BROADCAST tools inc.

INFORMATION AND OPERATION

MANUAL

for the

Broadcast Tool® SS2.1/BNC

Switcher / Router

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Software Version > 070900   Manual Revised 11/18/02

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INTRODUCTION

Thank you for your purchase of a **Broadcast Tools® SS2.1/BNC, Switcher/Router** (referred to as the SS2.1 Switcher/Router 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® SS2.1/BNC, Switcher/Router.

✎ **NOTE**: *This manual should be read thoroughly before installation and operation.*

SAFETY INFORMATION

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

💣 **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.*

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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THANK YOU FOR CHOOSING BROADCAST TOOLS® BRAND PRODUCTS!

PRODUCT DESCRIPTION

The SS2.1 Switcher/Router passively switches or routes a variety of electrical signals to a single destination. The SS2.1 Switcher/Router selects two inputs to a single output. The SS2.1 is also equipped with non-volatile memory allowing the restoration of the last selected channel after a power outage, if desired. The SS2.1 Switcher/Router provides PASSIVE switching through gold contact relays. The passive switching means that the unit can route a signal in both directions (multiple sources to a single destination, or a single source to multiple destinations). Due to the passive nature of the switching, distortion and noise are almost non-existent and in no way change the quality of the signal it is switching. In addition to their normal use, the unit can also be used to switch digital signals, composite stereo audio, video and AES-3 signals.

The SS2.1 Switcher/Router is controlled by means of rear panel switches, and may be optionally controlled from a rear panel 9-pin male D-Sub connector or the multi-drop RS-232 serial port.

The SS2.1 Switcher/Router has features to allow selecting which of any source is active at power-up; last selected input; audio mute; allowing the user to turn off the audio output when activated and an multi-drop RS-232 serial port; allowing operation of up to eight units from one serial port. Source number one is configured to route audio to the output in the case of loss of power to the unit. The sources, which are not selected, are terminated with a 75 Ω, _ watt load resistor.

Applications:
Composite audio, Video, AES/EBU switching

REAR PANEL DESCRIPTION

Source Switches:
Each switch represents an input to be routed to the switcher's output. The switches are highly reliable switches, which will give the user years of dependable service. Each switch has an LED indicator, which will illuminate when that particular source is routed to the output. When a source is selected, the previous source will be deselected, (interlock).

The rear panel contains all the inputs, outputs and remote control interfacing connectors. Signal inputs and outputs are routed through BNC connectors. Remote control is accomplished via a 9 pin "D-Sub" connector and the multi-drop RS-232 serial port.

Power:
Connect the 2.1mm barrel type power connector into the unit and the 9vac, 500 ma wall transformer into a 120 Vac 50-60 Hz power source. The rear panel power LED indicates when power is applied to the unit. (220 Vac 50-60 Hz wall transformer OPTIONAL)

Signal Connector:
BNC type connectors

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OPTIONS: *Follow the tables below for options.*

✎ **NOTE**:   *The < * > denotes factory setting.*

Unit ID	SW4-1	SW4-2	SW4-3
ID 0 *	OFF	OFF	OFF
ID 1	ON	OFF	OFF
ID 2	OFF	ON	OFF
ID 3	ON	ON	OFF
ID 4	OFF	ON	ON
ID 5	ON	OFF	ON
ID 6	OFF	ON	ON
ID 7	ON	ON	ON

Baud Rate	SW4-4	SW4-5
2400	ON	OFF
9600 *	OFF	OFF
19200	OFF	ON
33840	ON	ON

Operation	SW4-6	SW4-7
Normal *	OFF	OFF
Sustained	ON	OFF
Sustained	OFF	ON
Toggle	ON	ON

- **Normal operation:** Pulse pin 1 to select input 1, Pulse pin 2 to select input 2 or pulse the mute pin to mute.
- **Sustain operation:** Hold pin 2 low to select input 2.
- **Toggle operation:** Alternately pulse pin 1 to select between the two inputs.

Power-up	SW4-8
Last selected input *	OFF
User Selected	ON

To select an input at power-up with SW4-8 ON, hold down the push-button for the desired input while powering up the SS 2.1

Remote Connector:

A male 9 pin "D-sub" connector is provided for connection to equipment that will remotely control the Switcher.

INSTALLATION GUIDELINES

Installation of the SS2.1 in **high RF environments** should be performed with care. Shielded cable is suggested for all control, audio inputs and outputs. The station ground should be connected to the chassis ground screw located on the far right side of the SS2.1 as viewed from the rear. Surge protection with RF filtering is also suggested for the wall transformer. The purchase of an inexpensive UPS will provide back-up in case of power outages.

The SS2.1 Switcher/Router is very simple to install. The signal inputs and outputs are connected via BNC connectors. Installation of the SS2.1 Switcher/Router consists of six steps:

1. Inspection
2. Removal of the source termination resistors, if applicable
3. Bench test
4. Mount the unit on a rack shelf or rack panel (RM-2, or RM-3).
5. Connect your equipment to the unit
6. Serial operation, if applicable.

