



## *Installation and Operation Manual*



### **"LOU II"** ***Loss of Video Switcher*** ***with Four Channel Audio Switcher***

Firmware Version 1.1 / PCB Rev C

Manual Revised 04/08/04

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## INTRODUCTION

Thank you for your purchase of a Broadcast Tools® Loss of Video Switcher with Four Channel Audio Switcher (referred to as the LOV II 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® LOV II.

## 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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**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® LOV II, Loss of Video Switcher with Four Channel Audio Switcher is designed to accept and automatically or manually switch two NTSC/PAL signal sources, along with four balanced analog audio channels. Features include: Automatic control function that switches to a back up source upon failure of the main source; switch functions can be triggered by any video error, front panel transfer switch and/or external switch contact. Additional features: Front panel error status and valid video LED indicators; remote control of all front panel features; removable screw terminals for audio and remote control; BNC connectors for video with termination jumpers; Plug & Play installation; dipswitch selection of precise time delay from 2 seconds to 85 minutes and restore timing delay from off to 10.2 minutes; defeatable sonalert aural alarm; SPDT status relays; SPDT one-second pulse relay. The LOV II may be set on a desktop, mounted on a wall or as part of the new RA-1, Rack-Able mounting shelf.

## PRODUCT FEATURES

- Transparent two-input video switcher with automatic and manual control
- Transparent four channel audio switcher with automatic and manual control
- Front panel video error indicator
- Front panel active channel indicator
- Precise time delay from 2 seconds to 85 minutes
- Restore timing delay from off to 10.2 minutes
- Front panel “XFER” switch with front panel indicator, remote input and DPDT status relay
- Front panel “Mute” switch with built-in sonalert and remote mute input
- Front panel “Arm/Disarm” switch with front panel LED, remote input and SPDT status relay
- Front Panel Alarm “Reset” switch, Tripped LED and SPDT status relay
- External (“Ext”) alarm input with front panel indicator and SPDT status relay
- One SPDT one-second pulse relay. Great for automatically rebooting external equipment
- Front Panel Power LED
- BNC video connectors
- Removable screw (Euroblock) connectors
- The LOV II may be set on a desktop, mounted on a wall or as part of the new RA-1, “Rack-Able” mounting shelf.
- Optional RA-1 rack shelf for mounting up to TWO units in 1-RU

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## DESCRIPTION

## INSTALLATION GUIDELINES

### Inspection:

Please examine your LOV II for any damage that may have been sustained during shipping. If any is noted, please notify the shipper immediately and retain the packaging for inspection by the shipper. The package should contain the LOV II, 9 vac@500 ma wall power transformer and this manual.

### Mounting:

Mount the LOV II where it will be visible and rear panel accessible. Four (4) screw holes are provided for mounting. The LOV II may be set on a desktop, mounted on a wall or as part of the new RA-1, "Rack-Able" mounting shelf.

### Connecting user equipment:

Follow the designators on the rear of the LOV II. Pages six and seven list the function of all relays and remote control inputs. The video and audio connections are listed on the rear chassis.

### Configuring For Backup Switching:

- Connect the (MAIN) video source equipment to the Input 1 BNC connector.
- Connect (MAIN) audio to terminals labeled A1L-, A1L+ for the left channel or channel one and A1R-, A1R+ for the right channel or channel two.
- Connect (MAIN) audio to terminals labeled B1L-, B1L+ for the left channel or channel three and B1R-, B1R+ for the right channel or channel four.
- Connect the (BACK UP) video source equipment to the Input 2 BNC connector.
- Connect (BACK-UP) audio to terminals labeled A2L-, A2L+ for the left channel or channel one and A2R-, A2R+ for the right channel or channel two
- Connect (BACK-UP) audio to terminals labeled B2L-, B2L+ for the left channel or channel three and B2R-, B2R+ for the right channel or channel four.
- Connect the destination video equipment to the OUTPUT BNC connector.
- Connect the destination audio equipment to ALT-, ALT+ for the "A" left channel or channel one and ART-, ART+ for the "A" right channel or channel two.
- Connect the destination audio equipment to BLT-, BLT+ for the "B" left channel or channel three and ART-, ART+ for the "B" right channel or channel four.
- Shields may be connected to the terminals labeled "EGND"

### Automatic Operation:

When the main signal is lost, the LOV II will sense the loss and start timing. When the delay time-out is reached, the LOV II will switch to the back-up source. When the signal returns and after the restore time has been reached (if enabled), the LOV II will automatically switch back to the main source.



