

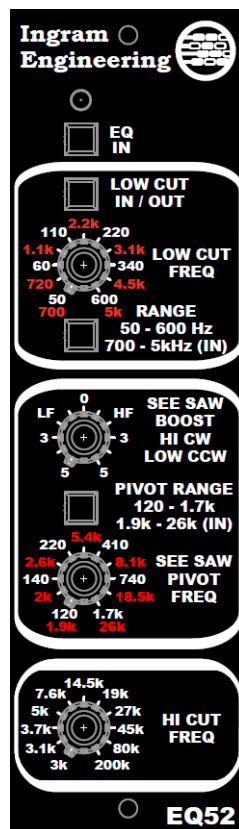


INGRAM ENGINEERING

EQ52

Equalizer

Owner's Manual



Jan 2021



INGRAM ENGINEERING

EQ52 Owner's Manual



Table of Contents

INTRODUCTION	5
FRONT PANEL FEATURES	6
EDGE CONNECTOR PIN ASSIGNMENTS	7
SAFETY INSTRUCTIONS	8
INSTRUCTIONS FOR USE	10
1. Installing the EQ52 in a Rack	10
2. Module Warm Up	10
3. EQ In (Bypass Switch)	10
4. Setting Audio Levels	10
5. Low Cut Filter	10
6. See-Saw Filter	11
7. High Cut Filter	13
8. Using Filters in Combination	15
ELECTRICAL SPECIFICATIONS	19
ENVIRONMENTAL SPECIFICATIONS	19
CARE AND MAINTENANCE	20
TROUBLESHOOTING	20
1. Power does not turn on	20
2. Audio Sounds Distorted	20
3. Hum or Buzz is Audible	20
CONTACT INFORMATION	21
WARRANTY INFORMATION	21
EQ52 EQUALIZER RECALL SHEET	24



Table of Figures

Figure 1: Front Panel Features	6
Figure 2: Edge Connector Pin Assignments	7
Figure 3: Low Cut Filter Example Responses	11
Figure 4: See-Saw Filter Example Responses, 1 kHz Pivot Frequency	12
Figure 5: See-Saw Filter Example Responses, Range 1 Pivot Frequencies	12
Figure 6: See-Saw Filter Example Responses, Range 2 Pivot Frequencies	13
Figure 7: High Cut Filter Example Responses	14
Figure 8: Filter Plot, Settings for Smoothing a Stereo Mix	15
Figure 9: Filter Plot with Subtle High Frequency Presence Boost	15
Figure 10: Filter Plot with Settings That Mute Guitar Pick Noise	16
Figure 11: Filter Plot with Settings that Clean Up Muddy Guitar Tracks	16
Figure 12: Filter Plot for Compressor Sidechain Filter, Mid-High Trigger Frequency	17
Figure 13: Filter Plot for Compressor Sidechain Filter, Mid-Low Trigger Frequency	17
Figure 14: Filter Plot with Presence Boost Settings	18
Figure 15: Filter Plot with High Frequency Shelf	18



INTRODUCTION

Welcome, and congratulations on your interest in the EQ52 Equalizer! It has been crafted to provide extremely high quality audio and a simple user interface that requires minimal effort to optimize.

The EQ52 contains extremely versatile and musical sounding high pass, low pass and see-saw filters with a simple and intuitive user interface. Expert circuit design and top quality components realize an outstanding equalizer that is ideal for individual tracks or for mixing and mastering stereo signals when the modules are used in pairs.

The unit features differential input and output. Both input and output can operate in differential or single-ended, unbalanced modes. A high current active output buffer mimics the behavior of a transformer, providing constant gain for balanced or unbalanced operation, when either the positive or negative output signals are grounded. Therefore, the output can drive differential or single ended output with no extra user configuration needed.

The simple controls and circuit layout belie the finely tuned and expertly engineered design. Extremely high input common mode rejection capability is realized, even down to critical power supply frequencies. High quality film caps, low distortion resistors and excellent quality integrated active stages realize a high headroom, low noise, and low distortion equalizer with superb audio quality that is ideal for individual tracks or for mixing and mastering stereo signals.

