BROADCAST tools INC

PROBLEM SOLVED

Installation and Operation Manual

SRC-4

Four channel serial remote control

Firmware Version 1.2 and above – Manual update: 7/23/2013
If you need a firmware upgrade, contact Broadcast Tools®

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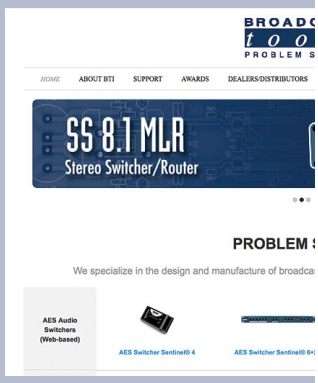

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INTRODUCTION

Thank you for your purchase of a BROADCAST TOOLS® SRC-4 four channel serial remote control (referred to as the SRC-4 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-4.

SAFETY INFORMATION

Only qualified technical personnel should install the SRC-4. Any attempt to install this device by a person who is not technically qualified could result in a hazardous condition to the installer or other personnel or damage to the SRC-4 or other equipment. Please ensure that proper safety precautions have been taken before installing this device. If you are unfamiliar with this type of equipment, please contact a properly qualified engineer to handle the installation and setup of the SRC-4. Broadcast Tools, Inc., is unable to support NON-Broadcast Tools software, hardware or NON-Broadcast Tools computer/hardware/software problems. If you experience these problems, please research your hardware/software instruction manuals or contact the manufacturers technical support department.

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:

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Designed, Assembled and Supported in WA State, USA

Product Overview

The SRC-4, serial remote control interfaces four optically isolated inputs and four SPDT relays to a RS-232 port. Communication with the SRC-4 is accomplished via short "burst" type ASCII commands from the user's PC. Alternatively, the SRC-4 may be used in Data mode which allows the user to define custom ACSII to control the relays as well as custom ASCII strings when an input is on or off. Two units may be operated in a standalone pair mode to form a "Relay extension cord," with four channels of control in each direction. The unit communicates using RS-232 at 9600 baud by default but can operate at other baud rates using the Auto-Detect mode. The SRC-4 is powered by a surge protected internal power supply. An optional USB-RS-232 smart cable adapter is available.

Features/Benefits

- RS-232 serial interface for connection to PC.
- LED indicators for all inputs and relays.
- Status and relay connections are on removable euro-block screw terminal connectors to simplify wiring and service, mating plugs are supplied.
- Fully RFI proofed.
- Surge protected internal power supply, universal switching power adapter with domestic connectors supplied.
- Up to four SRC-4's may be rack mounted on one RA-1, 1-RU rack shelf.

Applications

- One end of a full-duplex four channel serial-enabled I/O extension cord.
- Relay control and status monitoring via user defined PC application.

Inspection

Please examine your SRC-4 carefully for any damage that may have been sustained during shipping. If any damage is present, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package should contain the SRC-4, a modular cable with 9-pin "S9" female D-sub adapter, and 9 VDC wall power supply with domestic connector. Manuals may be downloaded from our web site.

Installation of the SRC-4 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 "CG" terminal. It is recommended that all cables connected to the SRC-4 be looped through ferrite cores to suppress RF.

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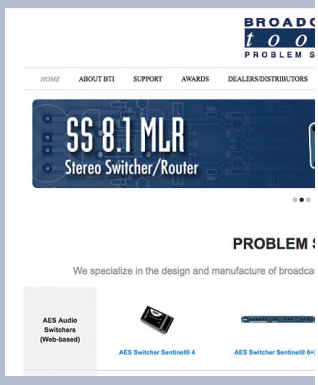

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Installation

Surge Protection

The SRC-4 has built-in resistance to voltage changes; we recommend that you use a power surge protector or line conditioner on the incoming AC line. Lightning strikes and/or other high voltage surges may damage your SRC-4 and connected equipment if it is not properly protected. For lightning protection devices, check out www.polyphaser.com and www.itwl-inx.com.

UPS Standby Power System

We recommend that you connect your SRC-4 to a UPS system. A UPS helps minimize the risk to the SRC-4 and provides power during a power outage.

LED indicators

- "PWR" LED: Blinks to indicate normal operation. (Green)
- "STATUS" LEDs 1-4: Lit when the associated input is active. (Yellow)
- "RELAYS" LEDs 1-4: Lit when the associated relay is active. (Red)

Power

2.1mm coaxial DC power jack, 7.5 - 12 VDC, center positive.

