



Installation and Operation Manual

for the

8 x 2 D/ev

Eight Input, Dual Output Stereo Audio Switcher

Copyright © 1995 by Broadcast Tools, Inc. All rights reserved.
Except as permitted under the United States Copyright Act of 1976, no part of this document
may be reproduced or distributed without permission

All Specifications and features are subject to change without notice.

Software Version 01.40 or above

Manual update 09/08/2000

Broadcast Tools, Inc.
8 x 2 D /ev
Eight Input, Dual Output Stereo Audio Switcher

Table of Contents

<u>Sections</u>	<u>Page Number</u>
Introduction	3
Safety Information	3
Who to contact for help	3
Product Description	4
Installation	5- 14
Quick Start	7
Equipment Specifications	15
Warranty	16

Broadcast Tools, Inc.
8 x 2 D/ev
Eight Input, Dual Output Stereo Audio Switcher

INTRODUCTION

Thank you for your purchase of a Broadcast Tools, Inc., 8 x 2 D/ev . We will refer to this unit as 8 x 2 D/ev thought out 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 unit.

☞ NOTE: This manual should be read thoroughly before installation and operation.

SAFETY INFORMATION

Broadcast Tools products should be installed only by qualified personnel. Incorrect or inappropriate use and/or installation could result in a hazardous condition.

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

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 or contact us directly.

If you would like more information about Broadcast Tools, Inc., products, you may reach us at:

Broadcast Tools, Inc.
131 State Street

Sedro-Woolley, WA 98284

Voice 360 . 854 . 9559

Fax 360 . 854 . 9479

Internet: www.broadcasttools.com

E-mail bti@broadcasttools.com

Thank you for choosing Broadcast Tools!

Broadcast Tools, Inc.
8 x 2 D/ev
Eight Input, Dual Output Stereo Audio Switcher

PRODUCT DESCRIPTION

The 8 x 2 D/ev are designed to accommodate 8 stereo inputs, 2 stereo outputs and 2 monaural outputs. Output selectable silence sense monitoring is also provided.

The 8 x 2 D/ev may be controlled via front panel switches with indicators and/or externally. This may be any momentary contact closure or TTL/CMOS logic. Open collectors are provided for status. The 8 x 2 D/ev also has the ability to be controlled by a computer.

The 8 x 2 D/ev features three (3) operating modes:

- 1 - Overlap mode that allows you to overlap one audio source with another while the button for the second source is held down. Both channels will be fed to the output until the second button is released, at which time the first audio source will be switched off.
- 2 - Mix mode allows any or all channels to be connected (mixed) to either output channel.
- 3 - Interlock mode provides that when a channel button on the switcher is pressed, the first audio source will be immediately turned off and the second audio source will be turned on.

Another user selectable feature is the way the 8 x 2 D/ev will act when power is first applied (or re-applied after a power failure). You have your choice of having all channels being OFF on power-up or any or all of the eight input channels being assigned to either or both of the two output channels at power-up.

Broadcast Tools, Inc.
8 x 2 D/ev
Eight Input, Dual Output Stereo Audio Switcher
INSTALLATION

Please examine your 8 x 2 D/ev 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 contains the 8 x 2 D/ev, "Lump in the line" power transformer, Installation manual, 25 pin male D-sub and shell, 4 conductor modular cable/ 9 pin D-Sub modular serial adapter.

The 8 x 2 D/ev 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 before permanently installing the 8 x 2 D/ev, you bench test and become familiar with the operation of the unit before installation.

The 8 x 2 D/ev interfaces to your equipment (sources, loads and remote control) through depluggable rear panel screw terminals. Follow the legends for the desired audio 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. Remove each screw terminal, strip each conductor, 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. Connections may be made to the + and - inputs for balanced operation, or to the + input and grounding the - side for unbalanced input operation. Connections can be made to the + and - outputs for balanced operation, or to the + output and ground for unbalanced output operation. In no case should either the + or - outputs be connected to ground. The input impedance is high, 600Ω termination may be done external to the 8 x 2 D/ev.

