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XLogic
SUPERANALOGUE
X-RACK

Super-Analogue™ Outboard

X-Rack E Series EQ User's Guide

This documentation package contains the User's Guide for your new X-Rack E Series 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.

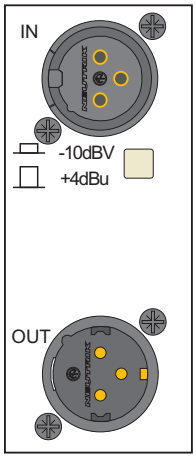
Please Note. *For correct operation of this module, your X-Rack unit must be running V1.4/2 or later software. Please refer to your X-Rack Owners Manual for instructions on how to check the current software version and how to obtain and install a newer version if required.*

There may be a newer version of the X-Rack Owner's Manual available for download from our website (www.solid-state-logic.com)

82S6XR0K0A

K. E Series EQ Module

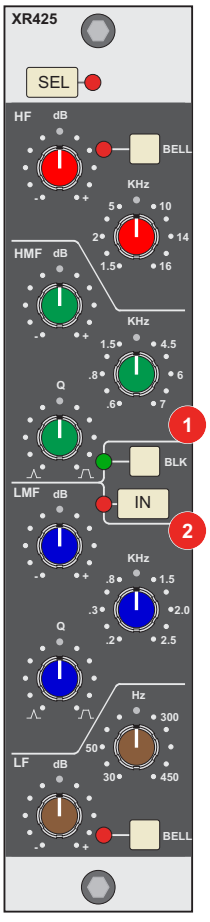
K.1 Connection



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.

K.2 Operation

The X-Rack E Series EQ module is a re-implementation of two of the classic SSL EQ circuits. The module defaults to the original 'Brown Knob' circuit that was standard on all early production E Series consoles but can be switched to emulate the later 'Black Knob' circuit.



The BLK button (1) switches the module from the default 'Brown Knob' EQ to 'Black Knob' EQ.

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

K.2.1 'Brown Knob' EQ

With the BLK button out, the two parametric mid-band sections feature SSL's classic logarithmically symmetric design that ensures that the ±3dB up/down points retain the same musical interval from the centre frequency regardless of frequency and amplitude settings. The two shelving sections are traditional 6dB/octave designs with an option for a fixed Q parametric response (Bell). The '02' EQ, to give it its correct name, was used on countless recordings and mixes in the early eighties.

K.2.2 'Black Knob' EQ

In 1983 a new '242' EQ circuit was developed in conjunction with the legendary George Martin for the first SSL console to be installed in AIR studios. The 'Black Knob' EQ, as it became known, featured enhanced cut and boost ranges (±18dB instead of ±15dB) together with a different control law and a steeper 18dB/octave high pass filter for tighter control of low frequencies. It is this design which is retained today as the 'E Series' EQ option of the AWS 900 and Duality consoles. It is also to be found in use in the X-Rack XR625 EQ module which features this design alongside an implementation of the 'G Series' EQ.

K.3 Performance Specification

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

K.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.

K.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

K.3.3 Performance

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

THD + N	< 0.003% at +20dBu 1kHz < 0.003% at +20dBu 10kHz
Frequency Response	±0.5dB from 20Hz to 20kHz –6dB at 100kHz
Output Headroom	> +26dBu at onset of clipping
Noise	< –80dBu (+4dBu operating level) < –92dBu (–10dBV operating level)

K.3.4 Controls

This is a four band equaliser that can be switched between two different sets of curves; one based on SSL's '02' ('Brown Knob') EQ and the other based on the latest version of the classic '242' E Series ('Black Knob') EQ.

HF Band controls:

Frequency	Variable from 1.5kHz to 16kHz
Gain	Variable between ±15dB ('Brown') Variable between ±18dB ('Black')
'Q' (on 'BELL' setting)	0.8 ('Brown') 1.3 ('Black')

HMF Band controls:

Frequency	Variable from 600Hz to 7kHz
Gain	Variable between ±15dB ('Brown') Variable between ±18dB ('Black')
'Q'	Variable from 0.5 to 2.5 ('Brown') Variable from 0.5 to 4 ('Black')

LMF Band controls:

Frequency	Variable from 200Hz to 2.5kHz
Gain	Variable between ±15dB ('Brown') Variable between ±18dB ('Black')
'Q'	Variable from 0.5 to 2.5 ('Brown') Variable from 0.5 to 4 ('Black')

LF Band controls:

Frequency	Variable from 30Hz to 450Hz
Gain	Variable between ±15dB ('Brown') Variable between ±18dB ('Black')
'Q' (on 'BELL' setting)	0.8 ('Brown') 1.3 ('Black')

K.4 Calibration Information

The X-Rack E Series 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.

K.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. Ensure that the BLK switch is released.
2. Set HF Gain to maximum and select HF BELL. Set the audio oscillator for 12kHz and adjust HF Frequency to find the maximum level on the audio level meter.
3. Adjust VR11 for +15dBu ±0.25dB.
4. Switch BLK in and re-adjust HF Frequency for maximum level.
5. Adjust VR12 for +18dBu ±0.25dB.
6. Reset HF Gain to its centre indent position, de-select HF BELL and release the BLK switch. Re-check the audio level meter for 0dBu.

HMF EQ – Maximum Gain

Adjustment:

1. Ensure that the BLK switch is released.
2. 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.
3. Adjust VR13 for +15dBu ±0.25dB.
4. Switch BLK in and re-adjust HMF Frequency for maximum level.
5. Adjust VR14 for +18dBu ±0.25dB.
6. Reset HMF Gain to its centre indent position and release the BLK switch. Re-check the audio level meter for 0dBu.

LMF EQ – Maximum Gain

Adjustment:

1. Ensure that the BLK switch is released.
2. 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.
3. Adjust VR15 for +15dBu ±0.25dB.

(continued)

4. Switch BLK in and re-adjust LMF Frequency for maximum level.
5. Adjust VR16 for +18dBu ±0.25dB.
6. Reset LMF Gain to its centre indent position and release the BLK switch. Re-check the audio level meter for 0dBu.

LF EQ – Maximum Gain

Adjustment:

1. Ensure that the BLK switch is released.
2. Set LF Gain to maximum and select LF BELL. Set the audio oscillator for 80Hz and adjust LF Frequency to find the maximum level on the audio level meter.
3. Adjust VR17 for +15dBu ±0.25dB.
4. Switch BLK in and re-adjust LF Frequency for maximum level.
5. Adjust VR18 for +18dBu ±0.25dB.
6. Reset LF Gain to its centre indent position, release the BLK switch and de-select LF BELL. Re-check the audio level meter for 0dBu.

K.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.

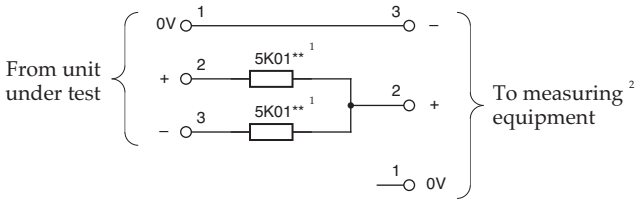
Input and Output: Oscillator to the Input of the channel being tested, Output to the level meter via the 'balance' adaptor.

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 VR19 (BAL) for minimum level (< 55dBr).

K.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.

K.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

K.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*

K.7 Environmental Specification

As per X-Rack – see page 19.