



Installation and Operation Manual



SM-III Plus *Silence Monitor III Plus*

Firmware Version 1.16 (PCB 103201 Rev E/F)

Manual Update: 12/22/11

Please check the label on U4 for the correct firmware version.

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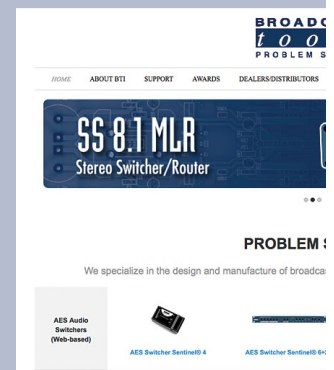


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INTRODUCTION

Thank you for your purchase of a Broadcast Tools® Silence Monitor III Plus (referred to as the SM III 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® SM III 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:

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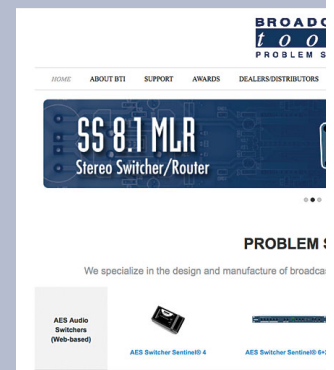


NOTE:

This manual should be read thoroughly before installation and operation.

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INTRODUCTION

PRODUCT DESCRIPTION

The Broadcast Tools® Silence Monitor III Plus improves on the features of the original Broadcast Tools® SSM. The Silence Monitor III Plus is designed to monitor any stereo or two independent monaural sources, generate alarms and transparently switch to back-up source equipment when silence is detected. Features include: front panel, remote control and relay monitoring; Plug-in euroblock screw terminals; “Plug & Play” (NO POTS) installation; dipswitch selection of silence detection of -23, -25, -35 and -45db; precise time delay from 2 seconds to 85 minutes; precise restore timing delay from off to 42 minutes; defeatable sonalert aural alarm; relays for most remote functions. The SM III Plus may be set on a desktop, mounted on a wall or optional RA-1 rack shelf for mounting up to three units in 1-RU.

PRODUCT FEATURES

- Transparent stereo or dual monaural program switcher with front panel switcher transfer switch and indicator LED.
- Dipswitch selection of silence detection of -23, -25, -35 and -45db
- Precise time delay from 2 seconds to 85 minutes
- Precise restore timing delay from off to 42 minutes
- Active balanced inputs
- May be configured for stereo or dual independent monaural operation
- Front panel switcher transfer switch
- Front panel “Mute” switch with built-in sonalert and remote defeat input
- Front panel “Manual/Automatic” switch with front panel LED, remote input and relay
- Front Panel Alarm “Reset” switch, Tripped LED and relay
- External (“Ext”) alarm input with front panel indicator and relay
- Front Panel Power LED
- Two independent audio alarm relays
- Two pulse open collector alarm outputs
- Auxiliary SPDT relay with user configuration of pulse and
- Plug-in euroblock screw terminals
- The SM III Plus may be set on a desktop, mounted on a wall or optional RA-1 rack shelf for mounting up to three units in 1-RU

INSTALLATION GUIDELINES

Inspection:

Please examine your SM III Plus 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 SM III Plus, 16.5 vac@600 ma wall power transformer and this manual.

Mounting:

Mount the SM III Plus where it will be visible and rear panel accessible. Four (4) screw holes are provided for mounting. The SM III Plus may be set on a desktop, mounted on a wall or optional RA-1 rack shelf for mounting up to three units in 1-RU.

Connecting user equipment:

TB 1, 18-position connector on the rear of the SM III Plus.

LT -	LT +	EG	RT -	RT +	1LT-	1LT+	EG	1RT-	1RT+	2LT-	2LT+	EG	2RT-	2RT+	DG	Pulse 1	Pulse 2
K3 NC Trpd	K3 CM Trpd	K3 NO Trpd	K4 NO/NC Auto	K4 CM Auto	K5 NC Ext	K5 CM Ext	K5 NO Ext	K6 NC LT Alarm	K6 CM LT Alarm	K6 NO LT Alarm	K7 NC RT Alarm	K7 CM RT Alarm	K7 NO RT Alarm	Mute In	Man/ Auto (Arm) In	Reset In	Ext In

Connect the audio source (air monitor, etc) to the left and right inputs, ground the negative (-) side if the source is unbalanced and observe proper phasing. These are labeled LT- and LT+ for the left channel and RT- and RT+ for the right channel.

