BROADCAST tools INC

PROBLEM SOLVED

Installation and Operation Manual

ACS 8.4 G2
Eight Input, Four Output Stereo Audio Matrix Switcher

Firmware Version 0.5 and above
Manual update: 3/18/2025
If you need a firmware upgrade, contact Broadcast Tools®

NOTE: We recommend the use of Chrome, Firefox or Safari as your browser.

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Table of Contents

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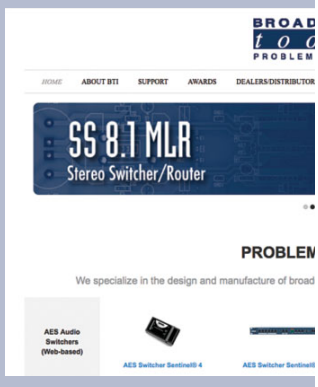

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INTRODUCTION

Thank you for your purchase of a Broadcast Tools® ACS 8.4 G2 Eight Input, Four Output Stereo Audio Matrix Switcher (referred to as the ACS 8.4 G2 throughout this manual). We are 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® ACS 8.4 G2.

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:

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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.

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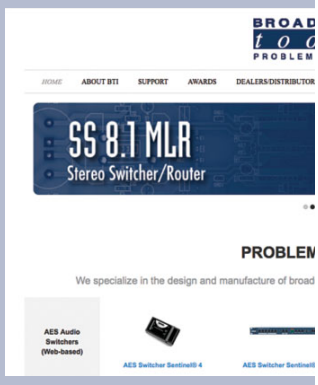

Product Description

The Broadcast Tools® ACS 8.4 G2 provides matrix audio switching of 8 stereo inputs to 4 stereo outputs. Matrix switching allows any/or all inputs to be assigned to any/or all outputs, this model of switcher is not equipped with fading capabilities. The ACS 8.4 G2 may be controlled via its front controls, contact closures/open collectors, multi-drop RS-232 serial port, and/or TCP/UDP Ethernet. Installation is simplified with RJ45 audio jacks for input and output connections and plug-in euroblock screw terminal connectors for remote control.

Features

- 8x4 balanced analog stereo matrix audio switcher, this model of switcher is not equipped with fading capabilities.
- Front panel input and output selection switches.
- 16 input "PIP" (GPI / Triggers) port (or remote control) with front panel LED indicator.
- Multi-drop RS-232 serial and TCP/UDP Ethernet interface with ASCII command protocol for computer/automation control.
- Three audio switching modes: Interlock, overlap, and mix.
- Internal silence sensors monitor each output and provide front panel LED silence indicators and silence alarm contact closures. Trip level, silence delay and restore duration timing are user configurable.
- Front panel stereo LED VU meters, switchable between outputs.
- Stereo headphone output with front panel headphone jack and level control, switchable between outputs.
- Configurable power-up selection of inputs to outputs, mute or last source selected.
- 16 SPST relay outputs with selectable function modes.
- Rear panel multi-turn input level trimmers and internal single turn output level controls.
- Electronically balanced stereo inputs and outputs with low noise, low distortion circuitry.
- Configuration options via rear panel dipswitches.
- RJ45 audio jacks for audio I/O and plug-in euroblock screw terminals for PIP trigger/ remote-control connections.
- Backwards compatible with ACS 8.2 Plus serial commands using emulation mode.
- Fully RFI proofed.
- 1-RU 19" aluminum rack enclosure.
- Surge protected external universal switching power supply (100 - 240 VAC / 50/60 Hz input) with IEC input plug with domestic AC power cord.

Applications

Broadcast automation audio switcher with trigger inputs, studio source selector, IP codec source selector, and transmitter site (STL) source selector.

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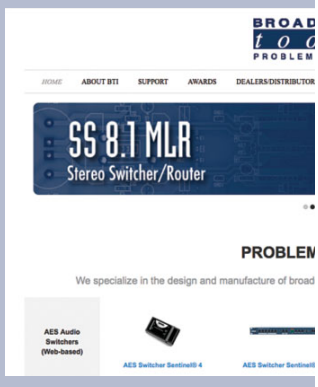

Inspection

Please examine your ACS 8.4 G2 carefully for any damage that may have been sustained during shipping. If any is discovered, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package contains the ACS 8.4 G2, universal desktop power supply with 5-pin DIN connector, Ethernet patch and crossover cables, and a reversed modular serial cable with the "S9" 9-pin D-Sub adapter. Manuals can be downloaded from our web site.

It is recommended that all cables connected to the ACS 8.4 G2 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 supply.

Mounting

The ACS 8.4 G2 is designed to be rack mounted in a standard 19" rack. It should be mounted in an area that is accessible from the rear and preferably away from sources of heat. We recommend that you bench test and become familiar with the operation of the ACS 8.4 G2 before permanently installing it.

Power Supply Connection

Insert the universal AC input, multi-voltage DC switching power supply's 5-pin DIN connector into the power receptacle on the rear panel of the ACS 8.4 G2. When ready, plug the power supply into the appropriate AC receptacle.
CAUTION! Only use the power supply provided with this product.

UPS Standby Power System

We recommend that you power your ACS 8.4 G2 from an uninterruptable power supply (UPS) system. A UPS, like the "BE600M1" from APC, helps minimize the risk to the ACS 8.4 G2 and provides power during a power outage.

Chassis Ground screw (CHS GND)

The #6-32 sized chassis ground screw should be tied to the station (house) or system ground.

CAUTION!

Installation of the ACS 8.4 G2 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 on each channel. The station ground should be connected to the chassis ground screw (GND) located on the right side of the chassis as viewed from the rear. For lightning protection devices, check out www.polyphaser.com and www.itwlinx.com.

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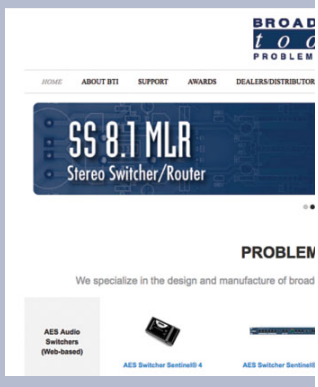

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Function Description

Front Panel

The ACS 8.4 G2 is a 1-rack unit device (19”w x 1.75”h x 10”d). The front panel features 14 selection switches, 43 LED indicators, a headphone and LED VU meter output monitor selection switch, headphone jack and headphone level control. The switcher can be configured for the following audio switching modes via dipswitch:
Overlap (default): Overlaps the selected (first) audio input with the audio from the new audio input while the button for the new source is held down. Both channels will be fed to the output until the button for the new audio input is released and pressed again, at which time the first audio source will be switched off.
Interlock: Connects one input to an output, selecting another input disconnects all other inputs from that output.
Mix: Multiple inputs may be routed to the output – Push the take button once to connect, to mute, press the take button again.

Front Panel LEDs

Front Panel LED’s	Number	Activation Event/Mode	Activation Behavior
Input connected to “OP 1”	8 Green	State of connection	ON if connected
Input connected to “OP 2”	8 Green	State of connection	ON if connected
Input connected to “OP 3”	8 Green	State of connection	ON if connected
Input connected to “OP 4”	8 Green	State of connection	ON if connected
“SS” 1-4, Silence Alarm on each output.	4 Red	Duration of silence	ON when silence is detected.
“Mon Sel” Monitor Select	4 Green	Output selected for VU/headphone monitoring	ON when output selected.
“PIP” (Triggers) input activated.	1 Yellow	Any valid “PIP” / Trigger input, when enabled.	ON when PIP inputs are triggered.
“Link” TCP Ethernet connection	1 Red	TCP Ethernet connection active	ON when connected.
“PWR/Ser” Status	1 Green	Valid power and/or serial data.	ON, but flickers with serial data activity.