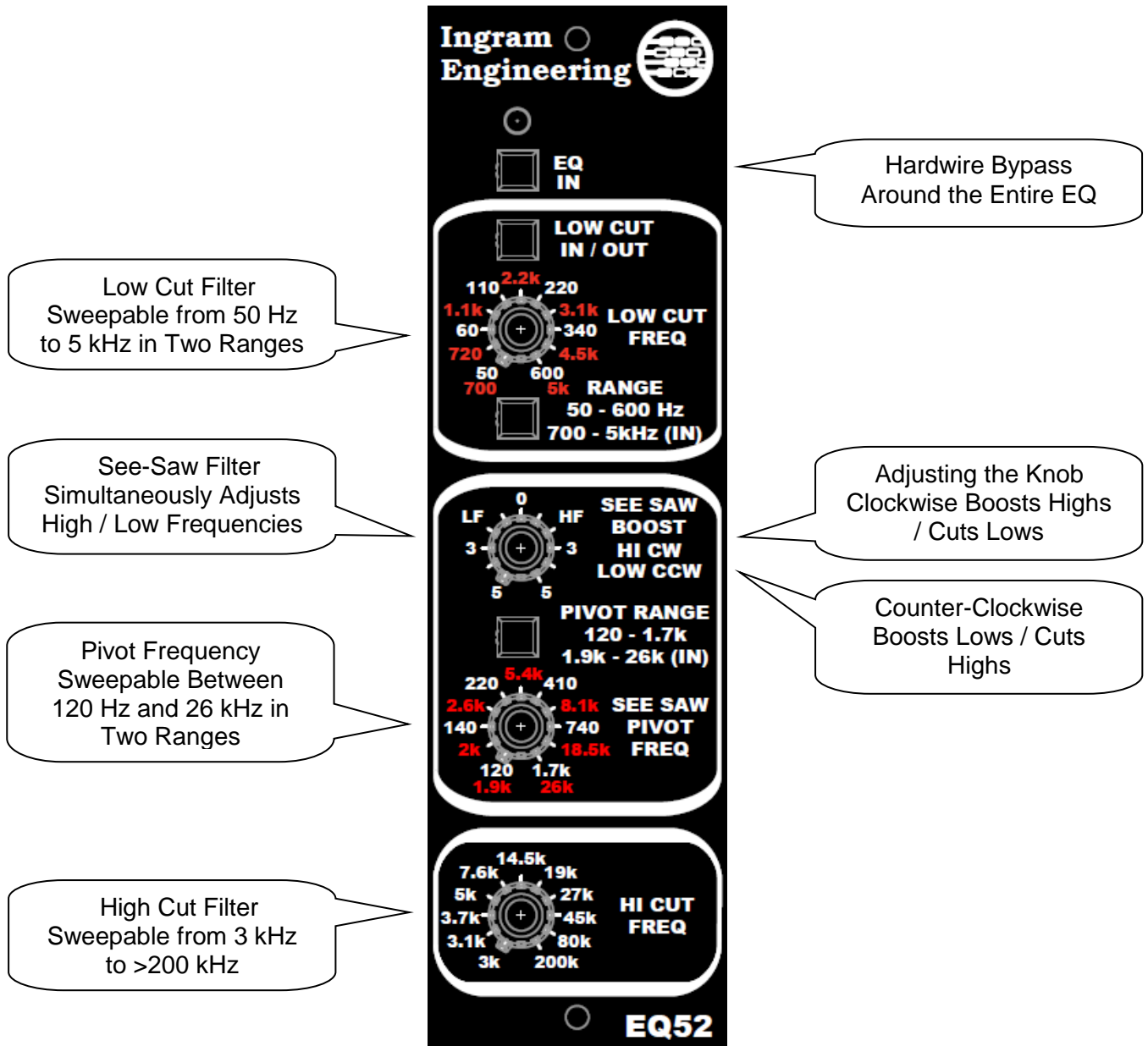
FRONT PANEL FEATURES


Figure 1: Front Panel Features



EDGE CONNECTOR PIN ASSIGNMENTS

Power, ground and audio signal interface to the EQ52 is through the edge card connector at the rear of the module. Assignments of the edge card connector pins follow:

