



Bel 5110E

Profanity Delay



User's Guide

Version 1.0 06/02/05

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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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BEL 5110E

Broadcast Profanity Delay

Description

The BEL 5110E offers all the features necessary for the broadcaster who performs live "on-air" phone-ins. The stereo audio processing with analogue and digital I/O provides from 2.5 to 40 seconds of delay, to enable the optimum time necessary to identify and remove undesirable content to be selected. Two catch-up algorithms are provided, to suit speech or music, both of these will adapt to the audio content by increasing the catch up speed during silent passages. The algorithms are selectable from the Remote Control Unit (optional). The Remote Control Unit also provides the main control switches and indicators. A Cart Player interface offers automatic cart insert on both analogue and digital if the catch-up facility is not used and a fail-safe "bypass" system is incorporated as standard. Simultaneous analogue and digital outputs are provided.

Operation

Operational modes

The two main modes of operation are possible these are: -

Normal (Cart) mode

The Auto switch is in the normal position. In this mode when delay is activated or the edit key is pressed the Bel 5110E will select the cart audio source and activate relays to start the cart machine. After the selected delay, when the profanity has been removed, the unit will revert to providing delayed audio out.

Auto (catch-up) mode

The Auto switch is in the auto position. In this mode the when delay is activated or the edit key is pressed the Bel 5110E will dump the contents of the audio delay and reduce the delay length to zero. The unit will then gradually increase the audio delay until the selected maximum delay is achieved. This is carried out unobtrusively by exploiting the characteristics of the current audio to change the delay. Two algorithms are used to recover the delay one for speech and another for music. These algorithms are selectable from the Remote Control Unit. They can be selected either before the start of the catch-up process, or during it. Points to note when using the catch-up mode are: -

Speech - The time required to catch up to a delay of, for example, 5.0 seconds following activation of the edit switch will vary depending upon the style of speech adopted. In this mode slow deliberate speech with as many pauses as possible will result in the most rapid catch up. The minimum catch up time is approximately 50 seconds and the maximum 4.5 minutes.

Music - The effect of the catch-up process is to very slightly slow the tempo of music. This is most noticeable on slow sustained music, for example, strings. Up-tempo, dynamic music will mask the effect. When operating on music, the adaptive catch up algorithm will not exploit silences to the same

degree as when in the speech mode. It is worth experimenting with different types of music to find the best type to mask the catch-up effect.

Operation and controls

Remote control Unit

The Remote Control Unit has the main operational controls, in the form of five switches, each with a LED indicator. From left to right these are: -

Delay-Out

This switch when pressed will bypass any delay set or being set and causes the program to revert to real time. This applies to both modes of operation. (The 5110E powers-up with Delay-Out).

Delay-In

The action of this switch is different in each of the two modes of operation:-

Normal Mode. Pressing Delay-In also enables the Edit switch. This will direct the Cart-Player to the main output. At the same time, a contact closure on the Cart interface starts the Player. After the selected delay the delay outputs are reconnected to the main output: this produces the required lag.

Auto Mode. Pressing Delay-In also enables the Edit switch, but the program remains "live". The lag gradually increases from zero until the selected lag is achieved.

The Delay-Out and Delay-In switches therefore toggle between No Delay, and Delay (This can be changed to Single switch-delay-out, toggle - see internal set-ups.

Edit

This is the main operational switch used for deleting undesirable program content.

Normal Mode. Pressing the Edit switch changes the program to the cart-player. The Delay is immediately reduced to zero, deleting the previous section of program content. After the cart-player has run for the selected time the program feeds are reconnected to the Delay. The red LED indicator is lit while the cart-player is active

Auto Mode. Pressing the Edit switch reduces the Delay to zero, deleting the previous program content. The program is then "live", with the catch-up process enabled. The LED flashes while the catch-up is in progress. When the selected delay has been achieved, the LED is extinguished.

Speech / Music

This switch selects either the speech or the music algorithm to be used for the catch-up process. It can be operated before or during the catch-up process. The green LED indicates that the music algorithm has been selected.

Main Unit

Front panel indicators

Power on indication

Red LED indicator illuminated when power is on.

PPI indicators (Peak Level)

These indicators give a visual indication to enable the optimum program levels setting to be set. For normal operation the yellow LED indicators should be constantly illuminated, with the green LED indicators flashing on the peaks. Red indicates clipping level reached.

Bypass Indicator

This yellow indicator is illuminated when the unit is in bypass or delay out mode.

Edit indicator

This red indicator is illuminated when edit mode is activated showing the following information: -

Cart mode Indicator is illuminated whilst cart is playing.

Auto mode Indicator will flash until the selected delay is achieved and will then be extinguished.

Cart, Main and Ref indicators

These yellow indicators are illuminated when a valid AES input is applied to their respective inputs and is locked.

Rear Panel

The rear panel has ten XLR connectors, one toggle switch, a max delay switch bank, one 9 way 'D' type connector, one 15 way 'D' type connector and a combined mains IEC inlet/ fuseholder/ switch.

From the left these are: -

- Main L & R analogue inputs XLR (pin 2 hot)
- Cart L & R analogue inputs XLR (pin 2 hot)
- Output L & R analogue XLR (pin 2 hot)

(To unbalance analogue outputs and inputs connect pin1 to pin 3 on XLR)

- Toggle switch to select analogue or digital input.
- Maximum delay selector
- AES Reference input XLR (Auto select)
- Main AES input XLR
- Cart AES input XLR
- Output AES XLR
- Remote control connector. 15 way 'D' type
- Cart interface 9 way 'D' type
- Combined IEC fuse and power switch block.

