industrial Automation, Telecommunications, SCADA Systems, DCS Systems ….

Protection against Surge, ESD and EMI is implemented in its design and there is 3kV insulation between Ethernet and RS-232 sides.

2. SPECIFICATIONS

- **Number of Ports:** #1 RS-232 Serial Port, #1 Ethernet RJ45 (10/100 Mbps) Port;
- **Serial Standard:** Meets or Exceeds the Requirements of TIA/EIA-232-F and ITU v.28 Standards;
- **Network Protocols:** ICMP, IP, TCP, UDP, DHCP, Telnet, DNS, ARP, HTTP;
- **RS-232 Signal (Full Handshake Support):** TxD, RxD, DTR, RTS, DSR, CTS, RI, GND;
- **Baud-Rates:** 50, 75, 110, 150, 300, 450, 600, 900, 1200, 1800, 2400, 3600, 4800, 7200, 9600, 14400, 19200, 28800, 38400, 56000, 57600, 76800, 115200, 153600, 184320, 230400, 307200, 460800, 921600 bps; Selectable. Custom Baud-Rates are supported too;
- **RS-232 Parity:** Even, Odd, None, Mark and Space; Selectable;
- **Power (Green)** LED Indicator;
- **Transmit (Blue)** and **Receive (Yellow)** LED Indicator for All Ports;
- **TCP Server (Green), TCP Client (Green)** and **UDP (Green)** LED Indicator;
- **ESD Protection:** RS-232 Bus-Pin ESD Protection Exceeds ±15 kV Using Human-Body Model (HBM);
- **Dimensions:** 26mm x 71.6mm x 122 mm (1.03in x 2.8in x 4.82in).
- **Operating Temperature:** -20°C to +85°C (-4°F to +185°F);
- **1 Year Guarantee** and **5 Years Support.**

3. PACKAGE CHECKLIST

Before installing the PH232Ex1, verify that the package contains the following items:

1) #1 PH232Ex1

2) #1 Quick Start Guide

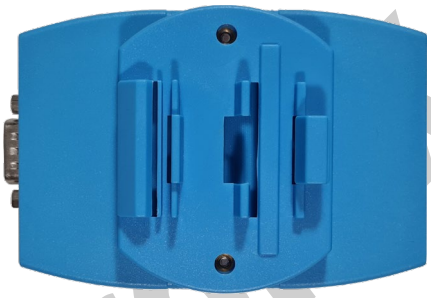
3) #1 Document and Driver CD-ROM

#4 220V AC to 12V DC Adaptor

NOTE: Notify your sales representative if any of the above items is missing or damaged.

4. TOP VIEW

5. BOTTOM VIEW



6. FRONT VIEW

7. BACK VIEW

8. GENERAL INDICATORS

POWER LED (Green): It is turned ON, when the power supply connects to +VDC and GND correctly.

PoE LED (Green): It is turned ON if the device takes its power from a network switch with PoE.

9. PORT INDICATORS

TCP Server LED (Green): Blinking this LED shows that the TCP Server mode for this port is selected and device is trying to connect in this mode. If the device connects to a client, then this LED turns on continuously.

TCP Client LED (Green): Blinking this LED shows that the TCP Client mode for this port is selected and device is trying to connect in this mode. If the device connects to a server, then this LED turns on continuously.

UDP LED (Green): Blinking this LED shows that the UDP mode for this port is selected and device is trying to connect in this mode. If the network works properly, then this LED turns on continuously.

PE LED (Red): It is blinking if the device detecting a Parity Error in data.

RX LED (Yellow): It is blinking when the device receive data on serial port.

TX LED (Green): It is blinking when data is transmitting from the device serial port.

REDIRECT IN (YELLOW): It is turned on if data from other ports are redirected to this port.

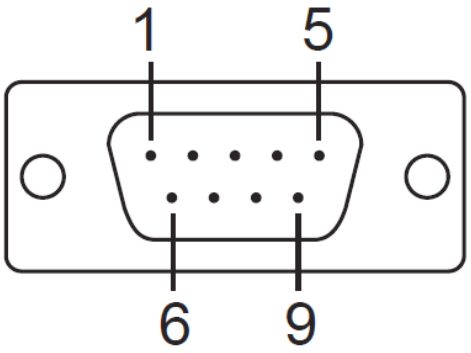
REDIRECT OUT (GREEN): It is turned on if data from the port are redirected to any other port.

10. DEVICE POWER SUPPLY

To working properly, you should connect a DC Power Supply to PH232Ex1. The voltage of the Power Supply should be from +8V to +48V. For example, this device is working with a single +12V, +15V or +24V DC Adaptor as well.

11. RS-232 SERIAL PORT PIN CONFIGURATION

Male DB9

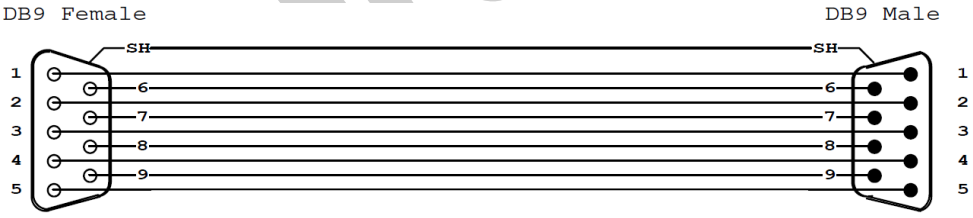


Pin	RS-232
1	DCD
2	RxD
3	TxD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

12. RS-232 CONNECTING METHODS

- Modem Connection (to a Modem, any DCE devices)

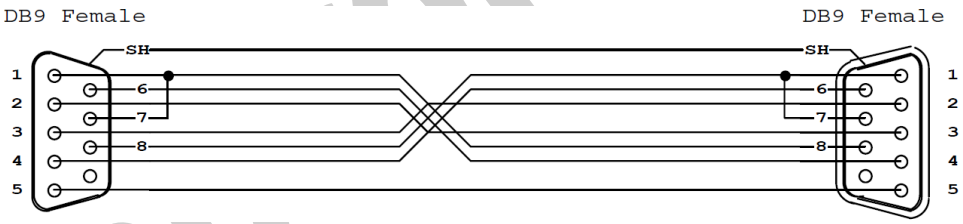
PH232Ux2 Port as DTE DB9-Male Pin Number		Modem or other DCE devices DB9-Female Pin Number	
Pin 1: DCD	(Input)	Pin 1: DCD	(Output)
Pin 2: RxD	(Input)	Pin 2: RxD	(Output)
Pin 3: TxD	(Output)	Pin 3: TxD	(Input)
Pin 4: DTR	(Output)	Pin 4: DTR	(Input)
Pin 5: GND	(Ground)	Pin 5: GND	(Ground)
Pin 6: DSR	(Input)	Pin 6: DSR	(Output)
Pin 7: RTS	(Output)	Pin 7: RTS	(Input)
Pin 8: CTS	(Input)	Pin 8: CTS	(Output)
Pin 9: RI	(Input)	Pin 9: RI	(Output)



(Modem Cable)

- **Null Modem Connection (to PC, PLC, RTU or any other DTE devices)**

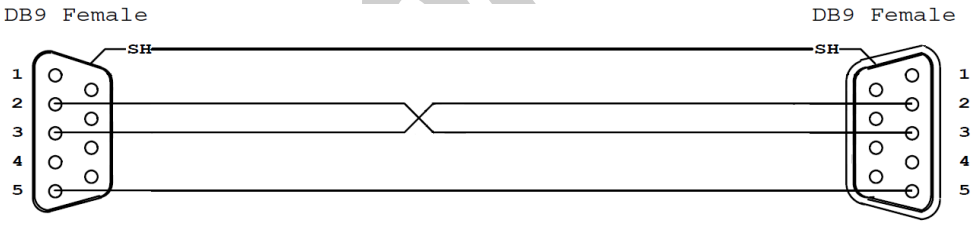
PH232Ux2 Port as DTE DB9-Male Pin Number		PC,PLC or other DTE devices DB9-Male Pin Number	
Pin 1: DCD	(Input)	Pin 7: RTS	(Output)
Pin 2: RxD	(Input)	Pin 3: TxD	(Output)
Pin 3: TxD	(Output)	Pin 2: RxD	(Input)
Pin 4: DTR	(Output)	Pin 6: DSR	(Input)
Pin 5: GND	(Ground)	Pin 5: GND	(Ground)
Pin 6: DSR	(Input)	Pin 4: DTR	(Output)
Pin 7: RTS	(Output)	Pin 8: CTS	(Input)
Pin 8: CTS	(Input)	Pin 7: RTS	(Output)
Pin 7: RTS	(Output)	Pin 1: DCD	(Input)