Pin 1	Chassis Ground
Pin 2	Output, Balanced, Positive
Pin 3	No Connection
Pin 4	Output, Balanced, Negative
Pin 5	Audio Ground
Pin 6	No Connection
Pin 7	No Connection
Pin 8	Input, Balanced, Negative
Pin 9	No Connection
Pin 10	Input, Balanced, Positive
Pin 11	No Connection
Pin 12	+16V DC
Pin 13	Power Ground
Pin 14	-16V DC
Pin 15	No Connection

Figure 2: Edge Connector Pin Assignments



SAFETY INSTRUCTIONS

1. Read Instructions

All the safety and operation instructions should be read before this product is operated.

2. Retain Instructions

The safety and operating instructions should be kept for future reference.

3. Heed Warnings

All warnings on the product and in these operating instructions should be followed.

4. Follow Instructions

All operating and other instructions should be followed.

5. Water and Moisture

This product should not be used near water or in environments with very high humidity or with condensation.

6. Heat

This product should be situated away from heat sources such as radiators or other devices that product heat.

7. Power Sources

This product should be connected to a power supply only of the type described in these operation instructions or as marked on this product.

8. Object and Liquid Entry

Care should be taken so that objects do not fall into and liquids are not spilled into the inside of this product.

9. Damage Requiring Service

This product should be serviced only by qualified service personnel when:

- a. Objects have fallen, or liquid has spilled into the product; or
- b. The product has been exposed to rain; or
- c. The product does not appear to operate normally or exhibits a marked change in performance; or
- d. The product has been dropped, or its chassis damaged.



10. Servicing

The user should not attempt to service this product beyond those means described in this operating manual. All other servicing should be referred to the Ingram Engineering Service Department.

Warning – To reduce the risk of fire or electric shock, do not expose this appliance to rain or moisture.



INSTRUCTIONS FOR USE

1. Installing the EQ52 in a Rack

RACK POWER MUST BE OFF BEFORE INSTALLING THE EQ52. The module design is not warranted for damage that occurs when it is inserted or removed from a rack with power applied.

2. Module Warm Up

After power up, please allow approximately 2 minutes time for component warm up and stabilization time before beginning critical listening or recording.

3. EQ In (Bypass Switch)

The EQ In button engages the EQ or switches in a hard-wire bypass of the entire EQ module. With balanced input and most types of equipment used in conjunction with this EQ, the EQ has unity gain. Therefore, by alternating between EQ In and EQ Out, the Bypass Switch is an effective tool to audition the effect of the EQ. An LED indicates when the EQ is engaged.

4. Setting Audio Levels

Ideal levels for the EQ52 are 0 dBu nominal at mid frequencies. While the EQ52 can accept audio levels up to +20 dBu when the EQ settings are flat, the see-saw filter has as much as +8 dB gain when adjusted to its extremes, so it is good practice to set the EQ52 input levels to 0 dBu for maximum headroom. The Low Cut and High Cut filters only attenuate the signal, so these filters will not be a factor in setting levels.

5. Low Cut Filter

The Low Cut Filter is a passive first order filter that provides gentle -6dB / octave cut to frequencies below that indicated on the knob. The cutoff frequency adjustment range is very wide, and extends from 50 Hz to 5 kHz in two ranges. The range is selected by a push button. By using a low order -6dB/octave filter, smooth and natural filtering of music is achieved with minimal phase shift. By providing cutoff frequency as high as 5



kHz, significant attenuation of lowest frequencies can be achieved. The plot below filter responses over both ranges.