SM III Plus operation configured For Backup Switching:

- Connect the source (MAIN) equipment (Console, Automation, etc) to LT- and LT+ for the left channel and RT- and RT+ for the right channel. This is the normally closed contact of the relay switcher and the input to the SM III.
- Connect the source (BACK UP) equipment (CD, etc) to 1LT- and 1LT+ for the left channel and 1RT- and 1RT+ for the right channel. This is the normally open contact of the relay switcher.
- Connect the destination equipment (PROCESSING) to 2LT- and 2LT+ for the left and 2RT- and 2PT+ for the right channel. This is the common contact of the relay switcher.
- Shields may be connected to the terminal labeled “EG” chassis ground.

When the main input audio is lost, the SM III Plus will sense the loss and start timing. When the time-out is reached, the SM III Plus will switch to the back-up source. When audio returns, (after a restore delay, if enabled) the SM III Plus will automatically switch back to the main source input. The user may also use the front panel “XFER” switch to alternately switch between the main and back up inputs. The XFER LED will be illuminated when the SM-III is in an alarm condition or the back-up input is selected.



NOTE:

If the audio source is a tuner or receiver, be sure to feed the SM-III Plus from the fixed output such as the tape monitor outputs.

The SM-III Plus is designed to route the main audio input to the output in an event of a power or unit failure.

Remote Control

- Mute input
- Manual/Automatic (Arm) input
- Switcher Transfer Input
- Reset input
- Ext input
- Tripped relay, SPDT contacts.
- Manual/AUTOMATIC (Arm) relay, May be configured for either NO or NC contacts.
- Ext relay, SPDT contacts.
- Left audio (1) alarm relay, SPDT contacts.
- Right audio (2) alarm relay, SPDT contacts.
- Pulse 1, open collector rated at 15Vdc @ 100ma
- Pulse 2, open collector rated at 15Vdc @ 100ma
- Auxiliary relay, SPDT contacts. JP5 is used to select the Aux relays control function. Move the jumper between XFER (transfer), PUL1 (Pulse 1) or PUL2 (pulse 2). When configured, the Aux relay will follow the selected function.

Note: ALL inputs are 5 volt TTL/CMOS compatible and active low (pull to ground to activate).

It is recommended that all cables connected to the SM III Plus be looped through ferrite cores to suppress RF. Surge protection with RF filtering 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.

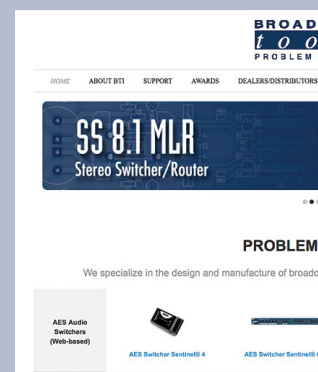


CAUTION!

Installation of the SM III 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 "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 and www.itwlinx.com.

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PROGRAMMING GUIDELINES

Mode Setup:

Jp-2 selects the two operating modes: Installed = Stereo
Removed = Dual Monaural

Sensitivity Setup:

A 4-position dipswitch is provided to change the sensitivity of the SM III Plus. Locate SW 7 and follow the grid below.

Sensitivity	SW 7-1 / Left (1)	SW 7-2 / Left (1)	SW 7-3 / Right (2)	SW 7-4 / Right (2)
- 23 db	ON	ON	ON	ON
- 25 db	OFF	ON	OFF	ON
- 35 db	ON	OFF	ON	OFF
- 45 db	OFF	OFF	OFF	OFF

Delay timing setup:

The SM III Plus time delay is set via SW 1, the 8-position dipswitch and Jp-1. The default for this jumper is installed. This provides TWO second resolutions. To provide longer time resolution, remove and stow Jp-1, which will provide 20 second resolution. The switches are set at the factory for a 6 second delay (switches 1 & 2 ON and Jp-1 installed). Each switch has a digit value as shown in the two tables below. For the factory default setting, as shown in the two-second-resolution table below, we have turned ON switches one and two. Switch one represents a one-digit value, while switch two represents a two-digit value. We add these two digit values together to obtain a total digit value of three. Each value is given a time delay of two or twenty seconds, so we therefore multiply the total digit value of three by two (or 20) to obtain six (or 60) seconds.

NOTE: The following table refers to the time delay in seconds.

