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Smart/EZ Polarity Checker
User's Manual

Description:
The Smart/EZ Polarity Checker allows to verify signal polarity at each step of the signal transmission path in recording studios, theatres, sound reinforcement systems etc. with easy-handling and flexibility being the most important features of the test divices.

The test system consists of two separate units:
1. the signal generator
2. the indicator

Both units may use and process either electrical or acoustical signals thus being able to check microphones, split-transformers, loudspeaker systems, cables and recording equipment.

The output of the generator may be adjusted by means of a detented pot whereas the input sensitivity of the indicator is selected by a mic-line switch.

On both units the user may select pin 2 or pin 3 of the XLR connector to exhibit positive polarity thus being enabled to check sound systems using different wiring standards without the need to reinterpret the indicator's display and so avoiding a possible error source.

The default selector position defines pin 2 to be of positive polarity. The generator's output (XLR-male) is floating balanced and may be used in unbalanced systems without problems as long as a bridge between pin 2 and pin 3 is avoided, e.g. when testing loudspeaker systems using the generator's loudspeaker direct drive capability.
The indicator may be used in a balanced of unbalanced mode.

Function:
The signal generator generates a sequence of unidirectional pulses which are radiated through the internal loudspeaker or may be picked up at the generator's XLR output connector.

After having passed the device-under-test the signal is fed either into the indicator's electrical input equipped with an XLR female connector or picked up acoustically using the indicator's internal condenser microphone.
The indicator processes the input signal and assesses the slope of the pulse being either positive or negative. The result of this process is displayed on the coloured display of the indicator.

Instructions for use:

1. Loudspeaker polarity
The signal generator may be directly connected to the loudspeaker under test, since it's electrical output is capable of driving even low impedances with sufficient level. Should the generator's output level suffice, e.g. due to high ambient noise level, it may be connected to an amplifier with known properties to drive the loudspeaker. Signal level should then be adjusted to deliver a clean, distortion-free acoustic output. The indicator's mode selector switch has to be in it's MIC-INT position while the indicator's internals microphone has to be placed in the nearfield of the loudspeaker. In case of testing horn loudspeakers, the microphone should NOT be inside the horn, which holds especially true for bass horns.

The result of the test process may now be read from the LED-Display:
GREEN LED fleshing - 'In Phase'

RED LED fleshing - 'Out of Phase'

2. Microphone polarity
The indicator's mod selector has to be in it's MIC-EXT position and the microphone connected to the input XLR-connector. The generator's acoustic test signal is now picked up with the microphone-under-test placed in close proximity to the generator's internal loudspeaker. The sensitivity of the indicator in it's MIC-EXT usually is sufficient to test even unsensitive microphones using the test signal of the generator. In case of disadvantageous conditions, e.g. extremly unsensitive microphones or high ambient noise, an amplifier with known properties should be looped into the signal path either at the generator's output powering a known loudspeaker or at the input of the indicator thus amplifying the microphone signal.

In case the microphone-under-test is phantom-powered an appropriate power supply has to be provided.

3. Polarity of line-level divices
With the mode selector of the indicator in it's LINE-IN position split transformers, amplifiers, X-Overs and other signal processing devices may be checked.

The test signal is picked up from the generator's XLR output and fed into the device-under -test. The output level of the signal generator is variable using the detented pot on top of the unit thus avoiding input overload.
The output signal of the device-under-test is directly fed into the XLR input connector of the indicator.

To check amplifier polarity the amplifier should not be set to excessive gain as input voltages beyond 50V may damage the indicator. The best procedure is to increase amplifier gain until a stable display is achieved. NOTE that ALL cables used in your test configuration must be checked for polarity changes as well!!!

4. Polarity of signal recording devices
Checking the polarity of recording equipment requires only slight changes in the test procedure. Whie the wiring scheme and the polarity checker settings do not change, the generator's output signal is now recorded and may be checked for plarity changes when played back.

5. Variable pulse repetition rate
As an option, the pulse generator may be ordered with variable pulse repetition rate. This option is useful when aligning delay times in delayed decentralized sound systems. Pulse generators with this option exhibit an additional trimpot which can be adjusted using an appropriate screwdriver.

6. Error sources
In case of a definitely wrong display at first the correct position of the 'PIN 2 - PIN 3' selector should be verified. Connect the generator's output directly to the indicator's input and set both switches correspondingly. The indicator should then flash the GREEN LED.
In case there is no LED flashing at all, either the signal level is too low, the mode selector is in an unappropriate position or pin 2 and pin 3 are shorted due in incorrect wiring.

Specifications:

Generator:

o	electrical and acoustical output	
o	output XLR male	0.0 ... 1.5V (8 Ohm)
o	switches	ON/OFF, PIN2/PIN3
o	level control line	detented pot
o	power supply	1 x 9V PP3
o	battery life	50 hours using alkaline cells
o	dimensions	60 x 110 x 35 (45) mm
o	weight	310 g (incl. battery)

Indicator

o	electrical and acoustical input	
o	input XLR female	MIC-EXT: 10 ... 500mV/ 1 kOhm
		LINE-IN: 0.5 ... 50V/ 10 kOHM
o	switches	ON/OFF; BAL./UNBAL.;
		PIN2/PIN3; MIC-INT/MIC-EXT/
		LINE-IN
o	display	LED red/green
o	power supply	1 x 9V PP3
o	battery life	50 hours using alkaline cells
o	dimensions	60 x 110 x 35 (40) mm
o	weight	280 g (incl. battery)

o handcrafted by 'veteran audio craftsmen'