(Null Modem Cable)

- **Simple Null Modem Connection (to PC, PLC... Without Hardware Flow control)**

PH232Ux2 Port as DTE DB9-Male Pin Number		PC,PLC or other DTE devices DB9-Male Pin Number	
Pin 2: RxD	(Input)	Pin 3: TxD	(Output)
Pin 3: TxD	(Output)	Pin 2: RxD	(Input)
Pin 5: GND	(Ground)	Pin 5: GND	(Ground)

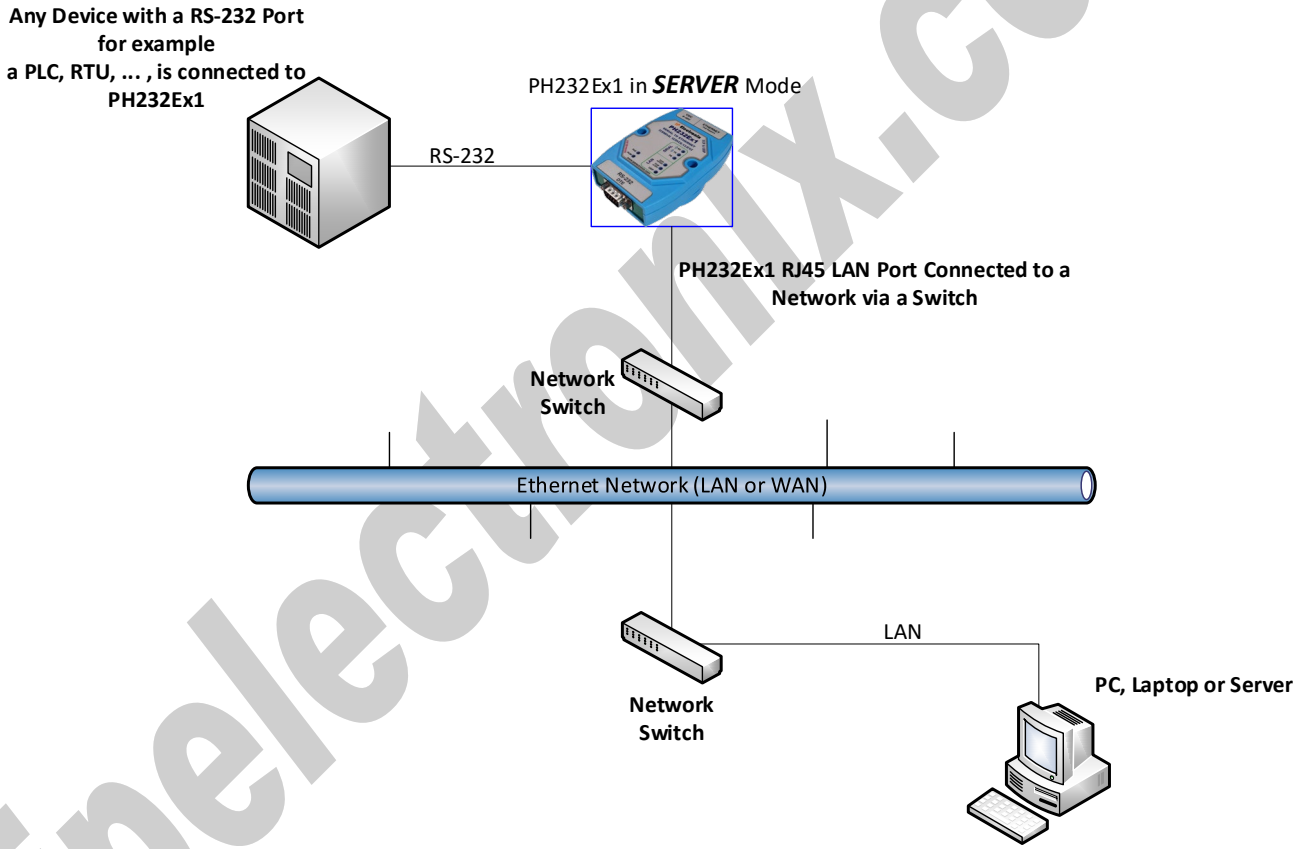


(Simple Null Modem Cable (Without Hardware Handshaking))

13. CONNECTION DIAGRAM

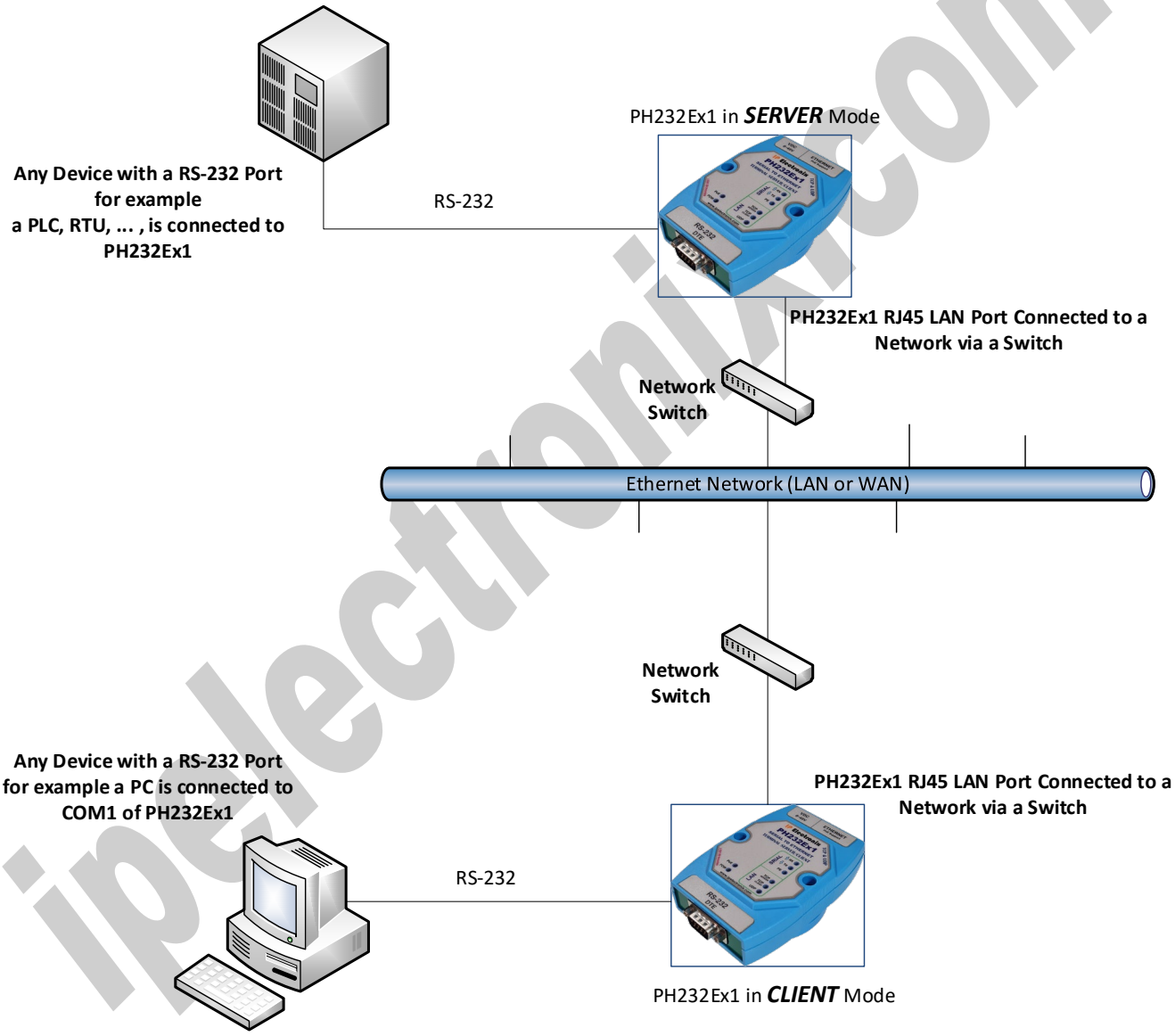
- PH232Ex1 as a Terminal Server

The below diagram is a typical connection configuration of PH232Ex1. You can connect a device with a RS-232 serial port to RS-232 serial port of the PH232Ex1, then you can connect to the device behind the network by any application software you want by opening a TCP or UDP Socket without need of any auxiliary driver.



