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Installation and Operation Manual

SRC-2X *Ethernet Serial Remote Control*

Firmware Version 1.06PIC / 01.08XP

Manual update 7/18/2005

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INTRODUCTION

Thank you for your purchase of the tiny TOOLS™ Ethernet Serial Remote Control, which we will refer to through out the manual as the SRC-2X. We're confident this product will give you many years of dependable service. This manual is intended to give you all the information needed to install and operate the product.

SAFETY INFORMATION

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WHO TO CONTACT FOR HELP

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CAUTION!

Broadcast Tools® Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.

NOTE:

This manual should be read thoroughly before installation and operation.

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PRODUCT DESCRIPTION

The tiny TOOLS SRC-2X interfaces two optically isolated inputs and two SPST relays to an Ethernet port. The SRC-2X can notify a users PC software program that any of two optically isolated inputs have been opened or closed and allows the users software to control two SPST, 1-amp relays. Communication with the SRC-2X is accomplished via short "burst" type ASCII commands from the users PC. The user may also add up to 64 ASCII strings per input and 16 user-defined strings per relay, while two units may be operated in a standalone mode (master/slave mode) to form a "Relay extension cord," with two channels of control in each direction. The unit communicates using an Ethernet connection. The SRC-2X is powered by a surge protected internal power supply. The SRC-2X may be rack mounted on the optional RA-1 mounting shelf.

INSTALLATION

Please examine your SRC-2X carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package contains the SRC-2X, 7.5 VDC @ 1 amp wall power transformer, CAT 5 cable and this manual.

Installation of the SRC-2X in high RF environments should be performed with care. Shielded cable is suggested for all I/O connections. All shields and the station ground should be connected to the ground screw on either of the inputs terminals. It is recommended that all cables connected to the SRC-2X be looped through ferrite cores to suppress RF. Surge protection with RF filtering such as the Tripp-Lite ISOBAR 4 or 6" is also suggested for the wall transformer.

Rack mounting: The SRC-2X may be rack mounted using the optional RA-1, 1-RU rack shelf. Apply a short strip of user-supplied Velcro to the bottom of the SRC-2X and attach the other mating strip to the surface of the RA-1.

Inputs connections: Two optically isolated inputs. Connect your equipment to the plug-in euroblock screw terminals labeled IN1 and/or IN2 and GND. Contact closures, TTL logic and/or open collectors may be used to activate each input. To internally power the optically isolated inputs, leave JP1 in the "LOC" position. To power externally, move JP1 to the "EXT" position and connect any positive DC voltage from 5 to 24 VDC to the "EXT+" terminal and the groundside of the power supply to the GND terminal. The red "DATA" led blinks when either input changes state.

Relay connections: Two SPST relays with Normally Open dry contacts. Make your connections to the desired relay. K1NO & K1COM and/or K2NO & K2COM. The two yellow led's indicate which relay is active.

The SRC-2X is factory programmed for an internal voltage source for the optically isolated inputs. The baud rate should be left at 9600,8,N, 1 and the operating mode is set for PC control. The Dipswitches are used for baud rate and mode selection. To select the desired baud rate and mode, refer to the Dipswitch descriptions on pages 4 and 4. When your SRC-2X is reconfigured, reinstall the cover, screws, reattach all connections and apply power to the unit. Verify that the green "PWR" led is lit.

NOTE:

To make jumper or Dipswitch changes, all connections should be removed from the SRC-2X, along with the four screws on the bottom of the enclosure. Remove the cover to expose the circuit assembly, jumper and the Dipswitch.

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SETUP

The following information lists Dipswitch setting and string commands.

Dipswitch 1 & 2. Baud Rate setting
********** Only read on power up or reset **********

1	2	Baud Rate	
0	0	9600	default
0	1	300	
1	0	1200	
1	1	4800	

Dipswitch 3 OFF, (Dipswitch 4 OFF) = Computer mode. Only read on power up or reset
NOTE: This would be the mode used for Windows Socket and Virtual COM port applications.