The input channels are numbered from 1 through 8 on the rear panel and correspond to the 8 switches on the front panel from left to right. (The left most switch on the front panel is channel 1 and is labeled 1).

Installation of the 8 x 2 D/ev 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 to the left of J2 as viewed from the rear. It is recommended that all cables connected to the 8 x 2 D/ev 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 UPS will provide back-up in case of power outages.

Broadcast Tools, Inc.
8 x 2 D/ev
Eight Input, Dual Output Stereo Audio Switcher

SETUP

Input and Output Levels

Once the input and output connections have been made, the input levels can be set. The switcher is factory set for unity. Maximum input levels of + 27dBu. The inputs and outputs can both add an additional 15 dB of gain from the factory settings. Should input levels need to be changed, they are accessible from the rear panel. Each stereo input is labeled and has one input adjustment per channel. Similarly, the output channel level controls are accessed with the top cover removed.

Silence Sensor

The 8 x 2 D/ev is equipped with a silence sensor. The silence sensor as shipped configured to monitor output # 1. A jumper (JP-17) is provided to switch to output # 2 if desired. The time delay is adjustable from 6 seconds to two minutes and 45 seconds. R310 is the time delay control. The silence sensors SPDT relay is provided at terminal TB-13. Bringing the SS DEF input on TB-13 to ground will defeat the silence sensor. NOTE: C112 may be increased to lengthen the time delay.

Input expansion

Input expansion may be accomplished by connecting a shielded cable between the first units EXT +LA sum input terminal and the second units unbalanced output. The shield should be connected to the CH GND terminal. Follow the same procedure for the (EXT +RA) right channel. The above example provides 16 inputs, with the first units # 1 output.

Power-Up

☞ NOTE: *Due to the power supplies long discharge time, a pause of 10 seconds before plugging the 8 x 2 D/ev back in may be required during power-up programming.*

Input Mode:

To select a channel configuration at power-up, select the desired input and output channels and in SEQUENCE, press and hold down the F1, F2 and MUTE button for 1 second. Your channel setup is now saved.

To select NO channels at power-up, turn off ALL channels and in SEQUENCE, press and hold down the F1, F2 and MUTE button for 1 second. Your channel setup is now saved. This is the DEFAULT mode.

Broadcast Tools, Inc.
8 x 2 D/ev
Eight Input, Dual Output Stereo Audio Switcher

Operating modes:

- | | |
|---------|------------------------------|
| F1 | - Set MIX Mode |
| F2 | - Set INTERLOCK Mode |
| F1 + F2 | - Set OVERLAP Mode (Default) |

To select the MIX mode, unplug the 8 x 2 D/ev, while holding down the F1 switch, plug the 8 x 2 D/ev back into the wall outlet.

To select INTERLOCK mode, unplug the 8 x 2 D/ev, while holding down the F2 switch, plug the 8 x 2 D/ev back into the wall outlet.

To select OVERLAP mode, unplug the 8 x 2 D/ev, and while holding down the F1 & F2 switches, plug the 8 x 2 D/ev back into the wall outlet. This is the DEFAULT mode.

Front Panel functions (while operating): Overlap mode allows you to overlap one audio source with another while the button for the second source is held down. Both channels will be fed to the output until the second button is released, at which time the first audio source will be switched off.

Mix mode allows any or all channels to be connected (mixed) to either output channel.

Interlock mode provides that when a channel button on the switcher is pressed, the first audio source will be immediately turned off and the second audio source will be turned on.

Input to Output selection:

By depressing the F-1 switch and any of the eight input selection switches, will assign that input to output # 1. The input LED indicator will light solid.

By depressing the F-2 switch and any of the eight input selection switches, will assign that input to output # 2. The input LED indicator will flash slowly.

By depressing the F-1 and F-2 switch and any of the eight input selection switches, will assign that input to both output # 1 and 2. The input LED indicator will flash rapidly.