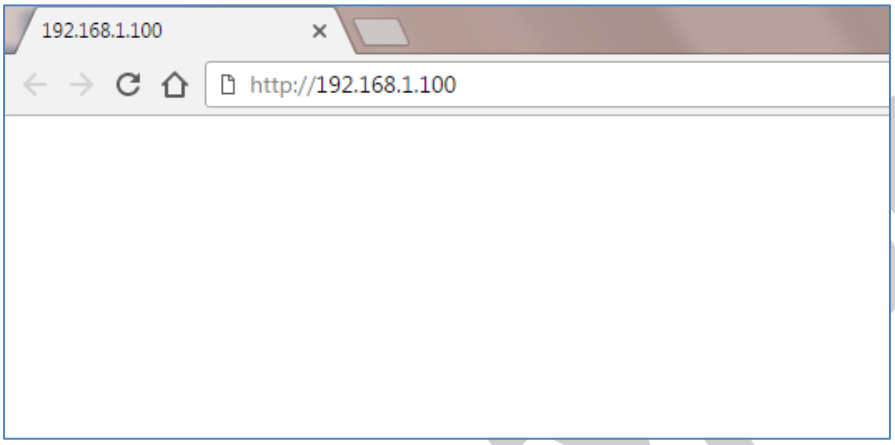
- Client/Server, Peer to Peer Connection

If you want to connect two devices which have only RS-232 Ports to each other via Ethernet network, you can use this connecting method. Take two PH232Ex1. Set one PH232Ex1 as Server and another one as Client with adding Remote Server IP and Port Number on it. These two converters are connecting automatically via network to each other, so RS-232 PORT of Server, connects to RS-232 PORT of Client via network. Now you can connect your RS-232 devices to COM Ports as shown in the following diagram.



14. DEVICE CONFIGURATION WEBPAGE

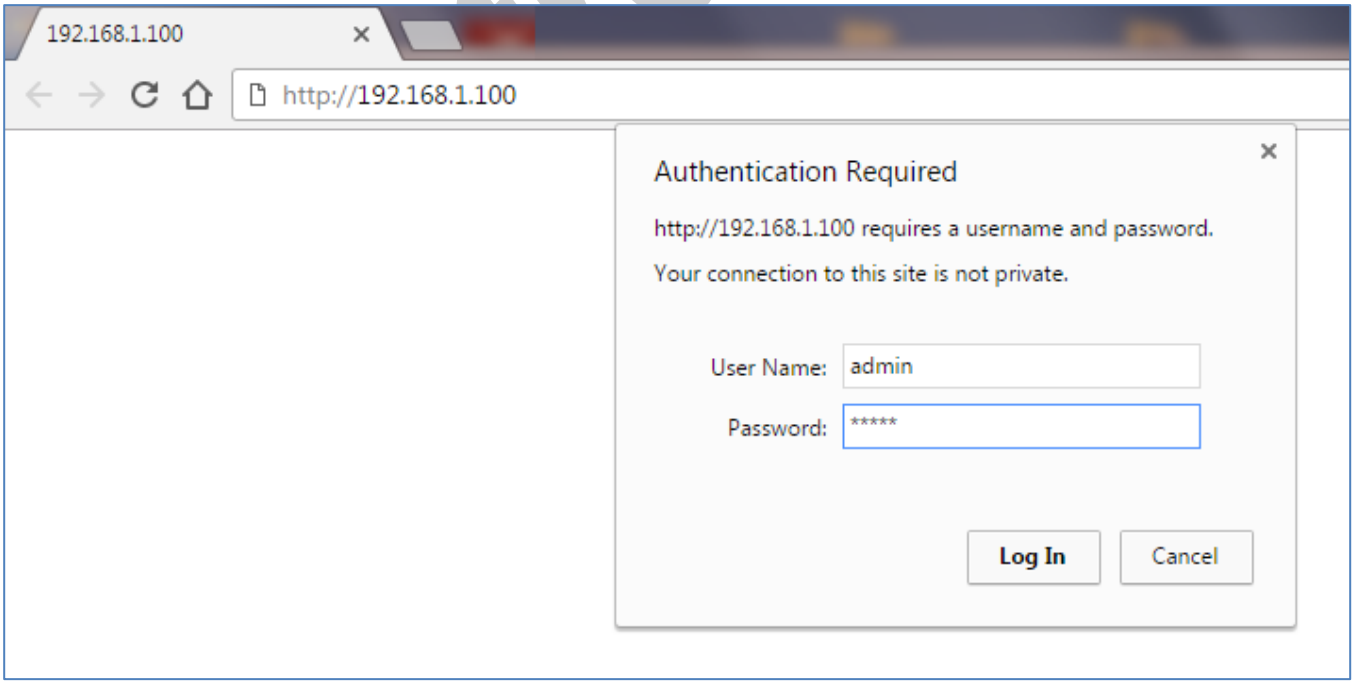
To open device configuration webpage, enter the device IP on your web browser address bar like this figure:



The device Default IP Address is **192.168.1.100** and the default Subnet Mask is: **255.255.255.0**

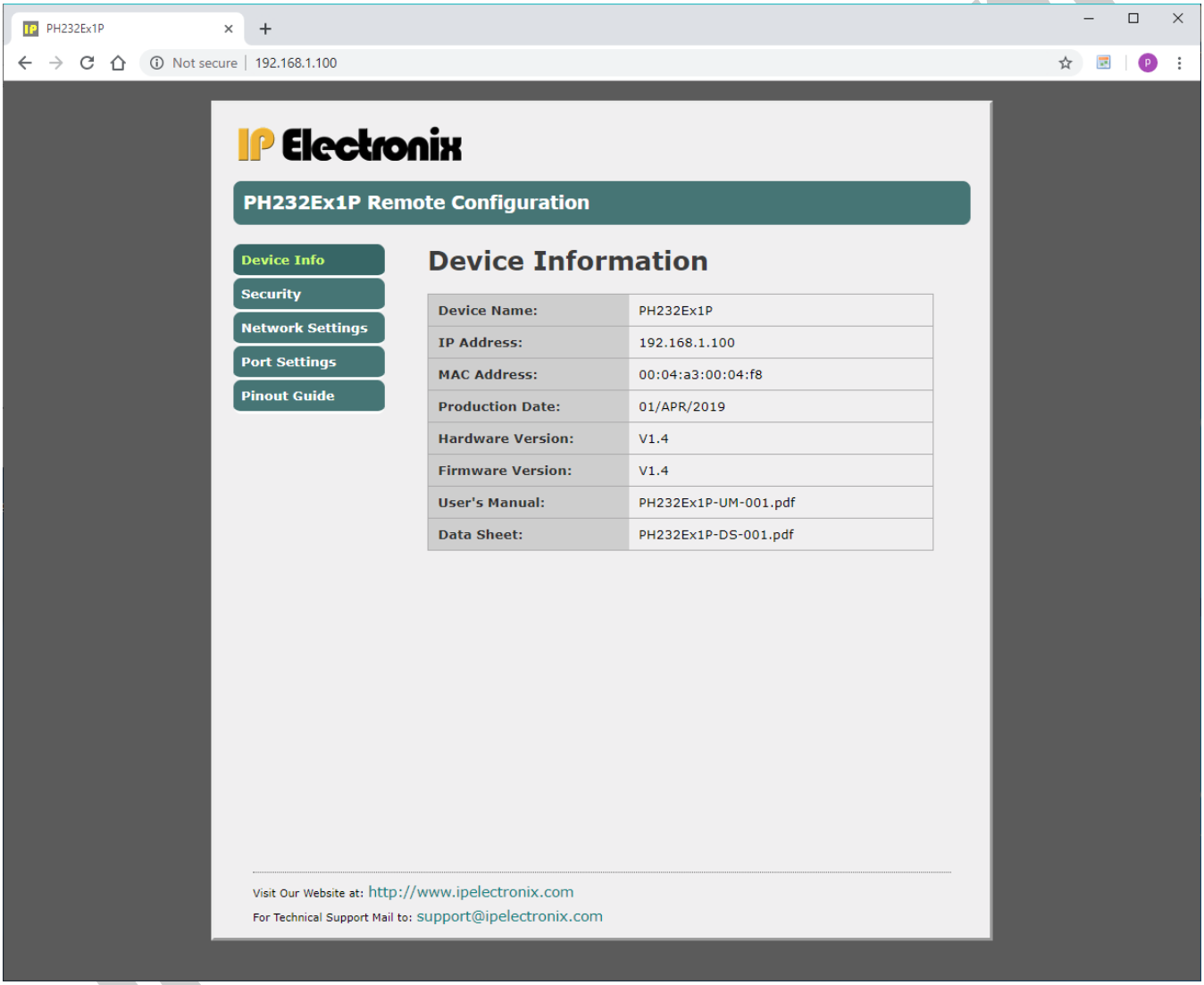
Now enter user name and password to pass the authentication procedure. Default User Name is **admin** and default password is **admin** too.

