



## *Installation and Operation Manual*



### **SRC-8 III** *Serial Remote Control*

Firmware version: 1.16

Manual Revised 07/31/07

Due to the dynamic nature of product design, the information contained in this document is subject to change without notice. Broadcast Tools, Inc., assumes no responsibility for errors and/or omissions contained in this document. Revisions of this information or new editions may be issued to incorporate such changes.

*Broadcast Tools® is a registered trademark of Broadcast Tools, Inc.  
Copyright, 1989 - 2005 by Broadcast Tools, Inc. All rights reserved.  
No part of this document may be reproduced or distributed without permission.*

Visit [www.broadcasttools.com](http://www.broadcasttools.com) for important product update information.

## Table of Contents

<b>Section Title</b>	<b>Page #</b>
Introduction . . . . .	3
Safety Information . . . . .	3
Who to Contact for Help . . . . .	3
Product Description . . . . .	4
Front Panel Description . . . . .	4
Installation Guidelines . . . . .	5
Specifications . . . . .	10
Warranty . . . . .	11

## INTRODUCTION

Thank you for your purchase of a Broadcast Tools® SRC-8 III, Serial Remote Control (referred to as the SRC-8 III throughout this manual). We're confident that 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 Broadcast Tools® SRC-8 III.

## SAFETY INFORMATION

Only qualified personnel should install Broadcast Tools® products. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

## WHO TO CONTACT FOR HELP

If you have any questions regarding your product or you need assistance, please contact your distributor from whom you purchased this equipment.

If you would like more information about Broadcast Tools® products, you may reach us at:

### Broadcast Tools, Inc.

131 State Street  
Sedro-Woolley, WA 98284 USA  
Voice: 360 . 854 . 9559  
Fax: 866.783.1742

Internet Home Page: [www.broadcasttools.com](http://www.broadcasttools.com)  
E-mail: [support@broadcasttools.com](mailto:support@broadcasttools.com)

**THANK YOU FOR CHOOSING  
BROADCAST TOOLS® BRAND PRODUCTS!**

Broadcast Tools is a Veteran Owned Business



Designed, Assembled and Supported in WA State, USA



### 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.

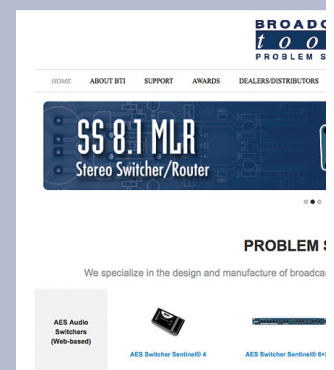


### NOTE:

This manual should be read thoroughly before installation and operation.

### WEBSITE:

*Visit our web site for product updates and additional information*



## PRODUCT DESCRIPTION

The Broadcast Tools® SRC-8 III is a computer interface to the real world. With connection through an RS-232, RS-422 or RS-485 serial port, the SRC-8 III can notify your PC software program that any of 8 optically isolated inputs has been opened or closed and allows your software to control eight SPDT, 1-amp relays. Communication with the SRC-8 III can be accomplished via short “burst” type ASCII or binary commands from your PC (computer mode). Also, two units can be operated in a standalone mode (master/slave mode) to form a "Relay extension cord," with 8-channels of control in each direction. The unit can communicate using RS-232, RS-422 or RS-485 at data rates up to 38400. The SRC-8 III may be expanded to 32 inputs x 32 outputs. Optional external Ethernet and USB capabilities may be added.

The SRC-8 III is supplied with LED indicators to display input and relay status. Three front panel LED's display power, serial transmit and receive data. Removable screw terminals are provided for ease of wire installation/removal.

### Set-up:

Connect the supplied 9Vac power supply. The default baud rate setting is 9600, 8, N, 1. The baud rate can be set to 2400, 4800, 9600 or 38400. This can be done using either the ASCII or binary command formats listed below. Inputs can be simple contact closures or completely optically isolated with your external trigger sourcing current to the opto-isolators. The RS-232 serial connection is made to the male DB-9 connector. JP07 is used to reverse the RS-232 transmit and receive pins on the DB-9. Factory setting is the “NN” position (Pin 5 = Ground, Pin 2 = Transmit and Pin 3 = Receive). RS-422/485 operation is via the removable screw terminals on the rear of the unit.

