BROADCAST tools® INC

Installation and Operation Manual

DAS 8.4 Plus
Eight Input, Four Output AES/EBU Digital Audio Routing Switcher

Firmware Version 1.9

Manual Update: 07/07/2011

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

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INTRODUCTION

Thank you for your purchase of a Broadcast Tools® DAS 8.4 Plus, Eight Input, Four Output Digital Audio Routing Switcher (referred to as the DAS 8.4 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® DAS 8.4 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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E-mail: support@broadcasttools.com

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.
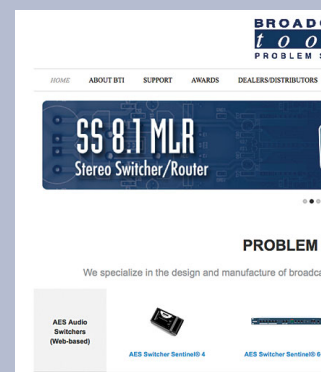
NOTE:

This manual should be read thoroughly before installation and operation.

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Product Description

The Broadcast Tools DAS 8.4 Plus provides AES/EBU digital audio routing/switching of any one of eight AES/EBU inputs to any/or all four AES/EBU outputs. The DAS 8.4 Plus may be used in Multicast applications, where an AES enabled EAS device assigned to input eight is routed to all four outputs via a contact closure or serial command. When the alert/test is completed, the DAS 8.4 Plus will return to its previous I/O configuration. The DAS 8.4 Plus may be controlled via front panel switches, contact closures, 5-volt TTL/CMOS logic and/or the multi-drop RS-232 serial port. The front panel is equipped with input and output selection pushbuttons, output assignment LED's, sample rate LED indicators and a headphone amplifier with a front panel T/R/S/ jack and level control. Additional features: 96 KHz AES receiver, a 24-bit D/A converter with analog balanced stereo output, headphone amplifier and 16 x 16 GPIO port. Installation is simplified with plug-in euroblock screw terminals. 1-RU chassis

Additional Features

- Routing type switching, any one input may be assigned to any/or all outputs.
- Multicast function and remote control port
- Logic functions via microprocessor and non-volatile memory
- Internal digital/analog audio activity/silence sensor monitors any one of four output channels selectable with the front panel monitor switch. The unit is equipped with four front panel sample-rate LED indictors, SS, AES/EBU Digital Error and stereo 10-LED meters; adjustable analog Silence Sensor/AES Digital error alarm delay and restore duration. Analog silence sensor sensitivity is factory set at -30db.
- Front panel input selection switches are provided for each input channel with separate output indicator LEDs.
- Power-up selection of inputs to outputs, mute or last source selected.
- Eight user configured macros.
- Most configuration options via rear panel dipswitches.
- 16 input GPI port (Remote Control or PIP) with LED indicator.
- 16 open collector channel status outputs or programmable via burst commands.
- Remote control of front panel functions and status.
- Multi-drop RS-232 serial port with data activity LED.
- Multiple units may be looped-thru to expand outputs.
- Plug-in euroblock screw terminals for ALL connections.
- Multi-voltage power supply (220v CE, optional).

Front Panel:

The DAS 8.4 Plus is a 1 - RU device (19"w x 1.75"h x 10"d). The front panel supports 15 selection switches and 43 LED indicators.

Rear Panel:

Installation is simplified with plug-in euroblock terminals. The DAS 8.4 Plus may be pre-wired and installed in minutes. The multi-drop RS-232 modular connection and a 7-pin DIN power connector are provided for the supplied multi-voltage power supply.

Switches:

Fifteen pushbutton switches (The "PGM" switch is hidden) that may be used to mute or select input and output channels. Eight macros may also be programmed and selected.

LED Indicators:

The DAS 8.4 Plus's 43 front panel LED indicators provide operational display of the following information:
   • Four indicators per input channel display which output channel the input is connected.
   • Sample rate display of 32, 44.1, 48 and 96Khz
   "PIP" Parallel Input Port active, indicating any change with the 16 input ports
   • Monitored Output channel being monitored.
   • Macro select LED indicator
   • Silence sensor alarm LED
   • AES/EBU sample rate led indicator
   • AES/EBU digital "error" led indicator.
   • Stereo, 10 LED meter.
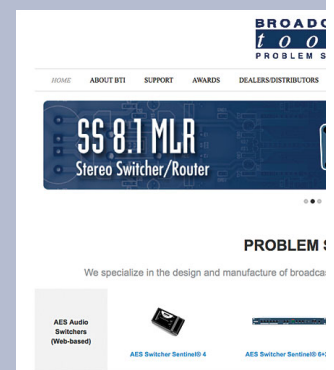   • Unit power and serial data activity.

Controls:
AES Inputs:
Each of the eight AES inputs is supplied with an adjustable termination for 75 ohm, 110 ohm or no termination.

AES Outputs:
The DAS 8.4 Plus provides four selectable AES outputs.

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DESCRIPTION

AES/EBU Digital, Analog Audio and Activity Sensor.

