Solid State Logic
SOUND | | VISION

Super-Analogue™ Outboard

X-Rack EQ User's Guide

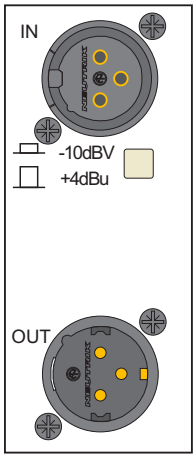
This documentation package contains the User's Guide for your new X-Rack EQ module. Depending on the age of your X-Rack, these pages may already be present in your X-Rack Owner's Manual – please check to see if these pages match your Manual. If they do not, these pages should be filed alongside it.

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 There may be a newer version of the X-Rack Owner's Manual available for download from our website (http://www.solidstatelogic.com)

82S6XR0B0B

B. EQ Module

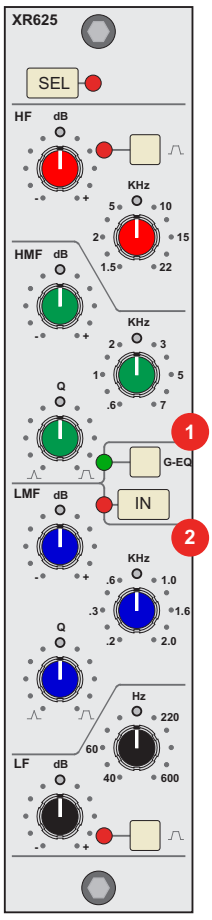
B.1 Connection



The module input and output gains can be set to operate at a nominal level of either +4dBu or –10dBV, using a switch on the connector panel. To select the appropriate level for the equipment you are connecting to, please check the operating manual for your mixer or DAW. The switch should be released for +4dBu operation: push it in for –10dBV operation.

B.2 Operation

The EQ module is a 4-band equaliser that can be switched between two different sets of curves, one based on the latest version of the classic SSL E Series EQ and the other based on SSL's G Series EQ.



The G-EQ button 1 switches the EQ from 'E' operation to 'G' operation.

The IN button 2 switches the entire section in and out of circuit.

B.2.1 Frequency Sections

The different frequency sections are as follows:

HF Section:	Frequency range 1.5kHz – 22kHz Gain ±20dB
LF Section:	Frequency range 40Hz – 600Hz Gain ±16.5dB

The HF and LF sections provide shelving equalisers with variable turnover frequency and a gentle slope. Selecting the 'G-EQ' button provides a slightly steeper slope for both sections with a degree of overshoot/undershoot (depending on whether you are boosting or cutting) below the selected HF frequency (or above the selected LF frequency). Selecting '⎍' ('Bell') in either mode switches the equaliser to a peaking curve.

HMF Section:	Centre frequency 600Hz – 7kHz Gain ±20dB Continuously variable Q (0.7 – 2.5)
LMF Section:	Centre frequency 200Hz to 2.5kHz Gain ±20dB Continuously variable Q (0.7 – 2.5)

Normally, the bandwidth of the HMF and LMF sections will remain constant at all gains – at lower gains the EQ curves are comparatively narrower for a given Q setting. This is particularly useful for drums since relatively high Q is available at low gain settings but is less suitable for overall EQ or subtle corrections because the Q must be adjusted to maintain the same effect as the gain is changed.

When the EQ is switched to 'G-EQ' operation, the bandwidth will vary with gain so an increase in boost or cut increases the selectivity of the EQ. This type of EQ can sound most effective when used at moderate settings; the gentle Q curve lends itself to the application of overall EQ on combined sources and subtle corrective adjustments to instruments and vocals.

B.3 Performance Specification

The following pages contain audio performance specification figures for the X-Rack EQ 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.

B.3.1 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.

B.3.2 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

B.3.3 Performance

Signal applied to Input and measured at Output. EQ switched In. All EQ controls set centre as appropriate.