## FRONT PANEL DESCRIPTION

The front panel is equipped with eight red LED's for each relay and eight green LED's for each input. The green “Power” LED will light when the SRC-8 III has power connected.

## INSTALLATION GUIDELINES

Rear panel dual-row 18-position connector

In 1A	In 1B	In 2A	In 2B	In 3A	In 3B	In 4A	In 4B	In 5A	In 5B	In 6A	In 6B	In 7A	In 7B	In 8A	In 8B	TX - RS-422	TX + RS-422
K 1 N.O.	K 1 Com	K 2 N.O.	K 2 Com	K 3 N.O.	K 3 Com	K 4 N.O.	K 4 Com	K 5 N.O.	K 5 Com	K 6 N.O.	K 6 Com	K 7 N.O.	K 7 Com	K 8 N.O.	K 8 Com	RX - RS-422	RX + RS-422

**Each input may be configured for wet, dry or 5 volt TTL/CMOS logic compatible inputs. Factory default = DRY**

**Each relay may be configured for normally open or closed contacts. Factory default = N.O.**

It is recommended that all cables connected to the SRC-8 III should be looped through ferrite cores to suppress RF. Surge protection with RF filtering such as the Tripp Lite "ISOBAR 4" is also suggested for the power transformer. The purchase of an inexpensive uninterruptible power supply (UPS) will provide back up in case of power outages. Check out our web site for lightning protection links.

### DIP Switch Settings:

**DIP 1,2** The board address is set using switch numbers 1 and 2 in normal binary format:

#### 1 2

0 0	=	0 (master) Set the SRC-8 III that will be connected to your PC or data link to address 00.
0 1	=	1
1 0	=	2
1 1	=	3

**DIP 3,4** Set baud rate

#### 3 4

0 0	=	9600
0 1	=	2400
1 0	=	4800
1 1	=	38400

The Baud rate will be set by the dipswitch on power up or reset. It can also be changed using the serial port commands at other times, but if the SRC-8 III is reset baud rate will be set according to the dipswitch settings.



### CAUTION!

*Installation of the SRC-8 III in high RF environments should be performed with care. Shielded cable is suggested for all control, audio inputs and outputs. All shields should be tied to the "CHASSIS GROUND" terminal. The station ground should be connected to the chassis ground screw (CH1) located behind J1 as viewed from the rear. For lightning protection devices, check out [www.polyphaser.com](http://www.polyphaser.com) and [www.itwlinx.com](http://www.itwlinx.com).*

**DIP 5 = (ON)** Hex mode – When on, hex “Burst” mode is selected. Refer to the protocol below for hex commands. **(OFF)** is ASCII mode. Refer to the ASCII protocol below for ASCII commands.

**DIP 6 = (ON)** Pair mode, inputs from one SRC-8 III will map directly to outputs of another SRC-8 III when connected together via RS-232 or RS-422. **(OFF)** normal operation via RS-232/422. DIP 5 must also be ON as pair mode only works in hex mode.

**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.**

**DIP 7 = (ON)** will cause inputs to generate \*uix<cr/lf>, on firmware version 1.16 or higher. Where \* is the start character, u is Unit ID 0 – 7, i = Input number 1 – 8, x = On/Off state, 1 = On, 0 = Off.

**DIP 8 =** Future feature creep

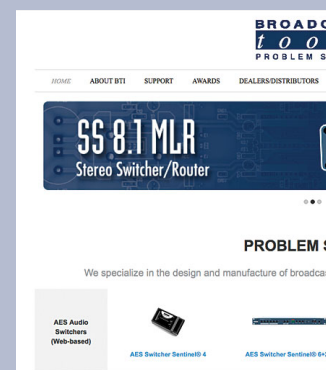
### Pair Mode:

The SRC-8 can be used to transmit the outputs from one unit to another over a serial connection. The logical sense of the inputs is inverted when written to the outputs of its corresponding unit. Normally inputs are high and when closed go to a logic 0 when in pair mode. When logic 0 is received, it will write logic 1 to the output. This allows the relay outputs 1-8 to come on if its corresponding input is closed. Multiple units can also be set up to communicate with the same number of units on the other end of a data link. All units must have DIP switches 5 and 6 turned on and the unit addresses must have a corresponding unit on the other end of the link set to the same address. For example, if you have two units on each side set to address 0 and 2, then the two units on the other side of the data link must also be set to 0 and 2. All units will automatically transmit the states of their inputs on power up, every ten seconds and when any input changes state. If a unit does not receive an update from its corresponding paired unit for a period of about 20 seconds, it will begin flashing the red RX LED one second on, one second off. When communication is restored, the LED will cease to flash.