The DAS 8.4 Plus contains an 8 - 96kHz AES receiver and 24-bit D/A converter. The AES receiver may monitor any one of the four AES outputs with the front panel monitor selector switch. The AES receiver provides data integrity information to the microcontroller, which is used to indicate a data error. The D/A converter furnishes a stereo feed to the balanced analog audio output amplifier, headphone amplifier and level control, along with the stereo 10-LED meter and silence sensor circuitry. The factory default time delay and restore delay is set at 10 seconds, with a fixed signal threshold of -30dB. Upon silence detection for the user-selected time, the serial "SS/DIG Error" status is sent. When audio returns and the restore time delay has expired, the serial "SS/DIG Error" status is sent. The "SS/DIG Error" may be programmed for:

- Number of seconds of silence that must be present before an alarm state is reached.
- Number of seconds of audio presence after an alarm state before the "SS/AES/EBU "DIG Error" led illuminates.

PIP Input:

The Parallel Input Port (GPI) provides 16 pulse-stretched parallel 5-volt TTL/CMOS compatible inputs. The inputs are pulled high to 5 volts through a 20KΩ resistor and are activated by pulling the input to ground for a minimum of 40ms. These inputs supply status to any serial polling device (when the unit ID is set to 0, no polling of inputs is required). For all PIP inputs a pulse of specified minimum input duration (000 to 2.55 Seconds) causes the status to go true until the end of the input pulse. The pulse width may vary between the specified value and 10 ms less than that value. This allows the polling computer more time to detect an input change.

"Open Collector" Status Outputs, 16 Port Output Control

The DAS 8.4 Plus provides sixteen open collector status outputs. The status outputs may be configured to operate in one of three modes:

- The status outputs follow the first eight-associated channel.
- The status outputs a one-second pulse when the first eight-associated channel is selected.
- RS-232 serial burst mode control

Serial Communication:

The DAS 8.4 Plus's serial communication is configured for multi-drop RS-232, allowing up to 8 - DAS 8.4 Plus's on the same computers serial port. Burst mode allows a computer or ASCII terminal to control and interrogate the unit. This section defines all burst mode commands. Each burst mode commands starts with an asterisk ("*"). Next is a single decimal digit that corresponds to the unit (ID) address 0-7. Following that are one or more ASCII characters specifying the command. No carriage-return or line-feed is required to terminate the command except for those few commands of variable length, if the maximum length is not sent. 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:

User Programming:

The DAS 8.4 Plus programming is stored in non-volatile memory. Configurations are set with selection dipswitches and computer commands.

Inspection:

Please examine your DAS 8.4 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 contains the DAS 8.4 Plus, Multi-voltage "Lump-n-Line power supply, plug-in euroblock screw terminal mating plugs, Installation manual, reversed modular serial cable and the 9-pin D-Sub (S 9) adapter.

Setting Operation "DIP" Switches:

The DAS 8.4 Plus is equipped with an 8-position "PGM" DIP Switch. The DIP Switch specifies 3-bit unit ID, baud rate, power-up modes, remote control and other features listed below. The dipswitch (SW16) is located on the rear panel.

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DIP (SW16) Switch Functions

Switch Number	Default Setting	Function
1	OFF	Add 1 to Address (base address is 0)
2	OFF	Add 2 to Address (base address is 0)
3	OFF	Add 4 to Address (base address is 0)
4	OFF	Baud Rate: OFF = 9600, ON = 38400
5	OFF	Open Collector Operation Mode
6	OFF	Open Collector Operation Mode
7	OFF	Power up mode (Off = User programmable)
8	OFF	PIP/Remote Control (Off = Remote Control)
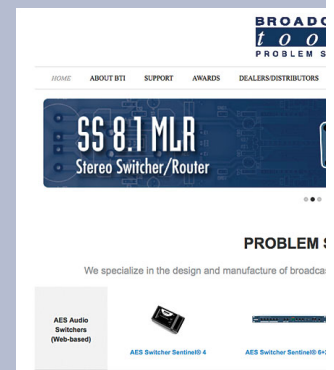
DESCRIPTION

Installation Guidelines
Address (ID) DIP Switches

SW16-1	SW16-2	SW16-3	ID
OFF	OFF	OFF	ID = 0
ON	OFF	OFF	ID = 1
OFF	ON	OFF	ID = 2
ON	ON	OFF	ID = 3
OFF	OFF	ON	ID = 4
ON	OFF	ON	ID = 5
OFF	ON	ON	ID = 6
ON	ON	ON	ID = 7

Baud Rate DIP Switch

SW16-4	Function
OFF	9600 baud
ON	38400 baud

Open collector DIP Switch

SW16-5	Function
OFF	Follow (See SW16-6)
ON	Pulse (See SW16-6)