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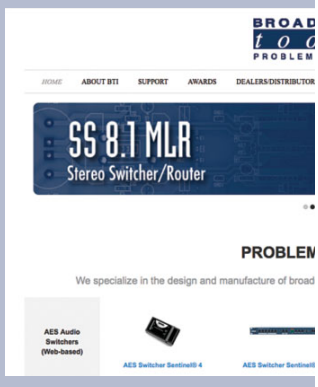

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Front Panel Operation

Action	Result
? Hold down the Output 1 button ? Push the Channel Button	Channel is connected to output 1. To mute the active channel, simultaneously hold down the mute switch and press the desired input channel button.
? Hold down the Output 2 button ? Push the Channel Button	Channel is connected to output 2. To mute the active channel, simultaneously hold down the mute switch and press the desired input channel button.
? Hold down the Output 3 button ? Push the Channel Button	Channel is connected to output 3. To mute the active channel, simultaneously hold down the mute switch and press the desired input channel button.
? Hold down the Output 4 button ? Push the Channel Button	Channel is connected to output 4. To mute the active channel, simultaneously hold down the mute switch and press the desired input channel button.

Rear Panel

The ACS 8.4 G2's rear panel hosts the audio and remote-control connectors, chassis ground terminal, multi-drop RS-232 modular connector, Ethernet, and 5-pin DIN universal power supply connector. Installation is simplified with RJ45 jacks for balanced audio I/O and plug-in euro-block screw terminals triggers/remote control.

RS-232 Serial Port (RJ-11 Jack):

This RJ-11 jack is used to connect the ACS 8.4 G2 to a computer's COM port for RS-232 serial operation using the included reverse modular cable with 9-pin "S9" female D-sub adapter. If your PC does not have a built-in RS-232 serial port but does have USB, then a USB-to-serial adapter cable is a good way to add USB serial capability. We recommend USB-to-serial adapters that use the FTDI chipset and have had good results with the model "SBT-FTDI" from Sabrent.

NET/LAN Ethernet Port :

The 10/100 Ethernet port is used to connect the ACS 8.4 G2 to network for control via telnet/TCP or UDP socket connections. See the "Ethernet" and "Programming" sections of this manual for more information.

Resetting Ethernet Settings to Defaults

Network Defaults may be restored by depressing the recessed front panel Def. (Defaults) switch, applying power to the unit, and holding down the switch for five seconds after power up.

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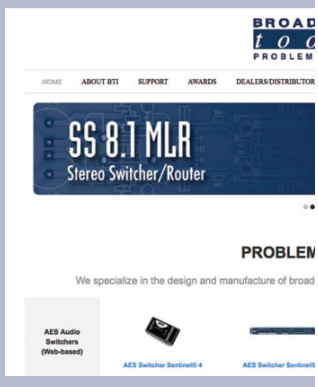

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Audio Inputs

Each of the eight stereo inputs are balanced bridging (20K) at a nominal line level of +4dBu. Input levels may be adjusted via rear panel multi-turn input level trimmers. Each input interfaces to external equipment via RJ45 audio jacks for analog audio signals.

Audio Outputs

The ACS 8.4 G2 provides four balanced low impedance stereo outputs. The output levels may be adjusted with the internal single-turn trimmers.

CAUTION: In no case should either the + or - OUTPUTS be connected to ground.

Connecting the Audio Inputs and Outputs

The input channels are numbered from 1 through 8 on the rear panel and the output channels are numbered from 1 to 4. The ACS 8.4 G2 interfaces to external audio equipment through RJ45 jacks using the standard audio pinout. Follow the RJ45 connection tables below for the desired audio input and output connections, which appear on the rear of the unit.

Input 1 RJ45	**Input 3** RJ45
Input 2 RJ45	**Input 4** RJ45

RJ45 Audio Input Jacks (J6)

Input 5 RJ45	**Input 7** RJ45
Input 6 RJ45	**Input 8** RJ45

RJ45 Audio Input Jacks (J7)

Output 1 RJ45	**Output 3** RJ45
Output 2 RJ45	**Output 4** RJ45

RJ45 Audio Out Jacks (J5)

RJ45 Audio Jack Pinout:

The input and output RJ45 jacks conform to the RJ45 audio wiring standards. Please use shielded twisted pair Cat5e or Cat6 cables and connectors (STP).

Function:	Wire Pair:	RJ45 Pins:
Left+	White/Orange	1
Left-	Orange/White	2
Right+	White/Green	3
Right -	Green/White	6
n/c	White/Blue	5
DC GND	Blue/White	4
n/c	White/Brown	7
n/c	Brown/White	8
GND	Shield	Shield

CAUTION!

Installation of the ACS 8.4 G2 in high RF environments should be performed with care. The station ground should be connected to the designated "Chs Gnd" ground terminal.

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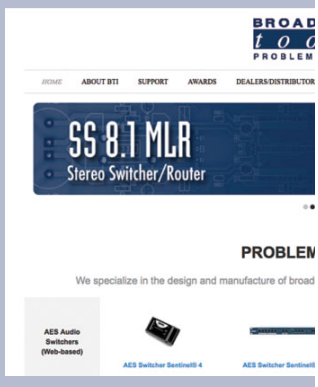

Installation Guidelines

Cable Preparation

The terminal block connectors used for triggers/remote-control connections accommodate wire sizes from 16 - 28 AWG, solid or stranded. Before installing a wire, remove the euro-block screw terminal plug and turn each terminal 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. Verify that no bare/stray wires are exposed.

Audio Input and Output Level Adjustment

Once the input and output connections have been made, the input levels can be adjusted. The switcher is calibrated for unity gain at the factory so normally no additional adjustment is necessary. Recommended average input levels are in the range of 0 dBu to +8 dBu. Should input levels need to be changed, trimmers are accessible from the rear panel. Each stereo input is labeled and has two trimmers, one for the left channel and one for the right channel. The factory input level configuration the input trimmer will have around 1.5db of additional gain available, and several dB of attenuation available. If additional system gain is needed, use the internal output level trimmers.

Calibrating audio levels on the switcher:

1 – Remove power from the unit and remove the top cover.
2 – Feed a reference signal into input channel 1. A 2 kHz sine wave test tone at +4 dBu is used at the factory. Connect a Hi-Z dB meter to the TEST jack JP5.
3 – Re-apply power. Adjust the left and right input 1 trimmers to a zero level on your dB meter.
4 – Disconnect the dB meter from JP2 and connect a balanced stereo input dB meter to the output. Adjust the output trimmer R335 (Output 1 Left) and R351 (Output 1 Right) for the desired output level. +4 dBu is set at the factory. Make sure input 1 to output 1 is selected using the front panel controls. Repeat this step for Output 2 (R371, R386), Output 3 (R18, R33), and Output 4 (R51, R68).
5 – Once input 1 and the four outputs have been calibrated the rest of the inputs may be calibrated by routing them to output 1 and adjusting the input level trimmers.

PIP / Trigger / Remote Control Inputs

The ACS 8.4 G2's has 16 PIP/Trigger inputs which have two operation modes: PIP (triggers) and remote control. From the factory the ACS is configured for PIP mode, The operation mode is set by the switch number 8 on the Options dipswitch (SW2-8) located on the ACS's rear panel. When SW2-8 is OFF the unit is in remote control mode and when SW2-8 is ON the unit is in PIP ('triggers") mode. The PIP/remote control connections to the switcher are found on the top row of the 18-positon euro-block connector TB1. Each channel is pulled high (5-volts) through a 22K resistor and is considered ON when connected to ground (pulled low.)

In PIP ("triggers") mode (SW2-8 ON) the inputs supply status to any serial polling device (when the unit ID is set to 0 (ZERO) no polling of inputs is required). Response time is set for 50ms but may be configured from 40ms to 2.54 seconds. For information on the PIP serial status commands and syntax refer to the serial burst mode commands section of this manual.

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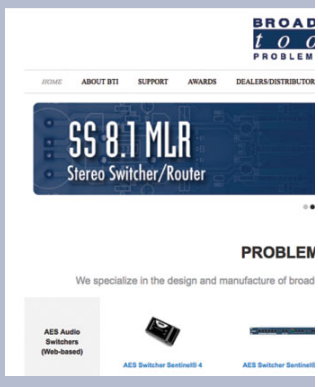

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In remote control mode (SW2-8 OFF) there are remote control inputs for each of the 8 audio input channels along with each of the 4 outputs, Mute, Monitor Select, and Macros. For example: to route input 1 to output 1 trigger the "Input 1" remote control pin and the "Output 1" remote control pin at the same time, just as you would need to hold down the OP1 button on the front panel and press the Input 1 button to do so via the front panel controls. To recall a saved macro (1-16), the macro input must be triggered along with the input number (1-16). Typically, in these situations you'll want to use steering diodes when triggering more than one remote control input with a single switch or relay contact.