THD + N	< 0.005% at +20dBu 1kHz < 0.007% at +20dBu 10kHz
Frequency Response	±0.5dB from 20Hz to 20kHz –3dB at 200kHz
Output Headroom	> +26dBu at onset of clipping
Noise	< –83dBu (+4dBu operating level) < –92dBu (–10dBV operating level)

B.3.4 Curves

Each channel contains a four band equaliser that can be switched between two different sets of curves, one based on the latest version of the classic SSL E Series EQ and the other based on SSL's G Series EQ.

HF Band controls:

Frequency	Variable from 1.5kHz to 22kHz
Gain	Variable between ±20dB
'Q'	2.5 (on '⎍' setting)

HMF Band controls:

Frequency	Variable from 600Hz to 7kHz
Gain	Variable by > ±20dB
'Q'	Variable from 0.7 to 2.5 (may also vary with gain)

LMF Band controls:

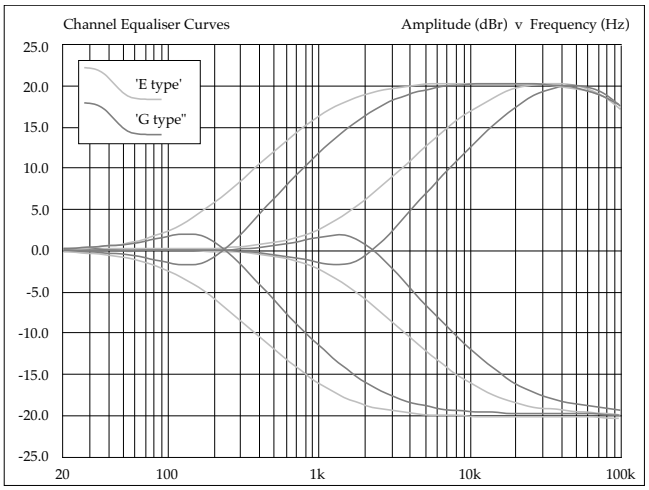
Frequency	Variable from 200Hz to 2.5kHz
Gain	Variable by > ±20dB
'Q'	Variable from 0.7 to 2.5 (may also vary with gain)

LF Band controls:

Frequency	Variable from 40Hz to 600Hz
Gain	Variable between ±16.5dB
'Q'	2.5 (on '⎍' setting)

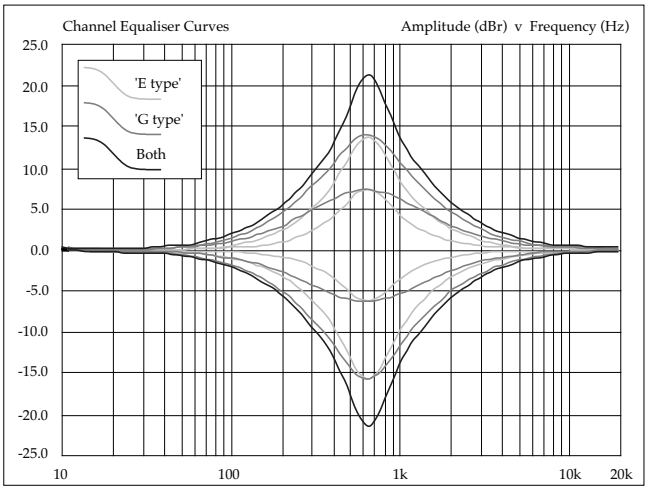
The LF and HF bands have variable turnover frequency with switchable bell/shelving and selectable response curves:

- Normal ('E type') curves with the 'G-EQ' switch OUT follow conventional cut or boost characteristics.
- 'G type' curves with the 'G-EQ' switch IN, have a modified slope with a degree of overshoot/undershoot for increased selectivity.



The two parametric bands have selectable characteristics which affect the relationship between frequency bandwidth and gain:

- With the 'G-EQ' switch OUT, the frequency bandwidth is constant at all gains.
- With the 'G-EQ' switch IN, the frequency bandwidth reduces with increased gain, thereby increasing the selectivity of the EQ as the gain is increased.
- At full boost or cut both are identical.



B.4 Calibration Information

The X-Rack EQ 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 the lid of the X-Rack has been removed 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.

All presets are accessible from the top of the unit.

