



Installation and Operation Manual



SS 4.1 Plus ***Four Input, Single Output Stereo Switcher/Router***

Firmware Version 1.10

Manual Update: 06/21/2011

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.

tiny TOOLS™ is a trademark of Broadcast Tools, Inc.

All Sentinel™ labeled products are a trademark of Broadcast Tools, Inc.

Copyright © 1989 - 2009 by Broadcast Tools, Inc. All rights reserved.

No part of this document may be reproduced or distributed without permission.

Visit www.broadcasttools.com for important product update information.

Table of Contents

Section Title	Page #
Introduction	3
Safety Information	3
Who to Contact for Help	3
Product Description	4
Features	4
Applications	4
Front Panel Description	5
Rear Panel Description	5
Installation Guidelines	6
Specifications	12
Warranty	13

WEBSITE:

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



INTRODUCTION

Thank you for your purchase of a Broadcast Tools® SS 4.1 Plus, Four Input, Single Output Stereo Switcher/Router (referred to as the SS 4.1 Plus 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® SS 4.1 Plus.

SAFETY INFORMATION

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

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:

Broadcast Tools, Inc.

131 State Street
Sedro-Woolley, WA 98284-1540 USA
Voice: 360.854.9559
Fax: 866.783.1742

Internet Home Page: www.broadcasttools.com
E-mail: support@broadcasttools.com

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



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.



INTRODUCTION

Product Description

The SS 4.1 Plus passively switches any one of four stereo inputs to a single stereo output and is equipped with eight trigger inputs. Perfect for automation switching and/or source selection. The passive switching utilizing gold contact relays, which means that the unit can route a signal in either direction. Due to the passive nature of the switching, any input level and impedance can be used. Inputs may be balanced or unbalanced, while output levels, impedance, distortion, noise and balancing will match that of the selected input. In addition to their normal use with audio signals, the unit can also be used to switch composite stereo audio, AES digital audio signals, RS-232, 422 or 485 data signals and telephone lines.

Features

- Operational control by front panel switches with LED indicators, contact closures, 5-volt TTL/CMOS logic levels and/or the multi-drop bi-directional RS-232 serial port.
- May be monitored and/or controlled via a web browser with the optional ESS-1.
- Plug-in euroblock screw terminals are provided for audio and remote control connections.
- Audio switching via sealed relays utilizing 2-form-C bifurcated - crossbar silver alloy with gold overlay contacts.
- Internal silence sensor monitors the output and is equipped with a front panel LED indicator; SPST alarm relay and adjustable SS alarm delay and restore timing duration.
- ^a The “ACT” circuit performs as an audio output activity monitor with front panel LED indicator.
- The “ENABLE” switch provides a safety lock to the front panel source selection switches.
- The audio “MUTE” switch allows the user to turn off the audio output when activated.
- The “STEP” function allows the user to single step through each channel or to automatically sequence with user programmed channel steps and speed.
- Eight remote inputs, user configured for remote control or “PIP” (trigger) inputs.
- Four open collector outputs provide remote channel status.
- Logic functions via flash microprocessor with non-volatile memory.
- The power-up feature allows the user to select which one source is active at power up, including the last source selected.
- Configuration via dipswitches, serial port menu or burst mode.
- Source number one is configured to route audio to the output in the case of loss of power to the unit.
- Non-selected sources are terminated with 10K W load resistors. May be removed.
- The SS 4.1 Plus may be set on a desktop, mounted on a wall or up to three units on one RA-1 rack shelf.

Applications

Automation source switching with eight trigger inputs; Studio selection and routing; Audio processing selection; Exciter input selection; Remote broadcast input selection; STL source selection; Multiple station program on-hold and/or PA switching; EAS audio switching; ISDN or Phone hybrid feed selection; IFB selection; Satellite audio channel switching and console monitor inputs and outputs selection.

Front Panel Description

Source Switches

Each switch represents an input to be routed to the switcher's output. High quality tactile switches will give the user years of dependable service. Each switch has an associated 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, (interlocked). The front panel is also equipped with a MUTE switch and LED indicator. This switch turns off the audio output. The ENABLE switch (if recessed, it may require the use of a toothpick), when enabled, must be depressed in order for any of the other switches to function. This function may be bypassed (default).