Pair mode can also be used to broadcast input closures from one unit to many using a shared data link. The inputs on the transmit SRC-8 will appear on all of the receive units as long as their address codes match. If only one unit is used at each site, it must be set to an address of zero. The red RX LED will blink on the transmit side to indicate it is not getting return data from the remote units, however the data being broadcast will still cause the remote relays to follow their corresponding inputs on the broadcasting unit.

### WEBSITE:

*Visit our web site for product updates and additional information*



### INSTALLATION



**Connecting Multiple SRC-8's:**

Multiple SRC-8 III's can be "daisy chained" together using a single serial port. Units are daisy-chained using the 10 pin IDC "EXT" headers marked "EXT-J12" and "EXT-J14". Connect one end of the supplied ribbon cable to the "EXT-12" header on the first SRC-8 III and the other end of the ribbon cable to the "EXT-14" header of the next unit and so on. Each board should have a unique address set on its dipswitch address setting. Up to three additional, SRC-8 III's may be connected together so that up to 32 inputs can be monitored and 32 relays controlled from one PC's com port, other serial devices or the external Ethernet/USB option. NOTE: In order to use "external" units, JP10 must be kept in the 232/422-485/ position.

**Serial Burst Mode Commands**

The burst mode allows a computer or ASCII terminal to control and interrogate the unit. This section defines all burst mode commands. Each burst mode command starts with an asterisk (\*). Next is a single decimal digit that corresponds to the unit (ID) address 0-3. Following are one or more ASCII characters specifying the command. A carriage-return is required to terminate each command. If the command requested a response, the response will consist of an upper case S, followed by the unit address, and then the specific response. If acknowledgments are enabled, successful commands are responded to with RRR while errors get an EEE response. The syntax of each command is given below. The syntax shows the command exactly as it should be sent, except that lower case characters represent values that should be substituted:

**Glossary of Command Notation**

<u>Character String</u>	<u>Meaning</u>	<u>Allowable Values</u>
u	Unit ID	0-3
i	Input Number	1-8
o	Relay/Output Number	1-8

**Set-up Commands**

\*uCE<sub>x</sub> - Enable Error and Good Responses - Where x = Y to enable and N = disable. In this mode, when a command is sent that is in error, the unit will reply (possibly before receiving the entire command) with "EEE." If the command is sent correctly, the unit will reply with "RRR."

**Output Control Commands**

- \*uOR<sub>r</sub>L - Latch Output r, output number
- \*uOR<sub>r</sub>F - Unlatch Output r, output number
- \*uOR<sub>r</sub>Ptt - Pulse Output r, output number. Pulse Length tt: 00-99 corresponds to 00 - 9.9 Seconds / r. Output number 1 --> 8
- \*uOR<sub>r</sub>P - Pulse Output r, output number 1 --> 8. Fixed Pulse Length = 700ms

## Information Retrieval Commands

\*POLL - Respond with unit (ID) address in appropriate time slot. If there are multiple units on the line, each will respond with a different delay after receipt of this command.

\*uSPii - Send status of input ii. Response is SuP,ii,x where x is 0 if the corresponding input is high, 1 otherwise.

\*uSPA - Send status of all inputs. Response is SuP,A,x,x,x,x,x,x,x,x<CR><LF> where input 1 is first and input 8 is last. x is 0 if the corresponding input is high, 1 otherwise.

\*uSR - Send status of all OUTPUTS. Response is: SuA,x,x,x,x,x,x,x,x<CR><LF>

\*uU - Send Unit Information :<name(SRC-8)><version n.nn><CR><LF>

## Binary Commands

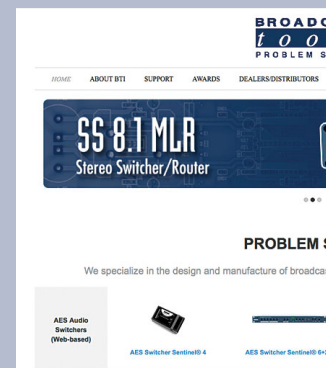
All commands start with a 2Ah (ASCII \*). The first byte contains the board ID and the byte count iibbbbb. Byte count is number of bytes after the byte containing the byte count including checksum. The second byte contains an 8-bit command. Some commands are followed by data bytes. Checksum is the LSByte of the sum of all bytes preceding checksum including start. Binary commands must be received as a packet. If 50 ms or more passes after a character is received, with no new character following, the SRC-8 III will begin looking for a new string if no valid data packet has been received.

