BROADCAST tools®

Installation and Operation Manual

8 x 1 DAS/XLR or BNC
Eight Input, Three Buffered Output AES/EBU Digital Audio Switcher

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INTRODUCTION

Thank you for your purchase of a Broadcast Tools, Inc., 8 x 1 DAS/XLR or BNC, Eight Input, Three Buffered Output AES/EBU Digital Audio Switcher. We're confident 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 unit.

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:

Broadcast Tools, Inc.
131 State Street
Sedro-Woolley, WA 98284 USA
Voice: 360 . 854 . 9559
Fax: 360 . 854 . 9479

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

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BROADCAST TOOLS® BRAND PRODUCTS!

CAUTION!

Broadcast Tools® Products, as with any electronic device, can fail without warning. Do not use this product in applications where a life threatening condition could result due to failure.

NOTE:

This manual should be read thoroughly before installation and operation.

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SPECIFICATIONS

Digital Input (8)	Eight, AES3, 110 Ω transformer balanced, female XLR or AES3-ID, 75 unbalanced BNC. Ω
Digital Input level	200 mV p-p to 5 V p-p
Digital Output (3)	Buffered outputs one & two, AES3, 110 Ω transformer balanced, male XLR or AES3-ID, 75Ω balanced, male XLR or AES3-ID, 75 Ω unbalanced BNC. Buffered output three, AES3-ID, 75Ω unbalanced BNC on either unit.
Digital output level	1 Volt p-p
Sampling Frequency Range	30 kHz to 100 kHz
Logic	Microprocessor, Non-volatile memory.
Operational Control	*Front Panel* - Momentary switches. *Remote* - Momentary closure to ground. *Serial* - RS-232c or *RS*-485, 2400, 9600, 19200, 38400, 8,N,1
Status	*Front Panel* - Indicator LED in Switch. *Remote* - Open collector output, pulsed or latched. Limit current to 50ma per output. Pull-ups may be required.
Interfacing	*Input* – Female XLR or BNC *Output* – Male XLR or BNC *Remote Control* - Male 25 pin D-Sub connector. Mate supplied *RS-232* - 4C6P Modular. Adapter supplied *RS-485* – 3 position screw terminal
Power Requirement	9 Vac, 500 ma. 120 Vac 50-60 hz transformer, Supplied.
Dimensions	19" X 1.75" X 4.5" (WHD)
Weight	6.0 lb.

PRODUCT DESCRIPTION

The 8 x 1 DAS/XLR-BNC selects any one of eight AES-EBU inputs to three buffered outputs. The 8 x 1 DAS/XLR-BNC is equipped with eight female XLR or BNC input connectors. The three-buffered outputs are configured with two male XLR's and one BNC on the XLR model and three BNC's on the BNC model. The 8 x 1 DAS/XLR-BNC may be controlled in three ways: 1) The front panel switches, 2) Parallel remote control, 3) Selectable RS-232 or RS-485 multi-drop serial. The 8 x 1 DAS/XLR-BNC has features to allow selecting which of any source is active at power-up or last input selected, mute; allowing the user to turn off all inputs, an Enable switch; providing a safety lock to the front panel input selection switches.

APPLICATIONS

Studio, Audio processing, Exciter and STL selection, EAS switching and digital console input expansion.

FRONT PANEL DESCRIPTION

INPUT SWITCHES

Each switch selects an input to be routed to the switcher's output. The switches are highly reliable switches, which will give the user years of dependable service. Each switch has an LED indicator, which will illuminate when that particular input is selected. When an input is selected, the previous input is deselected. The ENABLE switch must be pressed and held in order for any of the front panel switches to function. This function may be bypassed. The front panel is also equipped with a MUTE switch. This switch, when pressed in combination with the ENABLE switch, mutes the output.

Front Panel Switches

Switch(es)	Function
1-8	Selects Input Channels 1-8
ENABLE	Safety switch
MUTE	Mutes Output

Front Panel LED's	Number Of LED's	Activation Event/Mode	Activation Behavior
Input connected to output	8 RED	State of Connection	On if connected. Only one on at a time
Power	1 Green	Valid Power	On
Mute	1 Red	System Mute Status	On

REAR PANEL DESCRIPTION

The rear panel contains all inputs, outputs and remote control interfacing connectors. AES/EBU signals are coupled through XLR or BNC connectors. Remote control is accomplished via a 25 pin "D-Sub" connector and the RS-232 serial port is a modular while the RS-485 is 3-position screw terminal.

POWER
2.1mm coaxial type (barrel) power connector and 9Vac @ 500ma wall transformer. (220 Vac 50-60 Hz wall transformer OPTIONAL)

DIGITAL INPUT/OUTPUT CONNECTORS
Input connectors are female XLR or BNC. The output connectors are male XLR or BNC. Input channel designators can be found on the left side of the input connector and output designators are on the right of the output connector.