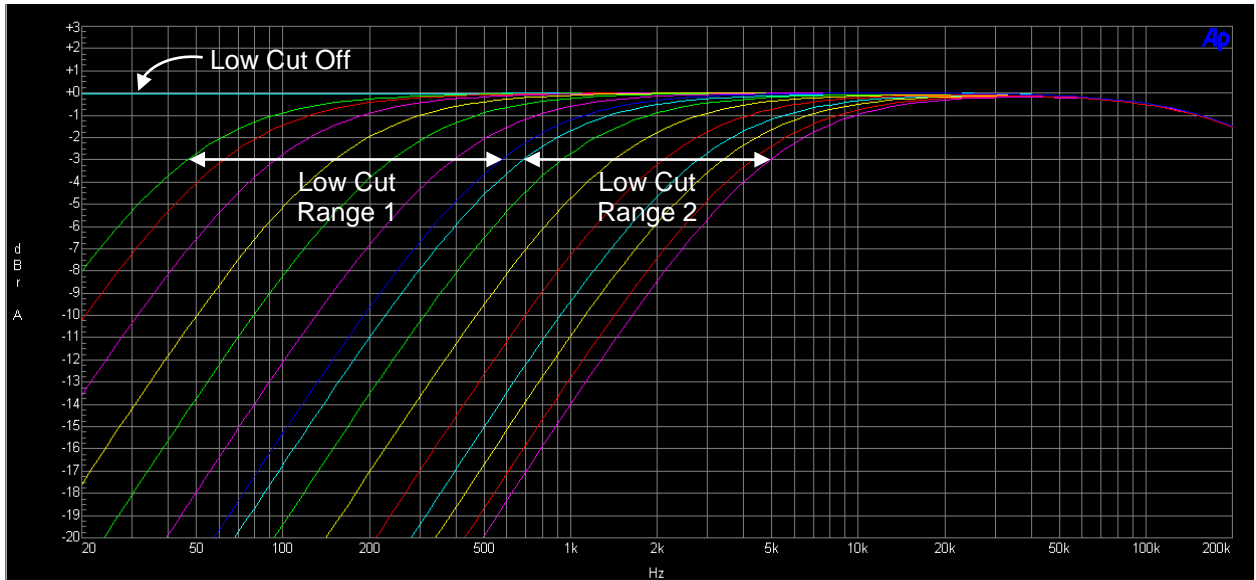


Figure 3: Low Cut Filter Example Responses

6. See-Saw Filter

The See-Saw Filter provides simultaneous cut of one frequency band while boosting another band. When the adjustment knob is turned clockwise, high frequencies are boosted and low frequencies are cut. When the adjustment knob is turned count-clockwise, low frequencies are boosted and high frequencies are cut. The filter has approximately linear slope over the transition region. Max boost and cut are approximately 8dB, so significant shaping of the audio spectrum can be achieved.

The See-Saw filter has a “pivot” frequency that can be sweep over an extremely wide range of 120 Hz to 26 kHz, in two ranges. The range is selected using a front panel push button. The See-Saw filter has the same linear slope for each setting. Plots below show a range of filter responses.