Open Collector Operation Switch

SW16-6	Function
OFF	Enable SW16-5
ON	OC's software control

Power up/Last source DIP Switch

SW16-7	Function
OFF	User Programmable
ON	Last Source(s) selected

PIP/Remote Mode DIP Switch

SW16-8	Function
OFF	Remote Control
ON	PIP inputs enabled

Front Panel Switches

Switch(es)	Function
01-08	Channel Inputs
OUTPUT 1,2,3,4	Output selector
MUTE	Mutes selected channel
MACRO	Selects up to 8 Macro's
MONITOR	Selects the four output channels to monitor

Operation

| Action	Result
Hold down the Output 1 button, then push the desired input channel button	Selected input 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, then push the desired input channel button	Hold down the Output 2 button, then push the desired input channel button Selected input 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, then push the desired input channel button	Hold down the Output 3 button, then push the desired input channel button Selected input 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, then push the desired input channel button	Hold down the Output 4 button, then push the desired input channel button Selected input channel is connected to output 4. To mute the active channel, simultaneously hold down the mute switch and press the desired input channel button.

NOTE: To mute any/or all output channels assigned to an input, hold down the mute button and press the desired input button.

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INSTALLATION
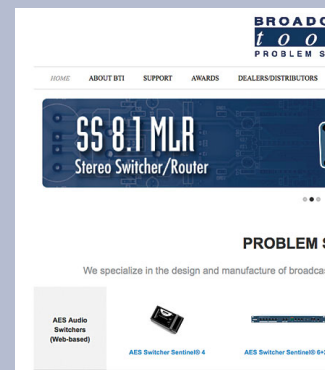
Power-Up Feature, user programmable:
To select a channel configuration at power-up:
    1 - Verify that dipswitch SW16-7 is OFF.
    2 - Select the desired input and output channel configuration.
    3 - Press and hold the "MACRO" button.
    4 - Press the "OUTPUT 1" button.
    5 - The macro led will flash for 2 seconds.
    6 - Release both switches.
    7 - Your power up configuration is saved.

Power-Up Feature, last source selected:
    1 - Verify that dipswitch SW16-7 is ON.
    2 - The DAS 8.4 Plus will power up with whatever channel configuration was
       present at power off.

Storing a Macro:
    1 - Select the desired input and output channel configuration.
    2 - Press and hold both the "MACRO" and "OUTPUT 2 buttons.
    3 - Press the desired input channel button.
    Example: Pressing channel 1 would store it as Macro 1.

Recalling a Macro:
    1 - Press and hold the "MACRO" button.
    2 - Press the desired stored macro's using the input channel buttons.

Multicast Mode:
    Verify that dipswitch SW16-8 is OFF. Connect the output of your AES enabled EAS unit to AES input eight. Connect the sustained relay contacts of your EAS unit between ground and remote control input 16 on the DAS 8.4 Plus. When the EAS unit trips, the DAS 8.4 PLUS will switch AES input eight to all four AES outputs. The four led's associated with input eight will start to flash in sequence. When the alert/test is completed, the relay contact of the EAS unit should open and the DAS 8.4 Plus will return to its previous I/O configuration. NOTE: You may also put the DAS 8.4 Plus into Multicast mode via serial commands listed on page 16.
Note: To convert your EAS unit from analog audio to AES digital audio, check out either of the Broadcast Tools Analog to Digital converters: ADCS-III or ADC-1

Mounting:
    The DAS 8.4 Plus is designed to be rack mounted in a standard 19" rack, (1-RU). It should be mounted in an area that is accessible from the rear and preferably away from sources of heat. We recommend before permanently installing the DAS 8.4 Plus that you bench test and become familiar with the operation of the unit.

Power Supply Connection:

Install the 7-pin DIN connector into the receptacle on the DAS 8.4 Plus. When ready, plug the Lump-N-Line power supply cable into the appropriate AC receptacle.

Connecting The Digital Inputs, Outputs, PIP, remote control inputs and OC's:

NOTE: Refer to the connection grid on page 17.

The DAS 8.4 Plus interfaces to your equipment are through plug-in euroblock rear panel terminals. Refer to the supplied connection template. Remove each screw terminal, strip each conductor and insert the conductor into the terminal and screw down the capture screw. The terminals accommodate wire sizes from 16 - 28 AWG solid or stranded wire.

It is recommended that all cables connected to the DAS 8.4 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.

Remote Control:

Most front panel functions of the DAS 8.4 Plus may be remote controlled via plug-in euroblock terminals located on the rear panel. The DAS 8.4 Plus accepts momentary contact closures, open collector or 5-volt TTL/CMOS logic levels. Open collector status is provided. Multicast mode requires a sustained contact closure on remote input 16. NOTE: Refer to the connection grid on page 18.

Serial Interface:

The Serial Interface uses a multi-drop RS-232 transceiver.

CAUTION!

Installation of the DAS 8.4 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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INSTALLATION

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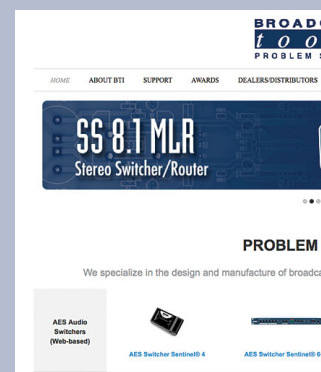
Front Panel Switches:

Switch(es)	Function
1-8	Input Channels or Macros 1-8
Output 1	Output 1 selection
Output 2	Output 2 selection
Output 3	Output 3 selection
Output 4	Output 4 selection
Mute	Turn off selected I/O
Macro	Select any one of 8 Macros
Monitor Select	Select any one of the four output channels. Sequences through each output each time the switch is pressed.