RELAY COMMANDS

*0OR1L = Latch relay 1
*0OR1F = Unlatch relay 1
*0OR1P = Pulse relay 1

*0OR2L = Latch relay 2
*0OR2F = Unlatch relay 2
*0OR2P = Pulse relay 2

INPUT STRINGS

*011 = Input 1 High
*010 = Input 1 Low
*021 = Input 2 High
*020 = Input 2 Low

PRODUCT & VERSION REQUEST

*uU = SRC-2X 1.06 (or latest PIC firmware version). This is also displayed at power-up or reset.

Dipswitch 3 ON, (Dipswitch 4 OFF) = **Pair mode,** inputs from one SRC-2X will map directly to the outputs of another SRC-2X when connected together via the Ethernet port. **NOTE:** When in pair mode, as soon as a communication failure is detected, all relays will be turned off. As soon as communications is restored, the relays will be set according to the other unit's inputs.
NOTE: This would be the mode used with Serial Bridge/Tunneling, with or without email triggering.

To program the SRC-2X, open a TELNET session on the PC used to program the SRC-2X as outlined in the Quick start Section. To enter program mode, enter a "P" on the keyboard. Once program mode is entered, the "DATA" LED will illuminate. Follow the information related to Dipswitch 4 below. To leave programming mode, simply press the ESC key. **NOTE:** If one minute elapses with no data entry, the SRC-2X will time out and exit the program mode.

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Dipswitch 4 ON, (Dipswitch 3 OFF) = **String mode Only read on power up or reset** Inputs 1 and 2 may be programmed to output a data string when closed. To enter program mode, enter a "P" from a terminal program. The following will be displayed:

INPUT DATA STRING ENTRY

Enter a 1 or 2, then the string data you want to be transmitted when the corresponding input is closed. To enter a HEX character, enter a "/" followed by the hex value. For example, if you want to send 12345(CR/LF) for input 2, enter: 212345/0D/0A and hit the ENTER key to terminate. Up to 64 characters can be entered for each input.
NOTE: /0D counts as three characters.

OUTPUT 1:
(Non-volatile string data that will be outputted when input 1 is activated).
OUTPUT 2:
(Non-volatile string data that will be outputted when input 2 is activated).

RELAY COMPARE DATA ENTRY

Enter a 3 or 4, then the string data that when received, will cause relays 1 and/or 2 to pulse for one second. The SRC-2X will receive and store whatever data it receives from the serial port, whether it be ASCII or HEX and use that to compare against incoming data. Up to 16 characters may be entered for each relay.

INPUT 1:
(Non-volatile input string data that when received and compared will pulse relay 1)
INPUT 2:
(Non-volatile input string data that when received and compared will pulse relay 2)

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Quick Start

The SRC-2X manual is supplied with some common application examples. If more in-depth information is needed, please refer to our Advanced Configuration Guide available on the supplied CD or the download section of our web site: http://www.broadcasttools.com/

Information you'll need to know

1 - An available Static IP address to assign to the SRC-2X.
2 - Your network's gateway address.
3 – Your network's subnet mask.
4 -The data port number. The factory default setting for channel/port-1 is 10001.
5 - Email setup information if applicable.

The SRC-2X's RJ-45 (Ethernet) is normally attached to a DSL/Cable router, Ethernet hub or switch. The supplied "Device Installer" software should be used to locate and configure your SRC-2X. The "Device Installer" software is available for download off the supplied CD or our web site, http://www.broadcasttools.com/ under "Downloads".

1 - Install the "Device Installer" software on the PC used for the SRC-2X setup.
2 - Connect the supplied straight-through CAT 5 cable to the RJ-45 connector on the SRC-2X labeled Ethernet and the other end to your hub, switch or router. NOTE: If you are attaching the SRC-2X directly to your computer, you MUST use a XOVER CAT 5 cable.
3 - Connect the supplied 7.5 VDC power supply to the SRC-2X power jack. Verify that the power led and left "LINK" led above the RJ-45 is lit.
4 - Start the "Device Installer" software.
  a - Click on "SEARCH"
  b - When the SRC-2X is found, click on the listed device. If more that one SRC-2X is found, refer to the MAC address label attach to the bottom of the SRC-2X case and click on the desired SRC-2X, which should be highlighted.
  c - Click on the "ASSIGN IP" button, then follow the instructions for setting a static IP address, along with the subnet and gateway, if applicable.
5 – After the SRC-2X has rebooted, click the "SEARCH" button, the configured SRC-2X should be listed. NOTE: You may have to click the search button more than once after the reboot.
6 – Ethernet port LED indicator functions