## Commands to SRC-8 III

<u>Command</u>	<u>Additional Data Bytes</u>	<u>Function</u>
40h		RS-232 timer off
41h		RS-232 timer on
42h		Set serial speed to 2400
43h		Set serial speed to 9600
44h		Set serial speed to 4800
45h		Set serial speed to 38400
46h		Enable error & good responses

## WEBSITE:

*Visit our web site for product updates and additional information*



## INSTALLATION



<u>Command</u>	<u>Additional Data Bytes</u>	<u>Function</u>
47h		Disable error & good responses
48h	n	Latch output n (00 – 07)
49h	n	Unlatch output n (00 – 07)
4Ah	n t	Pulse output n (00 – 07), t= time (1-63h =.1-9.9sec)
4Bh	n	Poll output n (00 – 07) (see 55h)
4Ch	n	Poll input n (00 – 07) (see 55h)
4Dh		All Output status request (see 52h)
4Eh		All Input status request (see 53h)
4Fh		Unit version request (see 54h)

**Output Response from SRC-8 III**

		<u>Function</u>
50h		Error response if enabled by 46h
51h		Good response if enabled by 46h
52h	n	Response of 4Dh, outputs are sent as 1 byte
53h	n	Response of 4Eh, inputs are sent as 1 byte Also sent when any input changes state
54h	nm	Response to 4Fh outputs version, (i.e. 01h, 03h=ver 1.03)
55h	n	Response to 4Bh or 4Ch for polled output or input where the three highest bits of n are used to identify if an input/output is low/high and the lowest 5 bits identify the input or output. n = 00h – 07h if input n is low, n = 20h – 27h if input n is high, n = 40h – 47h if output n is low and n = 60 – 67 if output n is high. n=cccnnnn where ccc = 000 = input low, 001 = input hi, 010 = output lo, 011 = output hi. nnnnn lowest 5 bits used to identify the input or output

Example of binary exchange:

To poll the status of outputs of unit 2 when outputs (0-7) 0, 6 are high, all else low:

**Command string to SRC-8 III:**

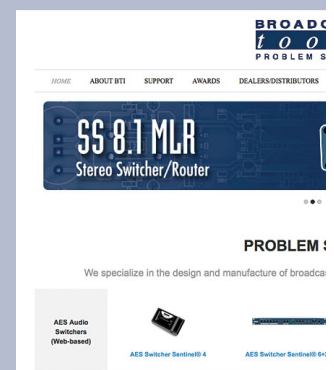
00101010b	2Ah	Start byte
01000010b	42h	Board ID 2 (010b), Byte count 2 (00010b)
01001101b	4Dh	All Output Status Request
10111001b	B9h	Check sum (2Ah+42h+4Dh=B9h)

**Response string from SRC-8 III:**

00101010b	2Ah	Start byte
01000100b	44h	Board ID 2 (010b), Byte count 4 (00100b)
01010010b	52h	Response code for an All Output Status Request
00000000b	00h	Outputs 7-F are all low
01000001b	41h	Outputs 6 and 0 are high
00000001b	01h	Check sum (2Ah+44h+52h+00h+41h=01h)