Front panel LED indicators:

Front Panel LED's	# LED's	Activation Event/Mode	Activation Behavior
Inputs connected toOutput 1	8 Green	State of Connection	On if connected
Inputs connected toOutput 2	8 Yellow	State of Connection	On if connected
Inputs connected toOutput3	8 Red	State of Connection	On if connected
Inputs connected toOutput 4	8 Red	State of Connection	On if connected
Power Status	1 Green	Valid Power	On
Monitor	4 Green	Balanced output and headphone monitor	Any one of four output channels
Macro	1 Yellow	Macro selection	On if active
"PIP" Active	1 Green	Any valid "PIP" input	On if active
Stereo 10-LED Meter	20 assorted	Audio Level	Audio activity
SS	1 Red	Analog Audio Silence Sensor	On if stereo analog silence is detected on the selected output.
Digital Error	1 Red	Digital error	On if a digital error is detected on the selected output.
Sample-rate	4-colors	Four sample rates	Sample rate of input signal connected to the monitored output.

Connecting the RS-232 Serial Port:
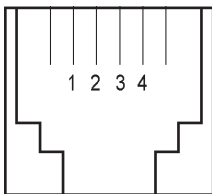
Use the provided modular 9-pin D-sub connector adapter (S9) and reversed modular cord to connect the DAS 8.4 Plus's serial connector to your serial port.

The pin out of the adapter is shown below.

| RJ-11 Adapter Pin	DB-9 D-Sub	DAS 8.4 PLUS (Point of view)
4	3	RS-232 Receive
3	2	RS-232 Transmit
2	5	Ground

Modular Jack Pin Numbers

1 2 3 4

The DAS 8.4 Plus is supplied with a reversed modular cable and a 9-pin D-connector modular adapter (S9) for serial control. Only use the reversed modular cord that is supplied with the DAS 8.4 Plus or a replacement that reverses, such as Radio Shack Cat No. 279347. Connect the cable between the DAS 8.4 Plus and your computer. The DAS 8.4 Plus may operate at baud rates 9600 or 38400 baud. The unit is shipped set for 9600 baud, with 8 data bits, no parity and one stop bit. Load your favorite communication software package Windows 95/98/ME/NT/2000/XP HyperTerminal, etc.) Using the protocol of 9600-N-8-1. Set the mode to: DIRECT, Flow Control to: NONE and emulation to: ANSI.

Connecting Two DAS 8.4 Plus's to a Single Computer's Serial Port:

Multiple DAS 8.4 Plus's may be cascaded serially to operate from the same serial port. The first step is to assign unit ID's to each DAS 8.4 Plus. One suggestion is to assign 1 to the first DAS 8.4 Plus and 2 to the second switcher. The second step is to parallel the serial ports of the DAS 8.4 Plus's. Plug the male end of the duplex modular adapter into the supplied female (S9) DB-9 to RJ-11 adapter, then attach the supplied reversed modular line cords into each of the duplex modular adapter receptacles (Radio Shack Cat No. 279-0357) and the other ends into each DAS 8.4 Plus modular receptacles. See the diagram below. NOTE: Three or more DAS 8.4 Plus's may be daisy chained by using the above description and a Radio Shack Cat No. 279-0410, 5-jack modular adapter.
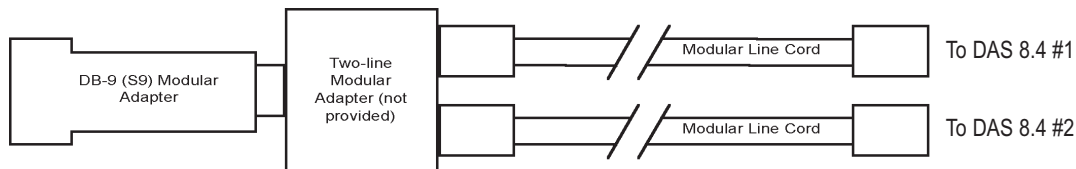
Serial Control:

The unit is controlled in either Menu or Burst mode. It can run at the following data rates:
- 9600 Default
- 38,400

Serial communications is multi-drop RS-232. Commands may be entered either via a menu (menu mode) or a short form code (burst mode). All commands and responses use normal ASCII characters, facilitating scripting. A burst mode command starts with an asterisk ("*") followed by the device (ID) address as a single decimal digit. A burst mode command must be entered within 5 seconds or it will time out. The command to enter menu mode starts with an asterisk ("*") followed by the device (ID) address as a single decimal digit and then MM. The menu mode displays certain parameters, and allows the setting of these parameters. In both cases, device (ID) address (0-7) is specified with the on-board dipswitches.