User Name: **admin** Password: **admin**



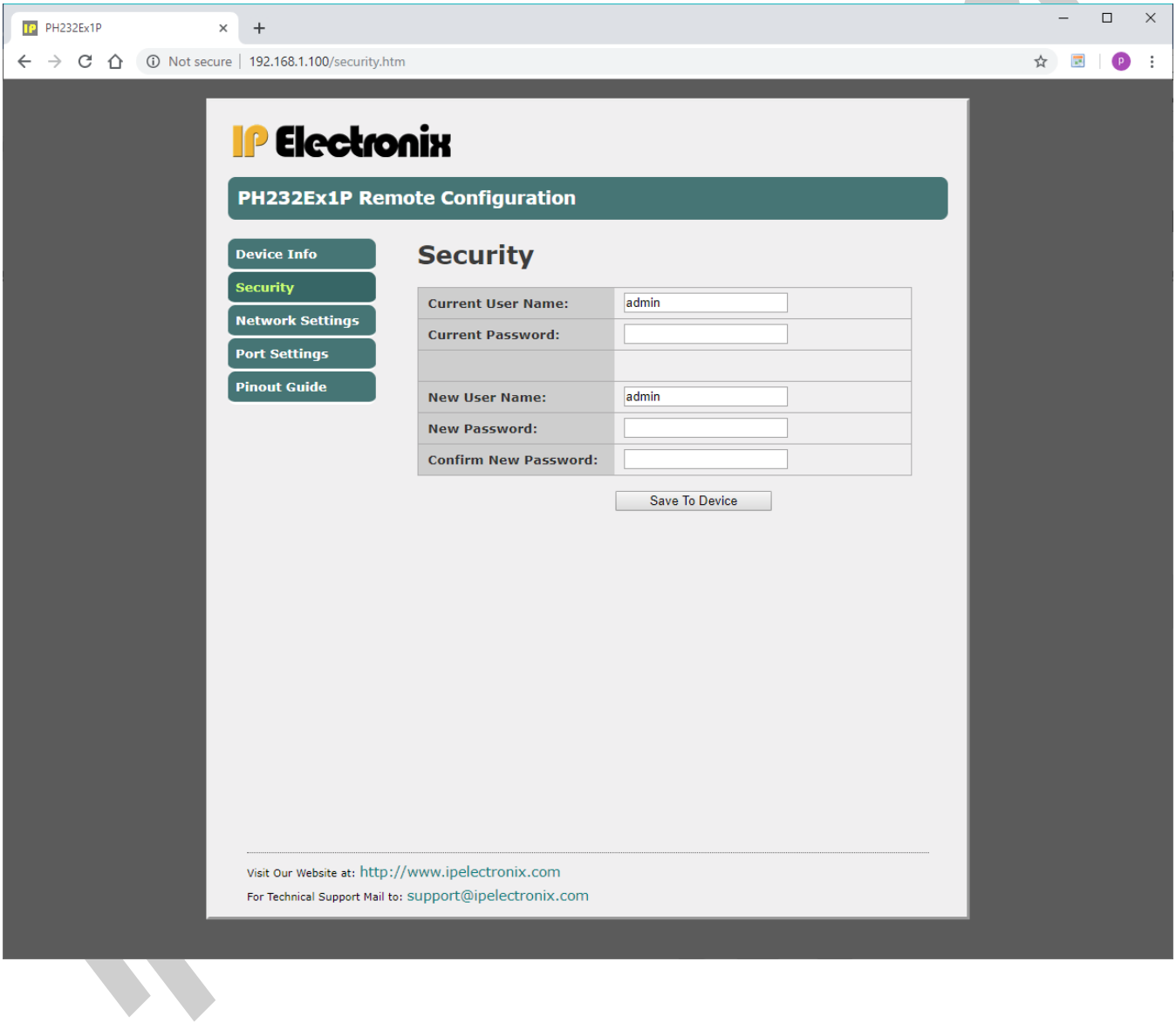
- Device Information Webpage

You can see some general information about the device such as MAC address, Firmware and Hardware version and … in this page.



- Security

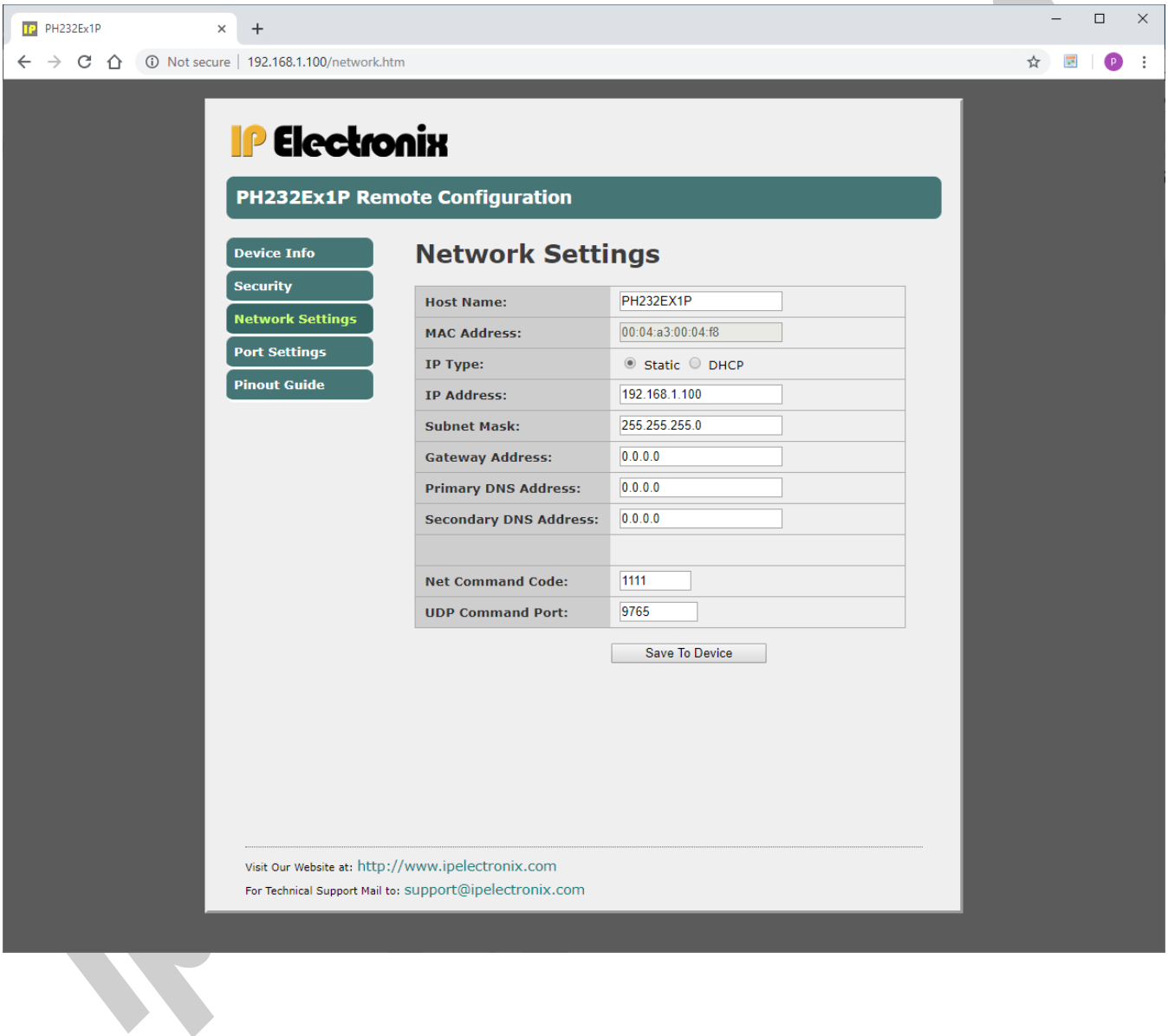
You can change device configuration webpage user name and password in this page.