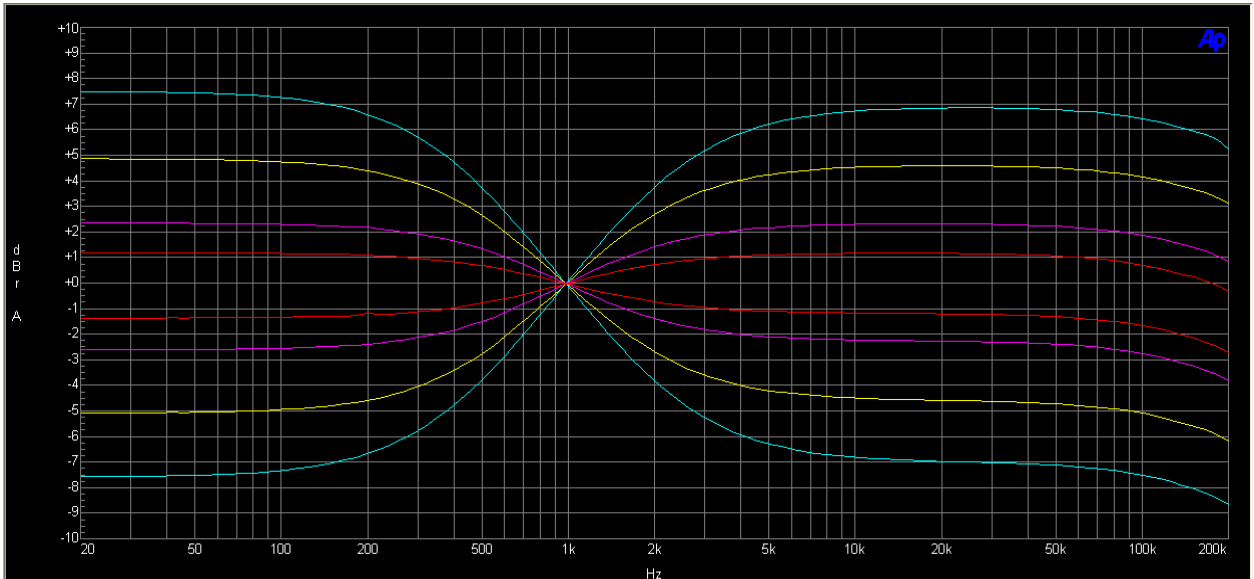


Figure 4: See-Saw Filter Example Responses, 1 kHz Pivot Frequency

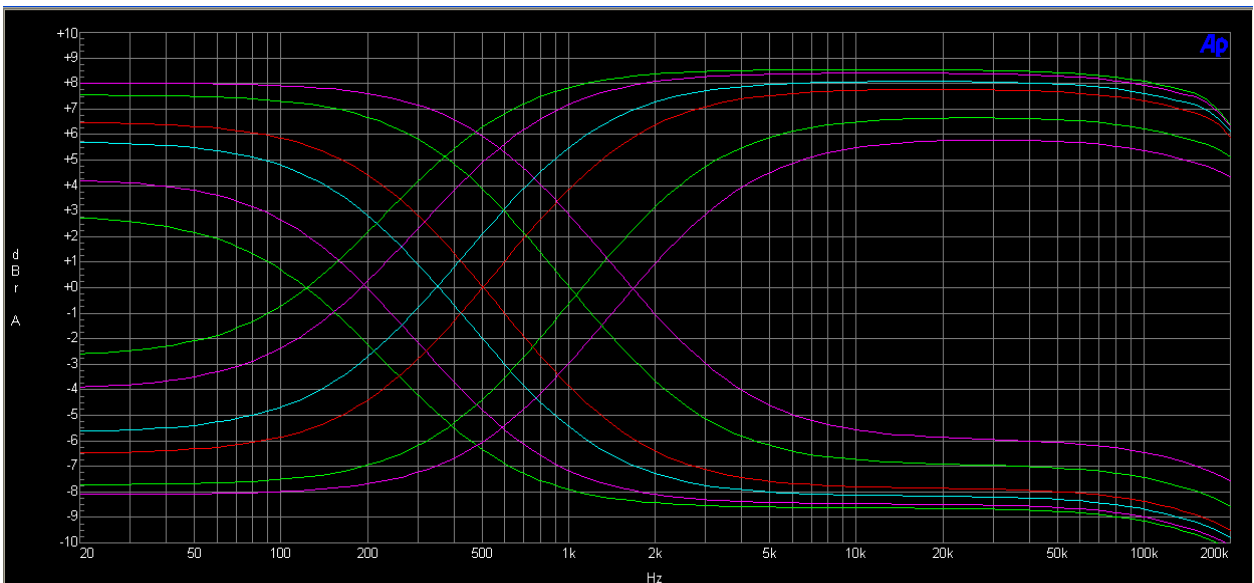


Figure 5: See-Saw Filter Example Responses, Range 1 Pivot Frequencies

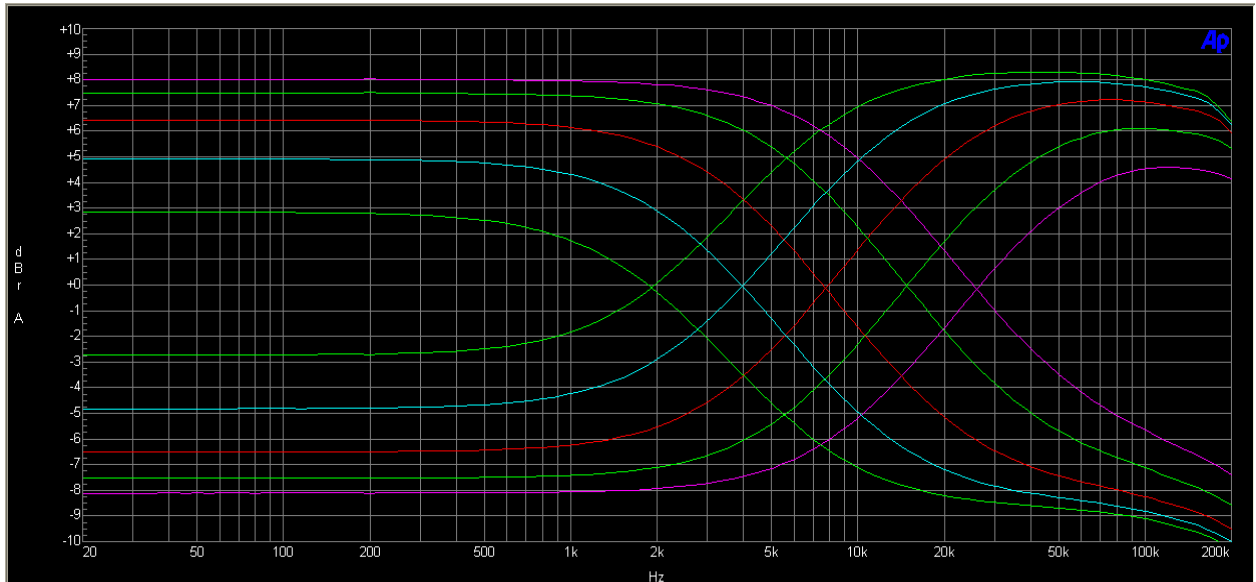


Figure 6: See-Saw Filter Example Responses, Range 2 Pivot Frequencies

7. High Cut Filter

The High Cut Filter is a passive first order filter that provides gentle $-6\text{dB} / \text{octave}$ cut to frequencies above that indicated on the knob. The cutoff frequency adjustment range is very