(Top row, TB-1)

Remote Control Mode (SW2-8 = OFF)

Pin	Function	Label
1	Input	INPUT 1
2	Input	INPUT 2
3	Input	INPUT 3
4	Input	INPUT 4
5	Input	INPUT 5
6	Input	INPUT 6
7	Input	INPUT 7
8	Input	INPUT 8
9	Input	MUTE
10	Input	OUTPUT 1
11	Input	OUTPUT 2
12	Input	OUTPUT 3
13	Input	OUTPUT 4
14	Input	Mon. Select
15	Input	(unused)
16	Input	Macro Select
17	GND	Ground
18	GND	Ground

PIP Mode (SW2-8 = ON, Default)

Pin	Function	Label
1	Input	PIP 1
2	Input	PIP 3
3	Input	PIP 3
4	Input	PIP 4
5	Input	PIP 5
6	Input	PIP 6
7	Input	PIP 7
8	Input	PIP 8
9	Input	PIP 9
10	Input	PIP 10
11	Input	PIP 11
12	Input	PIP 12
13	Input	PIP 13
14	Input	PIP 14
15	Input	PIP 15
16	Input	PIP 16
17	GND	Ground
18	GND	Ground

Silence Sensors

Each of the four outputs on the ACS 8.4 G2 are monitored by silence sensors. The factory default alarm delay is set at 10 seconds, while the restore time is set at two seconds. The silence sensors are disabled by default and can be enabled via burst commands or menu mode. When enabled, upon silence delay detection, the appropriate "SS" led will illuminate and the corresponding relay will close for the duration of the silence. Output 1 silence sensor will close relay K13 when silence is detected, the Output 2 silence sensor will close relay K14, the Output 3 silence sensor will close relay K15, the Output 4 silence sensor will close relay K16. This overrides the pulse, latch, and follow mode operation of the relays and follows the silence alarm and restore time.

The silence sensors may be programmed for:

- The Number of seconds of silence (delay) that must be present before an alarm state is triggered.
- The number of seconds that valid audio (restore) must be present before an alarm is cleared.
- Alarm threshold: -20, -25, -30, -35, or off (disabled).

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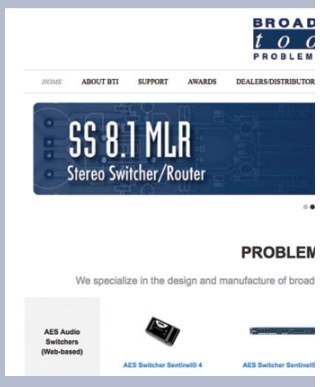

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Relay Outputs

The ACS 8.4 G2's sixteen SPST relay outputs can be used to control external equipment using contact closures. The relays are controlled by serial commands. Each relay can be commanded by serial command to: pulse, latch on, or latch off. The relay connections are located on pins 1-17 of the bottom TB-1 terminal block connector.

Alternatively, Follow Mode can be enabled via serial command. In Follow Mode relays K1-8 will close providing status for Output 1 and relays K9-16 will close providing status for Output 2.

If enabled, the Output 1 silence sensor will close relay K13 when silence is detected, the Output 2 silence sensor will close relay K14, the Output 3 silence sensor will close relay K15, the Output 4 silence sensor will close relay K16. This overrides the pulse, latch, and follow mode operation of the relays and follows the silence alarm and restore times.

(Bottom row, TB-1)

Pin #	Function	Label
1	Output	K1NO (Normally Open)
2	Output	K2NO (Normally Open)
3	Output	K3NO (Normally Open)
4	Output	K4NO (Normally Open)
5	Output	K5NO (Normally Open)
6	Output	K6NO (Normally Open)
7	Output	K7NO (Normally Open)
8	Output	K8NO (Normally Open)
9	Output	K9NO (Normally Open)
10	Output	K10NO (Normally Open)
11	Output	K11NO (Normally Open)
12	Output	K12NO (Normally Open)
13	Output	K13NO (Normally Open)
14	Output	K14NO (Normally Open)
15	Output	K15NO (Normally Open)
16	Output	K16NO (Normally Open)
17	Output	K-COM (Relay Common)
18	Ground	GND

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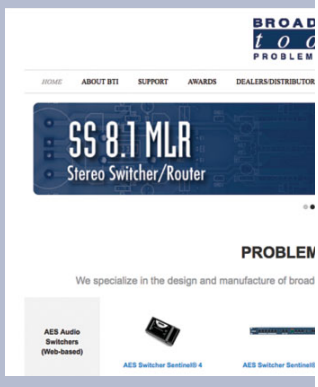

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Configuration Dip-switch Setup

The ACS 8.4 G2 is equipped with an 8-position configuration dipswitch labelled SW2. The dipswitch specifies a 2-bit unit ID, serial baud rate, audio modes (mix, interlock, overlap), and other features. Follow the configuration description below.

"OPTIONS" SW2 Dip-switch Functions

1	OFF	Unit ID binary address 1 **(Default ID = 0)**
2	OFF	Unit ID binary address 2
3	OFF	Baud rate **(Default, OFF = 9600)**
4	OFF	Baud rate **(Default, OFF = 9600)**
5	OFF	Stereo Audio Switching **(Default = Overlap)**
6	OFF	Stereo Audio Switching **(Default = Overlap)**
7	OFF	Power up modes **(Default = Last source selected)**
8	**ON**	Remote Control / **"PIP / Triggers" (Default)**

Unit ID Address DIP-switches

Switch 1 (SW2-1)	Switch 2 (SW2-2)	Mode
OFF	OFF	ID = 0 (default)
ON	OFF	ID = 1
OFF	ON	ID = 2
ON	ON	ID = 3

Baud Rate DIP-switch

Switch 3 (SW2-3)	*Switch 4 (SW2-4)*	*Mode*
OFF	OFF	9600 (default)
ON	OFF	2400
OFF	ON	19200
ON	ON	38400

Audio Switch Mode DIP-switches

Switch 5 (SW2-5)	*Switch 6 (SW2-6)*	*Mode*
OFF	OFF	Overlap (default)
ON	OFF	Interlock
OFF	ON	Interlock
ON	ON	Mix

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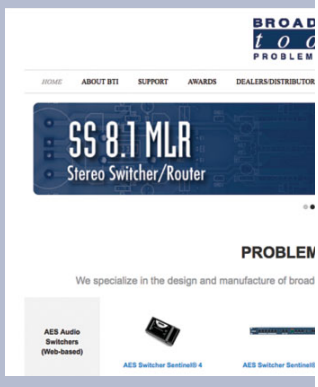

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Power-up Mode DIP-switch

Switch 7 (SW2-7)	Function
OFF	Use the Menu or serial "Burst" mode command ***0CPS** to store the current selected input/output configuration for power-up. (default)
ON	Last Source Selected

Remote / "PIP" (Triggers) Mode DIP-switch

Switch 8 (SW2-8)	Function
OFF	Remote Control
ON	"PIP"/Triggers enabled (default)

ACS 8.2 Plus Emulation Mode

The ACS 8.4 Plus firmware has an emulation mode designed to allow it to work with automation systems designed for the ACS 8.2 Plus without the need for any changes to automation software's configuration. ACS 8.2 Plus emulation mode is enabled via serial burst command or the serial setup menu described later in this manual. When enabled, emulation mode causes the 8.4 to present itself as an 8.2 and uses the ACS 8.2 Plus serial command protocol, which means outputs 3 and 4 will not be reported automatically. However, emulation mode allows manual control of the "extra" outputs, outputs 3 and 4, as well as some serial control of the extra outputs when the command doesn't conflict with existing ACS 8.2 commands.

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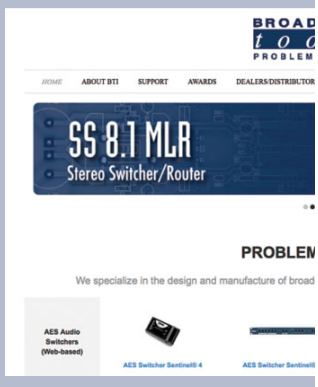

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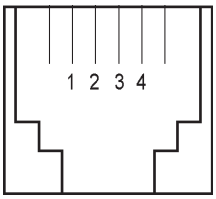
Operation Guidelines

Connecting the RS-232 Serial Port

The multi-drop RS-232 transceiver always switches between transmit and receive mode, unless the unit ID is zero. In that case, the unit will always leave the RS-232 transceiver enabled. Use the provided modular (S9) 9-pin D-sub connector adapter and reversed modular cord to connect the ACS 8.4 G2's serial connector to your serial port.