Status/Logic Inputs

The SRC-4 has four opto-isolated status/logic inputs. Each input is configured at the factory to accept a dry contact closure; we call this the DRY configuration. To use one of the SRC-4's status inputs with dry contacts wire the contacts to input channels Ax and Bx (where x is the status/logic input channels number, 1 thru 4) terminals. A closure between an input's A and B terminals will cause the input to go HIGH (turn on.) The four yellow LEDs on the front panel indicate which inputs are active.

Each input has a four-position configuration header and two jumpers. You can refer to the jumper layout in the appendix for a detailed view. Each jumper is labeled (JPx, where x is the status/logic input) and the header pins 1,2,3,4 are used to configure for WET or DRY operation. The factory default is DRY (Switch, relay contact, open collector) with jumpers between 1 & 2 and 3 & 4. In the DRY configuration, the "A" terminal is ground while the "B" terminal is the cathode of the opto-isolator diode (pulled up to 5 volts through a 2.2K resistor).

If an output that you are interfacing with the SRC-4 provides its own voltage then you will need to configure the corresponding input for the WET (floating) configuration. In the WET configuration the SRC-4's opto-isolated inputs can be triggered by an input voltage from 5 VDC up to 24 VDC. To change a status/logic input to WET (floating), remove both jumpers for the input's configuration header (labeled JPx) and place ONE jumper over pins 2 & 3. You may then connect the positive voltage to the input's "A" terminal (anode) and ground or minus voltage to the input's "B" terminal (cathode).

(Top Row, TB1)

A1	B1	GND	A2	B2
A3	B3	CGND	A4	B4

(Bottom Row, TB1)

NOTE:

Please refer to the appendix for configuration examples and observe proper polarity.

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Relay Outputs:

Each of the four relays is supplied with SPDT (form C) dry contacts. External equipment to be controlled should be connected to the terminals labeled K1NO, K1CM, K1NC, K2NO, K2CM, K2NC, K3NO, K3CM, K3NC, K4NO, K4CM, K4NC. The four red LEDs on the front panel indicate which relays are active.

NOTE: If mechanical latching relays are required, we suggest the Broadcast Tools LR-5 or LR-5 Plus (4PDT & SPST) mechanical latching relay.

Relay terminal block connection layout

(Top Row, TB2)

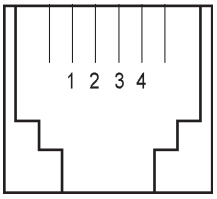
K1 NC	K1 CM	K1 NO	K2 NC	K2 CM	K2 NO
K3 NC	K3 CM	K3 NO	K4 NC	K4 CM	K4 NO

(Bottom Row, TB2)

RS-232 Serial Connection

Connect one end of the reverse modular cable to the RJ11 jack on the rear panel of the product and the other end to the RJ11 to the jack on the "S9" 9-pin female D-sub adapter. Connect the 9-pin female D-sub "S9" adapter to the COM port of the controlling PC/device. Note: An optional USB to RS-232 adapter cable may be required if your PC isn't equipped with a RS-232 COM port. The default protocol is as follows: 9600, N, 8, 1 (auto-detect for baud rate is selectable.)

RJ-11 Adapter Pin	DB-9 Female Pin #	Function Name (Product Point of view)
4	3	RS-232 Receive
3	2	RS-232 Transmit
2	5	Ground



Modular Jack Pin Numbers

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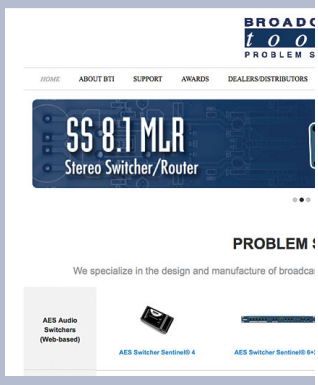

Configuration Dip-switch Setup

The configuration dip-switch package (SW1) is located on front panel of the SRC-4.
Note: After changing any dip-switch, please repower the unit.