INSTALLATION
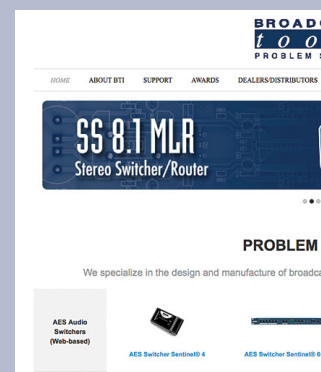
Type *0MM, follow the prompts on the pop-up menu.

Menu Mode:

The command to enter menu mode starts with an asterisk ("*") followed by the device (ID) address as a single decimal digit, then the MM command. **NOTE: Commands you type will NOT be seen, unless you turn "Echo On" in HyperTerminal.** The menu mode displays advanced configuration parameters. Unit ID, Baud rate and other configurations are set via the on-board dipswitches (SW16) at the rear of the unit.

Broadcast Tools® DAS 8.4 Plus v 1.9 - Setup Menu
1 - Set PIP Minimum (0 - 2.55 sec)	- Now: 0.02
2 - Set Remote Mode Open Collector Mode	- Now: "Follow"
3 - Set Silence Sense Acquire Delay (sec)	- Now: 10
4 - Set Silence Sense Restore Delay (sec)	- Now: 10
A - Save Current Channel State for Power Up	
C - Show Current Configuration	
F - Set Factory Defaults	

Enter Selection, or Q to quit:

Serial Burst Mode Commands:

Burst mode allows a computer or ASCII terminal to control and interrogate the unit. This section defines all burst mode commands. Each burst mode commands starts with an asterisk ("*"). Next is a single decimal digit that corresponds to the unit (ID) address 0-7. Following that are one or more ASCII characters specifying the command. No carriage-return or line-feed 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 will 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:

Glossary Of Command Notation:

Character String	Meaning	Allowable Values
u	Unit ID	0-7
ii	Input Number	01-08
o	Output Number	1,2,3,4
oo	Open Collectors	01 – 16

Set-up Commands:

*uCCx	Ignore, set by switches
*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."
*CDEF	Reset to factory defaults
*uCIIttt	Set "PIP" Programmable Pulse Stretcher Input Duration = ttt: 000 – 255 Off to 2.55 Seconds.
*uCIOiittt	Ignore, send OK
*uCLx	Lock Front Panel if x is "L". Unlock Front Panel if x is "U"
*uCRtt	Set Open Collector Momentary Pulse Length – tt:00-99 for 00 – 9.9 Seconds
*uCSAtttt	Set digital data error and/or silence sensor time delay to tttt seconds (0002 – 9999), 0000 = OFF
*uCSBtttt	Set digital data error and/or silence sensor restore delay to tttt seconds (0002 – 9999), 0000 = OFF
*uCSDttt	Ignore, send OK
*uCST	Ignore, send OK
*uCSVttt	Ignore, send OK
*uMCnn	Save current audio state as Macro # nn (01 à 08)
*uMInn	Invoke macro # nn (01 à 08)
*uMM	Enter menu mode if unit ID = 0
*uMS	Ignore, send OK
*uN	Ignore, send OK

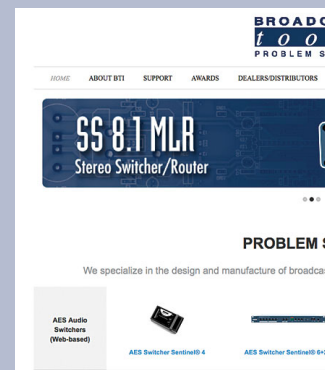## Real Time Control Commands:

*uDxx	Delay xx seconds before processing next command.
*uZx	Echo character "x" to serial control port. Useful in debugging command strings

Open Collector Output Control Commands:

*uOOrrL	Latch open collector "rr"
*uOOrrF	Unlatch open collector "rr"
*uOOrrP	Pulse open collector "rr"

INSTALLATION

Channel Switch Control Commands:

*uiio	Apply input "ii" to output
*uiiA	Apply input "ii" to ALL outputs
*uiiMA	Mute input "ii" for all outputs
*uiiMo	Mute input "ii" for output "o"
*uMo	Mute output "o"
*uMA	Mute all outputs

Multicast Switch Control Commands:

*uEY	Turn ON Multicast mode
*uEN	Turn OFF Multicast mode

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 receipt of this command.

*uSA — Ignore, Send OK

*uSL — Send Channel Status: SuLo,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. Thus "S1L2,1,0,0,0,0,0,0,0<CR><LF> says that unit 1, output 2 is connected to input 1.

*uSO — Send status of all open collectors, SuSO,x,x,x,x,x,x,x,x,x,x,x,x,x,x,x,<CR><LF>

*uSPii — Send status of programmable pulse stretcher input "ii". Response is "SuP,ii,x" where "x" is 1 if the corresponding input is high, 0 otherwise.

*uSPA — Send status of all programmable pulse stretcher inputs. Response is "SuP,A,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 1 if the corresponding input is high, 0 otherwise.