The pin out of the adapter is shown below

RJ-11 Adapter Pin	DB-9 D-SUB Pin #	view Function Name.
4	3	RS-232 Receive
3	2	RS-232 Transmit
2	5	Ground



Modular connector's point of view.

The ACS 8.4 G2 is supplied with a standard reverse modular (RJ11 6p4c) telephone voice cable and a Broadcast Tools S9, 9-pin female D-sub modular adapter for serial control. Only use the modular cord that is supplied with the ACS 8.4 G2 or a replacement that reverses (X-over). Connect the cable between the ACS 8.4 G2 and your computer's COM port or USB adapter cable (optional). The ACS 8.4 G2 may be serially controlled at baud rates of 9600 or 38400 baud. The unit is shipped set for 9600 baud, with 8 data bits, no parity and one stop bit. Use a serial terminal like PuTTY, Tera Term, or HyperTerminal using the protocol of 9600-N-8-1. Set the mode to: DIRECT, Flow Control to: NONE and emulation to: ANSI. PuTTY and HyperTerminal set up instructions are available on our web site under "Downloads".

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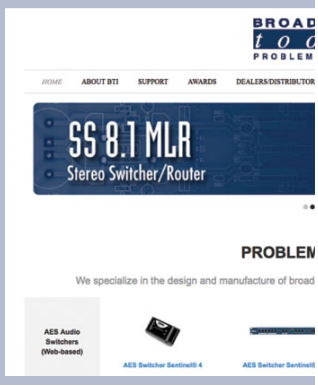

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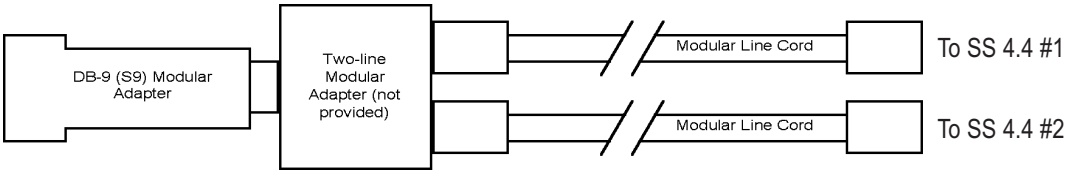
Connecting Multiple ACS 8.4 G2's to a Single Serial Port

Multiple ACS 8.4 G2 switchers may be cascaded serially to operate from the same serial port. The first step is to assign unit IDs to each ACS 8.4 G2. For example: you can assign unit ID 1 to the first switcher and unit ID 2 to the second switcher. You must parallel the serial ports of the ACS 8.4 G2's, to do this plug the male end of a duplex modular adapter (Allen-Tel AT202-6) into the supplied female (S9) DB-9 to RJ-11 adapter, then attach the supplied modular line cords into each of the duplex modular adapter receptacles and the other ends into each ACS 8.4 G2 modular receptacles. See the diagram below.

NOTE: Up to four ACS 8.4 G2's may be daisy chained by using the above description and an Allen-Tel AT150, 5-jack modular adapter.



Serial/Ethernet Burst Mode Commands

The burst mode allows a computer or ASCII terminal (RD-232 serial or TCP/UDP Ethernet) to control and interrogate the unit. This section defines all burst mode commands accepted by the ACS 8.4 G2. Each burst mode command starts with an asterisk (*) followed by a single decimal digit that corresponds to the unit (ID) address 0-3 and one or more ASCII characters specifying the command. No carriage-return or linefeed is required to terminate the command except for those few commands of variable length if the maximum length is not sent. If the command requested a response, the response would consist of an upper case "S", followed by the unit address, and then the specific response. If acknowledgements 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.

Operation Guidelines

Glossary of Command Notation

Character String	Meaning	Allowable Values
u	Unit ID	0-3
ii	Input Number	01-08
o	Output Number	1-4
rr	Relay Output Number	01-16

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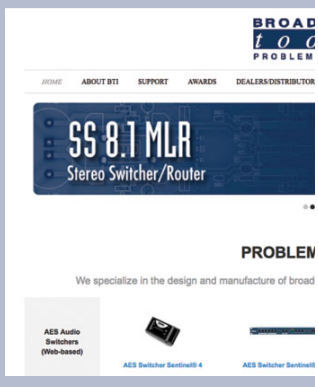

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Set-up Commands
*0MM - Open setup menu. Unit ID 0 only.

*uCEx - 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."

*uCFRx Set relays 1-8 to follow output 1, 9-16 to follow output 2. Where x = Y to enable and N = disable

*uCAs Enable ACS 8.2 Plus emulation mode. Where x = Y to enable and N = disable.

*uCDEF - Set factory default.

*uCIIttt - Set "PIP" Programmable Pulse Stretcher Input Duration = ttt: 000 –> 255 hundredths of seconds (255 = 2.55 Seconds)

*uCLx - Lock Front Panel if x is "L". Unlock Front Panel if x is "U"

*uCPR - Power up audio state: Restore audio from power up state

*uCPS - Power up audio state: Save power up state

*uCRtt - Set Relay Momentary Pulse Length – tt: 00-99 for 00 –> 9.9 Seconds

Silence Sensor Set-up Commands
*uCSAtttt - Set silence sensor time delay to tttt seconds (0002 – 9999), 0000 = OFF

*uCSBtttt - Set silence sensor restore delay to tttt seconds (0002 – 9999), 0000 = OFF

Relay Commands
*uORrrF - Unlatch output relay "rr"

*uORrrL - Latch output relay "rr"

*uORrrP - Pulse output relay "rr"

Note: Two-digit values 01-16 can be used to control relays K1-K16.

Audio Switch Control Commands

*uiio - Apply input "ii" to output "o"

*uiiA - Apply input "ii" to ALL outputs

*uiiEott - Start overlap - Apply input ii to output o. After tt tenths of a second, remove all other inputs from output o.

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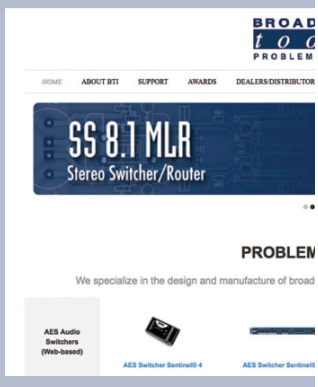

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NOTE: Only one at a time can be pending per output. Max time 9.9 seconds

*uE - End overlap if in overlap mode. This applies to all outputs that have changed since the last “end overlap” command was issued.

*uiiMA - Mute input “ii” for all outputs

*uiiMo - Mute input “ii” for output “o”

*uMo - Mute output “o”

*uMA - Mute all outputs

*uB,a,a,a,a,a,a,a,a Set all status ignoring mode: Lower 4 bits of A is channel #'s OR’d together + 1, upper 4 bits is 41.

NOTE: Input commands MUST be in CAPS.

A = all off
B = 1
C = 2
D = 1 + 2
E = 3
F = 3 + 1
G = 3 + 2
H = 3 + 2 + 1
I = 4
J = 1+4
K = 2+4
L = 1+2+4
M = 3+4
N = 1+3+4
O = 2+3+4
P = 1+2+3+4

Special MIX mode commands (the switcher doesn’t need to be in MIX mode).

*uii5 - For input “ii” output 1 ON without affecting any other audio status
*uii6 - For input “ii” set output 2 ON without affecting any other audio status
*uii7 - For input “ii” set output 3 ON without affecting any other audio status
*uii8 - For input “ii” set output 4 ON without affecting any other audio status
*uiiW - For input “ii” set output 1 OFF without affecting any other audio status
*uiiX - For input “ii” set output 2 OFF without affecting any other audio status
*uiiY - For input “ii” set output 3 OFF without affecting any other audio status
*uiiZ - For input “ii” set output 4 OFF without affecting any other audio status

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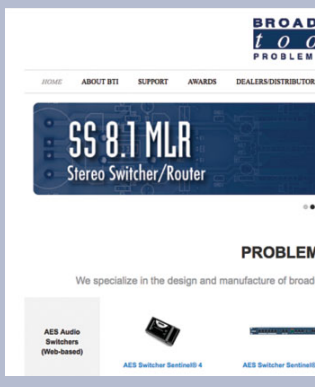

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Information Retrieval Commands

*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 receiving this command.