wide, and extends from 3 kHz to $>200\text{ kHz}$. By using a low order -6dB/octave filter, minimal phase shift of the signal is realized and very natural sounding filtering results. By providing cutoff frequency as low as 3 kHz, significant attenuation of highest frequencies can be achieved. The plot below shows a range of filter responses.

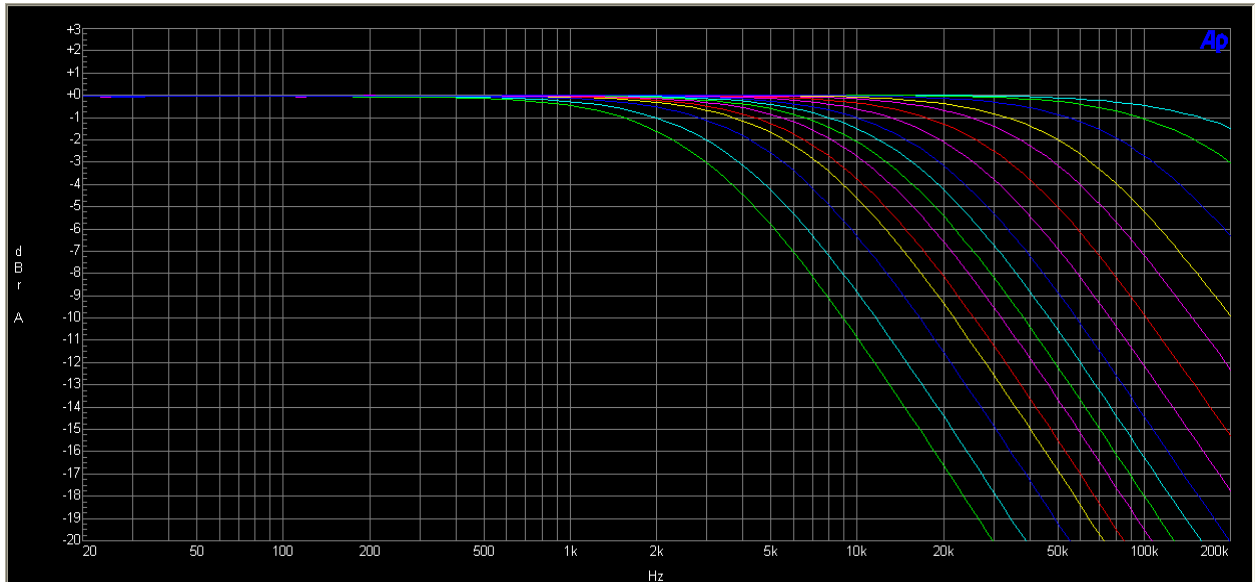


Figure 7: High Cut Filter Example Responses



8. Using Filters in Combination

The following plots show examples applications of the three filters, used in combination.