Link LED Left Side			Activity LED Right Side	
Color	Meaning		Color	Meaning
Off	No Link		Off	No Activity
Amber	10 Mbps		Amber	Half Duplex
Green	100 Mbps		Green	Full Duplex

7 - The SRC-2X is ready to use. The following Quick Start Examples may require additional configuration.

CAUTION!

Assigning an IP address already in use by another device may cause problems with your network!

NOTE:

DHCP and Auto IP are enabled with the IP Address set at 0.0.0.0 by default. If you are not familiar with Ethernet enabled equipment, it may be useful to contact your IT department, network administrator or outside network consultant.

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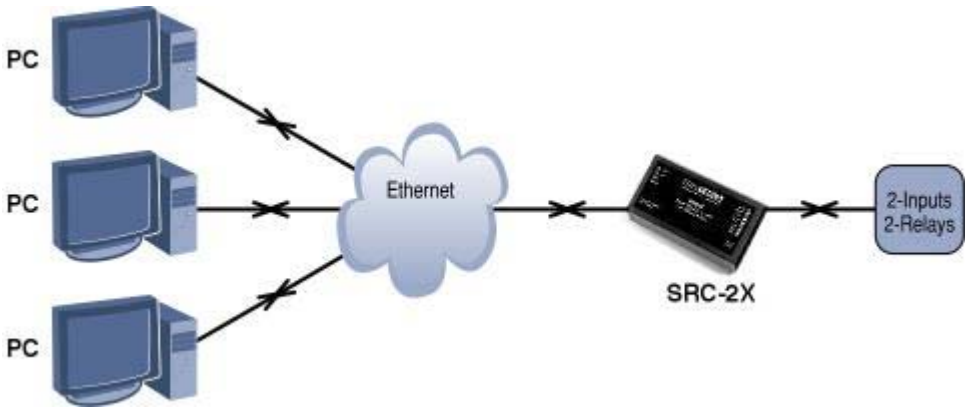
Quick Start Application Example - 1

Windows "SOCKET" connection.
Using a networked SRC-2X to transfer functions from a single or multiple PC's operating a Windows application.



1 – The following procedure should be performed on one SRC-2X at a time

2 - Connect the supplied straight-through CAT 5 cable to the RJ-45 connector on the SRC-2X labeled Ethernet and the other end to your hub, switch or router. NOTE: If you are attaching the SRC-2X directly to your computer, you MUST use a XOVER CAT 5 cable.

3 - Connect the supplied 7.5 VDC power supply to the SRC-2X power jack. Verify that the power led and left "LINK" led above the RJ-45 is lit.
Quick Start Application Example - 1

4 - Start the "Device Installer" software.
a - Click on "SEARCH"
b - When the SRC-2X is found, click on the listed device. If more that one SRC-2X is found, refer to the MAC address label attach to the bottom of the SRC-2X case and click on the desired SRC-2X, which should be highlighted.
c - Click on the "ASSIGN IP" button, then follow the instructions for setting a static IP address, along with the subnet and gateway, if applicable.

5 – After the SRC-2X has rebooted, click the "SEARCH" button, the configured SRC-2X should be listed. NOTE: You may have to click the search button more than once after the reboot.

6 – Click on the "TELNET" button.
a - Verify that the port is set to 9999 and then press OK.
b - Press Enter within 5 seconds. The configuration settings will display, followed by the setup menu options.

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Setup Menu Options

Change Setup:

0 Server configuration
1 Channel 1 configuration
3 E-mail settings
5 Expert settings
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choice ?

c - Select option 1 and press Enter.
d - To enter a value for a parameter, type the value and press Enter, or to confirm a current value, just press Enter.