*uSL - Send Audio Status: SuLo,x,x,x,x,x,x,x,x<CR><LF>. “u” is unit ID, “o” is output, and “x” is “1”for connected; “0” for not connected for each respective input.

*uSPii - Send single input (GPI) PIP status. Response is “SuP,ii,x” where “x” is 0 if the corresponding input is high, 1 if low.

*uSPA - Send ALL input (GPI) PIP status. Response is:
“SuP,A,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x<CR><LF > where input 0 is first and input 15 is last. “x” is 0 if the corresponding input is high, 1 if low.

*uSR - Send status of all relays. Response is: SuR x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x<CR><LF> (0 = OFF).

*uSS - Send status of silence sensor: SuS,a<CR><LF> a = 0 (not silent), 1 = silent

*uU - Send Unit Information:<name)><version (><cr><lf Example: ACS8.4_Vx.x

*uY - Display configuration

Real Time Control Commands

*uDxx - Delay xx seconds before processing the next command.

*uDLxxx - Delay xxx seconds before processing next command.

*uZx - Echo character “x” to serial control port. This is useful in debugging command strings.

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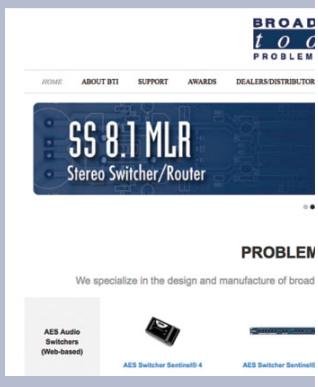

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Menu Mode

The command to enter menu mode is: *0MM. The menu mode displays certain parameters and allows for the control and/or configuration of most switcher functions. Menu mode is only available when the switcher is configured for Unit ID 0.

```
Broadcast Tools(R) ACS8.4 G2 V0.5 - Menu

   1 - PIP Min 0-2.55 sec Now:0.02 (sec)
   3 - SS Acq Time (sec) Now: 10
   4 - SS Rest Time (sec) Now: 10
   5 - SS Thresholds      Now:   Off, Off, Off, Off
   6 - 8.2 Emulation Mode Now:(Disabled)
   7 - Relay Pulse (sec) Now:1.0
   8 - Turn ON Audio XPOINT
   9 - Turn Off Audio XPOINT

   A - Save Audio for Powerup
   B - Select Audio Macro
   C - Save Audio Macro
   D - Set Defaults

--Audio Status--
 1->1 1->2 1->3 1->4

 Enter Choice, or Q to quit:
```

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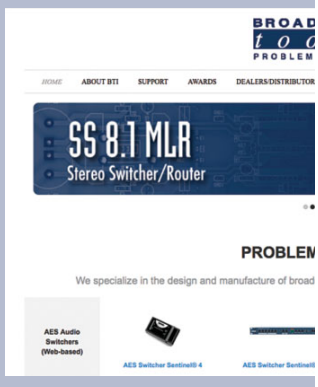

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Ethernet Setup and Operation

Ethernet "Quick Start" Guide

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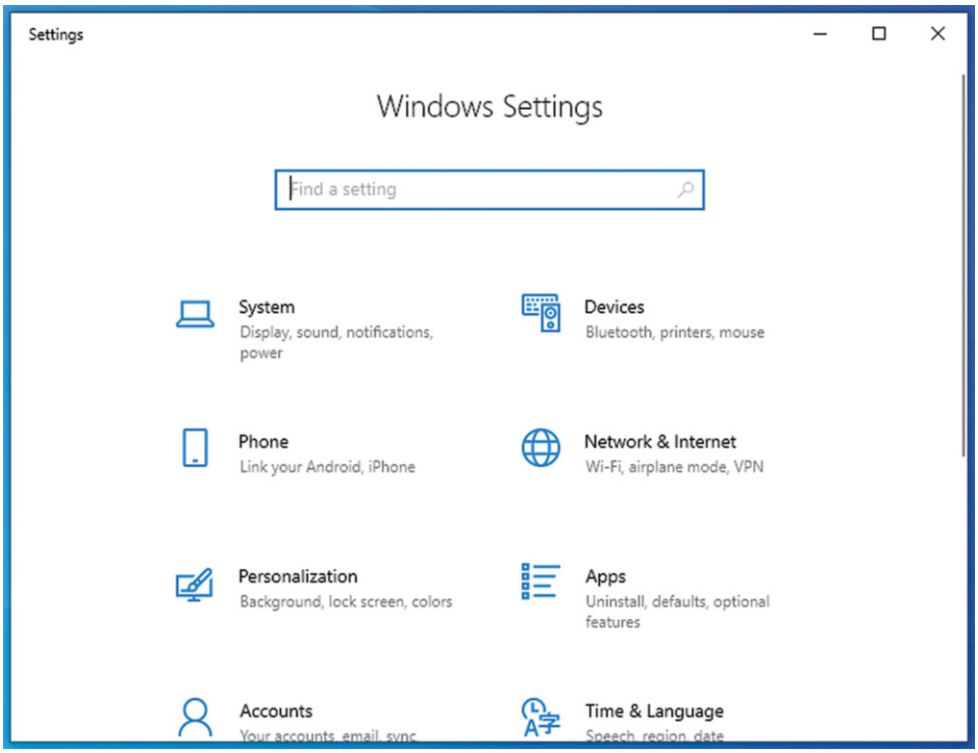
CAUTION! If you are not familiar with Ethernet-enabled equipment, it may be useful to contact your IT department, network administrator or network consultant for assistance. Assigning an IP address already in use by another device may cause problems with your network!

Instructions for changing the IP address of the computer that will be used for the configuration of this product are given here. Note that these instructions are specifically for computers with the Windows 10 operating system but will also work with Windows 7. For setup using other operating systems, refer to the appropriate OS user's manual.

Step 1: Open the control panel by clicking on the Start Menu, click on Settings, then click on Network & Internet.



NOTE:

We recommend the use of Chrome, Firefox, or Safari as your browser.

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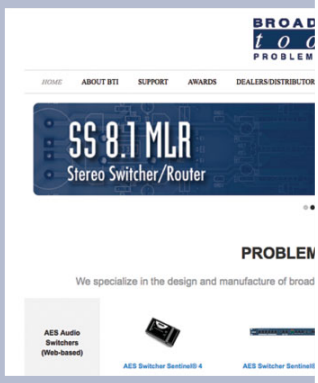

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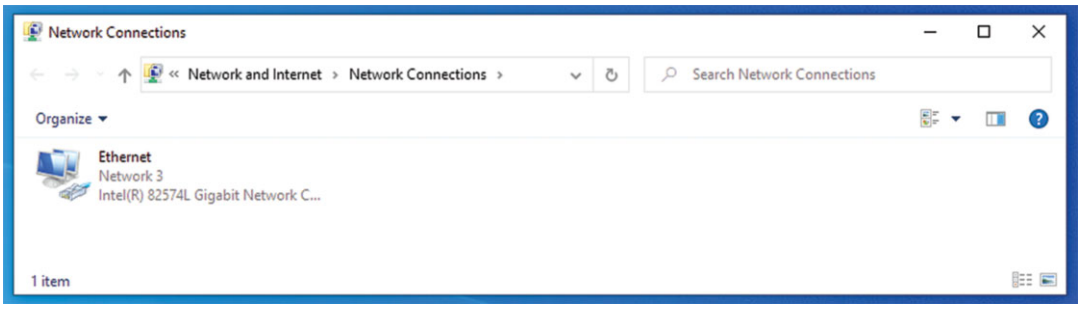
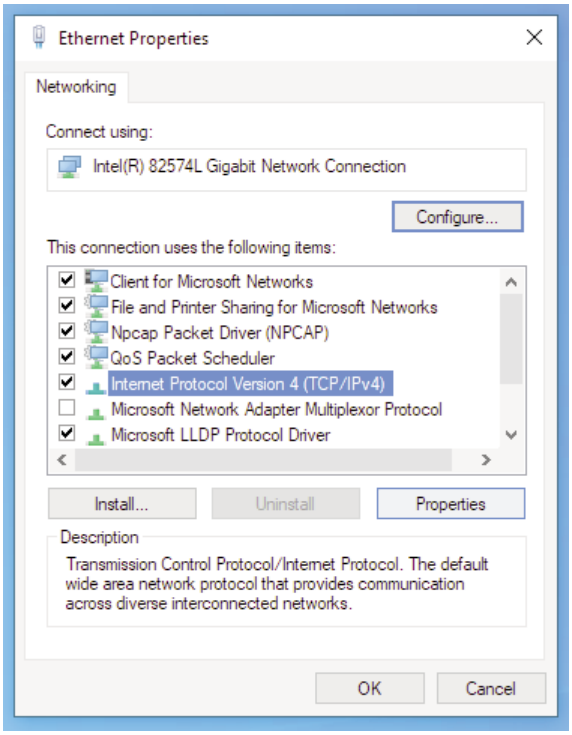
Step 2: Under Advanced Network Settings click Change adapter settings. The Network Connections windows will pop up, as shown below.