Smooth a stereo mix using the Low Cut and See-Saw filters.

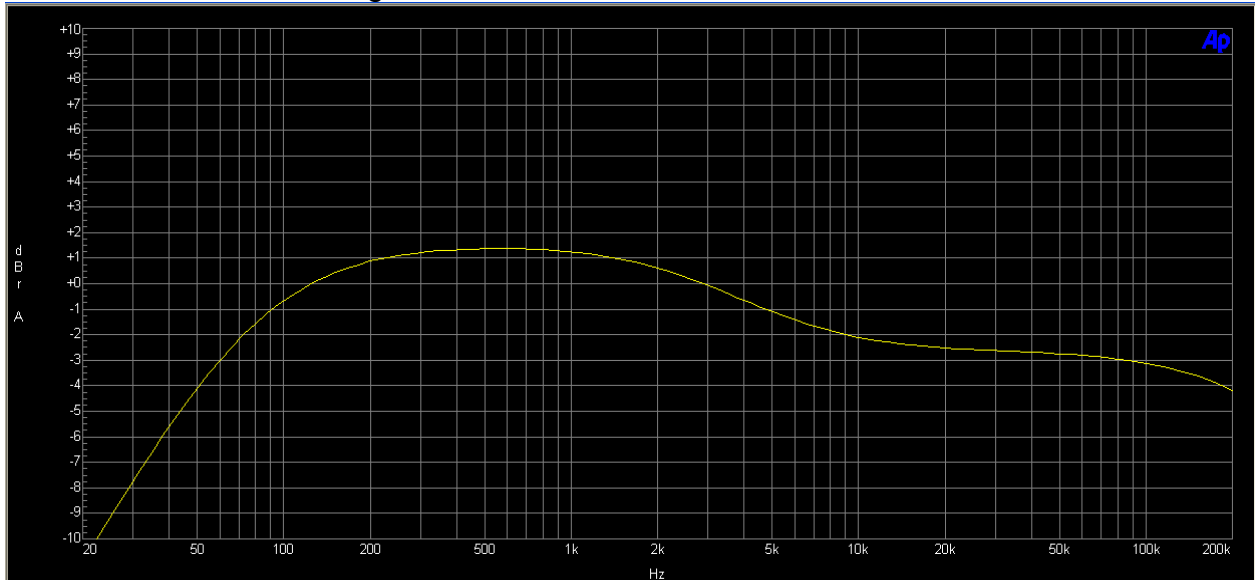


Figure 8: Filter Plot, Settings for Smoothing a Stereo Mix

Subtle presence boost using the See-Saw, some band limiting using the High Cut filter.