SRC-2X, Channel 1, Basic parameters

Hardware:	Ethernet
IP Address:	192.168.001.017
Baud rate:	9600
I/F mode:	4C
Flow:	00
Port No:	10001
Connect mode:	C0
Disconnect Mode:	00
Flush Mode:	00

When you are finished, save the new configurations (option 9). The SRC-2X will now reboot.

Your SRC-2X is ready to go. Set your Windows application to match the SRC-2X's IP address and port number.

NOTE:

The IP addresses used here are examples ONLY.

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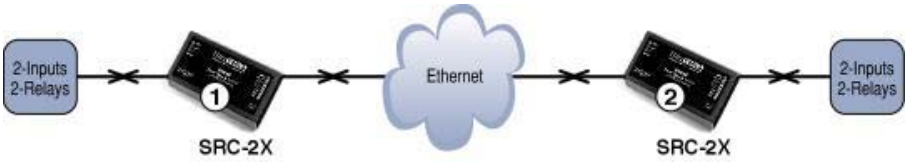
Quick Start Application Example - 2

Serial Bridge/Tunneling.
Emulate a direct serial connection over a LAN using two SRC-2X's.



1 – The following procedure should be performed on one SRC-2X at a time

2 - Connect the supplied straight-through CAT 5 cable to the RJ-45 connector on the SRC-2X labeled Ethernet and the other end to your hub, switch or router. NOTE: If you are attaching the SRC-2X directly to your computer, you MUST use a XOVER CAT 5 cable.

3 - Connect the supplied 7.5 VDC power supply to the SRC-2X power jack. Verify that the power led and left "LINK" led above the RJ-45 is lit.

4 - Start the "Device Installer" software.
a - Click on "SEARCH"
b - When the SRC-2X is found, click on the listed device. If more that one SRC-2X is found, refer to the MAC address label attach to the bottom of the SRC-2X case and click on the desired SRC-2X, which should be highlighted.
c - Click on the "ASSIGN IP" button, then follow the instructions for setting a static IP address, along with the subnet and gateway, if applicable.

5 – After the SRC-2X has rebooted, click the "SEARCH" button, the configured SRC-2X should be listed. NOTE: You may have to click the search button more than once after the reboot.

6 – Click on the "TELNET" button.
a - Verify that the port is set to 9999 and then press OK.
b - Press Enter within 5 seconds. The configuration settings will display, followed by the setup menu options.

Setup Menu Options

Change Setup:

0 Server configuration
1 Channel 1 configuration
3 E-mail settings
5 Expert settings
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choice ?

c - Select option 1 and press Enter.
d - To enter a value for a parameter, type the value and press Enter, or to confirm a current value, just press Enter.

SRC-2X, number 1: Channel 1, Basic parameters

Hardware:	Ethernet
IP Address:	192.168.001.017
Baud rate:	9600
I/F mode:	4C
Flow:	00
Port No:	10001
Remote IP Address:	192.168.001.016
Remote Port No:	10001
Connect mode:	C1
Disconnect Mode:	00
Flush Mode:	00

When you are finished, save the new configurations (option 9). The SRC-2X will now reboot. Go back to step 1 of "Quick Start Application Example - 2" to set up the second SRC-2X, but enter the Channel 1 data listed below.

SRC-2X, number 2: Channel 1, Basic parameters

Hardware:	Ethernet
IP Address:	192.168.001.016
Baud rate:	9600
I/F mode:	4C
Flow:	00
Port No:	10001
Remote IP Address:	192.168.001.017
Remote Port No:	10001
Connect mode:	C1
Disconnect Mode:	00
Flush Mode:	00

When you are finished, save the new configurations (option 9). The unit reboots. Any data transferred in SRC-2X, will appear in the 2nd SRC-2X and vice-versa.

NOTE:

The IP addresses used here are examples ONLY.