Step 3: Right click on the icon labeled Local Area Connection or Ethernet. A menu will appear. Select the option at the bottom of the menu labeled Properties. The Ethernet Properties window will appear.



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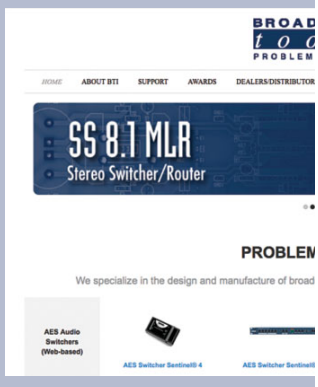

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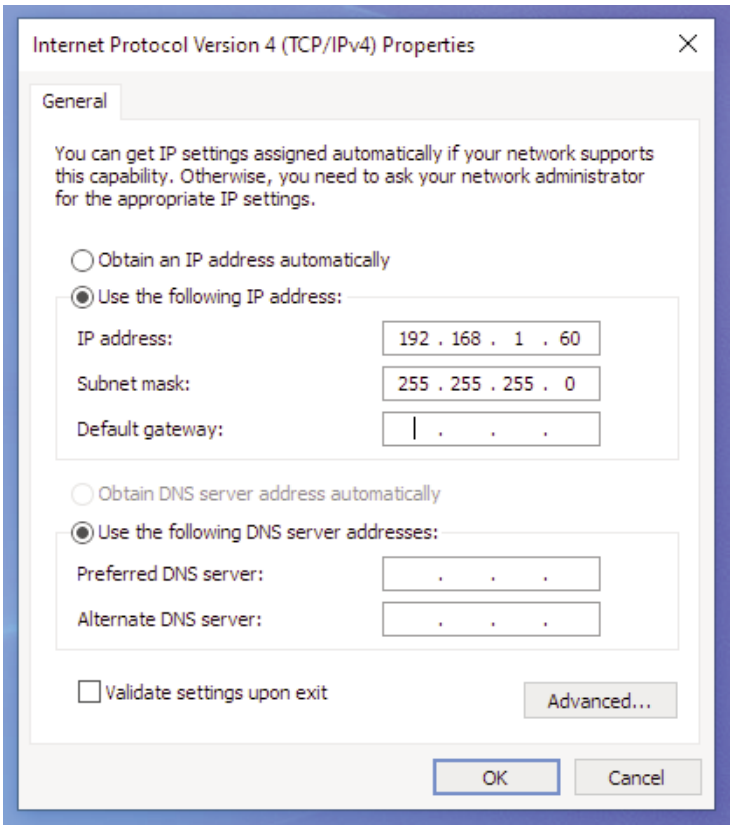
Step 4: On the Local Area Connection Properties page, double click on Internet Protocol (TCP/IPv4) to display properties.



Step 5: Before making any changes to the network settings, write down the current settings (or screen capture the page and print) so that they can be restored once the unit is configured. Next, select the radio button labeled "Use the following IP address" and type in the IP address 192.168.1.60. Type in the subnet mask of 255.255.255.0. Leave the default gateway field blank. Click OK to apply the new settings.

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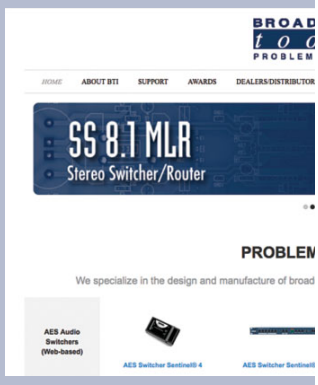

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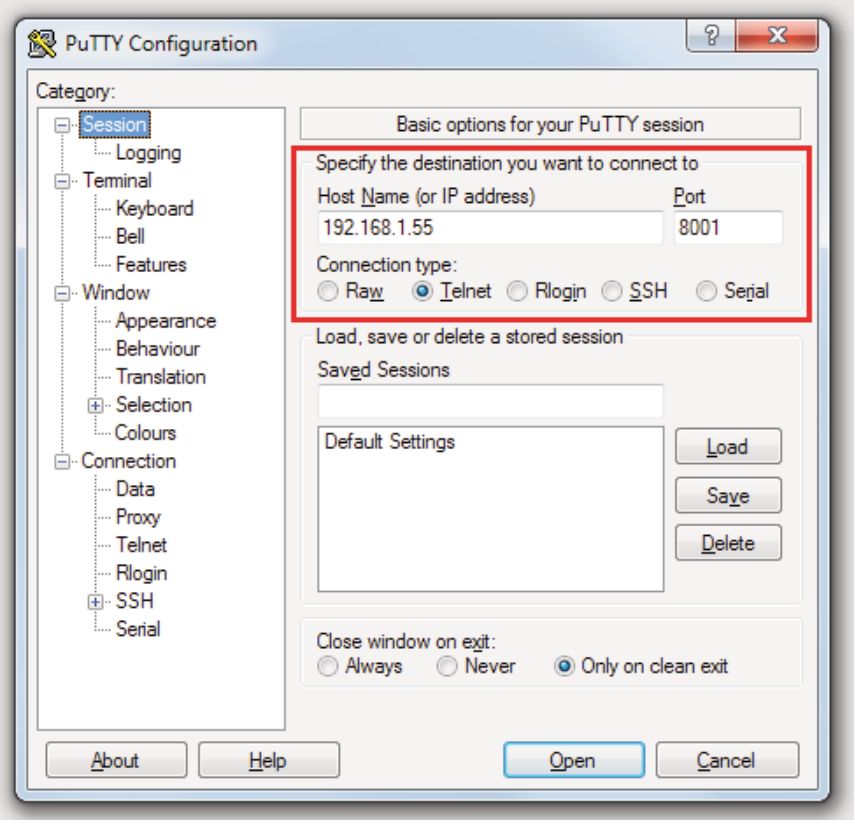
Connecting via the Ethernet "LAN/NET" port:

1. Connect the supplied GRAY colored XOVER cable between the PC's Ethernet port and the products "LAN/NET" network RJ45 jack.

2. Connect the included power supply to the ACS 8.4 G2. Verify that the green PWR LED is lit and the green "LINK" LED to the left of the "LAN/NET" Network RJ45 jack is illuminated.

3. Open terminal application PuTTY configured for a Telnet connection type to host 192.168.1.55 port 8001.



4. In PuTTY configuration > Terminal > Line discipline options set Local echo "Force on" and Local line editing to "Force off".