SW1-1		**Baud Rate**	
OFF	=	9600	(default)
ON	=	Auto-Detect	

In auto-detect mode the SRC-4 can automatically detect and set itself to the baud rate a connected serial device. This allows the SRC-4 to be used with a wide range of serial devices.
To use the Auto-Detect feature power down the SRC-4, turn SW1-1 on, and connect the serial device you wish to interface with. Configure the serial device to send an uppercase U. Power up the SRC-4, from power up there is a 3 second window in which a received U will set the SRC-4's baud rate. Once the baud rate is detected and set the SRC-4 will send its version information over the serial port. After SRC-4's baud rate has been set it will retain this setting until the auto-detect feature is used again.

SW1-2 Unused

SW1-3	SW1-4	Operation Mode	
OFF	OFF	Computer	(default)
ON	OFF	Pair Mode	
OFF	ON	Data Mode	
ON	ON	Data Programming Mode	

Computer Operation Mode
In computer operation mode the SRC-4 uses the following ASCII string command format:
Relay Control 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
*0OR3L =	Latch relay 3
*0OR3F =	Unlatch relay 3
*0OR3P =	Pulse relay 3
*0OR4L =	Latch relay 4
*0OR4F =	Unlatch relay 4
*0OR4P =	Pulse relay 4

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Input Strings:

*011 = Input 1 High
*010 = Input 1 Low

*021 = Input 2 High
*020 = Input 2 Low

*031 = Input 3 High
*030 = Input 3 Low

*041 = Input 4 High
*040 = Input 4 Low

Firmware Version:

*0U = SRC-4 1.02 (or latest firmware version). This is also displayed at power-up or reset.

Pair Operation Mode

In pair mode inputs from one SRC-4 will map directly to the outputs of another SRC-4 when connected together via the RS-232 port. This allows two SRC-4's to be used as a "relay extension cord." You may need a "null-modem" serial cable for this operation. **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.

Data Operation Mode

This mode allows the SRC-4 to be used with a wide variety of serial devices by allowing the user to define custom relay control strings and custom input strings. These strings are set in the Data Programming Mode and are used in the Data Operation Mode.

Data Programming Mode

When the SRC-4 is powered up in Data Programming mode it will automatically display the programming menu:

```
SRC-4_1.02

OUTPUT 1
ON:  OFF:
OUTPUT 2
ON:  OFF:
OUTPUT 3
ON:  OFF:
OUTPUT 4
ON:  OFF:
INPUT 1
ON:  OFF:
INPUT 2
ON:  OFF:
INPUT 3
ON:  OFF:
INPUT 4
ON:  OFF:
ENTER 1,2,3, or 4 for output data, 5, 6, 7, or 8 for input data,
```

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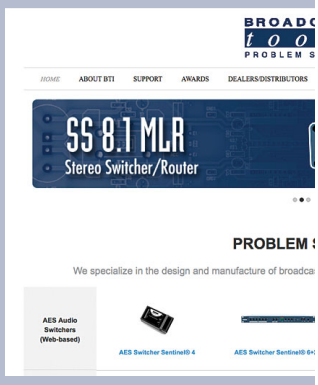

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Outputs 1-4 represent the string data that will be sent over the serial port when inputs 1-4 are activated. Each output channel can have a custom ON and OFF string. Special characters may be entered as ASCII HEX characters, to do so enter a "/" followed by the hex value. For example, if you want to send 12345(CR/LF) enter as the string: 12345/0D/0A and hit the ENTER key to terminate. Each string may be up to 14 characters long.

To enter strings for an output channel first type the channel number (1-4) followed by the desired ON string, press enter to complete the string, then type the desired OFF string, press enter to complete the string. The settings will be saved and you may enter strings for another channel.

Inputs 1-4 represent the strings that control relays 1-4. Each input channel can be configured for custom ON and OFF (latching) strings or for a custom ON (pulse) string.

To enter strings for an input channel first type the channel number (5-8) followed by 0 for Pulse mode or 1 for Latch mode, then enter the desired string(s) and press enter to complete each string. The settings will then be saved and you may enter strings for another channel. Each string may be up to 14 characters long.

Once you have finished programming the SRC-4 you can power the unit down, switch it to the Data operation mode and begin using it.