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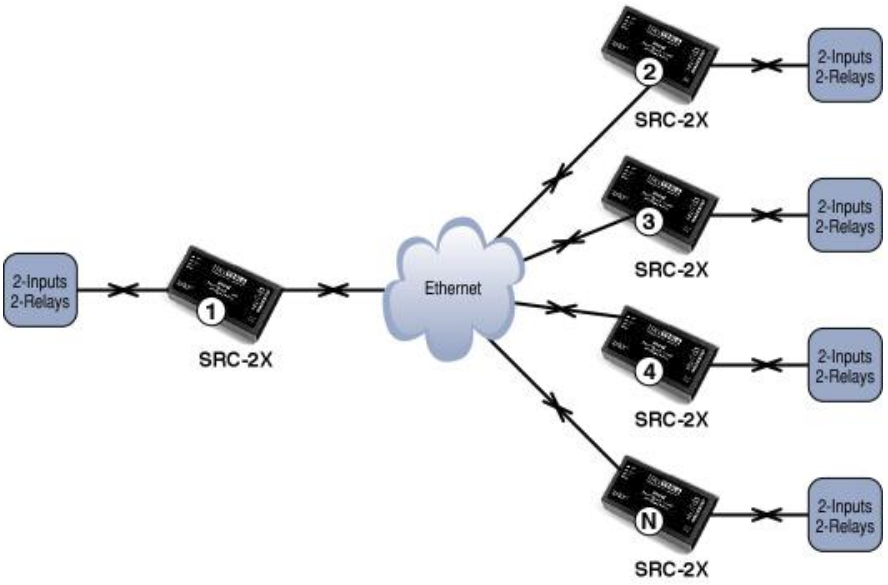
Quick Start Application Example - 3

Serial Tunneling.
Serial tunneling from one SRC-2X to multiple SRC-2X's using the UDP broadcast protocol.



1 – The following procedure should be performed on one SRC-2X at a time

2 - Connect the supplied straight-through CAT 5 cable to the RJ-45 connector on the SRC-2X labeled Ethernet and the other end to your hub, switch or router. NOTE: If you are attaching the SRC-2X directly to your computer, you MUST use a XOVER CAT 5 cable.

3 - Connect the supplied 7.5 VDC power supply to the SRC-2X power jack. Verify that the power led and left "LINK" led above the RJ-45 is lit.

4 - Start the "Device Installer" software.
a - Click on "SEARCH"
b - When the SRC-2X is found, click on the listed device. If more that one SRC-2X is found, refer to the MAC address label attach to the bottom of the SRC-2X case and click on the desired SRC-2X, which should be highlighted.
c - Click on the "ASSIGN IP" button, then follow the instructions for setting a static IP address, along with the subnet and gateway, if applicable.

5 – After the SRC-2X has rebooted, click the "SEARCH" button, the configured SRC-2X should be listed. NOTE: You may have to click the search button more than once after the reboot.

6 – Click on the "TELNET" button.
a - Verify that the port is set to 9999 and then press OK.
b - Press Enter within 5 seconds. The configuration settings display, followed by the setup menu options.

NOTE:

Similar configurations may be used to increase the number of slave unit's. This configuration points SRC-2X number ONE to all addresses in its subnet. The other SRC-2X's will only communicate to SRC-2X number ONE. The connection passes data only; handshaking signals such as CTS/RTS are not passed between SRC-2X's.

Setup Menu Options

Change Setup:
0 Server configuration
1 Channel 1 configuration
3 E-mail settings
5 Expert settings
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choice ?

c - Select option 1 and press Enter.
d - To enter a value for a parameter, type the value and press Enter, or to confirm a current value, just press Enter.

SRC-2X, number 1: Channel 1, Basic parameters

Hardware:	Ethernet
IP Address:	192.168.5.10
Baud rate:	9600
I/F mode:	4C
Flow:	00
Port No.:	10001
Remote IP Address:	192.168.5.255
Remote Port:	10001
Connect mode:	CC
Datagram Type:	01

When you are finished, save the new configurations (option 9). The SRC-2X will now reboot. Go back to step 1 of "Quick Start Application Example - 3" to set up the next SRC-2X, but enter the Channel 1 data listed below.

