



Bel 8150

8 Channel Audio Delay



User's Guide

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BEL 8150

8 Channel Audio Delay

Introduction

The Bel 8150 is a compact, cost effective AES and analogue audio delay designed specifically for synchronizing audio to video in postproduction areas where video delays result from the VT editing and video effects units etc. It is intended for use where the video delay is known and is likely to be constant or when frequent changes of delay are not required. The Bel 8150 may be used in a fixed location with each channel dedicated to a specific item of video equipment. This unit has 4 independent stereo channels. Each stereo pair of delay lines is selectable in fields (PAL or NTSC) over the range 0 to 15. An input level potentiometer and peak LED are provided for each analogue stereo pair. A lock indicator is provided for each AES input pair. The Bel 8150 user controls are recessed to prevent inadvertent operation. Master signal bypass is achieved by relays in the event of a power loss.

Features

Refer to front and rear views of the Bel 8150 below for control/connector positions.

The front panel has four input sensitivity controls with "Peak" LED indicators above each control. These are used to set the correct operating signal level. Four AES lock indicators are provided. The audio source can be selected by means of the analogue/ digital switch on the rear panel.

The delay settings for each channel are set by one of the four Rotary switches (16 position) located on the left side of the front panel. Each position increases or decreases the set delay by 1 field (PAL = 20ms) and the 0 position switches the channel to bypass. Maximum delay setting is 15 fields.

The input and output connections are made via six 15 way female connectors on the rear panel; two for analogue inputs, two for analogue outputs, one for AES input and one for AES output. (Refer to pin out information.) An XLR connector for AES reference input is provided.

Also on the Rear panel is an IEC Power socket, fuse and ON/OFF switch block.

Operation

Input sensitivity controls in the analogue mode

The input sensitivity controls are used to ensure that the input signal level is sufficient to maximize the signal to noise available from the Bel 8150 but less than the clipping level. Clipping occurs in the Bel 8150 at +15dB, so setting the input level at +6dB allows 9dB headroom.

The LED indicator above each control show "peak" (+15dB) on the right input channel.

AES input.

The AES inputs can accept inputs at sampling rates of 30 to 50kHz. An LED indicator on the front panel will show that a valid input signal has been applied. The input is converted by a sample rate converter to the 48kHz internal clock source or, if applied, to the rate of the reference input.

AES reference

An XLR connector on the back panel allows an AES reference signal to be applied to the Bel8150. This signal is automatically detected and used as the clock source for the internal operation of the delay.

Note. The analogue input peak indicators and the AES lock indicators will function regardless of the input source selected.

Delay setting controls

The four Rotary switches (1 per channel pair) are used to set multiples of "field" delays or relay bypass.

These switches have sixteen positions and can be rotated in either clockwise or counter clockwise directions with "click" positions 1-15.

Position 1-15 in PAL mode = 20-300 ms (1-15 fields)

Position 1-15 in NTSC mode = 16-250 ms (1-15 fields)

Position 0 in both PAL / NTSC will put that channel pair into bypass connecting the inputs directly to the outputs.

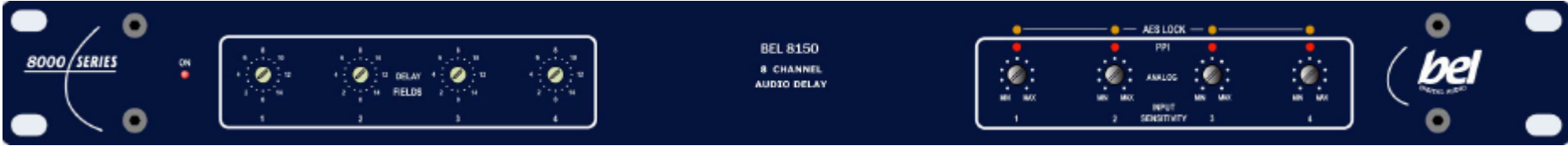
On Power off or Power fail the bypass function will be initiated as above regardless of the delay set switch position.

A bypass hold of approximately 2 second is initiated when the 8150 is powered on to allow random data in the memory to be purged before normal operation. Switching to bypass in normal operation will also invoke the hold time. NOTE: An internal jumper is used to select either PAL or NTSC "field" increments. (See below)

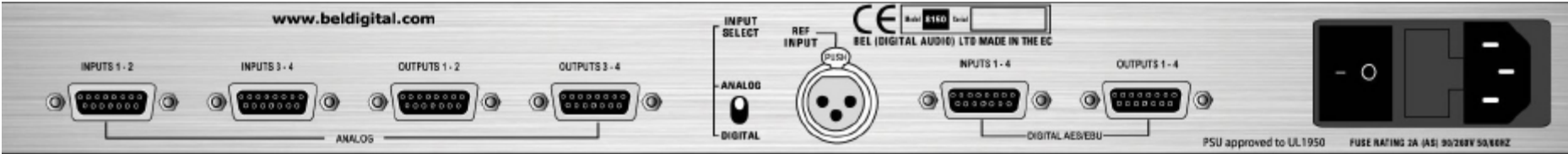
NTSC Video.