To mute a selected channel for output # 1, depress the MUTE and F1 switch along with the selected input. To mute a selected channel for output # 2, depress the MUTE and F2 switch along with the selected input.

Broadcast Tools, Inc.
8 x 2 D/ev
Eight Input, Dual Output Stereo Audio Switcher

Remote Control

All functions on the 8 x 2 D/ev may be remote controlled via a rear panel 25 pin D-sub connector. The 8 x 2 D/ev accepts momentary contact closures, open collector or TTL/CMOS logic levels. Open collector status/tally is also provided and follows the action of the front panel LED's.

☛ NOTE: Steering diodes (1N4148 or 1N4004) may be used to provide single switch input selection. Tie the cathode of each diode to the desired input pin of J2, while tying the anodes together. Take the combined anodes and connect them to the F1 or F2 pin on J2. This will provide a ground on the selected F# pin when any input is selected.

The remote connector provides a step input. By pulsing the "STEP" input to ground, the unit will increment one source for each low to high transition. Automatic sequencing may be accomplished by holding the step input low for two seconds. The unit will now step to each source at a two-second rate, allowing you to automatically preview each source. The step input is helpful in freeing up valuable remote control channels.

J2 Remote Control Connector

CONTROL		STATUS	
<u>J2 Pin #:</u>		<u>J2 Pin #</u>	
1	- Switch 1	13	- Ground
2	- Switch 2	14	- Status 1
3	- Switch 3	15	- Status 2
4	- Switch 4	16	- Status 3
5	- Switch 5	17	- Status 4
6	- Switch 6	18	- Status 5
7	- Switch 7	19	- Status 6
8	- Switch 8	20	- Status 7
9	- Switch F1	21	- Status 8
10	- Switch F2	22	- Ground
11	- Mute Switch	23	- Ground
12	- Step Switch	24	- Ground
		25	- Chassis Ground

Broadcast Tools, Inc.

8 x 2 D/ev

Eight Input, Dual Output Stereo Audio Switcher

Front Panel LED's

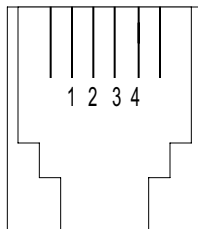
Front Panel LED's	Number Of LED's	Activation Event/Mode	Activation Behavior
Inputs connected to Output 1	8 Red	State of Connection	On if connected
Inputs connected to Output 2	Same as Above	State of Connection	Slow flash if connected
Inputs connected to both outputs	Same as above	State of Connection	Fast flash if connected
Silence Alarm	Red	Duration of Silence	On if alarmed
Power	Green	Valid Power	On
Mute	1 Red	System Mute Status	Flash when muted
F1, F2	2 Red	Front Panel Locked Out	Flash

Front Panel Switches

Switch(es)	Function
1-8	Input Channel 1-8
F1	Output 1 select and/or Function Modifier
F2	Output 2 select and/or Function Modifier
MUTE	Mute either or both Outputs

Connecting the 8 x 2 D/ev to a computer

Use the provided modular/9 pin D-sub connector adapter and modular cord to connect the 8 x 2 D/ev's serial connector to your serial port.



Modular jack pin numbers.

The pin out of the adapter is shown on the next page.

Broadcast Tools, Inc.
8 x 2 D/ev
Eight Input, Dual Output Stereo Audio Switcher

RJ-11 Adapter Pin	DB-9	8 x 2 D/ev (Point of view)
4	3	RS-232 Receive
3	2	RS-232 Transmit
2	5	Ground