Time Delay Two (2) Second Resolution Table

SW-1 Switch Position and Jp-1 installed.	1	2	3	4	5	6	7	8
Digit Value	1	2	4	8	16	32	64	128
➔ EXAMPLES:								
1 = 2 seconds	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
1 + 2 = 3 x 2 = 6 seconds	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
1 + 2 + 4 = 7 x 2 = 14 seconds	ON ↑	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
32 x 2 = 64 seconds, or 1 minute and 4 seconds	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	ON ↑	OFF ↓	OFF ↓
255 x 2 = 510 seconds, or 8 minutes and 30 seconds	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑

Time Delay

Twenty (20) Second Resolution Table

SW-1 Switch Position and Jp-1 installed.	1	2	3	4	5	6	7	8
Digit Value	1	2	4	8	16	32	64	128
➔ EXAMPLES:								
1 = 2 seconds	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
1 + 2 = 3 x 2 = 6 seconds	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
1 + 2 + 4 = 7 x 2 = 14 seconds	ON ↑	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
32 x 2 = 64 seconds, or 1 minute and 4 seconds	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	ON ↑	OFF ↓	OFF ↓
255 x 2 = 510 seconds, or 8 minutes and 30 seconds	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑

Restore timing setup:

The SM III Plus restore time delay is set via SW 2, the first six positions of the dip-switch and Jp-1. The default for this jumper is installed. This provides TWO second resolutions. To provide longer time resolution, remove and stow Jp-1, which will provide 20 second resolution. The switches are set at the factory for off. Each switch has a digit value as shown in the two tables below. For the factory default setting. Please note the table below refers to the restore time delay in seconds.

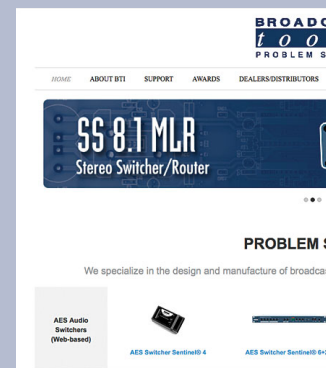
Restore Delay

Two (2) Second Resolution Table

SW-2 Switch Position and Jp-1 installed.	1	2	3	4	5	6	7	8
Digit Value	1	2	4	8	16	32	Note 1	Note 2
➔ EXAMPLES:								
1 = 2 seconds	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓		
1 + 2 = 3 x 2 = 6 seconds	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓		
1 + 2 + 4 = 7 x 2 = 14 seconds	ON ↑	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓		
32 x 2 = 64 seconds, or 1 minute and 4 seconds	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	ON ↑		
Restore is turned OFF.	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓		

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November 19, 2007

Changes to the Broadcast Tools® SM-III with version 1.16 firmware. Please check the label on U4 for the correct firmware version.

Restore timing setup:

The SM III Plus restore time delay is set via SW 2, the first six positions of the dipswitch and Jp-1. The default for this jumper is installed. This provides TWO second resolutions. To provide longer time resolution, remove and stow Jp-1, which will provide 20 second resolution. The switches are set at the factory for off. Each switch has a digit value as shown in the two tables below. For the factory default setting. Please note the table below refers to the restore time delay in seconds.

Restore Delay Two (2) Second Resolution Table								
SW-2 Switch Position and Jp-1 installed.	1	2	3	4	5	6	7	8
Digit Value	1	2	4	8	16	32	Note 1	Note 2
→ EXAMPLES:								
1 = 2 seconds	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓		
1 + 2 = 3 x 2 = 6 seconds	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓		
1 + 2 + 4 = 7 x 2 = 14 seconds	ON ↑	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓		
32 x 2 = 64 seconds, or 1 minute and 4 seconds	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	ON ↑		
Restore is turned OFF.	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓		
Restore Delay Twenty (20) Second Resolution Table								
SW-2 Switch Position and Jp-1 removed.	1	2	3	4	5	6	7	8
Digit Value	1	2	4	8	16	32	Note 1	Note 2
→ EXAMPLES:								
1 = 20 seconds	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓		
1 + 2 = 3 x 20 = 60 seconds or 1 minute	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓		
1 + 2 + 4 = 7 x 20 = 140 seconds or 2 minutes and 20 seconds	ON ↑	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓		
32 x 20 = 640 seconds or 10 minutes and 40 seconds.	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	ON ↑		
Restore is turned OFF.	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓		

NOTE 1, SW2-7 now has two independent functions.