OPTIONS
Setting function SW-11 DIP switch
The 8 x 1 DAS/XLR or BNC is equipped with a 4-position DIP switch. The DIP switch specifies 3 bit unit ID and power-up selection. Remove the cover to access this switch. Follow the description below.

DIP Switch SW- 11 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	ON	Power-up mode

The factory default address is 0, while the power-up default is input 1.
The Enable jumper is factory installed. This feature may be ENABLED by removing the jumper on JP6.

Power-up mode: SW11-4 OFF = (Default) Last selected channel
                   SW11-4 ON = Program by holding down the desire channel button for > 2 seconds. Stored selection is verified by the blinking of the selected channel indicator LED three times.

REMOTE CONTROL CONNECTOR
J1 the male 25 pin "D-Sub" connector provides a connection to equipment, which will remotely control the 8 x 1 DAS/XLR or BNC. Pulsing any of the inputs or mute to ground (low) will select the function. The status outputs are also available.

INSTALLATION

Installation of the 8 x 1 DAS/XLR or BNC 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 EGND terminals. The station ground should be connected to the chassis ground screw located on the far left side of the 8 x 1 DAS/XLR or BNC as viewed from the rear. It is recommended that all cables connected to the 8 x 1 DAS/XLR or BNC be looped through ferrite cores to suppress RF. Surge protection with RF filtering such as the Tripp Lite "ISOBAR 4 or 6" is also suggested for the wall transformer. The purchase of an inexpensive UPS will provide back-up in case of power outages.

The 8 x 1 DAS/XLR or BNC is simple to install. Digital inputs and outputs are connected via XLR or BNC connectors. Installation of the 8 x 1 DAS/XLR or BNC consists of six steps:

1.   Inspection
2.   Bench test
3.   Mount the unit
4.   Connect your equipment to the unit
5.   Label the front panel switches
6.   Serial operation, if applicable

STEP 1: INSPECTION
Please examine your 8 x 1 DAS/XLR or BNC carefully for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately. Retain the packaging for inspection by the shipper. The package should contain the 8 x 1 DAS/XLR or BNC, 9Vac @ 500ma wall power transformer, this manual, 25 pin female D-connector/shell, 7 foot modular cable and 9 & 25 pin D-Sub adapter.

STEP 2: BENCH TEST
Place each unit on a workspace and connect power to the unit. Check to see if LED #1 (Switch 1) and the power LED are lit (Input one is the power-up factory default). Connect a digital source to input one and a monitoring device to any of the digital output. Verify that the digital signal is present. Repeat the process until each channel's operation has been verified. This would also be a good time to set up the desired options.

STEP 3: MOUNTING
Mount the unit allowing adequate airflow for cooling.

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STEP 4: CONNECT YOUR EQUIPMENT

The 8 x 1 DAS/XLR or BNC interfaces to your equipment (input, output) through XLR or BNC connectors. Follow the legends for the desired input and output connections, which appear on the rear side of the printed circuit board and also on the layout drawing on the last page of this manual.

STEP 5: DESIGNATION STRIP

The designation strip is provided in order to write the input descriptions under each input switch.

STEP 6: SERIAL OPERATION

The supplied modular cable and 9 or 25 pin D-sub adapter may be connected to the 8 x 1 DAS/XLR or BNC by connecting the cable to the modular jack located on the rear of the unit. Plug in the D-sub adapter into your computer's serial port. Plug the supplied wall transformer into a source of 117vac and the cable end of the transformer into the power receptacle on the 8 x 1 DAS/XLR or BNC. The factory default protocol is as follows: 9600, N, 8, 1. The pin out of the modular/D-Sub adapter is shown below.

| RJ-11 Adapter. Pin Number.	DB-9 Female. Pin Number.	DB-25 Female. Pin Number.	Product's point of view Function Name.
4	3	2	RS-232 Receive
3	2	3	RS-232 Transmit
2	5	7	Ground
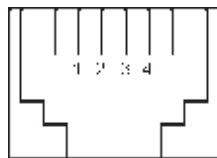
Modular connectors point of view.

The 8 x 1 DAS/XLR or BNC is supplied with a modular cable and a 9 & 25 pin D-connector modular adapter for serial control. Only use the modular cord that is supplied with the 8 x 1 DAS/XLR or BNC or a replacement that reverses, such as Radio Shack Cat No. 279-422. Connect the cable between the 8 x 1 DAS/XLR or BNC and your computer. The 8 x 1 DAS/XLR or BNC may operate at baud rates from 2400 to 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 (Procomm, Bitcom, Windows 3.1/3.11 Terminal, Windows 95/98/NT Hyper Terminal, etc.) Using the protocol of 9600-N-8-1. Set the mode to: DIRECT, Flow Control to: NONE and emulation to: ANSI. Press the space bar along with the unit ID. Follow the instructions on the pop-up menu.