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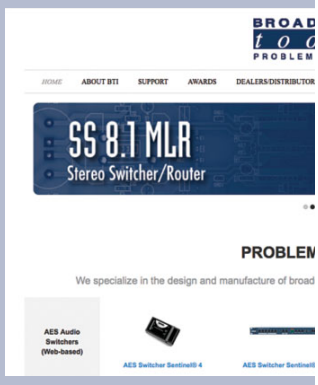

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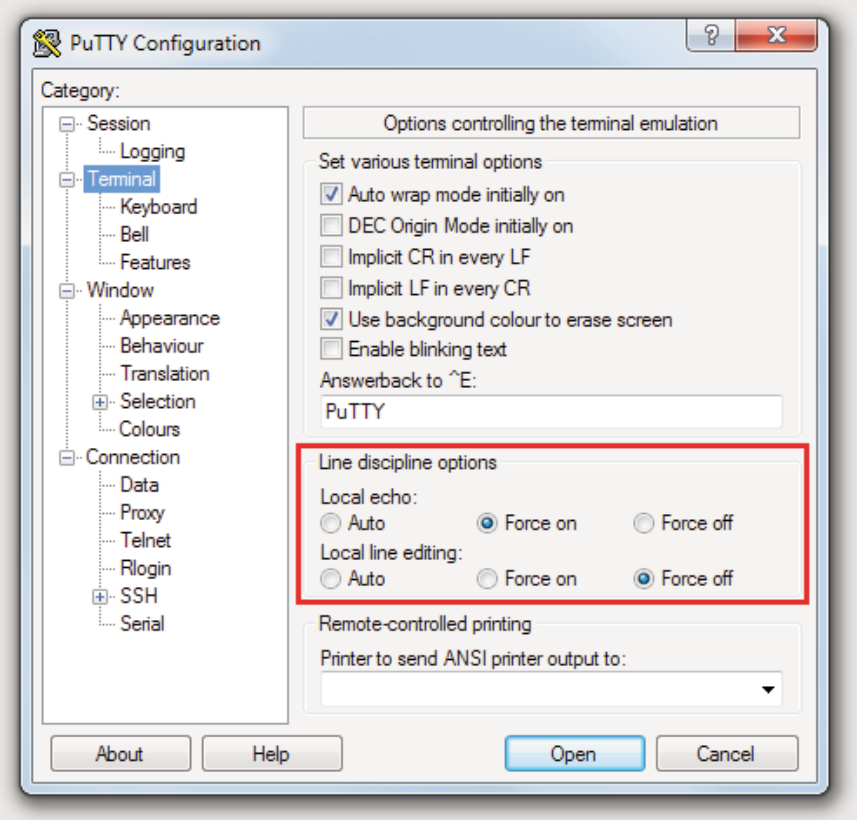
5. Click okay to connect to the ACS 8.4 G2 and type *0mm into the terminal window and press return to bring up the Menu. See: “Serial/Ethernet” section of this manual.

Changing network settings on the Ethernet “LAN/NET” port:

NOTE: We recommend the use of Chrome, Firefox, or Safari for as your browser.

1. Connect the supplied GRAY colored XOVER cable between the PC’s Ethernet port and the products “LAN/NET” network RJ45 jack.

2. Connect the included power supply to the ACS 8.4 G2. Verify that the green PWR LED is lit and the green “LINK” LED to the left of the “LAN/NET” Network RJ45 jack is illuminated.



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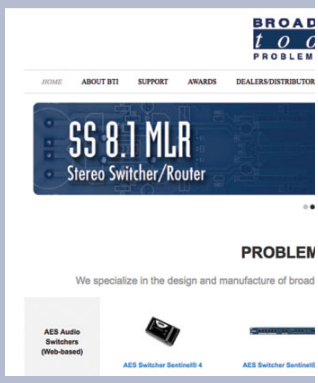

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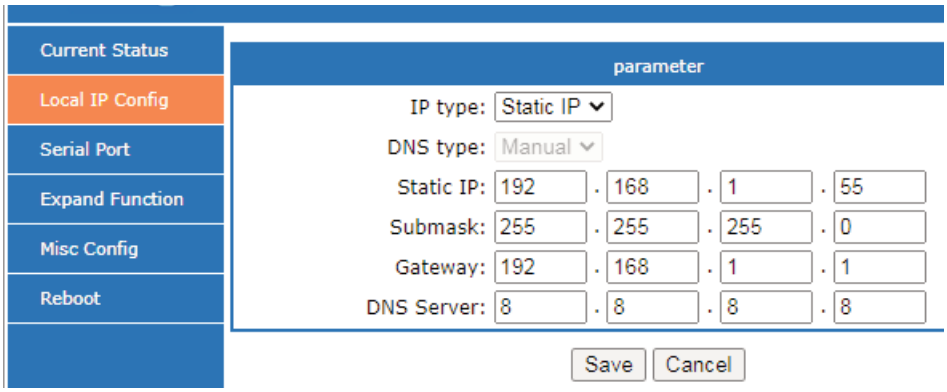
3. Open a web browser window and navigate to the ACS 8.4 G2's default IP address: http://192.168.1.55

4. When prompted to login, use the default login and password. Login: admin Password: 1234

5. To change the network settings, choose "Local IP Config" from the side bar:



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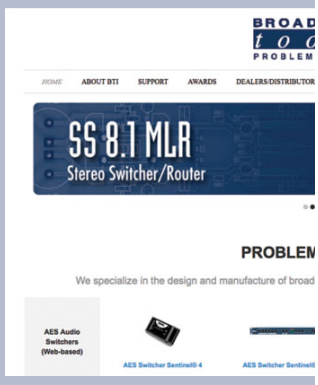
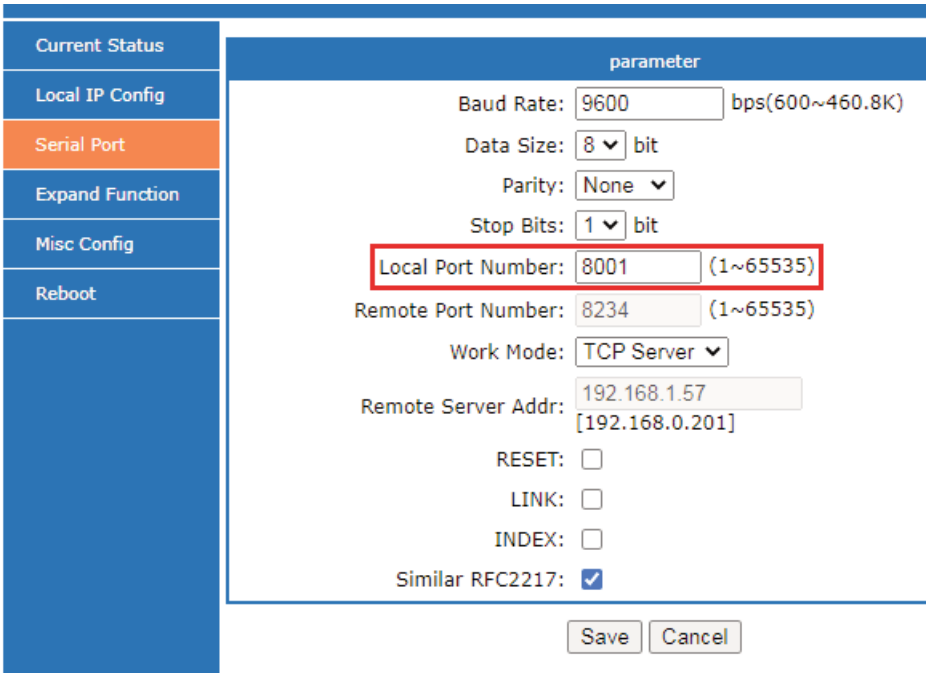


6. The default work mode is TCP Server, TCP Client, UDP Server and UDP Client are also available. To change the TCP port choose “Serial Port” from the side bar and change the “Local Port Number” setting:



7. To save changes click “Save” then when prompted click "Restart Module” and “Ok” to reboot the web server module and allow the changes to take effect.

