



Bel 7150

**Analogue/AES
Audio Delay Synchroniser**



User's Guide

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Bel Digital Audio Ltd.
Unit 3
Horwood Court
Bletchley
Milton Keynes
Bucks
MK11RD
Tel: 01908-641063
Email: info@beldigital.com
Web: www.beldigital.com

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INTRODUCTION

The BEL 7150 is a stereo analogue and AES audio delay system. The unit was designed to resynchronise audio to video following processes such as standards conversion, video F/X, video synchronisation, satellite transmission, synchronising digital radio networks etc.

The BEL 7150 provides 0-10.4 Sec. of stereo audio delay (0-256 frames PAL / 0-312 frames NTSC). Frequently used delay parameters can be stored in eight memories. Inadvertent operation of the keys can be avoided by invoking the key 'lock' function. An LCD display is used to show delay, increment value, programme number, bypass, lock and input level. The delay may be adjusted in steps of 1 sample, 1millisec, fields or frames. The field and frame step values change to reflect the PAL or NSTC selection. Bypass can be selected by means of the front panel. An electromechanical bypass will automatically engage in the event of a power failure. Four GPI inputs associated with program memories are provided.

Front panel controls

Six controls are located on the front panel Fig 1.0 these are:-

BYP

This key is used to connect the input directly to the output bypassing the delay mechanism. Press the switch once to enter the bypass mode and again to return to the delay mode. The word Byp is displayed on the lower line of the LCD display when the unit is in the bypass mode.

LOCK

When the unit is 'locked' all the front panel switches, except LOCK, are inoperative. To release the switches press and hold the LOCK key for a period in excess of three seconds. A momentary press of the LOCK key will lock the unit again.

SET

This key is used in conjunction with the nudge keys to access the set up menus and to change values and parameters within the menu. See below for details.

PROG

This key will allow up to eight frequently used settings to be stored and recovered from a non-volatile memory.

To memorise settings simply press the PROG switch until the required program number appears on the display. Any adjustment carried out will now be associated with that program number.

Nudge \wedge \vee

These are the nudge up and down keys. When the default display is visible operating these keys will adjust the delay value. The nudge keys are also used to change values within the set up menus.

Default display

On power-up the LCD will show model number, software version and model description for a few seconds before resetting to the default display. The default LCD display will show input levels, the selected delay, the program memory and if selected bypass and lock:



The input level indication is in the form of a pair of horizontal bars. A short vertical line at the right hand end of the bars indicates the clipping point for the A/D converters. This level corresponds to +15dB on the analogue input to the unit, with input gain set to 0dB.

Set up menu description

Pressing the SET key enters the set up pages. Pressing the SET key again will select the next menu item. The value of the item selected can be changed by the use of the nudge keys. A 30 second timer is running while the set up pages are visible which will cause the unit to return to the default display if no values are changed in that time.

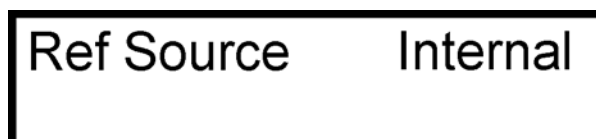
Page 1

The first page allows the audio source to be selected. The source can be analog or digital (AES). Both analog and digital outputs are produced regardless of the input source. The feature makes the 7150 suitable for use as an analogue to digital or digital to analogue converter.



Page 2

This page allows the AES reference source to be selected. The possible sources are internal, AES or DLB. In the DLB reference mode the sample rate converters are bypassed to allow DolbyE or AC3 to be delayed by the 7150. In this mode it is necessary to link the AES input to the reference input.



Page 3

This page allows the video mode (PAL or NTSC) to be selected. A second line allows the increment mode to be selected. The second line can be accessed by pressing the SET key. The unit can increment the delay in samples ($21\mu\text{s}$), milliseconds, fields or frames. To return to the upper line press the BYP key.

Video mode	>	PAL
Inc mode		msec

Page 4

This page will be shown only in the analog source mode and will permit adjustment of the input and output analogue gain. The input levels after gain adjustment are displayed whilst the input gain is selected. Adjusting the input gain settings will affect the headroom that the unit will provide.

■■■■■	Ingain	>	0dB
■■■■■	Opgain		0dB

GPI Inputs

Four GPI inputs are available each of which is associated with a program memory. A transient ground applied to one of these inputs will force the 7150 to change to the appropriate program memory. GPI input 1 to memory 1 etc. If several GPI inputs are grounded simultaneously they will be serviced in a priority order, 1 being the highest priority. A current of approximately 0.5mA is sourced by each GPI input.

Connections

The rear panel of the BEL 7150 has 7 XLR connectors, a 9 pin 'D' connector and a combined IEC inlet, fuse holder and switch. Fig 1.1

From the right these are: -

Mains power	IEC 3Pin (90-260VAC 50/60Hz)
Fuse	Ratings are 2 amp (A/S)

GPI connector

9 Pin 'D' female

Pin 1	Memory program 1
Pin 2	Memory program 2
Pin 3	Memory program 3
Pin 4	Memory program 4
Pin 5/6 and 9	GND
Pin 7/8	Reserved (do not connect)

Digital Audio connectors

AES output	3 Pin male XLR
AES input	3 Pin female XLR
External reference	3 Pin female XLR

Analog Audio connectors

Left and right audio outputs 3 Pin XLR male balanced Pin 2 hot.
(To unbalance connect pin 3 to pin 1 on the cable connector).

Left and right audio inputs 3 Pin XLR female balanced Pin 2 hot.
To unbalance connect pin 3 to pin 1 on the cable connector).

Mounting

If mounted in an enclosure that does not include forced air-cooling, allow 1U of space above and below the unit.

EMC compliance

The BEL 7150 was designed and tested to comply with the EMC directive numbers EN55103, EN55022 when used as directed.



Fig 1.0 Bel7150 front panel



Fig 1.1 Bel7150 rear panel

Specification

Delay	0-10.4 seconds
Delay increments	1 sample, 1 millisecond, 1 field, 1 frame
Video system	PAL or NTSC

Digital input/outputs

Inputs	1 pair stereo AES/EBU digital(110 Ω)
sampling frequency	32-50kHz, nominally 48kHz
Outputs	1 pair stereo AES/EBU digital (48kHz) (110 Ω)
Word length max	24 bit
Reference input	48kHz AES

Analog input/output

Frequency response	20Hz - 20kHz \pm 1dB
Input dynamic range	120dB
Signal to noise ratio	-100dB r.m.s. 20 -20kHz
Distortion less than	0.015% at 1kHz
Inputs	Electronically balanced 25k Ω
Outputs	Electronically balanced 50 Ω
Conversion accuracy	24 bit Delta Sigma 128 x oversampled
D/A	24 bit 128 x oversampled