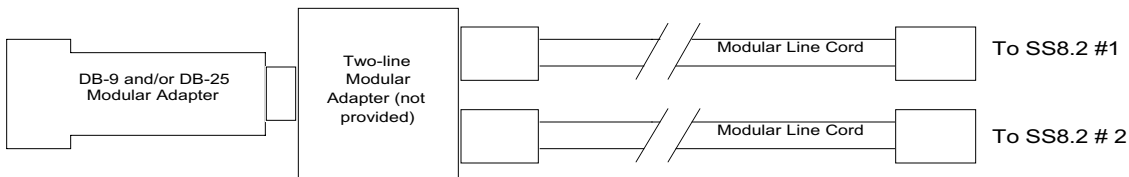
The 8 x 2 D/ev is supplied with a modular cable and a modular 9 pin D-sub adapter for serial control. Only use the modular cord that is supplied with the 8 x 2 D/ev or a replacement that reverses, such as Radio Shack Cat No. 279-347. Connect the cable between the 8 x 2 D/ev and your computers serial port. The 8 x 2 D/ev may operate at baud rates of 2400 and 9600. The unit is shipped set for 2400 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 95/98/2000/NT Hyper Terminal, Mac, etc.) Using the protocol of 2400-N-8-1. Set the mode to: (Connect using) Direct to Com x: Flow Control to: NONE and emulation to: ANSI. Press the space bar ONCE and the intuitive menus will pop-up.

CONNECTING TWO 8 x 2 D/ev'S TO A SINGLE COMPUTERS SERIAL PORT

Multiple 8 x 2 D/ev'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 2 D/ev. One suggestion is to assign 1 to the first 8 x 2 D/ev and 2 to the second switcher. The second step is to parallel the serial ports of the 8 x 2 D/ev. Plug the male end of the duplex modular adapter into the supplied female DB-9 D-Sub to RJ-11 modular adapter and then attach the supplied modular line cords into each of the duplex modular adapter receptacles (Radio Shack Cat No. 279-407) and the other ends into each 8 x 2 D/ev modular receptacles. See the diagram below.

NOTE: To set the (ID) password to 01: Front panel input switches one and two must be held down while the 8x2D/ev is powered up. The next step while holding down the two input switches is to press the space bar. Next, press the <P> key and wait for the "Enter password" prompt. You may now enter your password. (Up to eight numbers only). When finished, press the "ENTER" key. Press <Q> and repower the 8x2D/ev. To get the menu with a password, simply type P plus your password and press the space bar.

NOTE: Three or more 8 x 2 D/ev may be daisy chained by using the above description and a Radio Shack Cat No. 279-410, 5-jack modular adapter.



Broadcast Tools, Inc.

8 x 2 D /ev

Eight Input, Dual Output Stereo Audio Switcher

A menu mode interaction is initiated by sending a <space> character (Pressing the space bar). If a password is required, the user enters Pxxxxxxx <space> to initiate the menu. The menu is then displayed. The user then interacts with the menu, and each interaction results in the requested action-taking place immediately, and the menu being re-displayed until the user sends the Q command, at which time the screen will be cleared and the interaction ended. The menu will show (in this example, channel 1 is connected to output 2 and 5 is connected to output 1):

Interactive Menu

Broadcast Tools, Inc. "8 x 2 D/ev " Dual Stereo Audio Switcher. (c) 1995
V01.40

Input channel:	Output channel(s):
1	2
2	
3	
4	
5	1
6	
7	
8	

BR	(baud rate)	24
M	(mute)	
L/U	(Lock/unlock front panel)	
Q	Quit	

SILENCE ALARM !

☛ NOTE: *The MENU MODE does NOT allow overlapped commands to be entered. If in overlap mode, it will still behave as if in interlock mode (change will occur when Q is entered). Note that after 25 seconds of no activity, the system will behave as if a Q had been entered.*

Burst Mode Command Protocol

☛ NOTE: *If a password is to be used in the BURST mode, the password MAY be entered from the MENU mode.*

A burst mode command must be sent within 5 seconds. It starts with an asterisk (*), then the command codes, followed by a carriage return, 1 or 0. Burst mode commands may be answered by an optional "OK" response from the unit or a status response if requested.