Maximum delay selector

A bank of 4 switches is provided to enable a maximum delay of up to 40 seconds in steps of 2.5 seconds to be selected. These switches are read by the processor on power up. The delays available are shown in Fig 1.0 the switch is viewed from the rear of the unit.

















Switch	Delay
	2.5 Seconds
	5.0 Seconds
	7.5 Seconds
	10.0 Seconds
	12.5 Seconds
	15.0 Seconds
	17.5 Seconds
	20.0 Seconds
	22.5 Seconds
	25.0 Seconds
	27.5 Seconds
	30.0 Seconds
	32.5 Seconds
	35.0 Seconds
	37.5 Seconds
	40.0 Seconds

Fig 1.0 Maximum delay selection

Remote Control Unit Connector Pin-Out

1	Auto/Normal select (GPI)
2	Delay Out (GPI)
3	Delay In Indicator (Open Collector)
4	Delay In Indicator (LED - Pull +5v)
5	+5 volts
6	Edit switch (GPI)
7	Speech / music select (GPI)
8	Ground
9	Delay in (GPI)
10	Delay Out Indicator (Open Collector)
11	Delay Out Indicator (LED - Pull +5v)
12	Edit indicator (LED - pull +5v)
13	Ground
14	Edit Indicator (Open Collector)
15	Ground

For the purpose of providing remote control of the 5110E, other than via the Bel remote panel supplied, please observe the following:

Function pins 1, 2, 6, 7, and 9 should be connected independently via 1K Ω resistors to pin 5 (+5v). The control functions 'Delay In', 'Delay Out' and 'Edit' are activated by a momentary switch closure between the associated function pin and ground.

The mode functions 'Auto / Normal', and 'Speech / Music' are determined by the associated pins remaining high (+5v), or low (ground) as follows:

Pin 1	'Auto' = High	Pin 7	'Speech' = Low
	'Cart' = Low		'Music' = High

N.B.: All switching should be buffered.

Cart interface connection Pin-out

1	Normally closed	Open when edit is enabled
2	Normally open	Closed when edit is enabled
6	Common for above	
7	Normally closed	Open when edit is enabled
8	Normally open	Closed when edit is enabled
3	Common for above	
4	Normally closed	Open when delay-in is enabled
5	Normally open	Closed when delay-in is enabled
9	Common for above	

Mounting

If the unit is mounted in an enclosure that does not have forced air-cooling, then 1U of space above and below the unit must be provided, to permit convection cooling.

Audio connectors

It is recommended that, where possible, all cables be good quality screened twisted pairs with the screening braid connected to pin 1 on the XLR connector. Optimum performance is obtained using double-screened cable with separate ground returns. It is also recommended that 360 degree connection be made to the screening braid on the BNC connectors.

EMC compliance

The BEL 5110E was designed and tested to comply with the EMC directive numbers EN55103, EN55022, EN55082-1 and EN60950 when used as directed.

This unit must be used with an earthed mains lead to comply with the CE low voltage directive.

CE

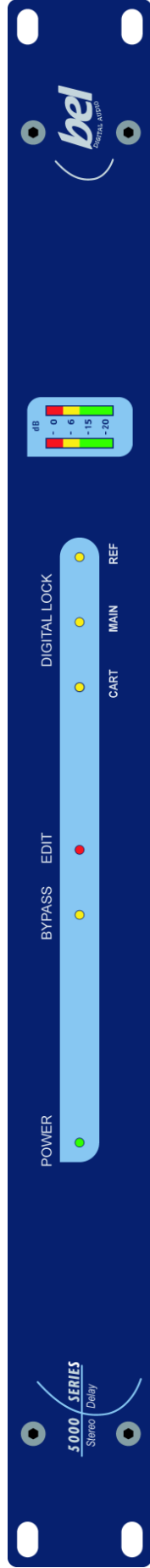


Fig 1.1 Bel 5110E Front Panel

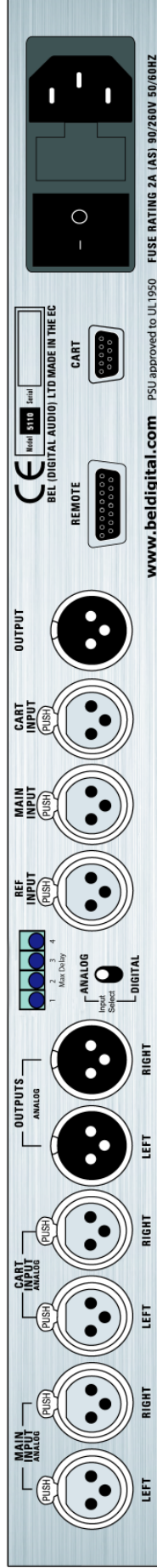


Fig 1.2 Bel 5110E Rear Panel



Fig 1.3 Bel 5110E Remote controller

Specification

Delay 40 seconds maximum

Analogue I/O

Frequency response	20 Hz - 20 kHz \pm 3dB
Input dynamic range	120 dB
Signal to noise ratio	Better than -98dB 20 - 20 kHz
Distortion	less than 0.015% at 1 kHz
Conversion accuracy	A/D 24 bit D/ A 24 bit
Sampling rate	48 kHz.
Inputs	Electronically balanced 25k W
Outputs	Electronically balanced 600 W Max. drive capability +18dBu

Digital I/O

Ref input	AES/EBU 48kHz nominal 110 Ω
Main input	AES/EBU 32 – 96 kHz 110 Ω
Cart input	AES/EBU 32 – 96 kHz 110 Ω
AES output	AES/EBU 48kHz (or Ref) 110 Ω
Power input	90 –260 V ac 50/60 Hz
Fuse rating	2A anti surge
Power consumption	

Size	483mm x 210mm x 44.4
Weight	5kg