*uSR — Ignore, send OK

*uSS — Send status of silence sensor (ACT x). Response is "SuS,a,b<CR><LF>"
1 1 = Active / 0 = Silent

*uU — Send Unit Information:<name(DAS 8.4 PLUS)><version><cr><lf>

*uY — Display configuration

"Open Collector" Status Outputs, 16 Port Output Control

The DAS 8.4 Plus provides 16 open collector status outputs. The status outputs may be configured to operate in one of three modes:

- The status output follows the associated channel. SW16-5 OFF (SW16-6 must be OFF).
- The open collector outputs a one-second pulse when the associated channel is selected. SW16-5 ON (SW16-6 Must be OFF).
- Software control. SW16-6 ON. Note: SW16-6 OFF, enables SW16-5

"PIP" with Programmable Pulse Stretcher:

If DIP Switch SW16-8 is ON, the Programmable Pulse Stretcher (PIP) provides 16 "PIP" (GPI) inputs. Each input must be 40ms or longer to be considered valid. The Programmable Pulse Stretcher Duration may be globally set from 10ms to 2.55 seconds.

NOTE: When the unit ID is set to 0, no polling of "PIP" (GPI) inputs is required.

Remote Control connector TB-1
18-position double-decker connector on the rear of the switcher.

OC 1	OC 2	OC 3	OC 4	OC 5	OC 6	OC 7	OC 8	OC 9	OC 10	OC 11 OP1	OC 12 OP2	OC 13 OP 3	OC 14 OP 4	OC 15 AES Digital Error	OC 16 Silence Sensor	Gnd	Gnd	Top
PIP1	PIP 2	PIP 3	PIP 4	PIP 5	PIP 6	PIP 7	PIP 8	PIP 9	PIP 10	PIP 11	PIP 12	PIP 13	PIP 14	PIP 15	PIP 16	Gnd	Gnd	Bottom SW16-8 ON
IN 1	IN 2	IN 3	IN 4	IN 5	IN 6	IN 7	IN 8	OP 1	OP 2	OP 3	OP 4	Mute	Mon Sel	Macro	Multi-cast mode	Gnd	Gnd	Bottom SW16-8 OFF

AES inputs TB2 (IN1), TB3 (IN2), TB4 (IN3), TB5 (IN4), TB6 (IN5), TB7 (IN6), TB8 (IN7) and TB9 (IN8).

    Pin 1 +   Pin 2 -   Gnd

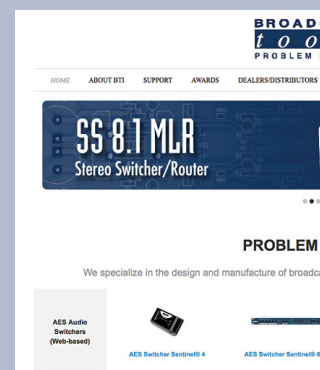**AES outputs TB10 (OP 1), TB11 (OP 2), TB12 (OP 3) and TB13 (OP 4).**

    Pin 1 +   Pin 2 -   Gnd

Balanced stereo analog audio output TB14.

    Left -   Left +   Gnd   Right -   Right +

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

INSTALLATION

Specifications
Audio Precision Test Equipment

Inputs:	Level - 0.1Vp-p minimum Eight - Transformer isolated, AES/EBU, selectable 75 ohm, 110-ohm or no termination for loop-thru operation.
Outputs:	Four - Transformer isolated, AES/EBU, 110-ohm termination. 1 - Analog Headphone - 24 to 600 ohm. 75 mw peak. Front panel 1/4" phone jack with level control. 1 - Analog - Balanced Stereo, +24dBm peak, +4dBm nom. 100 ohm. 20 to 20kHz +/- .25dB. .01%.
Sample Rate / A/D:	8 to 96 kHz / 16 - 24 bit A/D.
Switching Method:	Asynchronous digitally controlled multiplexers.
Logic:	Microprocessor / Non-volatile memory.
Operation Control:	Front Panel - Momentary push button switches. Remote - Sixteen momentary closures to ground. >40ms. RS-232 - Multi-drop Serial 9600 or 38.400 baud, 8N1.
Status:	Front Panel - LED indicators. Remote - Sixteen open collector outputs. RS-232 - Multi-drop Serial 9600 or 38.400 baud, 8N1.
Interfacing:	AES/EBU digital Audio & Remote Control - Rear panel plug in euroblock terminals. Accommodates 16 - 28 AWG wire. Mating connectors supplied. RS-232 Serial - RJ-11/6P4C Modular, female DB-9 adapter & cable supplied.
Power:	Plus Version: 34.5 Vac/ct @ 500 ma / 10.5 Vac @ 1 amp, 120 Vac 50-60 Hz "Lump in the line" power transformer. Supplied. (CE 240 Vac 50-60 Hz optional)
Mechanical:	19" x 1.75" x 10.0" (WHD) / Weight: 5.0 lbs.
Options:	RS-232 to USB Smart Cable adapter. ESS-1, ETHERNET to RS-232 /RS-422 converter.