NOTE *If a password is in effect, a password string must precede each burst mode Command (see examples below).*

Broadcast Tools, Inc.
8 x 2 D /ev
Eight Input, Dual Output Stereo Audio Switcher

Syntax of burst mode commands is <xxxx> is a single character described by xxxx: <#> is either a carriage return, 1 or 0.

- *BR24<#> - Set baud rate to 2400 (kept in EEPROM).
- *BR96<#> - Set baud rate to 9600 (kept in EEPROM).
- *M<#> - Mute (turn off all Inputs/Outputs).
- *M1<#> - Mute output ONE (1) Only.
- *M2<#> - Mute output TWO (2) Only.
- *E<cr> - End Overlap. If in overlap mode, previously connected channels will not be disconnected until this command is received.
- *Ex<#> - End Overlap. If in overlap mode, previously connected channels will be disconnected after a time delay. The <x> represents the delay in seconds.

The delay may be between 1 and 9 seconds. The carriage return is optional with this command.

- *Q<#> - End communications.
- *S<#> - Requests that a status response be sent from the unit.
- *L<#> - Lock the front panel.
- *U<#> - Unlock the front panel.
- *O<#> - Cause each burst mode command to be answered with an OK<cr> from the unit.
- *N<#> - Do not answer burst mode command with an OK string.
- *Dss<#> - Delay processing future commands for ss tenth of seconds (99 = 9.9 seconds)
The commands may be sent during this time but will not be processed until the delay is complete. This allows one to send a series of commands, with built-in delays, and have those commands processed in the prescribed sequence and timing. This is allowed by leaving unprocessed commands in the circular receive buffer during delays. Thus, the length of a command string can be no more than 71 characters. More characters cannot be sent until enough of the command has been processed to free up buffer space.
- *Zc<#> - Outputs the character "c" to the serial port.

Broadcast Tools, Inc.
8 x 2 D /ev
Eight Input, Dual Output Stereo Audio Switcher

This can be useful in debugging command strings. It might also be used to generate pacing characters to allow a sender to determine when more commands may be sent after delayed commands have been sent.

- *V<#> - Outputs the model and firmware version number of the unit.
- *ios<#>
completed - Connect input "i" (1-8) to output "o" (1-2) and send status string when if "s" is 1. Mode switches may affect the final outcome.
- *i4s<#> - Connect input "i" to output 1. Mode switches have no impact on this.
- *i5s<#> - Connect input "i" to output 2. Mode switches have no impact on this.
- *i6s<#> - Disconnects input "i" from output 1. Mode switches have no impact on this.
- *i7s<#> - Disconnects input "i" from output 2. Mode switches have no impact on this.

(4) Carriage returns are allowed like in the old protocol, but are no longer required as long as the following rules are followed:

- *ios<#> - Input commands REQUIRE the "s" character or a <CR>. The "s" character is either a 1 or 0. The 1 will display status, while the 0 does not.

*<input_channel><output_channel><status_request (optional) ><#> - Set channels

<input_channel> is the input channel number 1-8

<output_channel> is the output channel number 1 - 2 or Both

<status_request> is "1" if a status response is requested (Optional)

Burst Mode Command Protocol, continued

- ☛ NOTE: Independent operation
 - 1 - Connect input channel to output channel 1
 - 2 - Connect input channel to output channel 2
 - B - Connect input channel to both output channels 1 & 2
 - 0 - Disconnect input channel from both output channels

A Status response is of the form:

Z<silence_status>1ab2ab3ab4ab5ab6ab7ab8ab<cr><lf>

Broadcast Tools, Inc.
8 x 2 D /ev
Eight Input, Dual Output Stereo Audio Switcher

Following this, there are three characters for each input channel, always in the same order:

<input channel number> 1 - 8

<a> - 1 if input channel is connected to output 1

0 if input channel is NOT connected to output 1

 - 1 if input channel is connected to output 2

0 if input channel is NOT connected to output 2

Z is a flag to indicate the start of a status response

<silence_status> is:

Q - Silence sensor Quiet, "ALARMED" !!

