Solid State Logic

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XLOGIC
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X - R A C K

Super-Analogue™ Outboard

XR623 X-Rack Line Return User's Guide

This documentation package contains the User's Guide for your new X-Rack Line Return module. Depending on the age of your X-Rack, these pages may already be present in your X-Rack Owner's Manual – please check to see if these pages match your Manual. If they do not, these pages should be filed alongside it.

Please Note. *The XR623 X-Rack Line Return module operates only in conjunction with the XR622 X-Rack Master module.*

X-Rack units prior to serial number XRK0110 are compatible with the X-Rack Line Return but may require a small modification to the buscard; if the 'SOLO' LED on the XR622 X-Rack Master module is permanently illuminated, resistors R1 and R2 will need removing. In addition, any Line Return module(s) must be fitted immediately to the left of the Master module – later X-Rack units do not have this limitation and Line Return modules may be freely placed anywhere in the later X-Rack units.

For correct operation of this module, your X-Rack unit must be running V1.2/0 or later software. Please refer to your X-Rack Owners Manual for instructions on how to check the current software version and how to obtain and install a newer version if required.

There may be a newer version of the X-Rack Owner's Manual available for download from our website (http://www.solid-state-logic.com)

E. Line Return Module

E.1 Introduction

The X-Rack Line Return module is designed to operate in conjunction with the X-Rack XR622 Master module to create an expandable, rack mounted, stereo line level mixer. The X-Rack Master module provides the monitoring facilities that would be expected; mix amps, monitor outputs and a headphone feed – please refer to the X-Rack Master module documentation for a full description.

E.2 Connection

LINE IN   INSERT
           SEND/
           RTN
           1 - 4
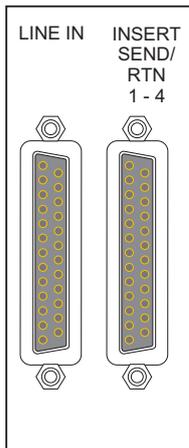
The rear panel of the module carries a pair of 25-way 'D' connectors. The left-hand connector provides four balanced Line Inputs whilst the right-hand connector provides access to the Insert Send and Insert Returns for each of the four Line Inputs.

This module operates at a nominal level of +4dBu although the gain of each Line Input or Insert Return can be varied by a front panel control.

E.3 Operation

The X-Rack Line Return module contains four separate input amplifiers, each equipped with individual Gain and Pan controls as well as Insert, Solo and Record/Mix bus switches.

The 'LEVEL' control ❶ allows the gain of each input to be varied from –∞ to +10dB with an indent at unity gain. A signal present indicator measures the signal level immediately prior to the 'LEVEL' control. It will light GREEN for signals above the lower threshold of –60dBu, AMBER for signals between +4dBu and +24dBu and lights RED for signals above +24dBu.

Signals applied to the input of the module will be permanently available on the Insert Send; the Insert Return can be selected in place of the Line Input by pressing the 'INS' switch ❷. Note that the Insert Return can also be used to provide an alternative input to each input amplifier.

Normally, each input can be individually routed to either the Mix Bus ('REC' switch released) or the Record Bus ('REC' switch pressed) ❸. X-Rack V1.3/1 or later software adds an additional setup item which enables a 'sum' mode for the REC switch such that the Mix bus is permanently fed with signal routed to the Record bus only when the 'REC' switch is pressed – refer to the latest X-Rack Owner's Manual for more details.

The 'SOLO' switch feeds signal, post Level and Pan, to the X-Rack Solo Bus. Each of the three busses feed the X-Rack Master Module, located either in the same X-Rack or remotely if multiple X-Rack units have been linked by the 'MIX BUS LINK' connector (*please note that X-Rack units prior to serial number XRK0110 are **not** equipped with an 'MIX BUS LINK' connector*).