SRC-2X, number 2: Channel 1, Basic parameters

Hardware:	Ethernet
IP Address:	192.168.5.11
Baud rate:	9600
I/F mode:	4C
Flow:	00
Port No.:	10001
Remote IP Address:	192.168.5.10
Remote Port:	10001
Connect mode:	CC
Datagram Type:	01

When you are finished, save the new configurations (option 9). The SRC-2X will now reboot. Go back to step 1 of "Quick Start Application Example - 3" to set up the next SRC-2X, but enter the Channel 1 data listed below.

Quick Start Application Example - 3

NOTE:

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SRC-2X, number 3: Channel 1, Basic parameters

Hardware:	Ethernet
IP Address:	192.168.5.12
Baud rate:	9600
I/F mode:	4C
Flow:	00
Port No.:	10001
Remote IP Address:	192.168.5.10
Remote Port:	10001
Connect mode:	CC
Datagram Type:	01

When you are finished, save the new configurations (option 9). The SRC-2X will now reboot. Go back to step 1 of "Quick Start Application Example - 3" to set up the next SRC-2X, but enter the Channel 1 data listed below.

SRC-2X, number 4: Channel 1, Basic parameters

Hardware:	Ethernet
IP Address:	192.168.5.13
Baud rate:	9600
I/F mode:	4C
Flow:	00
Port No.:	10001
Remote IP Address:	192.168.5.10
Remote Port:	10001
Connect mode:	CC
Datagram Type:	01

When you are finished, save the new configurations (option 9). The SRC-2X will now reboot.

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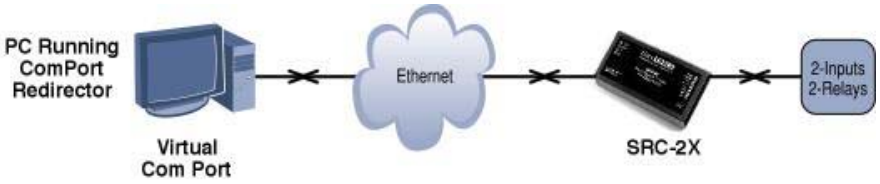
Quick Start Application Example - 4

Com Port Redirector

This applications function is to redirect customer application data destined for a local serial (COM) port on a PC to the serial port of an SRC-2X. Rather than going out the local COM port, the data is transmitted across the Ethernet network using TCP/IP. The SRC-2X attached to the network receives the data and presents it on its serial port. Conversely, data sent into the serial port of the SRC-2X is transmitted back to the customer's application via the network to the Com Port Redirector. Com Port Redirector then presents the data to the customer's application as if it were from a local serial COM port.



1 – The following procedure should be performed on the SRC-2X before loading the Redirection software on the PC.

2 - Connect the supplied straight-through CAT 5 cable to the RJ-45 connector on the SRC-2X labeled Ethernet and the other end to your hub, switch or router. NOTE: If you are attaching the SRC-2X directly to your computer, you MUST use a XOVER CAT 5 cable.

3 - Connect the supplied 7.5 VDC power supply to the SRC-2X power jack. Verify that the power led and left "LINK" led above the RJ-45 is lit.

4 - Start the "Device Installer" software.
- a - Click on "SEARCH"
- b - When the SRC-2X is found, click on the listed device. If more that one SRC-2X is found, refer to the MAC address label attach to the bottom of the SRC-2X case and click on the desired SRC-2X, which should be highlighted.
- c - Click on the "ASSIGN IP" button, then follow the instructions for setting a static IP address, along with the subnet and gateway, if applicable.

5 – After the SRC-2X has rebooted, click the "SEARCH" button, the configured SRC-2X should be listed. NOTE: You may have to click the search button more than once after the reboot.

6 – Click on the "TELNET" button.
- a - Verify that the port is set to 9999 and then press OK.
- b - Press Enter within 5 seconds. The configuration settings display, followed by the setup menu options.