When OFF, the SM-III switches back to input one from input two when the alarm is cleared or the audio returns.

When ON it allows the SM-III to stay at input two after the alarm is cleared or the audio returns.

NOTE 2, SW2-8 now has two independent functions.

When OFF, the SM-III is armed at start-up.

When ON, the SM-III is NOT armed at start-up.

AUX relay configuration

JP5 is used to select the Aux relays control function. Move the jumper between XFER (transfer), PUL1 (Pulse 1) or PUL2 (Pulse 2). When configured, the Aux relay will follow the selected function.

OPERATION GUIDELINES

Front panel switches:

“XFER” switch

Forces the SM III Plus between the main and back-up audio switcher input.

“MUTE” switch

Used to silence the sonalert. To permanently disable the sonalert, JP4 must be removed and stowed.

Manual/“AUTO”matic Switch

Manual or Automatic (Arm) operation. When in the “AUTO” mode, the front panel “AUTO” led will be illuminated and the Manual/Auto relay will be closed.

“RESET” switch

This switch clears all alarms, sonalert and resets the program switcher. If the alarm still exists, the SM III Plus will alarm again after the time out delay period. If the SM III Plus has automatically reset, pressing the reset switch will clear the tripped and audio alarm led(s) and relays.

Stereo Mode operation

When the SM III Plus is in auto mode (armed), it will trigger in the absence of audio (see sensitivity setup) on either or both channels after the delay time has expired (See delay dipswitch SW1) will cause the following action:

- 1 - The front panel left and right audio LED's will extinguish.
- 2 - Unit switches from the main source to the backup source.
- 3 - Turn on the failed audio alarm LED's (Left and/or Right) and relays.
- 4 - Turn on the “Tripped” led and relay.
- 5 - Pulse the pulse 1 open collector for 1 second.
- 6 - Sound the sonalert.

When both channels return and the restore time delay has expired (if enable), the following action occurs:

- 1 - Switch from the backup source to the main.
- 2 - Open the left and right audio alarm relays.
- 3 - The front panel left and right audio LED's will illuminate
- 4 - Pulse the pulse 2 open collector for 1 second.
- 5 - The left and/or right audio alarm indicators will stay illuminated to provide history of the alarm.
- 6 - The “tripped” relay stays energized until the SM III Plus is reset.



NOTE:

The sonalert may be defeated by pressing the front panel “mute” switch, remote input or remove the jumper on JP4 .

The “EXT” (external) input will trigger immediately and switch to the backup source. This may be used to monitor STL or satellite squelch relay, etc.

Dual Monaural Mode Operation :

When the SM III Plus is armed, it will trigger in the absence of audio (see sensitivity setup) on each of the independent channels after the delay time has expired (See delay dipswitch SW1).

The SM III Plus when triggered, will cause the following action:

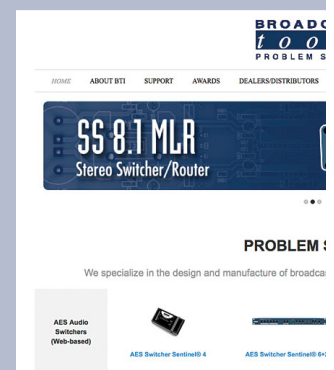
- 1 - Switch from the main source to the backup source of each independent monaural channel.
- 2 - Turn on the failed audio alarm LED (1 or 2) and each relay.
- 3 - Turn on the “Tripped” led and relay.
- 4 - Pulse the pulse 1 open collector for 1 second for channel (left) 1.
- 5 - Pulse the pulse 2 open collector for 1 second for channel (right) 2.
- 6 - Sound the sonalert.

When either channel returns and the restore time delay has expired, the following action occurs:

- 1 - Switch from the back up source to the main source of each independent monaural channel.
- 2 - Open the appropriate audio alarm relay(s).