STEP 1: INSPECTION
Please examine your SS2.1 Switcher/Router carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately. Retain the packaging for inspection by the shipper. The package should contain the SS2.1 Switcher/Router, 9vac, 500 ma wall power transformer, this manual, Modular cable and 9 pin female D-Sub adapter and a 9-pin female D-Sub connector/shell.

STEP 2: SOURCE TERMINATION RESISTOR REMOVAL
Input sources that are not selected are terminated with a 75 Ω load (1/4 watt maximum). If you do not want this load applied across the **deselected sources**, it may be removed from each channel. Each channel has a pair of resistors.

   EXAMPLE: Channel 1, relays K1 A&B switches the signal; R1 & R2 are the load resistors. As delivered, all channels are configured with these resistors installed. To remove the load resistors from a channel, locate via the schematic the proper resistors for that channel, cut its leads and discard the resistors.

STEP 3: BENCH TEST
Place each unit on a workspace and connect power to the unit. Check to see if the power LED is lit. Connect a audio source to stereo input one and a monitoring device to the output. Select channel one and verify that audio is present. Repeat the process until each channel's operation has been verified. This would also be a good time to set up the desired switch or jumper options.

INSTALLATION GUIDELINES

STEP 4: MOUNTING

Mount the unit on a rack shelf, such as the Broadcast Tools RM-3 or the Broadcast Tools RM-2 rack panel, allowing adequate airflow for cooling. The optional RM-2/3 may be ordered separately for rack mounting.

STEP 5: CONNECT YOUR EQUIPMENT

The SS2.1 Switcher/Router interfaces to your equipment (sources, loads and remote control) through the rear panel connectors. Follow the legends for the desired audio input and output connections.

STEP 6: SERIAL OPERATION

Connecting the RS-232 serial port of the SS2.1 **is** accomplished by using the supplied modular cable and 9-pin Female D-sub between the SS2.1 and controlling PC. Select the desired address for each unit. Never duplicate address numbers. The protocol is as follows: 9600, N, 8, 1 (other baud rates available).

To select a channel, send the following string: *tdi

Where the: < * > Denotes start of string character
              < t > Product type code, in this case 2
              < d > ID (address, 0 through 7) number
              < i > Input channel (1 through 2 or m, denoting MUTE).

Example: *202   This string would turn on channel 2.
            *20m This string would MUTE the switcher's output.
             No serial status is provided.

Apply power to the SS 2.1 via the wall transformer. Your SS 2.1 Switcher/Router is now fully functional.

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REMOTE CONTROL CONNECTOR PINOUTS

Control:

The rear panel switches are brought out through the rear panel REMOTE CONTROL connector, providing a means of controlling the SS2.1 Switcher/Router from a remote point. These digital inputs require a momentary or sustained action (See Page 5), compatible with 5 volts CMOS/TTL open collector or contact closures to ground. The inputs are pulled high.

Status:

The status signals from the rear panel indicator LED's are supplied through the remote control connector as individual open collectors. This may provide status to a remote control point to indicate which source is selected. The status output for the selected output will go low, providing a return for an LED indicator or TTL/CMOS logic. External pull-up resistors may be required in some installations.

J1, Remote Control & Status Pin Numbers

1   Switch number **1**
2   Switch number **2**
3   Mute switch
4   Status number **1**
5   Status number **2**
6   Open
7   Open
8   Open
9   Ground

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BROADCAST TOOLS® SS2.1/BNC SPECIFICATIONS

Inputs/Outputs:	*Any input level and impedance can be used. Inputs may be balanced or unbalanced. Output levels, impedance, distortion, noise and balancing will match that of the selected input.*
Switching Method:	*Passive. Sealed relays utilizing 2-form-C Bifurcated-Crossbar silver alloy with gold overlay contacts.*
Logic:	*Flash Microprocessor*
Operational Control:	*Rear Panel - Momentary switches.* *Remote – Momentary or sustained, compatible with 5 volts CMOS/TTL open collector or contact closures to ground.* *Serial – Multi-drop RS-232, 2400/9600, 8,N,1*
Status:	*Rear Panel - Indicator LED.* *Remote - Open collector output, limit current to 50ma @ 12vdc per output. Pull-ups may be required.*
Interfacing:	*Audio - Rear panel BNC connector* *Remote Control - Male 9 pin "D-Sub" connector. Mate supplied* *RS-232 – (RJ-11) Modular, Cable/female 9-pin D-Sub adapter supplied*
Power Requirements:	*9 Vac, 500 ma. 120 Vac 50-60 hz transformer.*
Physical Dimensions:	*7.75 " x 4" x 1.25" (WDH)*
Weight:	*2.0 lb.*
Shipping Weight:	*3.0 lb.*
Options:	*RM-2 Rack Panel. 3 - RU* *RM-3 Rack shelf. 1 - RU*

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LIMITED WARRANTY AND REMEDIES

LIMITED WARRANTY

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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.

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