LED Indicators

Channel LED indicators will illuminate when the desired channel is selected. The PWR LED displays valid power and TX/RX serial data activity. The mute LED illuminates when audio is off. The "ACT" (activity) LED is lit when audio is present at the output. The silence sensor LED will illuminate when in an alarm condition. Audio thresholds are set at -25db.

Rear Panel Description

The rear panel audio inputs, outputs and remote control (triggers) connections are routed through plug-in euroblock screw terminals. A RJ-11 modular jack is provided for the multi-drop bi-directional RS-232 serial port.

Power

Connect the 2.1mm coaxial type power connector into the unit and the 9 VAC @ 1-amp wall transformer into a 120 Vac 50-60 Hz power source. The front panel PWR LED indicates when power is applied to the unit.

Audio Signal Connector

The SS 4.1 Plus is supplied with plug-in euroblock screw terminals and mating connectors. Channel and polarity designators can be found on the chassis, as viewed from the rear.

"Remote" Control Connector

Plug-in euroblock screw terminals and mating plugs are provided for connection to equipment, which will remotely control the SS 4.1 Plus, unless the "PIP" (triggers) function is enabled. Pulsing the "MUTE" input to ground (low) would turn off the output of the SS 4.1 Plus until a front panel source switch is pressed, a remote control input is activated, the unit is powered up and/or a serial command is received from a PC or other serial device. Pulsing the "STEP" input to ground will step the unit one source for each low to high transition on this input. Automatic sequence may be accomplished by holding the step input low for two seconds. The unit will now step to each source at a user programmable rate from 1 to 99 seconds. The number of inputs sequenced may be programmed for channels 1 to 4. The step input is helpful in freeing up valuable remote control channels. This feature may also be used to sequence through multiple station air monitor signals for program on-hold feed.

WEBSITE:

Visit our web site for product updates and additional information.



DESCRIPTION

Installation Guidelines

It is recommended that all cables connected to the SS 4.1 Plus 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.

The SS 4.1 Plus is simple to install. The signal inputs, outputs are connected via plug-in euroblock screw terminals. Installation of the SS 4.1 Plus consists of seven steps:

1. Inspection
2. Removal of the source termination resistors, if applicable
3. Bench test and option set-up
4. Mount the unit in a rack (RA-1), desktop or wall
5. Connect your equipment to the unit
6. Label the front panel switches
7. Serial operation, if applicable

STEP 1: INSPECTION

Please examine your SS 4.1 Plus 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 should contain the SS 4.1 Plus, this manual and/or CD (the manual may be downloaded from our web site), 9 VAC @ 1-amp transformer, reversed modular cable, 9-pin female “S9” D-Sub adapter and audio and remote control mating connectors.

STEP 2: SOURCE TERMINATION RESISTOR REMOVAL

Input sources that are **NOT** selected are terminated with a 10K W resistor. If you do not require this load applied to the deselected sources, it may be removed from each channel. Each channel has a pair of resistors. Removal information: Channel 1 = R 8 & R9. Channel 2 = R10 & R11.

Channel 3, R12 & R13 and Channel 4 = R14 & R15. If the unit is to be used for applications other than switching audio, the Silence Sensor and ACT detection circuit should be disabled. To disable, remove the following components: R24, R25 and RP9.



CAUTION!

Installation of the SS 4.1 Plus 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 “GND” terminal. The station ground should be connected to the chassis ground screw (CH1) located behind J1, as viewed from the rear. For lightning protection, check out www.polyphaser.com and www.itwlinx.com

WEBSITE:

Visit our web site for product updates and additional information.



STEP 3: BENCH TEST and OPTIONS

Place each unit on a workspace and connect power to the unit. Check to see if LED #1 (Channel 1) and the PWR LED are lit (Source one is the power-up factory default). Connect an audio source to stereo input one and a monitoring device to the output. Verify that audio is present. Repeat the process until each channel's operation has been verified.

Jumper JP2

To enable the front panel "ENABLE" switch, remove and stow the jumper over the "Enable Bypass" jumper JP2.

Note: The "Enable" switch is disabled at the factory.

