

BEL1IP

Operating Instructions



Baldwin Boxall Communications Ltd.
Wealden Industrial Estate, Farningham Road
Crowborough, East Sussex, TN6 2JR

Telephone: 01892 664422
Fax: 01892 663146
Website: www.baldwinboxall.co.uk
Email: mail@baldwinboxall.co.uk

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BEL1IP LOUDSPEAKER LINE SURVEILLANCE SYSTEM

The BEL1IP is an IP66 rated Loudspeaker Line Termination Unit, which is normally fitted at the end of the 100V Loudspeaker Line.

Upto four BEL1IP units may be fitted to a single Loudspeaker Line, allowing spurs to be monitored. The unit generates a small DC current from the 100V line & superimposes this on the loudspeaker line.

This DC current is monitored by the BVRDACO / BVRDNCO / BVRD2M4 etc . Both the amplifier and the continuity of the cabling are monitored.

The IP66 rated enclosure has a 25mm gland hole for site cabling, however it is the installer's responsibility to ensure a suitable gland is fitted to maintain the IP66 rating.

This system is set to use either 30Hz or 20KHz surveillance tone when installed.

	Advantages	Disadvantages
30Hz Surveillance Frequency	<ul style="list-style-type: none"> • Less power absorbed by cable as compared to 20KHz • More positive fault detection as breaks in the cable are easier to detect due to lower stray capacitive coupling compared to 20KHz. • Most digital meters selected to the AC range will accurately indicate a 30Hz signal. • Suitable for systems employing horn loudspeakers or ceiling loudspeakers which have a poor low frequency response 	<ul style="list-style-type: none"> • Speakers with a good low frequency response will produce the 30Hz tone. • Any harmonic distortion produced by the amplifier may be audible, even when produced using horn loudspeakers. • Interrupting the 30Hz surveillance tone will cause a click thus envelope shaping must be employed.
20KHz Surveillance Frequency	<ul style="list-style-type: none"> • Generally inaudible, however some speakers may produce a sub-harmonic i.e. 10KHz. 	<ul style="list-style-type: none"> • Highly capacitive cable such as PYRO, FP200 etc absorb a lot of power at this frequency. • Breaks in cable may be difficult to indicate due to the capacitive coupling between adjacent conductors. • Possibility of lines resonating at this frequency and therefore consuming unnecessary power • Some digital multi-meters will not accurately read 20KHz AC.

Technical Description

The surveillance tone is fed (via the power amplifier) to the loudspeaker line.

At the end of each line (or at the end of each spur on that line) a BEL1IP detects this signal and super imposes a DC current with reference to ground.

Where there are no spurs on the line the single BEL1IP is set to produce 1mA. When there are spurs, the BEL1IP units are set to produce a total current of 1mA. Eg If there are two spurs each unit is set for 0.5mA. This current is monitored by the Fault Detection module.

The constant current source is designed so that if one side of the line becomes disconnected no current flows.

A voltage doubling circuit is incorporated which improves the overall system sensitivity, and care must be taken as high voltages may exist.

The recommended surveillance tone level is 10 Volts but detection is not affected when higher speech or music signals are present. The DC line current produced by the BEL1 is extracted by the centre tap of the amplifier's output transformer, which is fed to the input of the fault detector. This input is terminated with a 6.8K resistor and assuming a line current of 1mA produces 6.8 Volts across it. This DC signal is buffered and fed into a window detector via a sample and hold gate. The lower voltage threshold is 5 Volts and the upper is 10 Volts and providing the input signal is within this range the fault detector will indicate a normal condition. The input circuit also includes an AC detector providing a fault condition should the loudspeaker line be unbalanced due to a fault condition.

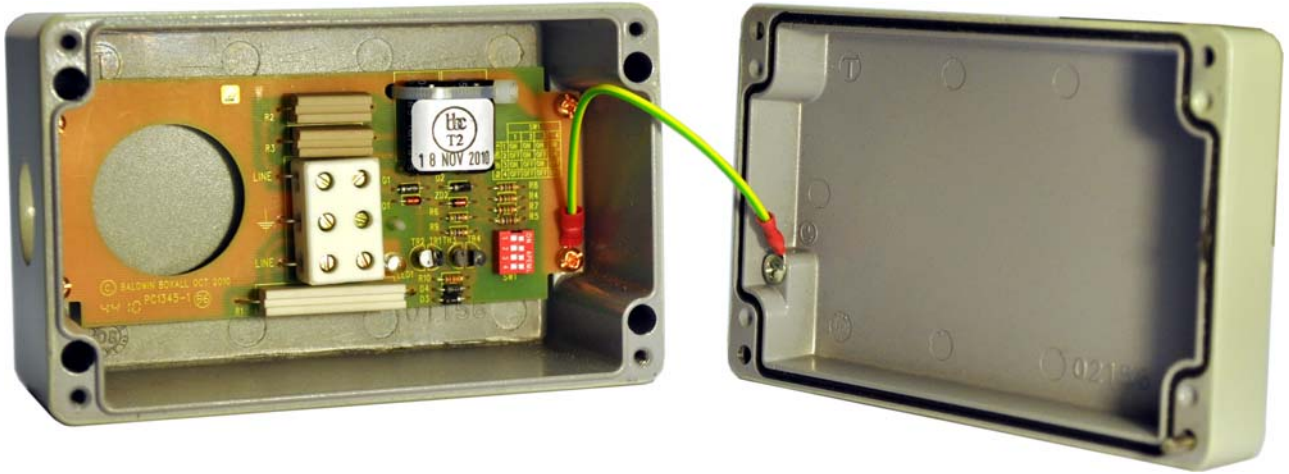
Switch Settings

The switches on the unit are set depending on the number of spurs and hence BEL1IPs on the line, as shown in the following table.

		SW1			
		1	2	3	4
No. of spurs on line	1	on *	on *	on *	on *
	2	off	on	off	on
	3	on	off	on	off
	4	off	off	off	off

* Default as supplied from the factory is for a single spur and a single BEL1IP per line.

Internal View of BEL1IP



Typical Connection details for BEL1IP