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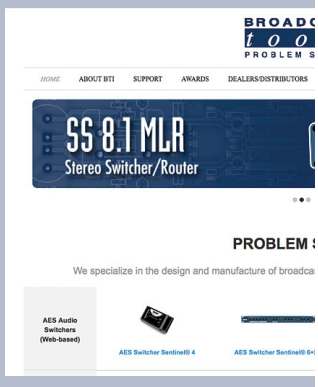

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Specifications

Inputs	4 - Optically isolated inputs. May be configured for wet (5 to 24vdc) or dry inputs.
Relays	4 - SPDT, 30VDC at 1 amp maximum.
Logic	Flash Microprocessor with non-volatile memory
RS-232	RS-232, 8N1, Handshaking disabled. 9600 baud (default), or Auto-Detect.
Connectors	Inputs/Relays - Plug-in euroblock screw terminals. Serial - RJ11 with modular cable and S-9 female DB-9 adapter.
Power Requirement	9 Volt DC, 660 ma universal wall transformer, supplied. Internal power supply surge protected. Domestic AC power adapter supplied. 2.1mm coax connector, center positive.
Weight	1.0 lb.
Size	6.18" x 3.70" x 1.42" (L,W,H) **Note: Velcro may be used to secure the product to the RA-1 shelf.**
Options	RA-1, Rack Shelf, 1 RU / USB-RS-232 "SMART"cable adapter / Universal power supply AC input plug adapters.

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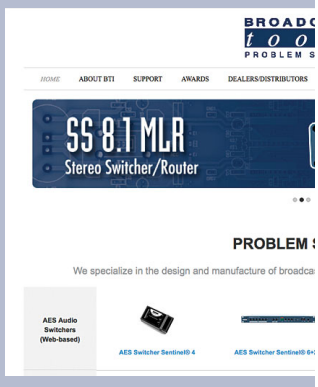

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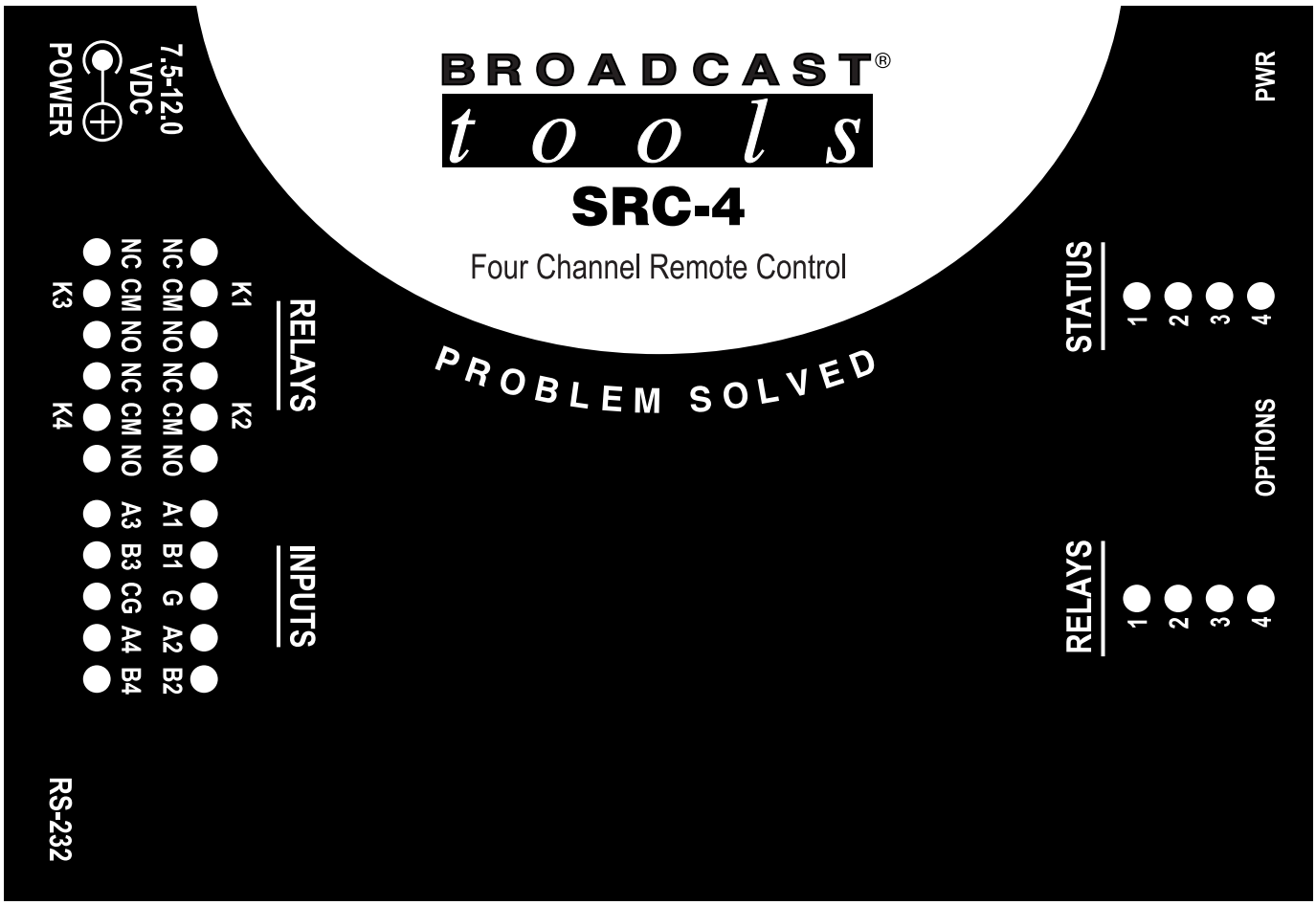