### NOTE:

*The LOV II is designed to route (video and audio) input 1 to the output in the event of a power or unit failure.*

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## INSTALLATION

## Manual Operation:

Pressing the “XFER” switch once will switch to input 2 and light the IN-2 indicator. Press the switch again to switch back to input one and extinguish the IN-2 LED. Pressing the RESET switch will always return the unit to input one.

### Remote Control

- Mute

### Description

Mutes the sonalert alarm. The sonalert may be disabled by removing JP6 on the rear panel.

- Reset

Clears all alarms.

- Ext

When grounded, will immediately switch to input 2. This may be used to monitor STL or satellite squelch relay, etc.

- Arm/Disarm

Arms or disarms the system. Toggle action. Armed at power-up.

- Xfer

Allows the switching back and forth (toggle) of inputs. Input 2 is active when the In-2 LED is lit.

**Note: On some units, this input is next to the “EXT” input and is mis-labeled “DGND”.**

**NOTE: All of the above inputs require momentary ground closures. Inputs are 5-volt TTL/CMOS compatible.**

- Tripped Relay (K3)  
SPDT

Closes when any alarm is triggered and stay latched until manually reset.

- Ext Relay (K4)  
SPST

Closes for as long as the “EXT” is active.

- Armed/Disarmed Relay (K5)  
SPST

Closed while the system is armed. May be configured as normally open or closed.

- Transfer (Xfer) Alarm Relay (K1B-K2B)  
SPST

Activated after the timed loss of signal and relaxed when the signal returns (this is determined by the setting of the RESTORE timing switches SW2).

- Pulse Relay (K2)  
SPST

Activated for one second after the timed loss of signal. Great for rebooting external equipment.



### CAUTION!

*Installation of the LOV-II 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](http://www.polyphaser.com) and [www.itwlinx.com](http://www.itwlinx.com).*



### NOTE:

*The relay designation of **NO**, refers to the Normally Open contact in the **OFF** condition. The relay designation of **NC**, refers to the Normally Closed contact in the **OFF** condition. **C** refers to the common or wiper of the associated relay.*

## PROGRAMMING GUIDELINES

### Switch and jumper Setup:

- Jp-1 Selects 75-ohm or no termination for input one. With no termination, you are able to loop-thru with a T-connector.
- Jp-2 Selects 75-ohm or no termination for input two. With no termination, you are able to loop-thru with a T-connector.
- Jp-3 Select what the video demodulator monitors. Either Input -1, Input-2 or the output. This is only available on version C of this product.
- Jp-6 Enables the sonalert (buzzer)

SW2-7 & 8 Not used (feature creep).

### Delay timing setup:

The LOV II time delay is set via SW 1, the 8-position dipswitch and SW2 switch 6. The default for SW-2-6 is OFF. This provides TWO second resolution. To provide longer delay time resolution, turn ON SW2-6, which will provide 20 second resolution. The switches are set at the factory for a 6 second delay (SW 1-1 & 2 ON and SW 2-6 OFF). Each switch has a digit value as shown in the two tables below. For the factory default setting, as shown in the two-second-resolution table below, we have turned ON switches one and two. Switch one represents a one-digit value, while switch two represents a two-digit value. We add these two digit values together to obtain a total digit value of three. Each value is given a time delay of two or twenty seconds, so we therefore multiply the total digit value of three by two (or 20) to obtain six (or 60) seconds.

**NOTE: The table on this and the next page refers to the time delay in seconds.**

**Time Delay** *Two (2) Second Resolution Table*

SW1 Switch Position and SW2-6 OFF.	1	2	3	4	5	6	7	8
Digit Value	1	2	4	8	16	32	64	128
EXAMPLES:								
1 = 2 seconds	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
1 + 2 = 3 x 2 = 6 seconds	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
1 + 2 + 4 = 7 x 2 = 14 seconds	ON ↑	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
32 x 2 = 64 seconds, or 1 minute and 4 seconds	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	ON ↑	OFF ↓	OFF ↓
255 x 2 = 510 seconds, or 8 minutes and 30 seconds	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑

## Time Delay

### Twenty (20) Second Resolution Table

SW1 Switch Position and SW2-6 ON.	1	2	3	4	5	6	7	8
Digit Value	1	2	4	8	16	32	64	128
EXAMPLES:								
1 = 20 seconds	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
1 + 2 = 3 x 20 = 60 seconds or 1 minute	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
1 + 2 + 4 = 7 x 20 = 140 seconds or 2 minutes and 20 seconds	ON ↑	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓
32 x 20 = 640 seconds or 10 minutes and 40 seconds.	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓	ON ↑	OFF ↓	OFF ↓
255 x 20 = 5,100 seconds or 85 minutes.	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑	ON ↑

## Restore timing setup:

The LOV II restore time delay is factory configured for 20-second resolution only. **Restore requires the video to be valid for the length of restore time before switching back to input one.** Restore delay is set by the **first five positions of dipswitch SW2**. The default for these switches is OFF. Each switch has a digit value as shown in the table below and refers to the restore time delay in seconds.