The 'PAN' control ❹ will pan between Left and Right of the selected bus.
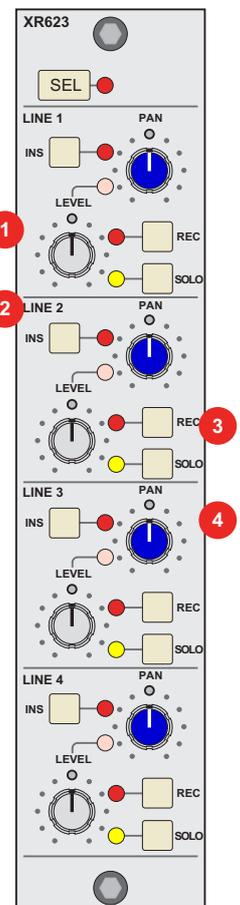
E.4 Performance Specification

The following page contains audio performance specification figures for the X-Rack Line Return module. No other Solid State Logic products are covered by this document and the performance of other Solid State Logic products can not be inferred from the data contained herein.

E.4.1 Measurement Conditions

For each set of figures on the following pages, the specific unit and test setup will be stated at the beginning of that section. Any changes to the specified setup for any particular figure(s) will be detailed beside the figures to which that difference applies.

E.4.2 Measurement References

Unless otherwise specified the references used in this specification are as follows:

- Reference frequency: 1kHz
- Reference level: 0dBu, where 0dBu ≈ 0.775V into any load
- Source impedance of Test Set: 50Ω
- Input impedance of Test Set: 100kΩ
- All unweighted measurements are specified as 22Hz to 22kHz band limited RMS and are expressed in units of dBu
- All distortion measurements are specified with a 36dB/Octave low pass filter at 80kHz and are expressed as a percentage
- The onset of clipping (for headroom measurements) should be taken as 1% THD
- Unless otherwise quoted all figures have a tolerance of ±0.5dB or 5%
- All measurements are made with the operating level switch set for +4dBu

E.4.3 Line Input Performance

Signal applied to Line Input and measured at Mix Bus Insert Send on an X-Rack Master module. Input Gain control set to 0dB (indent). Line Input under test routed to Mix Bus, all other Line Inputs routed to Rec Bus.

Gain	Continuously variable from –∞ to +10dB
Input Impedance	> 10kΩ
THD + Noise (+24dBu applied, 0dB gain)	< 0.005% from 20Hz to 20kHz
Frequency Response	±0.1dB from 20Hz to 20kHz −3dB at 150kHz
Equivalent Input Noise (Input terminated with 150Ω)	< −88dBu

E.5   Calibration Information

The X-Rack Line Return module is factory calibrated and should only need calibration if a potentiometer or other component has been replaced or if it is suspected that there is a problem with calibration.

In each of the following instructions it is assumed that an X-Rack Master module is also fitted to the X-Rack and that power has been applied. It is also assumed that unless otherwise specified, all switches are released and all front panel potentiometers are at unity or minimum position as appropriate. The required accuracy for each adjustment will be specified along with the target value. All level and distortion measurements should be made with audio-band 20Hz to 20kHz filters unless otherwise specified.

These presets are *not* accessible from the top of the unit, access to the right-hand side of the module will be required for adjustment.

E.5.1   Line Input

Equipment Required:	Calibrated audio oscillator and audio level meter
Test Signal:	1kHz sinewave @ 0dBu
Input and Output:	Oscillator to Line Input Output to the audio level meter from Master module Mix Bus Insert Send (use Left or Right as instructed below)
Unit Setup:	1. Set each Level control to indent (0dB).
	2. Set each Pan control Left.

E.5.2   Line 1

Adjustment:
1. Measure Insert Send Left and adjust VR9 for 0dBu ±0.1dB.
2. Set the Pan control to Centre and adjust VR14 for –4.5dBu ± 0.1dB.
3. Measure Insert Send Right and adjust VR13 for –4.5dBu ± 0.1dB.
4. Repeat each step until correct.