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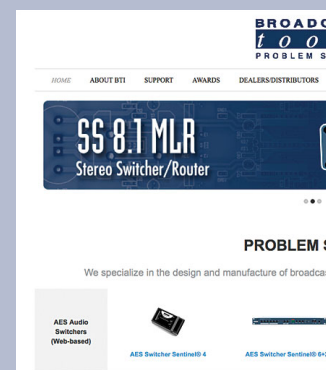
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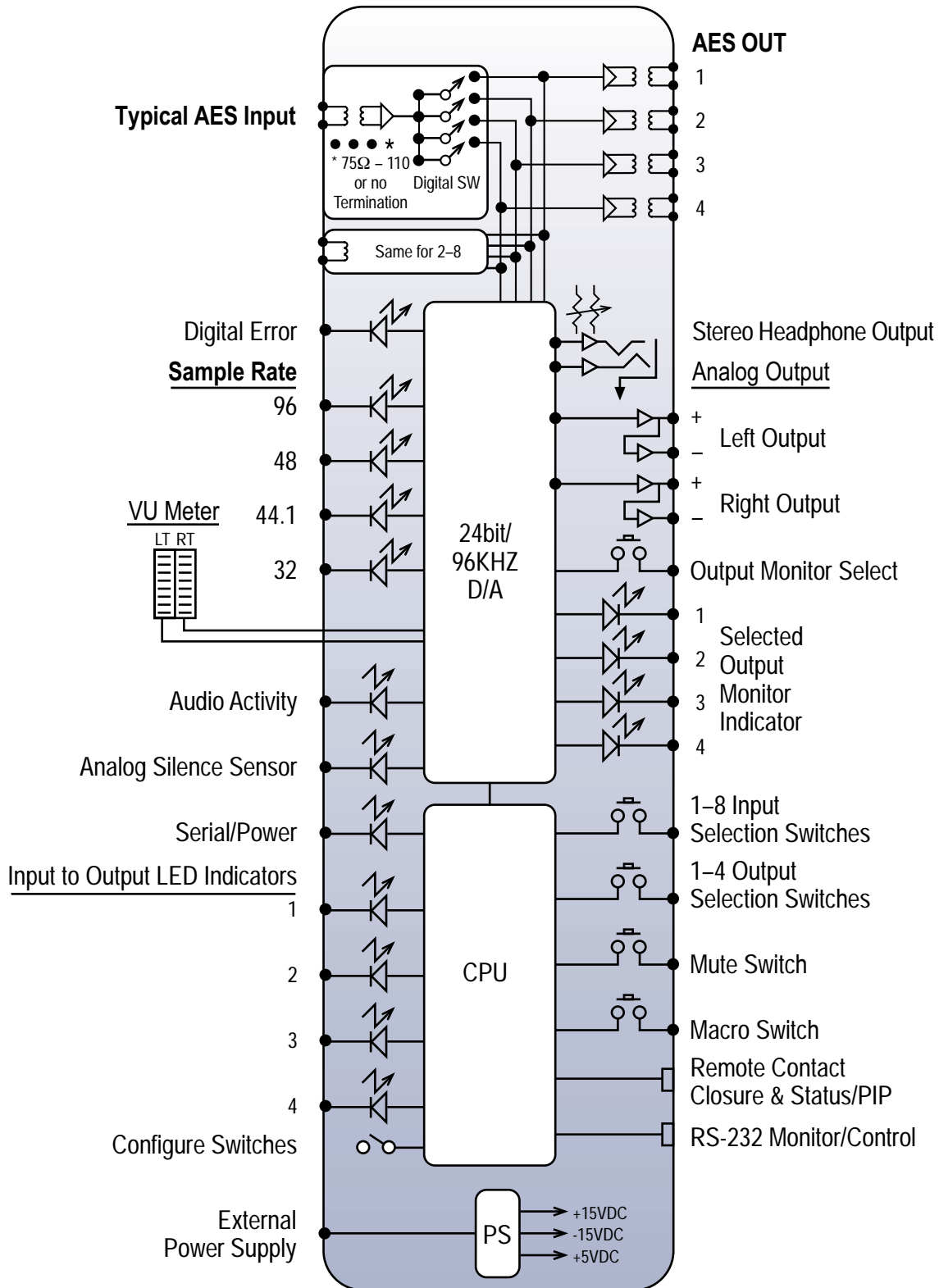
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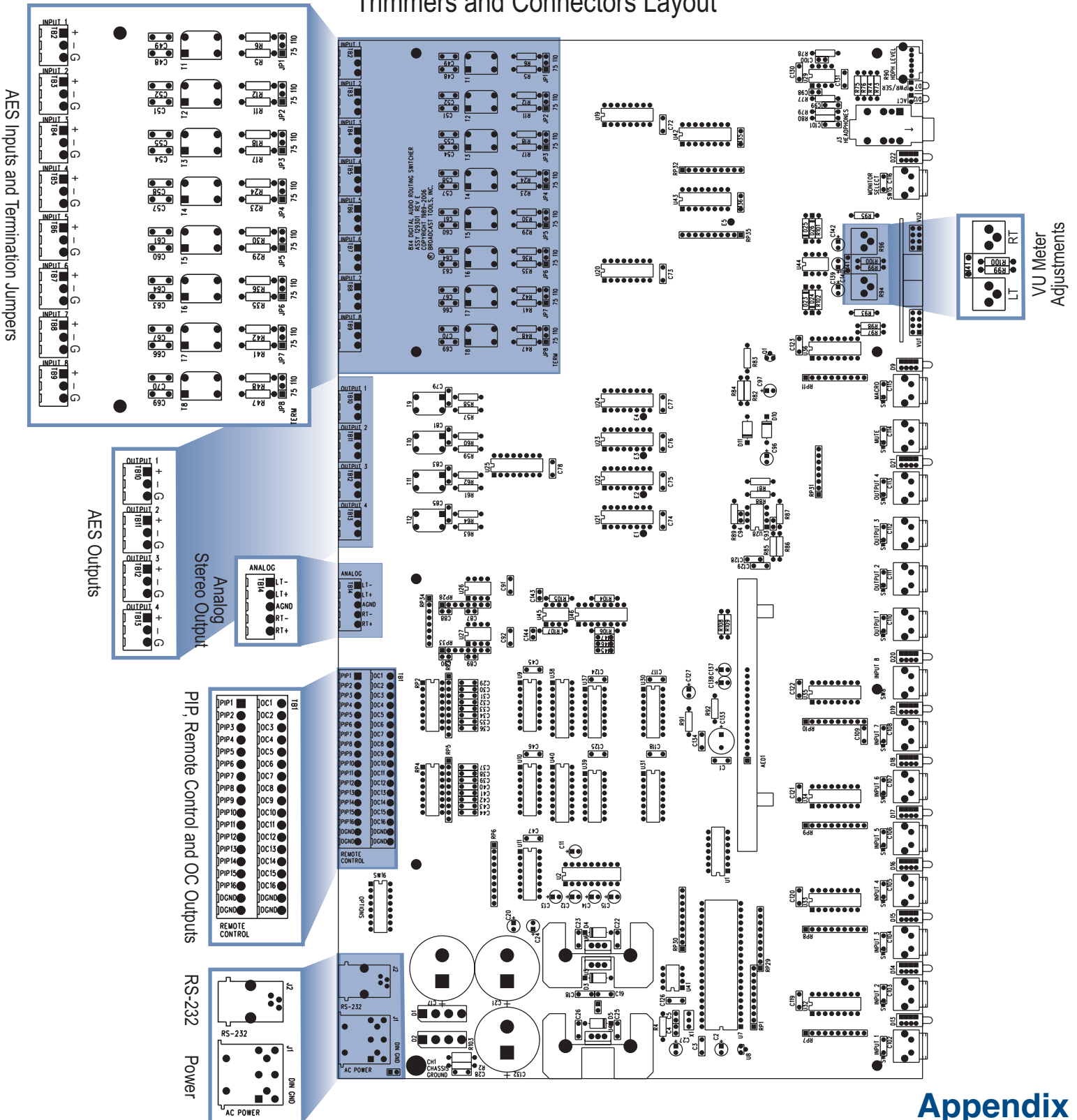Sedro-Woolley, WA 98284 • USA