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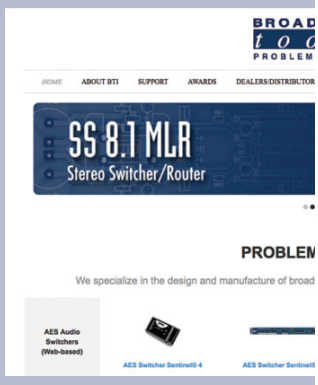

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Specifications

* Audio Precision Test Equipment

Input Levels:	Eight stereo balanced inputs. Max + 24 dBu, balanced, bridging. 20k Ω.
Output Levels:	Four stereo balanced outputs, +24 dBm. @ 600 Ω. / +26 dbu @ 10K Ω. Headphone output, 4.7 Ω. 100mw.
System Gain:	10 dB max.
Frequency Response: *	20 to 20 kHz; +/- .0.25dB
Signal/Noise Ratio: *	>-84 dB nominal, weighted 20 to 22Khz
Distortion: *	Less than 0.002% THD @ +26 dBu
Crosstalk: *	-100 dB @ 1khz / -79 dB @ 10 kHz from adjacent off channel.
Switching Method:	Digitally controlled professional level analog switch arrays.
Logic:	Flash microprocessor / Non-volatile memory.
Control and Status:	**Front Panel** - Momentary switches, LED indicators. **Remote Control / "PIP" (Triggers) Inputs** – 16 inputs, Momentary (40ms to 2.54 seconds response time, compatible with CMOS/TTL logic, open collector or contact closures to ground. **Remote Status** - 16 - SPST Relay Outputs
Interfacing:	**Audio & Remote Control** – RJ45 jacks & Plug-in euroblock screw terminals. Accommodates 16 – 28 AWG wire. Mating connectors supplied for euro-block connectors. **RS-232 Serial** - RJ-11/6P4C reversed modular cable & "S9" female 9-pin D-Sub adapter supplied. **10/100 Etherne**t – IPv4, TCP Server/Client, UDP Server/Client
Power:	Universal AC (100-240 VAC, 46-63 Hz w/IEC) input, multi-voltage (+/-15vdc & +5 vdc) DC switching power supply, 5-pin DIN. CE. (Supplied with domestic IEC AC cord).
Mechanical	19" x 1.75" x 10.0" (WHD)
Operating Conditions	32°F/0°C-122°F/50°C; 0%-95% non-condensing relative humidity; 10,000ft/3048m
Declaration of Conformity	Email support@broadcasttools.com for more information.
Weight:	5 lbs. (unit and accessories).

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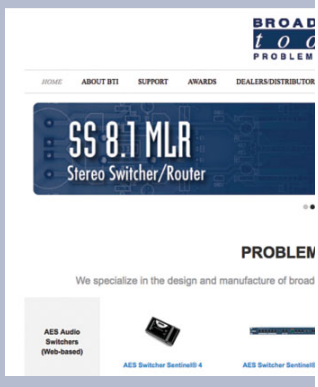

LIMITED WARRANTY

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

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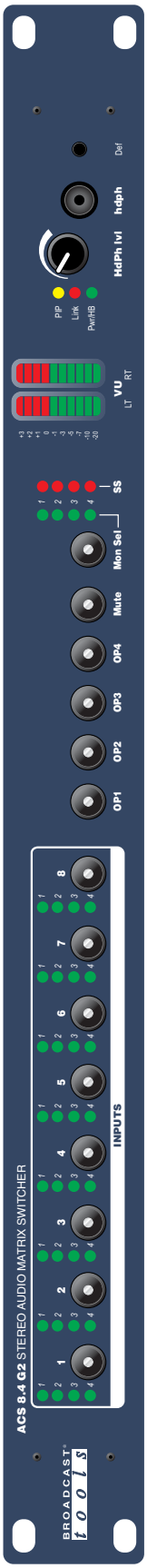
ACS 8.4 G2 STEREO AUDIO MATRIX SWITCHER
BROADCAST tools
INPUTS
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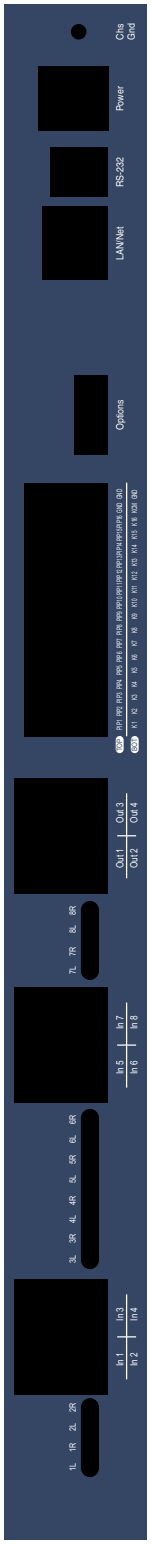
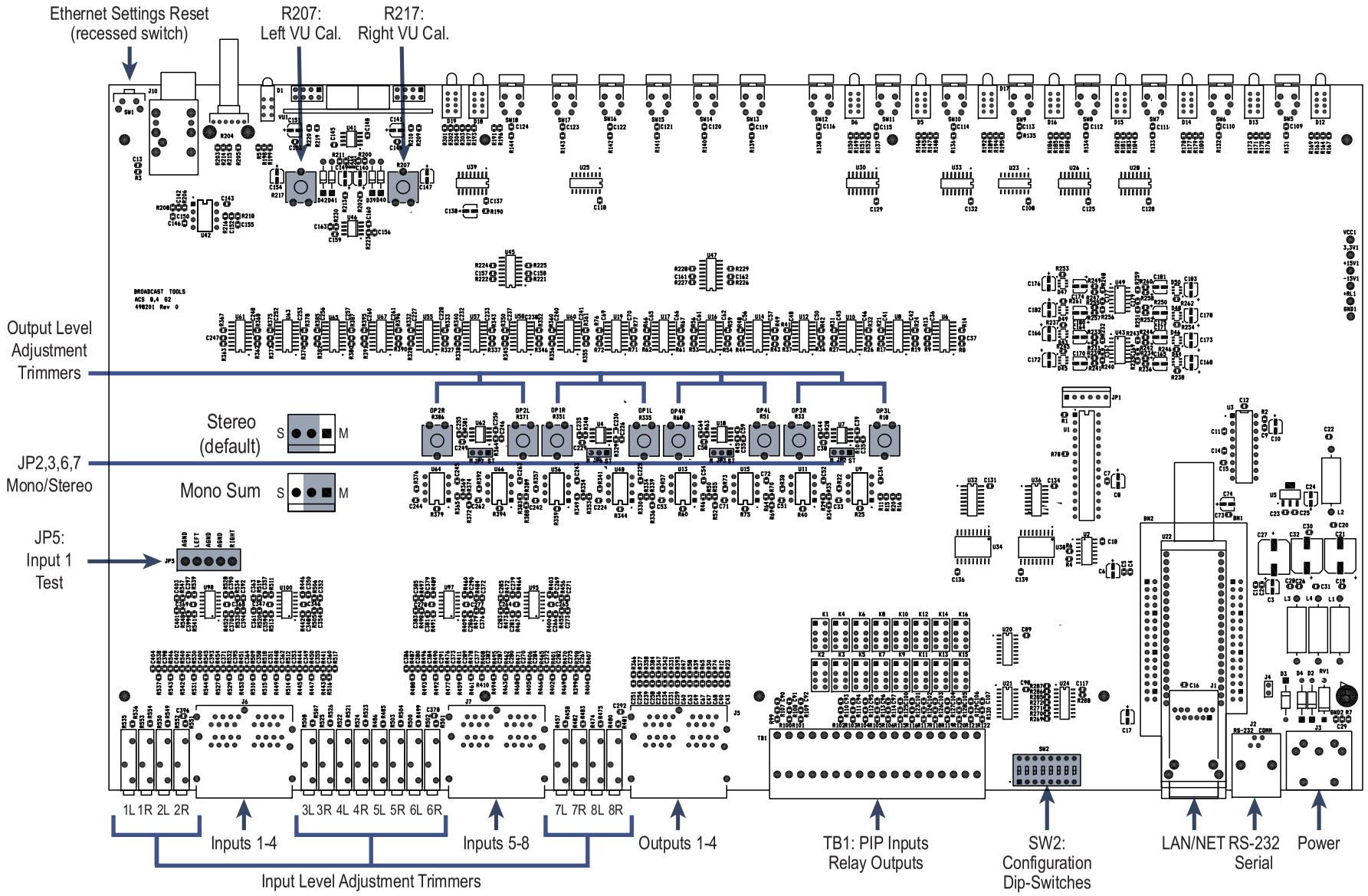
OP1 OP2 OP3 OP4 Mute Mon Sel SS
VU LT RT
PIP Link PwrHB
HdPh lvl hdph Def


Chs Gnd
Power
RS-232
LAN/Net
Options
Out1 Out3
Out2 Out4
In1 In3
In2 In4
In5 In7
In6 In8

ACS 8.4 G2

Jumper Layout



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