INSTALLATION

CONNECTING TWO 8 x 1 DAS/XLR OR BNC UNITS'S TO A SINGLE COMPUTER'S SERIAL PORT

Multiple 8 x 1 DAS/XLR or BNC's may be cascaded serially to operate from the same serial port. The first step is to assign ID's (passwords) to each 8 x 1 DAS/XLR or BNC. One suggestion is to assign 1 to the first 8 x 1 DAS/XLR or BNC and 2 to the second switcher. The second step is to parallel the serial ports of the 8 x 1 DAS/XLR or BNC's. Plug the male end of the duplex modular adapter into the supplied female 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 8 x 1 DAS/XLR or BNC modular receptacles. See the diagram below. NOTE: Three or more 8 x 1 DAS/XLR or BNC's may be daisy chained by using the above description and a Radio Shack 279-410UK 5-jack modular adapter.
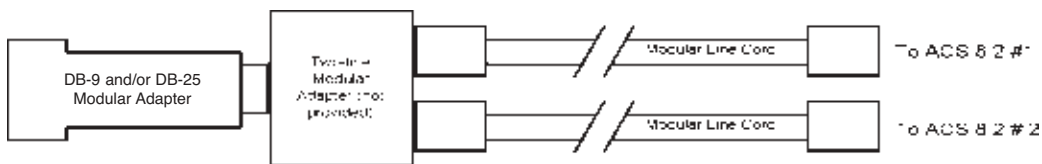
Serial Control
The unit is controlled in either Menu or Burst mode. It can run at the following data rates:
  • 2400
  • 9600 <u>Default</u>
  • 19,200
  • 38,400

Serial communications is either multi-drop RS-232 or RS485, jumper selectable.

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 a space   (" ") followed by the device (ID) address as a single decimal digit. The menu mode displays certain parameters, and allows the setting of the command serial communications rate ("baud rate"), front panel lockout mode, selection of a digital input, etc. In both cases, device (ID) address (0-7) is specified in the on-board DIP switches.

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 command 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 a "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
i	Input Number	1-8 or Mute

Set-up Commands

*uC4x   - Set RS-232/RS-485 mode timings.
      x = 1, Turn ON RS-232/RS-485 mode NO delays on sending data.
      x = 0, Turn OFF RS-232/RS-485 mode (delay for RS-232
      charge pump startup before sending response, unless ID = 0).

*uCCx   - Set Serial Speed. **x** = **0**:2400 **1**:9600 **2**:19200 **3**:38400

*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."

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

Real Time Control Commands

*uDxx   - Delay xx seconds before processing next command.

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

Digital Switch Control Commands

*ui	- Apply input "i" to output
*uM	- Mute output

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.

*uS   - Send status of all inputs. Response is:
SuA,x,x,x,x,x,x,x,x<CR><LF>

*uU   - Send Unit Information:<name><version><cr><lf>

REMOTE CONTROL CONNECTOR PINOUTS

CONTROL

The front panel switches are brought out through the rear panel remote control connector, providing a means of controlling the 8 x 1 DAS/XLR or BNC from a remote point. These digital inputs may be connected to any remote pair of switch contacts, such as external relays, switches, etc. The digital inputs may also be connected to external open collector circuits or 5-volt logic signals.

J1 Switch Pin numbers:

3 - Switch number **1**	4 - Switch number **2**
5 - Switch number **3**	6 - Switch number **4**
7 - Switch number **5**	8 - Switch number **6**
9 - Switch number **7**	10 – Switch number **8**
11- Mute input	
1,2,12,13,14,24 Digital ground	
25 - Shield	

STATUS

The status signals on the remote control connector are individual open collectors. These may provide status to a remote control point to indicate which input is selected. The status output for the selected output will go low, providing a return for an LED indicator or TTL/CMOS logic. External pull-up resistors may be required in some installations. Menu Mode setup of each input status output can be set independently to one of the following modes:

Follow the currently selected input channel. (Default)
Allows a 1.0 second pulse when the associated input channel is selected

J1 Status pin numbers:

23 - Status number **1**	22 - Status number **2**
21 - Status number **3**	20 - Status number **4**
19 - Status number **5**	18 - Status number **6**
17 - Status number **7**	16 - Status number **8**
1,2,12,13,14,24 Digital ground	

CAUTION!

The following commands are reserved for factory testing only. Use of these commands may cause unpredictable results.
*uYE
*uYT

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Broadcast Tools, Inc.
131 State Street
Sedro-Woolley, WA 98284 • USA

360.854.9559 **voice** • 360.854.9479 **fax**
support@broadcasttools.com **e-mail**
www.broadcasttools.com **website**