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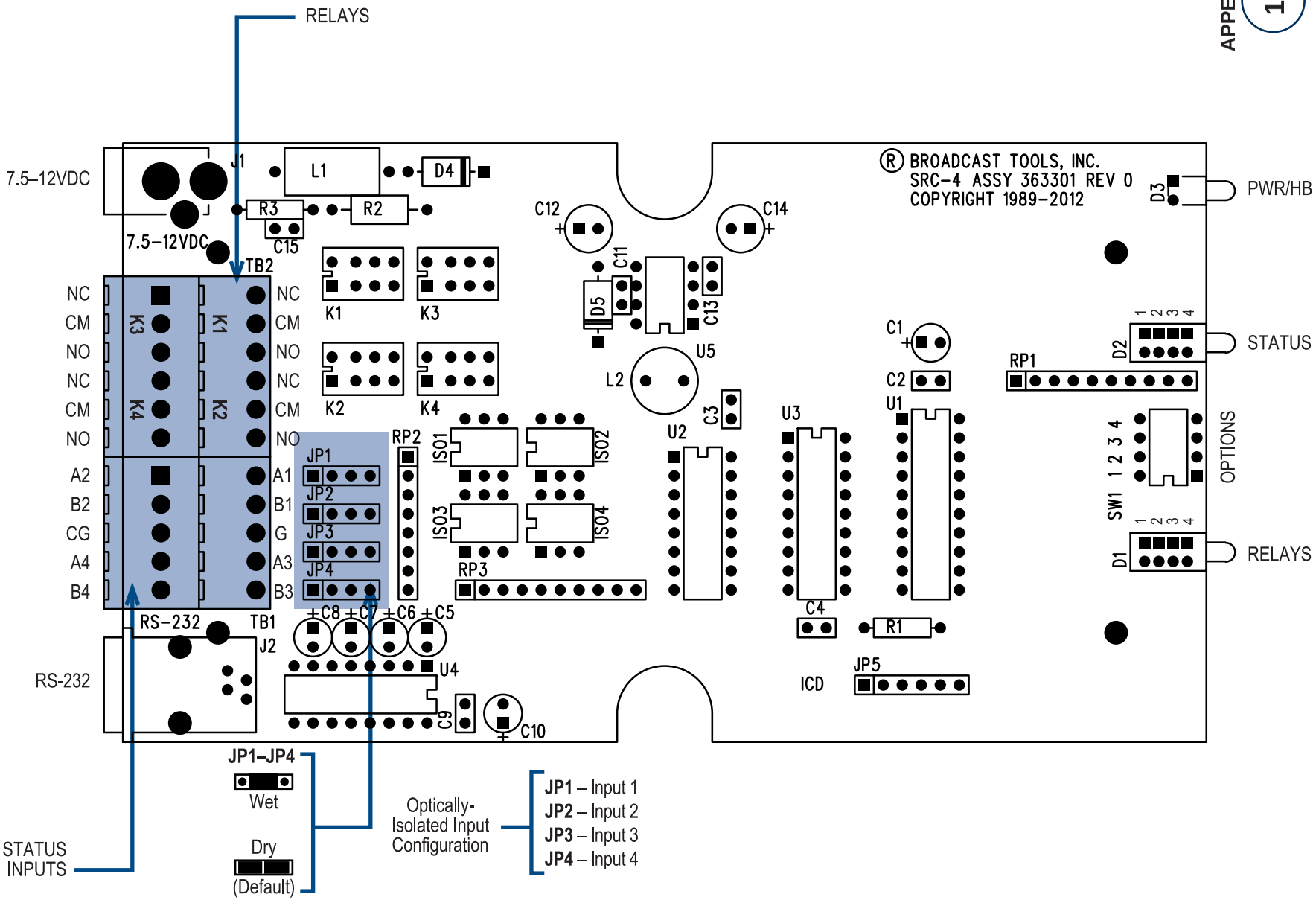
Component Layout