## SPECIFICATIONS

Digital Inputs:	8 – Selectable 5 to 24 vdc optically Isolated or 5-volt TTL/CMOS logic compatible input (Jumper selectable. Factory default = Dry). 50 ms minimum duration.
Relay Outputs:	8 – SPDT, 1 amp/30 vdc relays. Jumper selectable either N.O. or N.C. Factory default = N.O.
RS-232 Serial Port:	2400, 4800, 9600, 38400 baud, 8 data bits, no parity, 1 stop bit. Other baud rates may be requested.
RS-422 Serial Port:	2400, 4800, 9600, 38400 baud, 8 data bits, no parity, 1 stop bit. Other baud rates may be requested.
Ethernet Option:	Optional External Ethernet Device Server.
USB Option:	Optional external USB to Serial adapter. Broadcast Tools® USB-RS-232
Display:	LED's for inputs, relays, TX & RX serial data and power.
Interfacing:	Inputs - Removable (Euro)Screw terminals. Relays - Removable (Euro)Screw terminals. RS-232 Serial Port -Female DB-9. Data flow programmable. RS-422 Serial port - Removable (Euro)Screw terminals. Expansion port - Two, 10 position (2 x 5) .1" headers.
Logic:	Flash microprocessor / Non-volatile memory
Power:	9 Vac @500 ma / 120 Vac 50-60 Hz, "Wall Wart" Supplied. (CE, 240 Vac 50-60 Hz optional)
Mechanical:	5.65" x 6.50" x 1.55" (WDH)
Weight:	2 pounds
Option:	RA-1 rack shelf for mounting up to three units in 1-RU. Filler panels included.



## LIMITED WARRANTY

The term “Buyer” as used in this document refers to and includes both (but only) (a) any person or entity who acquires such an item for the purpose of resale to others (i.e., a dealer or distributor of an item), and (b) the first person or entity who acquires such an item for such person’s or entity’s own use.

Broadcast Tools warrants to each Buyer of any item manufactured by Broadcast Tools that the item will be free from defects in materials and workmanship at the time it is shipped by Broadcast Tools if the item is properly installed, used and maintained.

## EXCLUSIVE REMEDIES

If Broadcast Tools is notified, in writing, of a failure of any item manufactured by Broadcast Tools to conform to the foregoing Limited Warranty within one (1) year following the date of the Buyer’s acquisition of the item, and if the item is returned to Broadcast Tools in accordance with Broadcast Tools’ instructions for confirmation by inspection of the defect (which at Broadcast Tools’ election may include, without limitation, a requirement that the Buyer first obtain a Return Authorization number from Broadcast Tools, that the Buyer furnish proof of purchase in the form of an invoice and/or receipt, and that the Buyer prepay all freight charges associated with any return of the item to Broadcast Tools using such freight service as Broadcast Tools reasonably may specify), Broadcast Tools will repair or replace the defective item, or will refund the purchase price paid by the Buyer for the item. Broadcast Tools shall have the exclusive right to choose between these alternative remedies.

## NO OTHER WARRANTIES OR REMEDIES

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, BROADCAST TOOLS AND ITS SUPPLIERS DISCLAIM ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; AND THE FOREGOING ALTERNATIVE REMEDIES SHALL BE EXCLUSIVE OF ALL OTHER REMEDIES. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS, WHICH VARY FROM STATE/JURISDICTION TO STATE/JURISDICTION.

## NO LIABILITY FOR CONSEQUENTIAL DAMAGES

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, NEITHER BROADCAST TOOLS NOR ANY OF ITS SUPPLIERS SHALL HAVE ANY LIABILITY FOR ANY SPECIAL, INCIDENTAL, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, ANY DAMAGES FOR LOST PROFITS, BUSINESS INTERRUPTION, LOSS OF DATA OR INFORMATION, COST OF CAPITAL, CLAIMS OF CUSTOMERS, OR ANY OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF OR THE INABILITY TO USE ANY ITEM SUPPLIED BY BROADCAST TOOLS, EVEN IF BROADCAST TOOLS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES HAVE ANY LIABILITY FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY OR PUNITIVE DAMAGES. THIS LIMITATION OF LIABILITY APPLIES WHETHER A CLAIM IS ONE ALLEGING BREACH OF A CONTRACT OR WARRANTY, NEGLIGENCE OR OTHER TORT, FOR THE VIOLATION OF ANY STATUTORY DUTY, THE FAILURE OF ANY LIMITED OR EXCLUSIVE REMEDY TO ACHIEVE ITS ESSENTIAL PURPOSE, OR ANY OTHER CLAIM OF ANY NATURE. BECAUSE SOME STATES AND JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, THIS LIMITATION MAY NOT APPLY TO YOU.

### **Broadcast Tools, Inc.**

131 State Street  
Sedro-Woolley, WA 98284 • USA

360.854.9559 **voice** • 866.783.1742**fax**  
support@broadcasttools.com **e-mail**  
www.broadcasttools.com **website**