- Network Settings

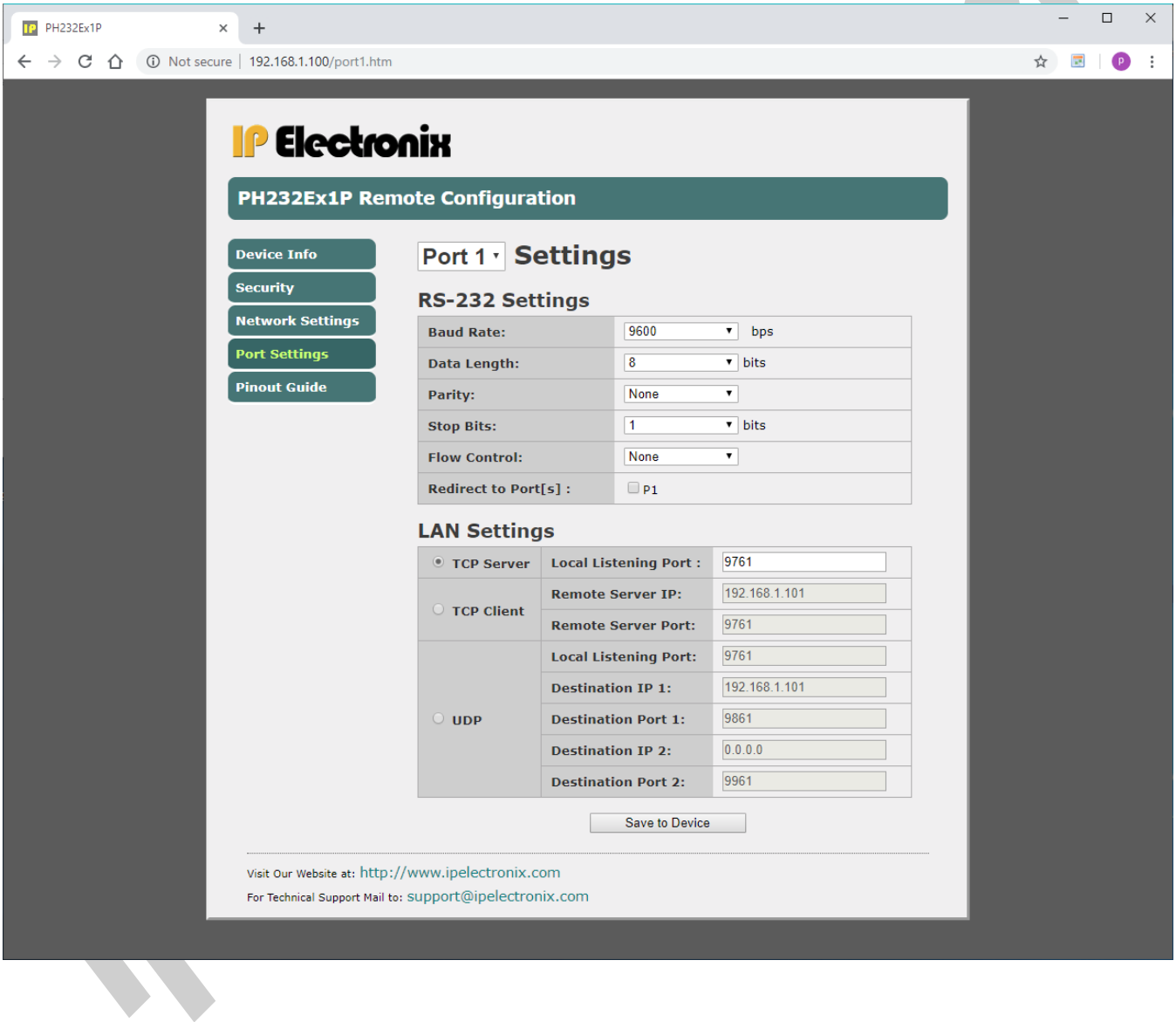
You can change all the network settings, such as device IP Address in this page.

It is important to enter valid data in this section. If you are not sure about your network settings such as DNS address and …, you should consult to your network administrator before any changing in these settings.



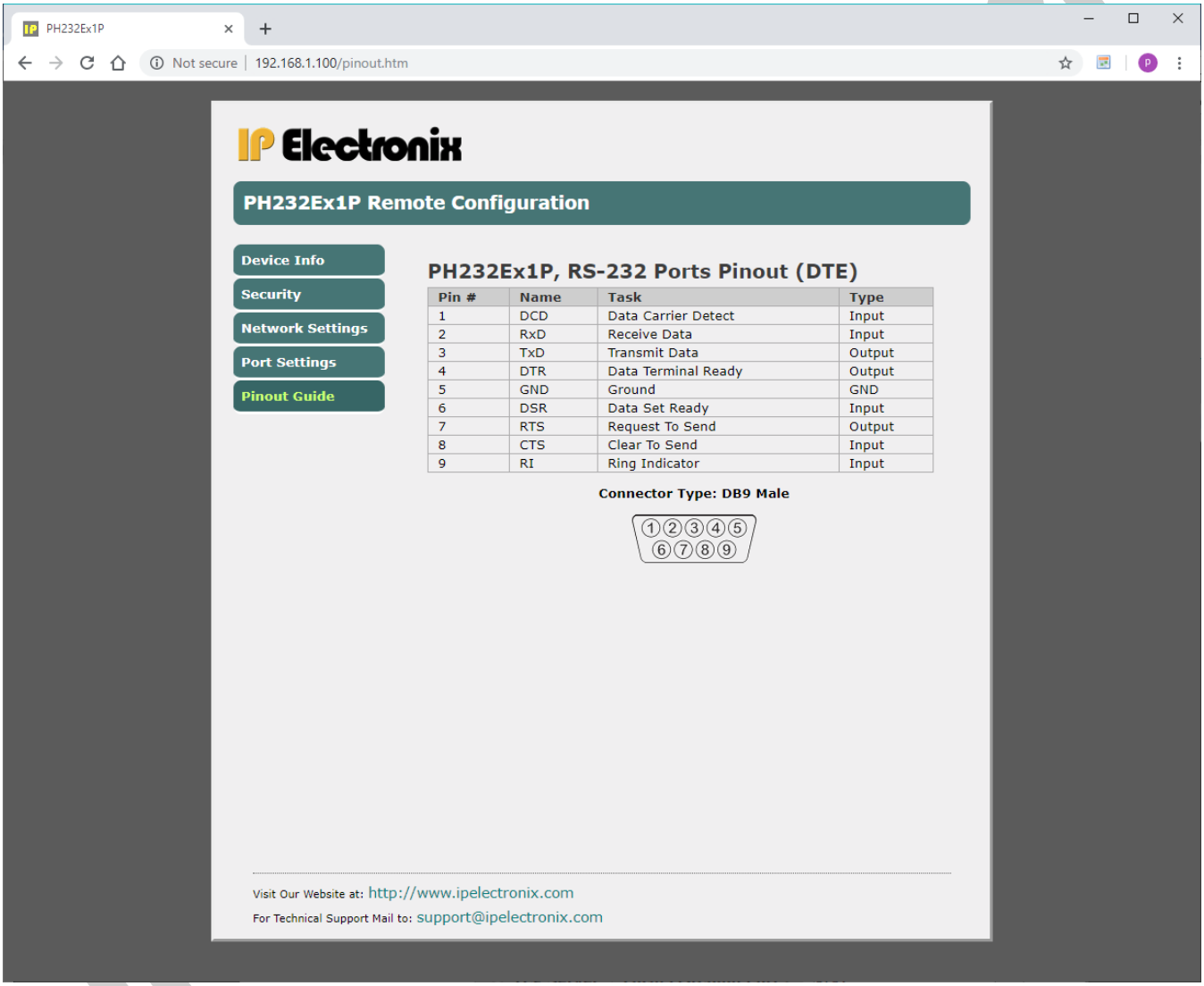
- PORT Settings

You can see and change all the port settings in this page.