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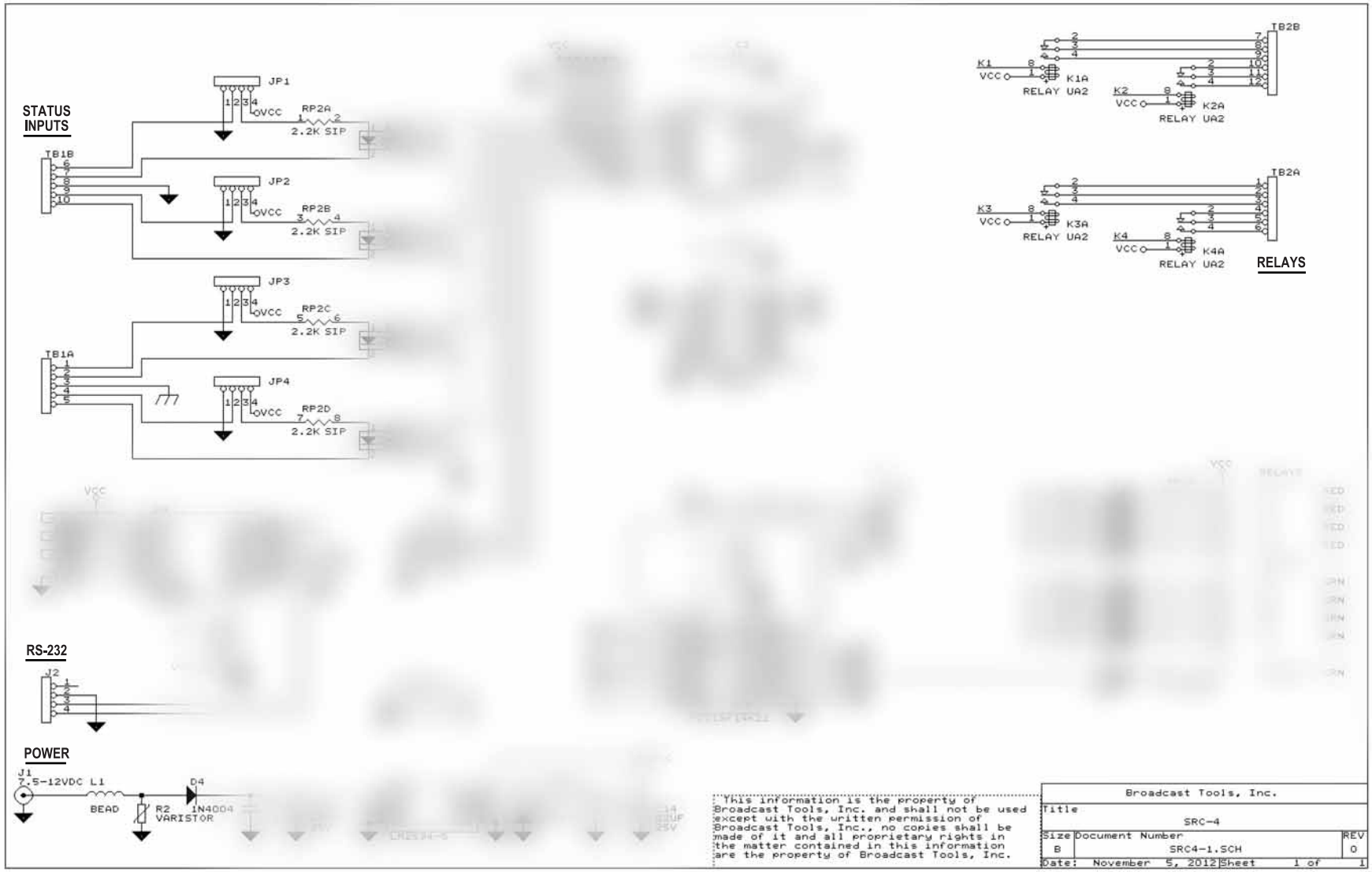
Fractional Schematic



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