E.5.3   Line 2

Adjustment:
1. Measure Insert Send Left and adjust VR10 for 0dBu ± 0.1dB.
2. Set the Pan control to Centre and adjust VR16 for –4.5dBu ± 0.1dB.
3. Measure Insert Send Right and adjust VR15 for –4.5dBu ± 0.1dB.
4. Repeat each step until correct.

E.5.4   Line 3

Adjustment:
1. Measure Insert Send Left and adjust VR11 for 0dBu ± 0.1dB.
2. Set the Pan control to Centre and adjust VR17 for –4.5dBu ± 0.1dB.
3. Measure Insert Send Right and adjust VR18 for –4.5dBu ± 0.1dB.
4. Repeat each step until correct.

E.5.5   Line 4

Adjustment:
1. Measure Insert Send Left and adjust VR12 for 0dBu ± 0.1dB.
2. Set the Pan control to Centre and adjust VR19 for –4.5dBu ± 0.1dB.
3. Measure Insert Send Right and adjust VR20 for –4.5dBu ± 0.1dB.
4. Repeat each step until correct.

E.6   Connector Details

Line In			
Location:		Rear Panel	
Conn' Type:		25-pin 'D' Type Female	
Pin		*Description*	*Cct*
1		Insert Return 4 (–ve)	
	14	Insert Return 4 (+ve)	8
2		0V	
	15	Insert Return 3 (–ve)	
3		Insert Return 3 (+ve)	7
	16	0V	
4		Insert Return 2 (–ve)	
	17	Insert Return 2 (+ve)	6
5		0V	
	18	Insert Return 1 (–ve)	
6		Insert Return 1 (+ve)	5
	19	0V	
7		Line Input 4 (–ve)	
	20	Line Input 4 (+ve)	4
8		0V	
	21	Line Input 3 (–ve)	
9		Line Input 3 (+ve)	3
	22	0V	
10		Line Input 2 (–ve)	
	23	Line Input 2 (+ve)	2
11		0V	
	24	Line Input 1 (–ve)	
12		Line Input 1 (+ve)	1
	25	0V	
13		n/c	

Insert Send/Return			
Location:		Rear Panel	
Conn' Type:		25-pin 'D' Type Female	
Pin		*Description*	*Cct*
1		Insert Return 4 (–ve)	
	14	Insert Return 4 (+ve)	8
2		0V	
	15	Insert Return 3 (–ve)	
3		Insert Return 3 (+ve)	7
	16	0V	
4		Insert Return 2 (–ve)	
	17	Insert Return 2 (+ve)	6
5		0V	
	18	Insert Return 1 (–ve)	
6		Insert Return 1 (+ve)	5
	19	0V	
7		Insert Send 4 (–ve)	
	20	Insert Send 4 (+ve)	4
8		0V	
	21	Insert Send 3 (–ve)	
9		Insert Send 3 (+ve)	3
	22	0V	
10		Insert Send 2 (–ve)	
	23	Insert Send 2 (+ve)	2
11		0V	
	24	Insert Send 1 (–ve)	
12		Insert Send 1 (+ve)	1
	25	0V	
13		n/c	

The Insert Send is simply a parallel of the Line Input. Also, note that the 'D' type connector binding posts fitted to the X-Rack Line Return Module are 4-40 UNC thread.

E.7 Physical Specification

Depth:	200mm / 7.9 inches	*including front panel knobs, excluding connectors*
	275mm / 10.9 inches	*including front panel knobs and connectors*
Height:	171mm / 6.75 inches	
Width:	35mm / 1.4 inches	*front/rear panels*
	49mm / 1.9 inches	*overall width (front and rear panels are offset)*
Weight:	260g / 9.5 ounces	
Boxed size:	190mm x 290mm x 70mm / 7.5" x 11.5" x 2.5"	
Boxed weight:	460g / 16.5 ounces	

* All values are approximate

E.8 Environmental Specification

As per X-Rack – see page 19.