- Pinout Guide

RS-232 Port pinout is seen in this page.



15. DEFAULT SETTINGS

Default IP Address: 192.168.1.100

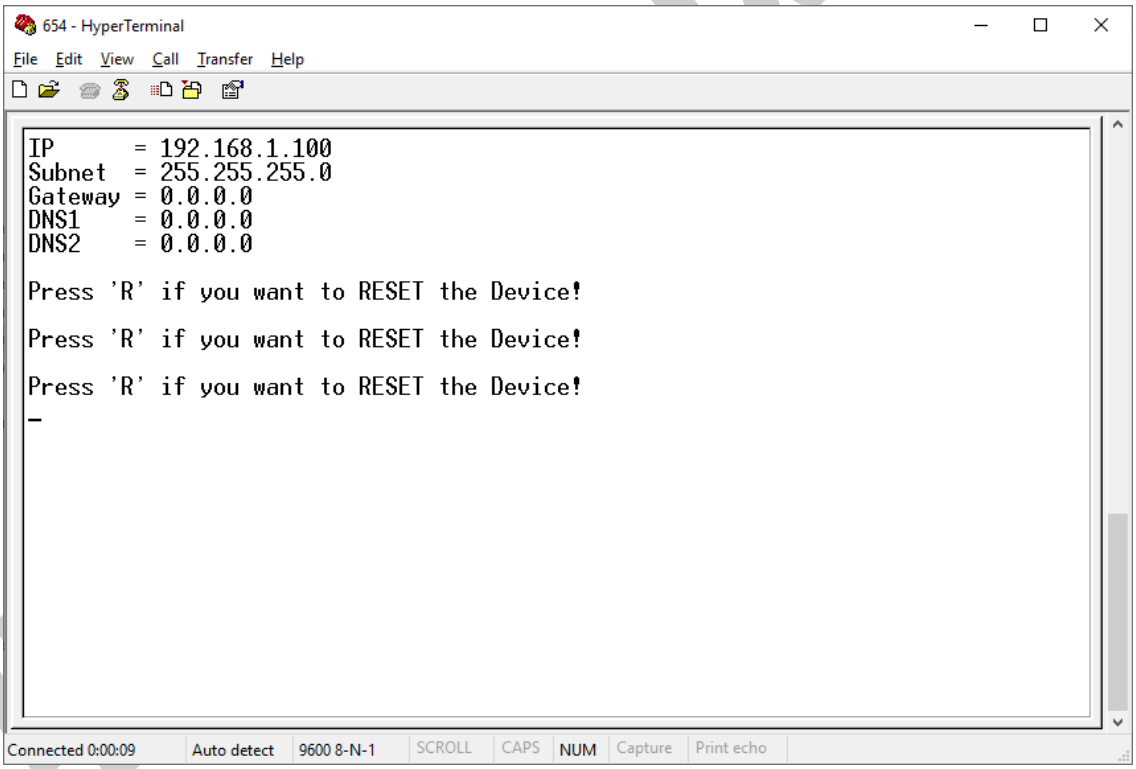
Default Subnet Mask: 255.255.255.0

Default User Name: admin

Default Password: admin

IMPORTANT NOTICE:
If you change the device IP and forget it, you can see the new IP Address on the serial port. Whenever you turn on the device, it sends its IP Address and Subnet Mask to the RS-232 Port. The port settings for watching device IP, are fixed to 9600, 8, n, 1. You can easily see this IP Address and Subnet Mask by using a Terminal Emulation Software such as Microsoft Hyper Terminal.

You can also Reset the device to its Factory Default Settings in this page if necessary.

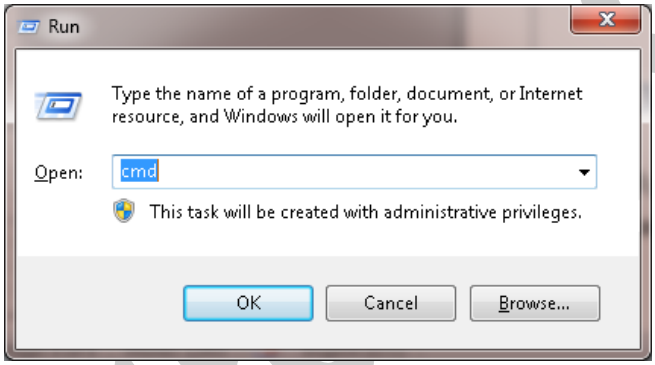


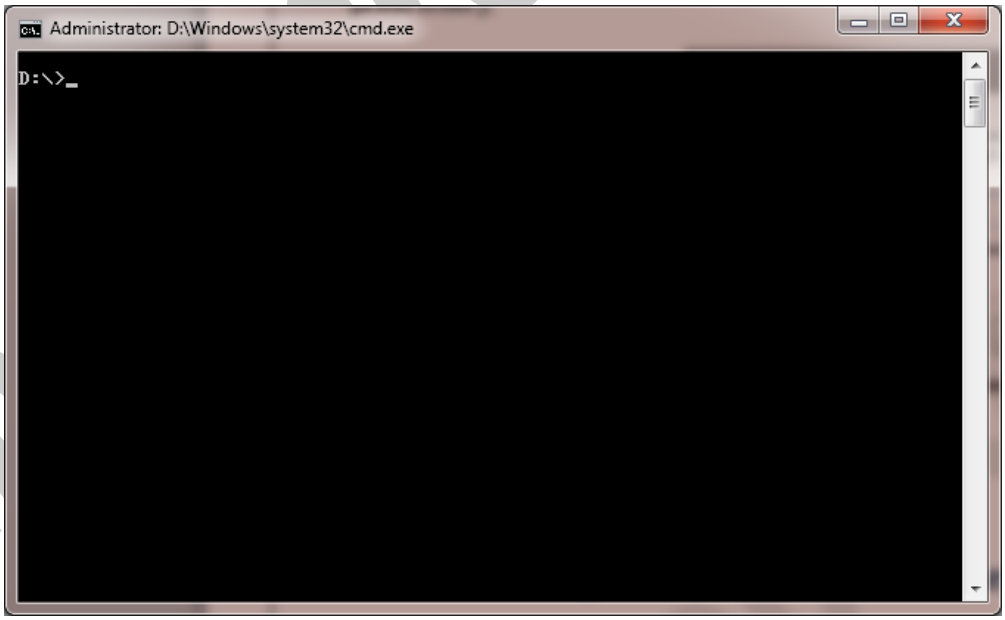
16. NETWORK CONNECTION TESTING

Connect PH232Ex1 to the Ethernet based network by connecting RJ45 LAN socket to network via a switch or Hub by an ordinary CAT5 or CAT6 cable. If everything is set properly, the green and yellow LEDs on the PH232Ex1's **RJ45 socket** will blink.

Now it is important to check the network wiring topology and testing all the cables, routers, switches … in the route from PH232Ex1 to the computer. This test is done simply by using PING command from computer.