Dipswitches:

DIP (SW6) Switch Functions

Unit ID	SW6-1	SW6-2	SW6-3
ID 0 *	OFF	OFF	OFF
ID 1	ON	OFF	OFF
ID 2	OFF	ON	OFF
ID 3	ON	ON	OFF
ID 4	OFF	OFF	ON
ID 5	ON	OFF	ON
ID 6	OFF	ON	ON
ID 7	ON	ON	ON

Baud RateSW6-4 SW6-5

2400	ON	OFF
9600 *	OFF	OFF
4800	OFF	ON
38400	ON	ON

Power Up SW6-6

User selected	ON
Last source selected *	OFF

Remote/PIP SW6-7

PIP / Triggers	ON
Remote Control *	OFF

Note: * Denotes factory setting.

Note: After changing any dipswitch, please repower the unit.

! TIP

The "ACT" (audio activity) LED is an excellent audio output indicator.

NOTE:

Input selection at power-up may be configured by holding down the desired channels push button until the mute and Pwr/Ser LED's flash. Factory power-up default is channel one.

STEP 4: MOUNTING

Mount the unit on a rack shelf, such as the Broadcast Tools RA-1, allowing adequate airflow for cooling. The RA-1 is furnished with filler panels to cover open spaces. Up to three units may be installed on one RA-1.

STEP 5: CONNECT YOUR EQUIPMENT

The SS 4.1 Plus interfaces to your equipment (sources and loads) through the rear panel plug-in euroblock screw terminals. Follow the legends for the desired audio input, output and remote control connections, which appear on the rear side of the chassis. Before installing a wire, remove the plug-in euroblock screw terminal and turn each capture screw fully counterclockwise. Strip each conductor to a length of 0.25" and insert the conductor fully into the terminal. Turn the capture screw fully clockwise to secure the conductor. The terminals accommodate wire sizes from 16 - 28 AWG solid or stranded wire.

Control

The front panel functions are brought out through the rear panel "REMOTE" (Inx) connector TB 4, providing a means of controlling the SS 4.1 Plus from a remote point. The channel select inputs may be connected to any remote pair of switch contacts and ground, such as external relays, switches, open-collector circuits, contact closures or 5-volt TTL/CMOS logic signals.

WEBSITE:

Visit our web site for product updates and additional information.



Status

The status signals are supplied through the “Remote” control connector TB-3 as individual open collectors. The open collectors may be used to provide status to a remote control point to indicate which source is selected. The status open collector (OCx) output for the selected channel will go low providing a return for an LED indicator, TTL/CMOS logic or relay. External pull-up resistors may be required in some installations.

Connecting the remote control, PIP / Trigger Inputs and OC's / SS Relay

Most front panel functions of the SS 4.1 Plus may be remote controlled via the plug-gable euroblock screw terminals located on the rear panel. The SS 4.1 Plus accepts momentary contact closures (sustained, if break before make); open collector or TTL/CMOS input logic levels. Connections to the remote control and/or PIP (trigger) inputs are made on the TB-4. The following information is a comparison chart to be used when connecting external devices.

Rear Panel Connectors

TB 1 → TB 2

EVEN Inputs			Top Row	
Input x – Left	Input x + Left	Gnd	Input x – Right	Input x + Right
Input x – Left	Input x + Left	Gnd	Input x – Right	Input x + Right
ODD Inputs			Bottom Row	

TB 3

Audio Output				Top Row	
Output - Left	Output + Left	Gnd	Output - Right	Output + Right	
Open Collector 1	Open Collector 2	Gnd	Open Collector 3	Open Collector 4	
Open Collector Outputs				Bottom Row	