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Setup Menu Options

Change Setup:

0 Server configuration
1 Channel 1 configuration
3 E-mail settings
5 Expert settings
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choice ?

c - Select option 1 and press Enter.
d - To enter a value for a parameter, type the value and press Enter, or to confirm a current value, just press Enter.

SRC-2X, Channel 1, Basic parameters

Hardware:	Ethernet
IP Address:	192.168.5.10
Note: Use the IP address assigned to the COM Port redirection software	
Baud rate:	9600
I/F mode:	4C
Flow:	00
Port No.:	10001
Remote IP Address:	000.000.000.000
Remote Port:	0
Connect mode:	C0, Leave all other settings at the default settings.

When you are finished, save the new configurations (option 9). The SRC-2X will now reboot.

NOTE:

The IP addresses used here are examples ONLY.

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Quick Start Application Example - 5

Email Notification via input triggering
This application is used with most of the above applications to send an email to two different recipients when either or both of inputs change state (high to low transition). Enabling CP1 (input 1) will email either of the recipients. The same hold true for CP2 (input 2).

1 – Information you'll need to know The email setup information needed below is best obtained from the IT department, but if that's not possible, try this. Open an email message and select View, then options on the selected email. The Internet header information is displayed, which shows all the information about the local mail server. Remember that with the current SRC-2X, the mail server acts as a client. This means there has to be either a valid account that the email is validated against or email forwarding is left enabled. In most mail servers this feature is disabled to prevent being misused as a Spam server.

a - Mail Server:	The IP address in decimal-dot-notation.
b - Unit:	The user name used by the SRC-2X to send email messages.
c - Domain:	The domain name of your email server.
d - Recipient 1:	Full e-mail address of the first recipient.
e - Recipient 2:	Full e-mail address of the second recipient.

2 - Connect the supplied straight-through CAT 5 cable to the RJ-45 connector on the SRC-2X labeled Ethernet and the other end to your hub, switch or router. NOTE: If you are attaching the SRC-2X directly to your computer, you MUST use a XOVER CAT 5 cable.

3 - Connect the supplied 7.5 VDC power supply to the SRC-2X power jack. Verify that the power led and left "LINK" led above the RJ-45 is lit.

4 - Start the "Device Installer" software.
NOTE: If you have already set and IP address, jump to step 5 and continue.
a - Click on "SEARCH"
b - When the SRC-2X is found, click on the listed device. If more that one SRC-2X is found, refer to the MAC address label attach to the bottom of the SRC-2X case and click on the desired SRC-2X, which should be highlighted.
c - Click on the "ASSIGN IP" button, then follow the instructions for setting a static IP address, along with the subnet and gateway, if applicable.

5 – After the SRC-2X has rebooted, click the "SEARCH" button, the configured SRC-2X should be listed. NOTE: You may have to click the search button more than once after the reboot.