N - Silence sensor Normal, No alarm

Other responses are:

OK<cf><lf> - This is sent, if enabled, after each burst mode command.

E<cr><lf> - Error encountered in burst mode.

T<cr><lf> - Timeout encountered in burst mode.

EXAMPLE:

Request status response:

*S<#>

Request status response (password is required and is 123):

P123*S<#>

Status Response:

ZQ100200310400511600700800

Q means the silence alert is active

Channel 3 is connected to output channel 1

Channel 5 is connect to both output channels 1 & 2

Command: Connect channel 2 to output 1 and give a status response:

*211<#>

Command: Connect channel 4 to both outputs with no status response. Password of 1234 is required:

P1234*4B0<#> or P1234*4B<#>

Command: Set 9600 baud rate:

*BR96<#>

Broadcast Tools, Inc.
8 x 2 D /ev
Eight Input, Dual Output Stereo Audio Switcher

Command: Require burst mode response of OK on success:

*O<#>

Command: Overlap two inputs to output one with a overlap time of 4 seconds. No Password

*210<#> Connect channel 2 to output 1 and give no status response.

*110<#> Connect channel 1 to output 1 and give no status response.

*E4<#> End the overlap of channel 2 after 4 seconds

Command: To set the (ID) password to 01: Front panel input switches one and two must be held down while the 8x2D/ev is powered up. The next step while holding down the two input switches is to press the space bar. Next, press the <P> key and wait for the "Enter password" prompt. You may now enter your password. (up to eight numbers only). When finished, press the "ENTER" key. Press <Q> and repower the 8x2D/ev. To get the menu with a password, simply type P plus your pass and press the space bar.

*P01<#>

Broadcast Tools, Inc.
8 x 2 D /ev
Eight Input, Dual Output Stereo Audio Switcher

SPECIFICATIONS

<u>MAX INPUT LEVELS:</u>	+ 27dbu, balanced, bridging. > 20k Ω .
<u>MAX OUTPUT LEVELS:</u>	Stereo balanced output 1, 2 and mono output 1, + 24 dbu. @ 100 Ω . Mono unbalanced output 2, +18 dbu @ 47 Ω .
<u>GAIN:</u>	15db.
<u>FREQ RESPONSE:</u>	22 to 22 KHz; +/- 0.3dB
<u>SIGNAL/NOISE RATIO:</u>	85 dB nominal, unweighted, below +4dbu.
<u>DISTORTION:</u>	Less than 0.01% THD & IMD (250/7kHz) at + 18dbu.
<u>CROSSTALK:</u>	-80 dB @ 2kHz / -65 db @ 10 khz from adjacent off channel.
<u>MIX INPUT:</u>	Unbalanced summing inputs @ 10k Ω , 0 dbu.
<u>SWITCHING METHOD:</u>	Sealed relays, utilizing 2-form-C Bifurcated-Crossbar silver alloy with gold overlay contacts.
<u>LOGIC:</u>	Microprocessor / Non-volatile memory.
<u>SILENCE SENSOR:</u>	Front panel silence LED indicator, Spdt relay output, Defeat input.
<u>OPERATION CONTROL:</u>	<i>Front Panel</i> - Momentary switches. <i>Remote</i> - Momentary closure to ground. > 200ms. <i>RS-232</i> - Serial 2400/9600 baud, 8N1.
<u>STATUS:</u>	<i>Front Panel</i> - LED indicator in switch. <i>Remote</i> - Open collector . <i>RS-232</i> - Serial. 2400/9600 baud, 8N1.
<u>INTERFACING:</u>	<i>Audio</i> - Rear panel depluggable screw terminals. Accommodates 16 - 28 AWG wire. Mates supplied. <i>Remote Control</i> - Male 25 pin "D" connector. Mate supplied. <i>RS-232 Serial</i> - RJ-11/6P4C Modular, Adapter & cable supplied.
<u>POWER:</u>	34.5 Vac CT @ 500 ma / 10.5 Vac @ 1 amp, 120 Vac 50-60 hz Lump in the line power transformer. Supplied. (240 Vac 50-60 hz optional)
<u>MECHANICAL:</u>	19" X 1.75" X 10.0" (WHD) / Weight: 9.0 lbs.