## Restore Delay

### Twenty (20) Second Resolution Table

SW-2 Switch Position.	1	2	3	4	5
Digit Value	1	2	4	8	16
EXAMPLES:					
1 = 20 seconds	ON ↑	OFF ↓	OFF ↓	OFF ↓	OFF ↓
1 + 2 = 3 x 20 = 60 seconds or 1 minute	ON ↑	ON ↑	OFF ↓	OFF ↓	OFF ↓
1 + 2 + 4 = 7 x 20 = 140 seconds or 2 minutes and 20 seconds	ON ↑	ON ↑	ON ↑	OFF ↓	OFF ↓
16 x 20 = 320 seconds or 5 minutes and 20 seconds.	OFF ↓	OFF ↓	OFF ↓	OFF ↓	ON ↑
Restore is turned OFF.	OFF ↓	OFF ↓	OFF ↓	OFF ↓	OFF ↓

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### Front panel switches:

#### “XFER” switch

Allows the switching back and forth (toggle) between inputs one and two. The In-2 LED indicates that input 2 is selected. **NOTE: On some versions of metal work, this switch is to the left of the “MUTE” switch. Use a non-metallic object to operate this switch.**

#### Mute switch

Used to silence the sonalert. To disable the sonalert, **simply remove JP6 on the rear panel.**

#### Arm/Disarm Switch

Arms and disarms the LOV II. When armed, the front panel “ARMED” LED will be illuminated and the armed relay will be closed. Armed at power-up.

#### Reset switch

This switch clears all alarms, sonalert and resets the program switcher. If the alarm still exists, the LOV II will alarm again after the time out delay period. If the LOV II has automatically reset, pressing the reset switch will clear all alarmed indicators and relays.

### Front Panel LED Indicators

In-2:	Flashes when input 2 is active. <b>NOTE: On some versions of metalwork, this LED is mislabeled “Loss of Video).</b>
Valid Video:	Illuminated with valid video.
Armed:	Indicates that the unit is armed.
Ext:	Indicates the alarm was caused by an external source.
Tripped:	Indicates that an alarm has occurred. This must be manually reset.
Power:	Indicates power is applied to the unit.

## SPECIFICATIONS

Video Inputs:	BNC – Ground referenced Level – 0.5v to 2 V p-p video NTSC/PAL (autodetects). Two – Switchable, 75-ohm termination. May be disabled for loop-thru installation.
Video Output:	BNC – Ground referenced
Audio I/O:	Any input level and impedance can be used. Inputs may be balanced or unbalanced. Output levels, impedance, distortion, noise and balancing will match that of the selected input.
Switching Method:	Passive. Sealed relays utilizing 2-form-C Bifurcated-Crossbar silver alloy with gold overlay contacts.
Operation Control:	Front Panel - Momentary switches. Remote inputs –Momentary closure to ground, 5- Volt logic levels. Relays - Sealed relays utilizing bifurcated-crossbar silver alloy with gold overlay contacts, 1 amp @ 30 vdc. <b>NOTE: For safety, do NOT connect 120 Vac circuits to these Relays!</b>
Time delay:	2 seconds to 85 minutes, in 2 or 20 second increments, via an 8-position dipswitch. This feature may be defeated.
Restore delay:	Off to 10.2 minutes in 20 second increments, via a 5-position dipswitch. This feature may be defeated.
Logic:	Microprocessor
Interfacing:	Video – BNC Analog Audio & Remote Control - Pluggable screw terminals (Euro). Supplied. Power - 2.1 mm barrel.
Power Requirements:	9 Vac, 500 ma. 120 Vac 50-60 hz transformer. Supplied. (CE 240 Vac 50-60 Hz optional)
Physical Dimensions:	8.50" x 6.50" x 1.55" (WDH)
Weight:	3 pounds.
Options:	RA-1 rack shelf accommodates up to two units. (1-RU) / Filler panels supplied.

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## SPECIFICATIONS

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