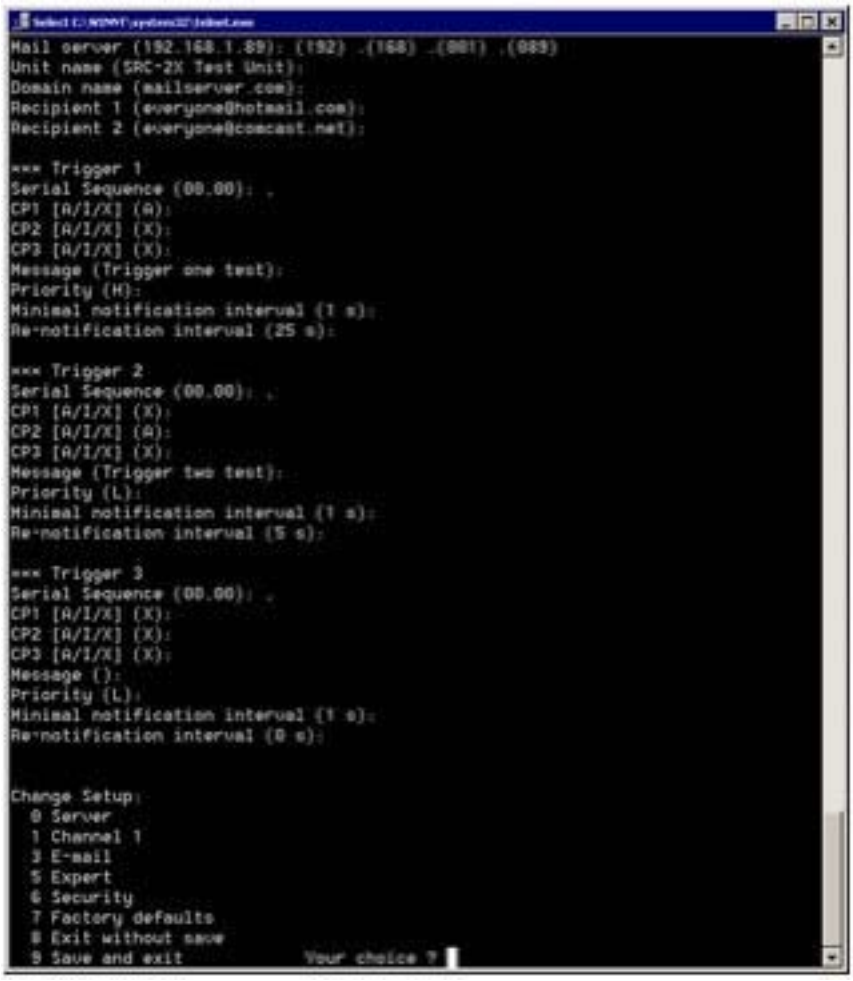
6 – Click on the "TELNET" button.
a - Verify that the port is set to 9999 and then press OK.
b - Press Enter within 5 seconds. The configuration settings display, followed by the setup menu options.

Setup Menu Options

Change Setup:
0 Server configuration
1 Channel 1 configuration
3 E-mail settings
5 Expert settings
6 Security
7 Factory defaults
8 Exit without save
9 Save and exit Your choice ?

c - Select option 3 and press Enter.
d - To enter a value for a parameter, type the value and press Enter, or to confirm a current value, just press Enter.

SRC-2X, E-mail settings



When you are finished, save the new configurations (option 9). The SRC-2X will now reboot

NOTE:

The information used here are examples ONLY.

e-mail: support@broadcasttools.com voice: 360.854.9559 fax: 360.854.9479

SPECIFICATIONS

Ethernet Interface:	RJ-45, 10Base-T/100Base-TX, auto sensing with Link & Activity indicators - Full/half duplex
Email Recipients	Two
Email Triggers:	Two
Data Rates:	Baud rates: 300, 1200, 4800, 9600 baud.
Protocols:	TCP/IP, UDP/IP, ARP, ICMP, SNMP, TFTP, Telnet, DHCP, BOOTP, HTTP, and AutoIP
Inputs:	Two: Optically isolated inputs. Internally powered or externally powered 5 to 24vdc.
Relays:	Two: SPST, 30Vdc/1 amp.
Indicators:	LED: Power, Program/input change, K1, K2
Connectors:	Ethernet: RJ-45 Inputs/Relays: Plug-in euroblock screw terminals. Power: 2.1mm coax, center positive.
EMI Compliance:	Class B limits of EN 55022:1998
FCC Compliance:	This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: 1) This device may not cause harmful interference, and 2) this device must accept any interference received, including that which may cause undesired operation.
Power Requirement:	7.5 VDC, 1 Amp, wall transformer, supplied. Internal power supply surge protected. (Optional, CE certified 240VAC, 50/60 hertz wall transformer).
Operating Temperature:	-40°F to +185°F (-40°C to +85°C)
Size:	2.60" x 4.25" x 1.12", Plastic enclosure with aluminum end panels.
Weight:	1.0 lb.
Options:	RA-1, Rack Shelf. 1 RU. CE certified 240VAC, 50/60 hertz wall transformer

WEBSITE:

Visit our web site for product updates and additional information

e-mail: support@broadcasttools.com **voice:** 360.854.9559 **fax:** 360.854.9479

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