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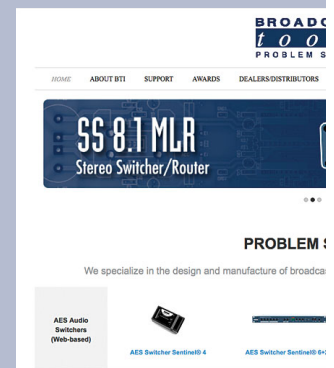


SPECIFICATIONS

Input level:	−20 to +27 dbu, balanced bridging (22 K \emptyset),
Program switcher: (2 x DPDT Relays)	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.
Sensitivity:	Dipswitch selectable: −23, −25, −35 or −45 db for each channel.
Operation Control:	Front Panel - Momentary switches. Remote inputs - Closure to ground or 5 Volt TTL/CMOS Logic levels. Relays - All but one SPDT sealed relays utilizing bifurcated-crossbar silver alloy with gold overlay contacts, 1 amp @ 30 vdc, (2 x DPDT for program switcher). NOTE: For safety, do NOT connect 120 Vac circuits to these Relays! Open collectors - 15 vdc @ 100ma each.
Silence delay:	2 seconds to 85 minutes, in 2 or 20 second increments, via an 8-position dipswitch and Jp-1.
Restore delay:	Off to 42 minutes in 2 or 20 second increments, via an 8-position dipswitch and Jp-1. This feature may be defeated.
Logic:	Microprocessor with nonvolatile memory.
Interfacing:	Audio& Remote Control - Plug-in euroblock screw terminals, dual-row 18 position. Mate Supplied. Power - 2.1 mm barrel.
Power Requirements:	16 VAC ONLY, 600 ma. 120 Vac 50-60 hz transformer. Supplied.(optional CE 240 Vac 50-60 Hz)
Physical Dimensions:	5.65" x 6.50" x 1.55" (WDH)
Weight:	2 pounds.
Options:	RA-1 rack shelf, holds three units (1-RU), filler panels supplied

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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.

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ADDENDUM

November 19, 2007

Changes to the Broadcast Tools® SM-III with version 1.16 firmware. Please check the label on U4 for the correct firmware version.

Restore timing setup:

The SM III Plus restore time delay is set via SW 2, the first six positions of the dipswitch and Jp-1. The default for this jumper is installed. This provides TWO second resolutions. To provide longer time resolution, remove and stow Jp-1, which will provide 20 second resolution. The switches are set at the factory for off. Each switch has a digit value as shown in the two tables below. For the factory default setting. Please note the table below refers to the restore time delay in seconds.

Restore Delay

SW-2 Switch Position and Jp-1 installed.
Digit Value

Two (2) Second Resolution Table

1	2	3	4	5	6	7	8
1	2	4	8	16	32	Note 1	Note 2

EXAMPLES:

1 = 2 seconds

1 + 2 = 3 x 2 = 6 seconds

1 + 2 + 4 = 7 x 2 = 14 seconds

32 x 2 = 64 seconds, or

1 minute and 4 seconds

Restore is turned OFF.

ON ↑ OFF ↓ OFF ↓ OFF ↓ OFF ↓ OFF ↓
ON ↑ ON ↑ OFF ↓ OFF ↓ OFF ↓ OFF ↓
ON ↑ ON ↑ ON ↑ OFF ↓ OFF ↓ OFF ↓

OFF ↓ OFF ↓ OFF ↓ OFF ↓ OFF ↓ ON ↑
OFF ↓ OFF ↓ OFF ↓ OFF ↓ OFF ↓ OFF ↓

Restore Delay

SW-2 Switch Position and Jp-1 removed.
Digit Value

Twenty (20) Second Resolution Table

1	2	3	4	5	6	7	8
1	2	4	8	16	32	Note 1	Note 2

EXAMPLES:

1 = 20 seconds

1 + 2 = 3 x 20 = 60 seconds or

1 minute

1 + 2 + 4 = 7 x 20 = 140 seconds

or 2 minutes and 20 seconds

32 x 20 = 640 seconds or 10

minutes and 40 seconds.

Restore is turned OFF.

ON ↑ OFF ↓ OFF ↓ OFF ↓ OFF ↓ OFF ↓
ON ↑ ON ↑ OFF ↓ OFF ↓ OFF ↓ OFF ↓
ON ↑ ON ↑ ON ↑ OFF ↓ OFF ↓ OFF ↓

OFF ↓ OFF ↓ OFF ↓ OFF ↓ OFF ↓ ON ↑
OFF ↓ OFF ↓ OFF ↓ OFF ↓ OFF ↓ OFF ↓



NOTE 1:

SW2-7 now has two independent functions. When OFF, the SM-III switches back to input one from input two when the alarm is cleared or the audio returns. When ON it allows the SM-III to stay at input two after the alarm is cleared or the audio returns.