TB 4

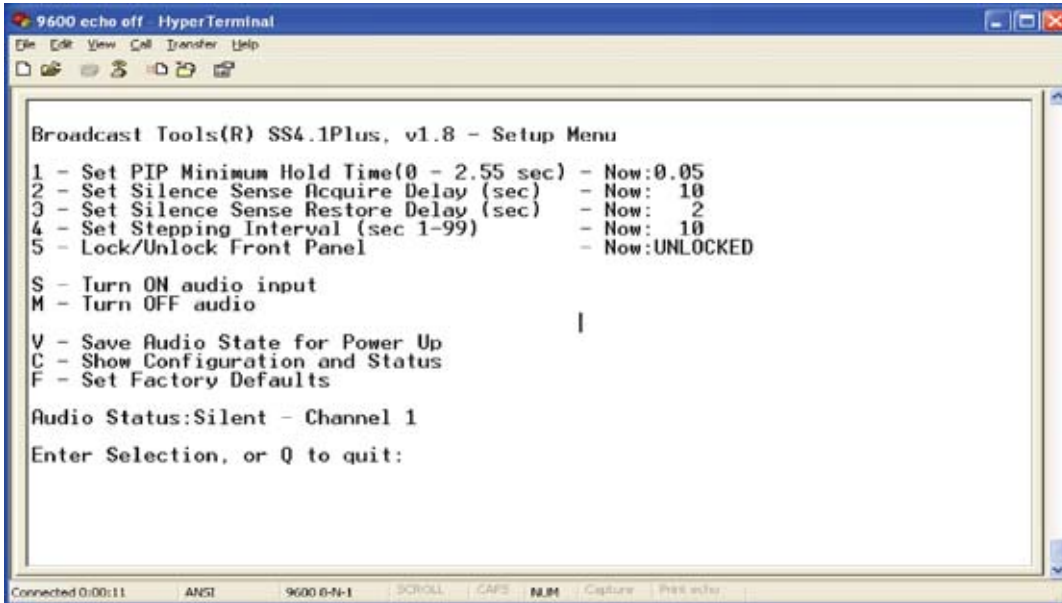
Remote input / Triggers						Top Row	
PIP 4	PIP 5	PIP 6	PIP 7	PIP 8	Gnd		
SS Relay N.O.		SS Relay CM		PIP 1	PIP 2	PIP 3	Gnd
SS Relay & Remote Inputs / Triggers						Bottom Row	

Note: Remote control cross-reference information is on the next page.

Menu:

The menu allows the selection of PIP (eight triggers) hold time, silence sensor delay and restore time, step time, the selection of the last channel in the step, front panel lock, audio channel selection with status and audio status.

The stepping time can be between 1 and 99 seconds. The last channel step is selectable from channels 1 through 4.



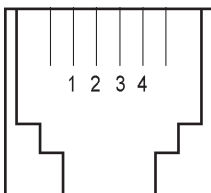
```
9600 echo off HyperTerminal
File Edit View Call Transfer Help
Broadcast Tools(R) SS4.1Plus, v1.8 - Setup Menu
1 - Set PIP Minimum Hold Time(0 - 2.55 sec) - Now:0.05
2 - Set Silence Sense Acquire Delay (sec) - Now: 10
3 - Set Silence Sense Restore Delay (sec) - Now: 2
4 - Set Stepping Interval (sec 1-99) - Now: 10
5 - Lock/Unlock Front Panel - Now:UNLOCKED
S - Turn ON audio input
M - Turn OFF audio
V - Save Audio State for Power Up
C - Show Configuration and Status
F - Set Factory Defaults
Audio Status:Silent - Channel 1
Enter Selection, or Q to quit:
```

Serial:

Pin out of the RJ-11 modular/"S9" female DB-9 D-Sub adapter is shown below.

RJ-11 Adapter Pin	DB-9 D-Sub	SS 4.1 Plus (Point of view)
4	3	RS-232 Receive
3	2	RS-232 Transmit
2	5	Ground

Modular connectors point of view.



Modular Jack
Pin Numbers

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 with non-volatile memory.
Operation Control:	Front Panel - Momentary push button switches Remote - Momentary or sustained (break before make), compatible with 5 volts CMOS/TTL logic, open collector or contact closures to ground. 50 ms response time in (PIP) trigger mode. Serial - Multi-drop RS-232, Bi-directional, 2400, 4800, 9600, 38400, 8,N,1.
Status:	Front Panel - Indicator LED's. Remote - Audio "ACTivity" LED - Trip level set at -25db. Remote - "SS" LED & Silence Sensor SPST relay - Trip level set at -25db Remote - Open collector outputs, 6 vdc and current limit to 50 ma per output. Pull-ups may be required.
Interfacing:	Audio & Remote Control - Plug-n euroblock screw terminals. RS-232 - 4C6P Modular. Mating reversed modular cable and (S9) adapter supplied.
Power Requirements:	9 Vac, 1-amp, 120 Vac 50-60 hz transformer (supplied). (CE 240 Vac 50-60 Hz optional)
Physical Dimensions:	5.50" x 6.50" x 1.55" (WDH)
Weight:	2.0 lb.
Shipping Weight:	3.0 lb.
Options:	RA-1 rack shelf holds three units (1-RU) / Filler panels supplied.

WEBSITE:

Visit our web site for product updates and additional information.



SPECIFICATIONS

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**