The Bel 8150 is factory configured to change its delay in steps of 20ms for the PAL video system. If NTSC video field steps are required this can be achieved as follows:

- 1) Power off and disconnect the power cable from the 8150.
- 2) Remove the cover plate
- 3) Locate LK3 on the printed circuit board.
- 4) A small "jumper" link should be fitted to one of these pins if PAL was the previous setting. Remove this and locate across both link pins. (Shorting LK3)
- 5) Re-fit the cover plate and power cable.
- 6) Power on the 8150
- 7) Delay set increments will now be in steps of 16ms (1 field / NTSC)



Bel 8150 Front panel



Bel 8150 Rear panel

Rear panel connections

Analogue input connector ch1/2	15 way female 'D'
1 CH2 RIGHT IN -	9 GND + CHASSIS
2 CH2 RIGHT IN +	10 GND + CHASSIS
3 CH2 LEFT IN -	11 GND + CHASSIS
4 CH2 LEFT IN +	12 GND + CHASSIS
5 CH1 RIGHT IN -	13 GND + CHASSIS
6 CH1 RIGHT IN +	14 GND + CHASSIS
7 CH1 LEFT IN -	15 GND + CHASSIS
8 CH1 LEFT IN +	

Analogue input connector ch3/4	15 way female 'D'
1 CH4 RIGHT IN -	9 GND + CHASSIS
2 CH4 RIGHT IN +	10 GND + CHASSIS
3 CH4 LEFT IN -	11 GND + CHASSIS
4 CH4 LEFT IN +	12 GND + CHASSIS
5 CH3 RIGHT IN -	13 GND + CHASSIS
6 CH3 RIGHT IN +	14 GND + CHASSIS
7 CH3 LEFT IN -	15 GND + CHASSIS
8 CH3 LEFT IN +	

Analogue output connector ch1/2	15 way female 'D'
1 CH1 LEFT OUT +	9 GND
2 CH1 LEFT OUT -	10 GND
3 CH1 RIGHT OUT +	11 GND
4 CH1 RIGHT OUT -	12 GND
5 CH2 LEFT OUT +	13 GND
6 CH2 LEFT OUT -	14 GND
7 CH2 RIGHT OUT +	15 GND
8 CH2 RIGHT OUT -	

Analogue output connector ch3/4	15 way female 'D'
1 CH3 LEFT OUT +	9 GND
2 CH3 LEFT OUT -	10 GND
3 CH3 RIGHT OUT +	11 GND
4 CH3 RIGHT OUT -	12 GND
5 CH4 LEFT OUT +	13 GND
6 CH4 LEFT OUT -	14 GND
7 CH4 RIGHT OUT +	15 GND
8 CH4 RIGHT OUT -	

(To unbalance an input link GND and - on the Male connector)

AES input connector ch1/4 15 way female 'D'

1 CH4 IN -	9 GND + CHASSIS
2 CH4 IN +	10 GND + CHASSIS
3 CH3 IN -	11 GND + CHASSIS
4 CH3 IN +	12 GND + CHASSIS
5 CH2 IN -	13 GND + CHASSIS
6 CH2 IN +	14 GND + CHASSIS
7 CH1 IN -	15 GND + CHASSIS
8 CH1 IN +	

AES output connector ch1/4 15 way female 'D'

1 CH1 IN +	9 GND + CHASSIS
2 CH1 IN -	10 GND + CHASSIS
3 CH2 IN +	11 GND + CHASSIS
4 CH2 IN -	12 GND + CHASSIS
5 CH3 IN +	13 GND + CHASSIS
6 CH4 IN -	14 GND + CHASSIS
7 CH4 IN +	15 GND + CHASSIS
8 CH4 IN -	

AES output connector ch1/4 15 way female 'D'

It is recommended that; where possible, all cables be good quality screened twisted pair multiway cables BELDEN or similar. Optimum performance is obtained using individual screened pairs with a overall screen and separate ground returns. Screened male 15 way 'D' connectors are essential.

EMC COMPLIANCE

The Bel 8150 was designed and tested to comply with the EMC directive numbers EN55103, EN55022, EN55082-1 and EN60950 when used as directed.

CE

Please ensure that wherever possible a 1U space is provided above and below the Bel 8150 to ensure that the unit is properly ventilated, unless forced air-cooling is employed in the rack.

Specification

Analogue I/O

Input Impedance	25k Ω Electronically balanced
Output Impedance	50 Ω Electronically balanced
Frequency Response	20-20kHz \pm 1db
Input Dynamic Range	120 db
Signal To Noise Ratio	-100 db Typical (Referenced to clipping level)
Distortion	less than .015% @ 1kHz / +6dbm
Nominal Input Level	+6db (+15db max.)
Nominal Output Level	+6db (+15db max.)
Conversion Accuracy	24 Bit Delta Sigma A/D 24 Bit Delta Sigma D/A

AES I/O

Digital input/output	AES/EBU
Accuracy	24 bits
Sample rates	30 to 50 kHz
Reference input	AES 30 to 50kHz. 48kHz for calibrated delays

Power Requirement	95/260VAC 50/60Hz
Power Consumption	35W max.
Dimensions	482w x 44h x 200d
Net Weight	5kg