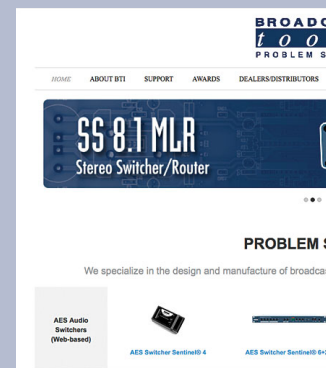


NOTE 2:

SW2-8 now has two independent functions. When OFF, the SM-III is armed at start-up. When ON, the SM-III is NOT armed at start-up.

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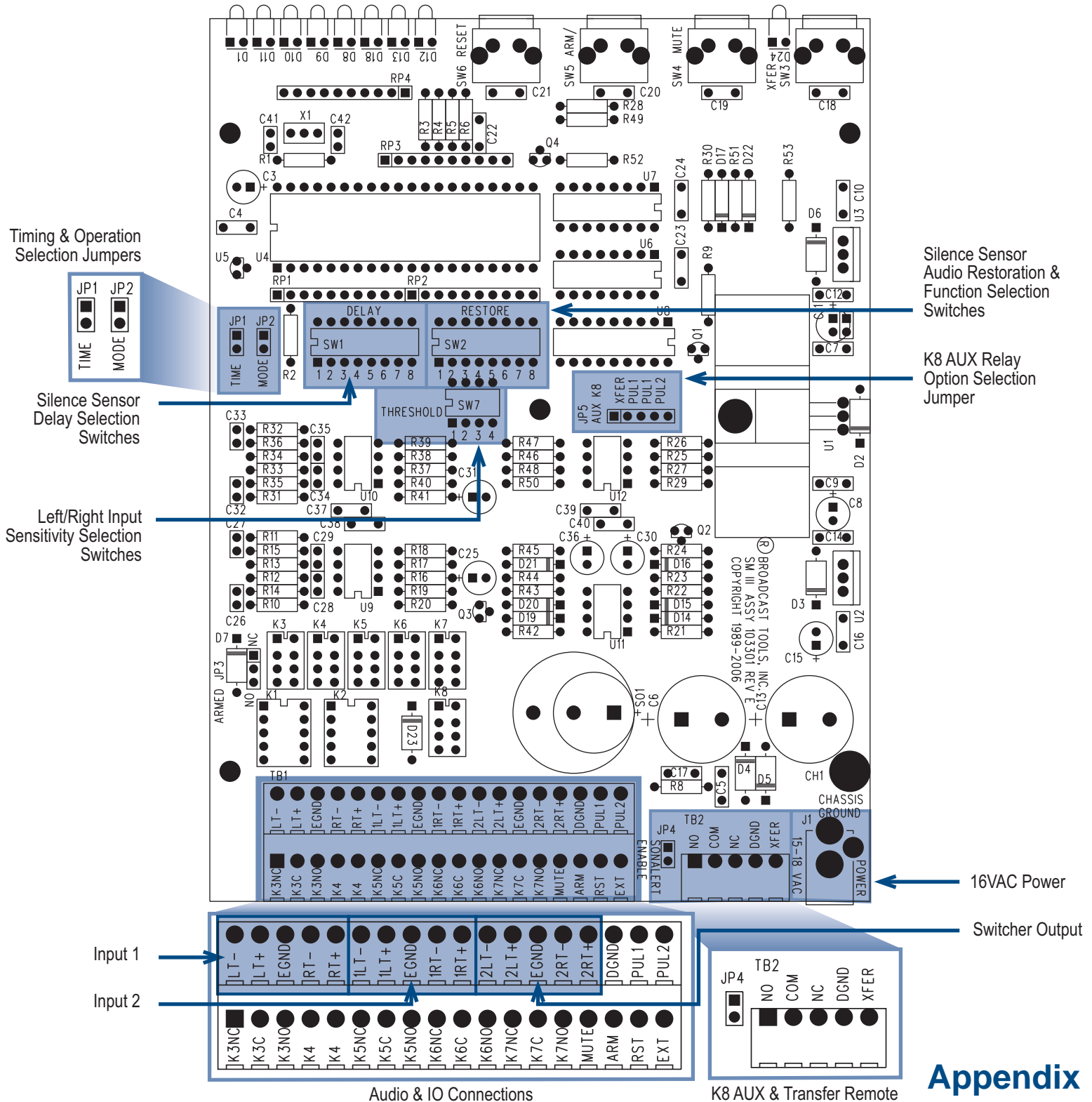


ADDENDUM



Broadcast Tools® SM-III Plus Silence Monitor

Switches, Jumpers and Connectors Layout



Appendix

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Functional Diagram