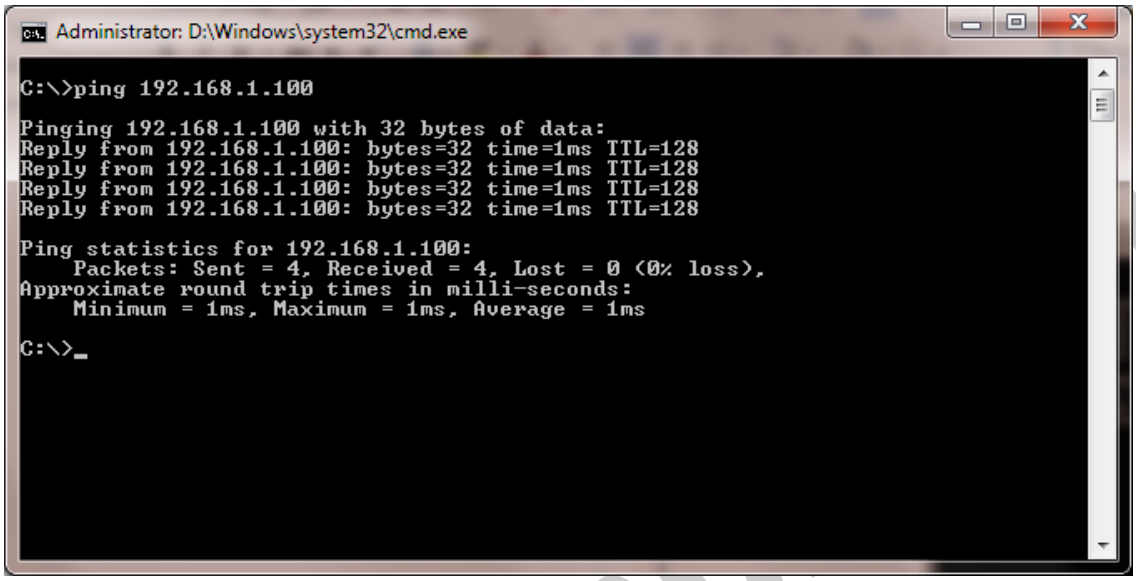
Go to Windows command prompt, (press WINDOWS KEY + R to going to run dialog and then type CMD and press enter):



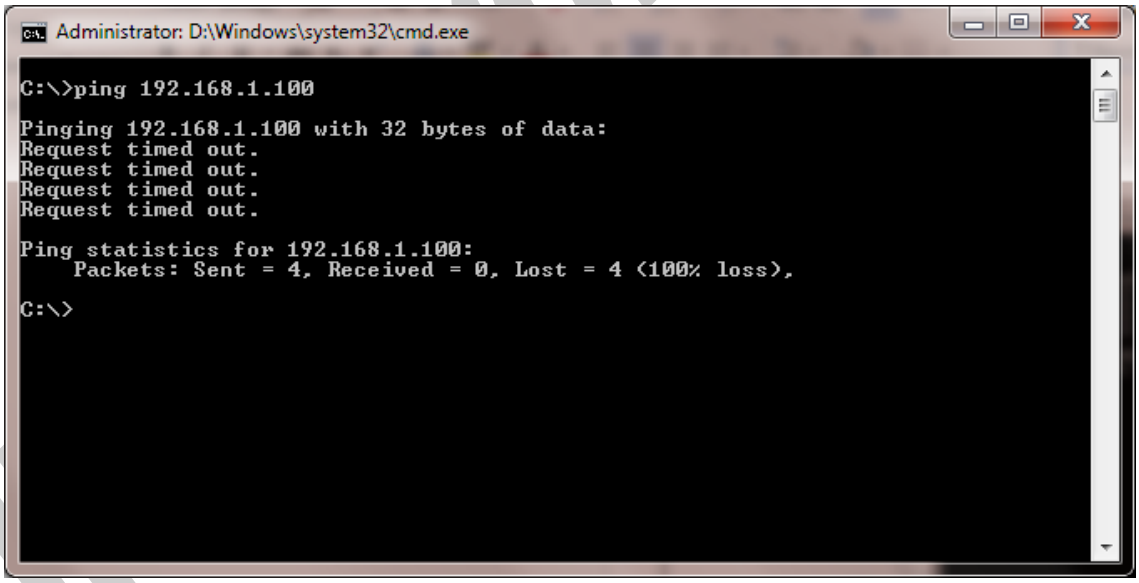


Type ping with the device IP address, for example "ping 192.168.1.100"and press Enter.

Now you should see the ping response from the device.



If there are any problems in the network, you could not see response from the device:



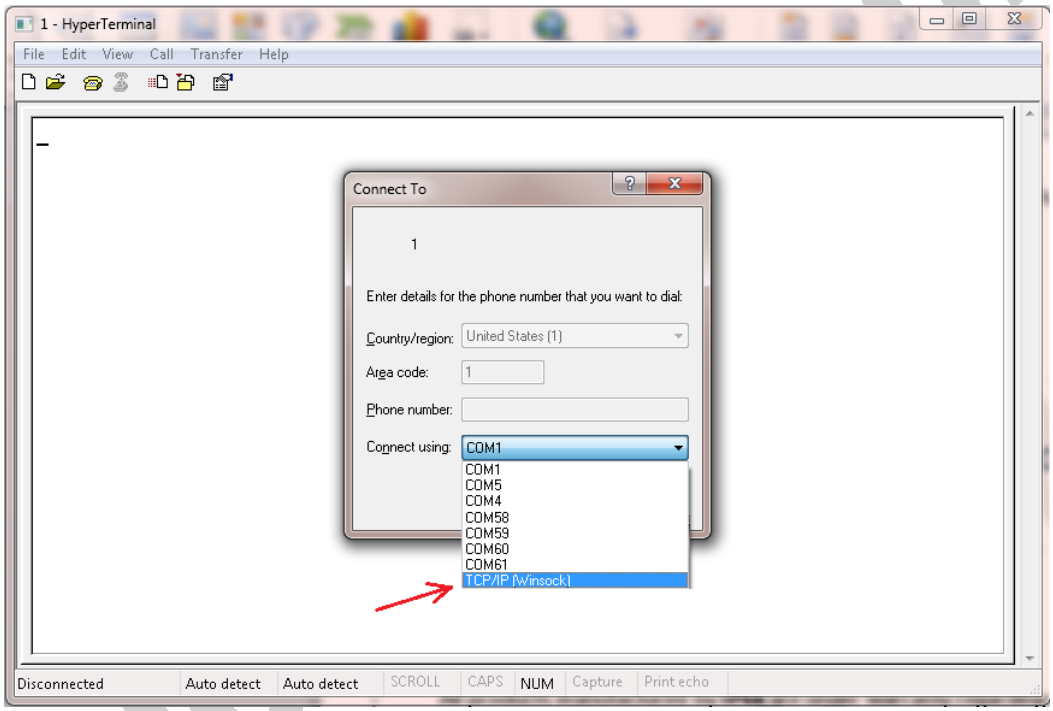
If you see this timeout window, you can't continue installation and first you should solve network problem by consulting your network administrator.

17. CONNECTING TO DEVICE VIA TCP SOCKET

It is possible to directly connect to PH232Ex1 RS-232 Serial Ports from any node of the network by using socket programming. This is simply done if you know only PH232Ex1 IP Address and socket port number for each Port. The default port number is as follow:

- Port 1: 9761

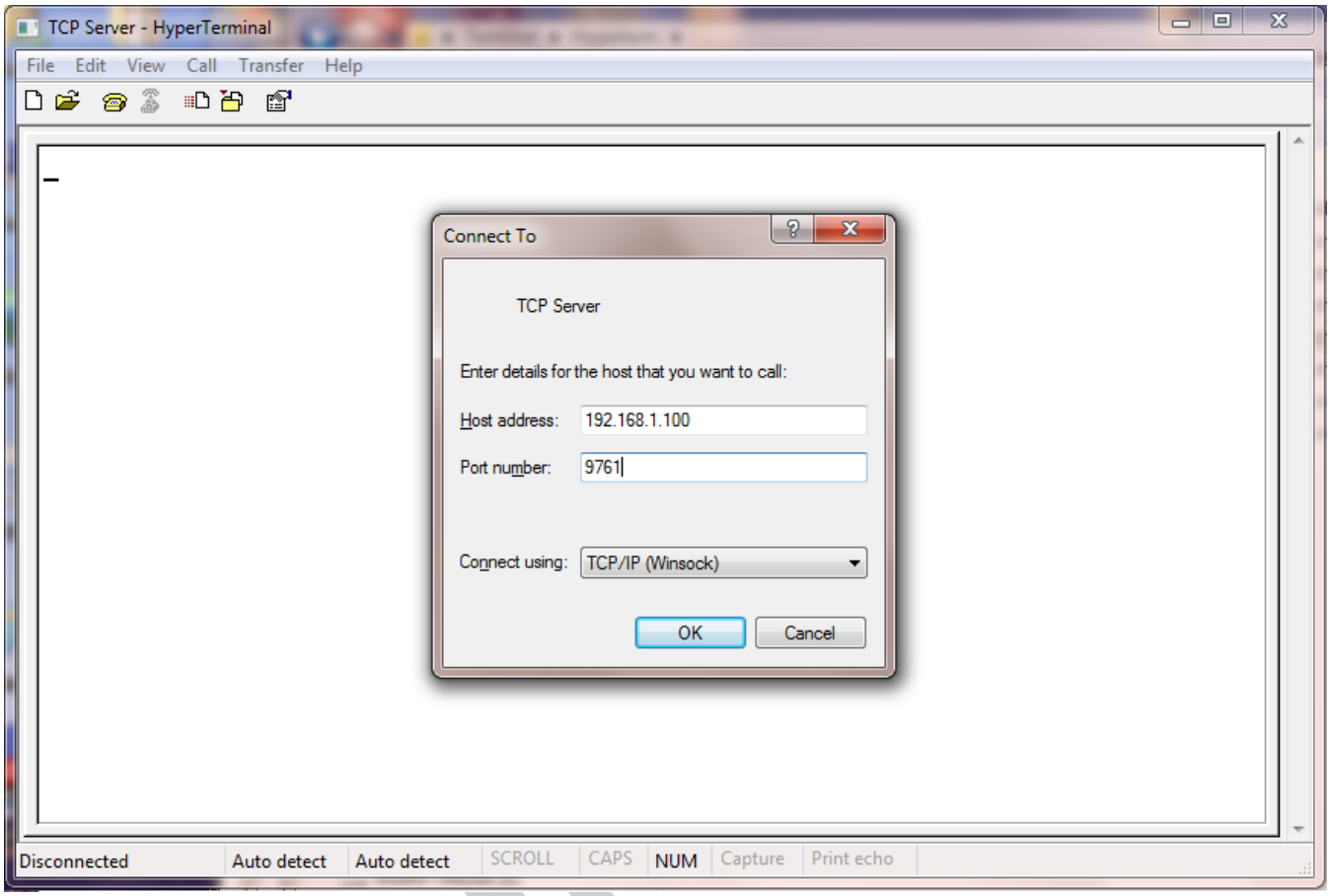
For example, we connect to RS-232 Port by means of Hyper Terminal. Run Hyperterm.exe and from properties dialog box, select "TCP/IP (Winsock)":



Enter device IP Address in the "Host address:" section, for example 192.168.1.100 and the port number in the "Port Number:" section (port number for RS-232 Port is 9761), then click on OK.

Now if you type some characters, you can see that TX Blue LED is blinking that means the data is sent to PH232Ex1 RS-232 port.

NOTICE: Don't forget to set PH232Ex1 in ***SERVER Mode*** for this method of connection.



18. Redirecting

All the Terminal Servers produced by **IP Electronix** have Redirecting ability. It means you can re-transmit all the received data from one serial port input (RxD) to any other serial port[s] output (TxD).

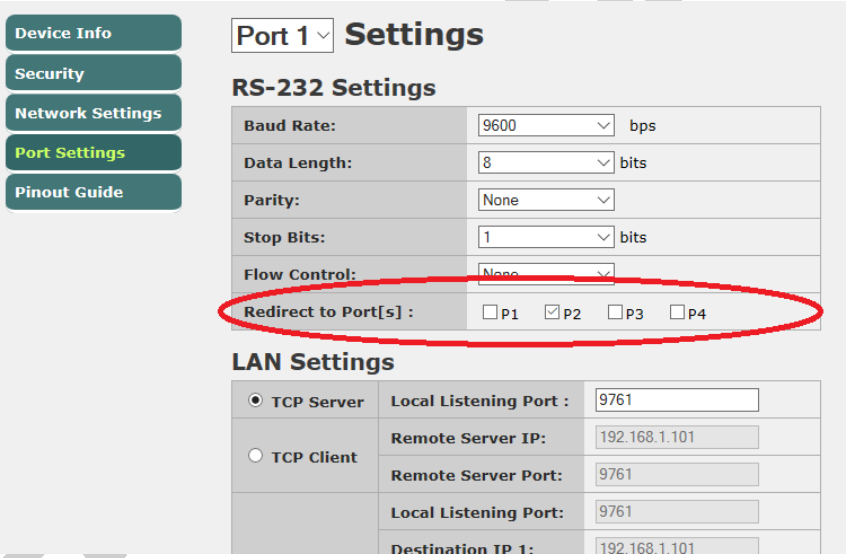
For example, if your device has more than two ports and you redirect one port to two other ports, you can simply make a Y-Switch.

If one serial port is redirected to itself, you have a LOOP line that is very useful for testing a communication line.

There are two ways to set redirect for each port, setting in main configuration webpage of the device by a web-browser or sending network command line via UDP packets.

- Setting Redirect by Web-Browser

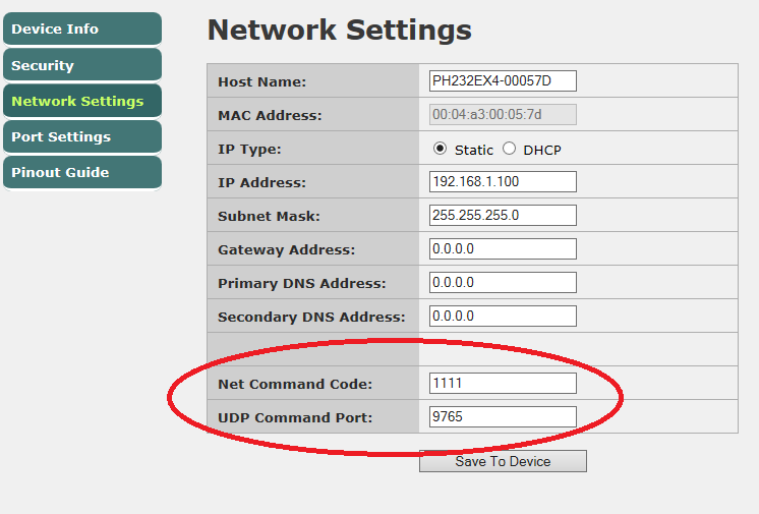
As it is shown in the picture below, go to the device configuration page by means of a web-browser such as Google-Chrome or Fire-Fox and choose Port Settings:



Now select destination port which you want to redirect current port to it. You can select more than one port for redirecting and also can redirect a port to itself.

- Setting Redirect by UDP Network Command

To send redirect command from a remote workstation or software to the device, we need IP number or Host-Name and the UDP Port-Number. The default UDP Port-Number is 9765 and you can change this port number if necessary. We also need to know the device Remote Command Password which is a Four-Digit number that you can see it in Network Settings and also can change it there if necessary.



The Command Frame and Device Response as follows:

1) Change Redirect Setting Command
   This command consists of 6 bytes as follows:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
0x01	CODE-MSB	CODE-LSB	'W'	pn	status

And the device response consists of 6 bytes as follows:

Byte 1	Byte 2	Byte 3	Byte 4	Byte 5	Byte 6
0x01	CODE-MSB	CODE-LSB	'S'	pn	status

These bytes are:

0x01: constant binary value = 0x01
CODE-MSB: Most Significant 8 bits of Security Code
CODE-LSB: Least Significant 8 bits of Security Code
'W': ASCII Character 'W', Write Command
pn: Port Number, a binary value from 0x00 to 0x03 for PORT1 to PORT4
status: Redirect Status Byte that is consists of 8 bits as follow:

Status Byte:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
X	X	X	X	P4	P3	P2	P1

X: Don't Care
P[i] = 1, means redirect to this port i is enabled
P[i] = 0, means redirect to this port i is disabled

Security Code is a 16-Bits Integer password that can be a number from 1000 to 9999 (decimal). The default value is 1111 decimal (0x0457 Hexadecimal).
For example, if the device password is 1111 and we want to redirect the port number 4 to the ports number 1 & 3, we should send this six-byte frame to the device: 0x01 0x04 0x57 0x57 0x03 0x05

2) Read Redirect Status Command
   This command is same as the change command, but we should send character 'R' instead of 'W', and status byte is not required.

1	2	3	4	5
0x01	CODE-MSB	CODE-LSB	'R'	Pn

The device response is similar to the previous one.

19. GUARANTEE

All products manufactured by **IPEX** are under warranty regarding defective materials for a period of one year from the date of delivery to the original purchaser.

20. TECHNICAL SUPPORT

If you have any technical question or need any technical support, please contact us using this Email address: support@ipelectronix.com.