Broadcast Tools, Inc.
8 x 2 D /ev
Eight Input, Dual Output Stereo Audio Switcher

BROADCAST TOOLS, INC.
LIMITED WARRANTY AND REMEDIES

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 its is shipped by Broadcast Tools if the item is properly installed, used and maintained.

EXCLUSIVE REMEDIES

If Broadcast Tools is notified of in writing of a failure of any item manufactured by Broadcast Tools to conform to the foregoing Limited Warranty within one (1) year following the date of the Buyer's acquisition of the item, and if the item is returned in to Broadcast Tools in accordance with Broadcast Tools' instructions for confirmation by inspection of the defect (which at Broadcast Tools' election may include, without limitation, a requirement that the Buyer first obtain a Return Authorization number from Broadcast Tools, that the Buyer furnish proof of purchase in the form of an invoice and/or receipt, and that the Buyer prepay all freight charges associated with any return of the item to Broadcast Tools using such freight service as Broadcast Tools reasonably may specify), Broadcast Tools will repair or replace the defective item, or will refund the purchase price paid by the Buyer for the item. Broadcast Tools shall have the exclusive right to choose between these alternative remedies.

NO OTHER WARRANTIES OR REMEDIES

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, BROADCAST TOOLS AND ITS SUPPLIERS DISCLAIM ALL OTHER WARRANTIES, EITHER EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE; AND THE FOREGOING ALTERNATIVE REMEDIES SHALL BE EXCLUSIVE OF ALL OTHER REMEDIES. THIS LIMITED WARRANTY GIVES YOU SPECIFIC LEGAL RIGHTS. YOU MAY HAVE OTHER RIGHTS, WHICH VARY FROM STATE/JURISDICTION TO STATE/JURISDICTION.

NO LIABILITY FOR CONSEQUENTIAL DAMAGES

TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, NEITHER BROADCAST TOOLS NOR ANY OF ITS SUPPLIERS SHALL HAVE ANY LIABILITY FOR ANY SPECIAL, INCIDENTAL, INDIRECT, CONSEQUENTIAL OR PUNITIVE DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, ANY DAMAGES FOR LOST PROFITS, BUSINESS INTERRUPTION, LOSS OF DATA OR INFORMATION, COST OF CAPITAL, CLAIMS OF CUSTOMERS, OR ANY OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF OR THE INABILITY TO USE ANY ITEM SUPPLIED BY BROADCAST TOOLS), EVEN IF BROADCAST TOOLS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES HAVE ANY LIABILITY FOR ANY SPECIAL, INCIDENTAL, CONSEQUENTIAL, EXEMPLARY OR PUNITIVE DAMAGES. THIS LIMITATION OF LIABILITY APPLIES WHETHER A CLAIM IS ONE ALLEGING BREACH OF A CONTRACT OR WARRANTY, NEGLIGENCE OR OTHER TORT, FOR THE VIOLATION OF ANY STATUTORY DUTY, THE FAILURE OF ANY LIMITED OR EXCLUSIVE REMEDY TO ACHIEVE ITS ESSENTIAL PURPOSE, OR ANY OTHER CLAIM OF ANY NATURE. BECAUSE SOME STATES AND JURISDICTIONS DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, THIS LIMITATION MAY NOT APPLY TO YOU.

BROADCAST TOOLS, INC.
131 State Street
Sedro-Woolley, WA 98284-1540 USA

Voice: 360 . 854 . 9559

Fax: 360 . 854 . 9479

Installation and Operation Manual
Broadcast Tools, Inc.
Page 17