Note. The unit should be allowed to warm up with power applied for at least 15 minutes prior to making any adjustments.

B.4.1 EQ Alignment

Equipment Required: Calibrated audio oscillator and audio level meter

Test Signal: Sine wave @ 0dBu, frequencies as specified below

Input and Output: Oscillator to Input, Output to the audio level meter

Unit Setup:

1. Switch the EQ IN and release all other EQ switches.
2. Release the +4dBu/–10dBV switch on the rear panel.
3. Set all of the Q and Frequency controls fully anti-clockwise and all Gain controls to their centre indent.

HF EQ – Maximum Gain

Adjustment:

1. Set HF Gain to maximum and select HF ⎍. Set the audio oscillator for 12kHz and adjust HF Frequency to find the maximum level on the audio level meter.
2. Adjust VR13 (HF Q) for +20dBu ±0.25dB.
3. Reset HF Gain to its centre indent position, de-select HF ⎍ and re-check the audio level meter for 0dBu.

HMF EQ – Maximum Gain

Adjustment:

1. Set HMF Gain to maximum and HMF Q fully anti-clockwise. Set the audio oscillator for 3kHz and adjust HMF Frequency to find the maximum level on the audio level meter.
2. Adjust VR11 (HMF Q) for +21dBu ±0.25dB.
3. Reset HMF Gain to its centre indent position, re-check the audio level meter for 0dBu.

LMF EQ – Maximum Gain

Adjustment:

1. Set LMF Gain to maximum and LMF Q fully anti-clockwise. Set the audio oscillator for 1kHz and adjust LMF Frequency to find the maximum level on the audio level meter.
2. Adjust VR12 (LMF Q) for +21dBu ±0.25dB.
3. Reset LMF Gain to its centre indent position, re-check the audio level meter for 0dBu.

(continued)

LF EQ – Maximum Gain

Adjustment:

1. Set LF Gain to maximum and select LF ⎍. Set the audio oscillator for 80Hz and adjust LF Frequency to find the maximum level on the audio level meter.
2. Adjust VR14 (LF Q) for +16.5dBu ±0.25dB.
3. Reset LF Gain to its centre indent position, de-select LF ⎍ and re-check the audio level meter for 0dBu.

B.4.2 Output Balance

Equipment Required: Calibrated audio oscillator, audio level meter and a 'balance' adaptor (see below).

Test Signal: 1kHz sine wave at +24dBu.

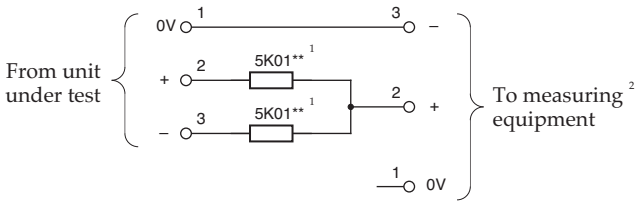
Input and Output: Oscillator to the Input of the channel being tested, Output to the level meter via the 'balance' adaptor.

Unit Setup: Ensure that all front panel switches are off and all controls are set fully anti-clockwise.

Adjustment: Connect the test equipment to the each channel in turn and adjust VR15 (BAL) for minimum level (< 55dBr).

B.4.3 'Balance' Adaptor

For the output balance adjustment, a 'balance' adaptor such as that illustrated here will be required. This adaptor consists of a pair of close tolerance resistors in an in-line cable and is used to sum together a balanced output in order to correctly adjust the level balance of the measured output; perfect balance should result in complete signal cancellation.



Note 1. Resistor tolerance should ideally be 0.01%
2. Absolute level measured will depend upon the input impedence of the measuring equipment.

B.5 Connector Details

Audio Input	
Location:	Rear Panel
Conn' Type:	XLR Female
Pin	*Description*
1	Chassis
2	Audio +ve
3	Audio –ve

Audio Output	
Location:	Rear Panel
Conn' Type:	XLR Male
Pin	*Description*
1	Chassis
2	Audio +ve
3	Audio –ve

B.6 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*

B.7 Environmental Specification

As per X-Rack – see page 19.