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www.broadcasttools.com **website**

Functional Diagram

Typical AES Input

* 75Ω – 110 or no Termination

Digital SW

Same for 2–8

AES OUT
1
2
3
4

Digital Error

Sample Rate
96
48
44.1
32

VU Meter
LT RT

24bit/ 96KHZ D/A

Stereo Headphone Output

Analog Output
+ Left Output
−
+ Right Output
−

Output Monitor Select

1
2 Selected
3 Output
4 Monitor Indicator

Audio Activity

Analog Silence Sensor

Serial/Power

Input to Output LED Indicators
1
2
3
4

Configure Switches

CPU

1–8 Input Selection Switches

1–4 Output Selection Switches

Mute Switch

Macro Switch

Remote Contact Closure & Status/PIP

RS-232 Monitor/Control

External Power Supply

PS
+15VDC
-15VDC
+5VDC

Modification Date: 11/13/06

Broadcast Tools® DAS 8.4 Plus AES Digital Router Switcher

Trimmers and Connectors Layout

AES Inputs and Termination Jumpers

AES Outputs

Analog Stereo Output

PIP, Remote Control and OC Outputs

RS-232

Power

VU Meter Adjustments

Appendix

Modification Date: 11/13/06

Broadcast Tools® DAS 8.4 Plus AES Audio EAS with Contact Closure Control

Installation Application

EAS Source*

* EAS units with a analog only output. The Broadcast Tools ADC-1 may be inserted between the analog EAS output and the AES input eight.

AES SOURCES

PROCESSING

Main
HD-1
HD-2
HD-3

OUTPUT 1
OUTPUT 2
OUTPUT 3
OUTPUT 4