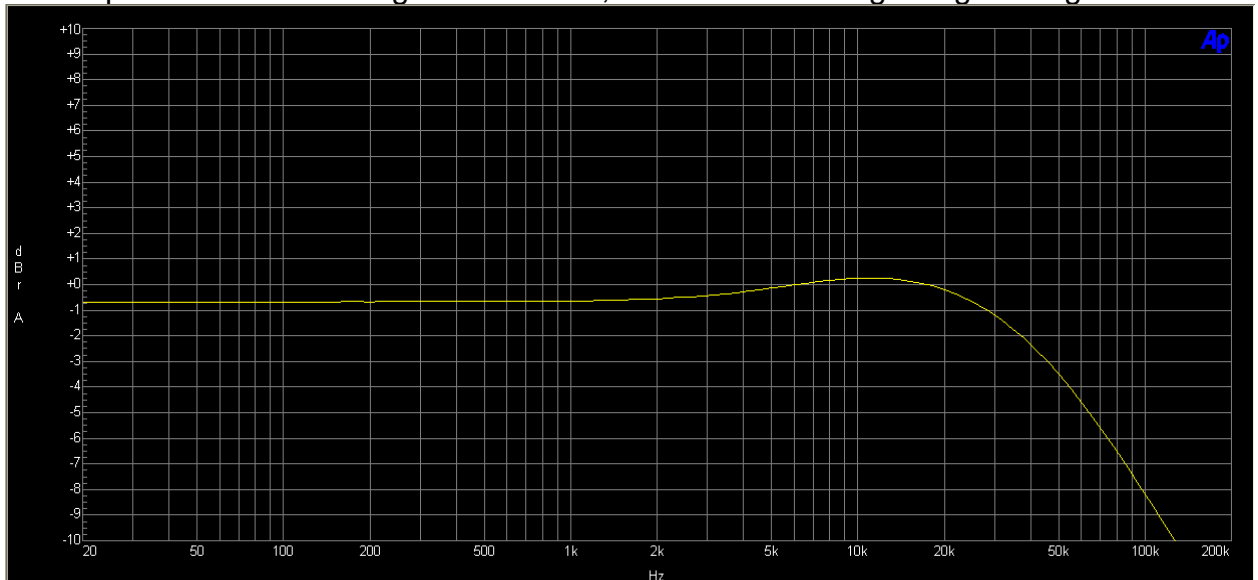


Figure 9: Filter Plot with Subtle High Frequency Presence Boost



Using combinations of the See-Saw and High Cut filters as shown below can turn bright guitar tracks played with a pick into tracks that sounds like they were played using only fingers.

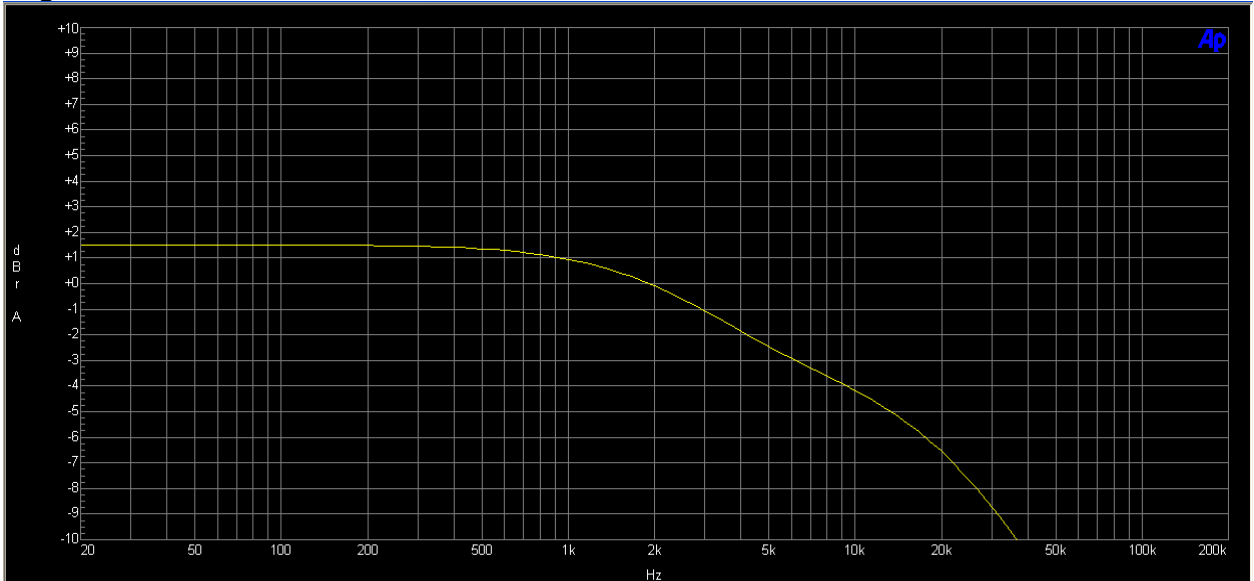


Figure 10: Filter Plot with Settings That Mute Guitar Pick Noise

The filters can also be used to clean a muddy guitar track by using the See-Saw and Low Cut filters.

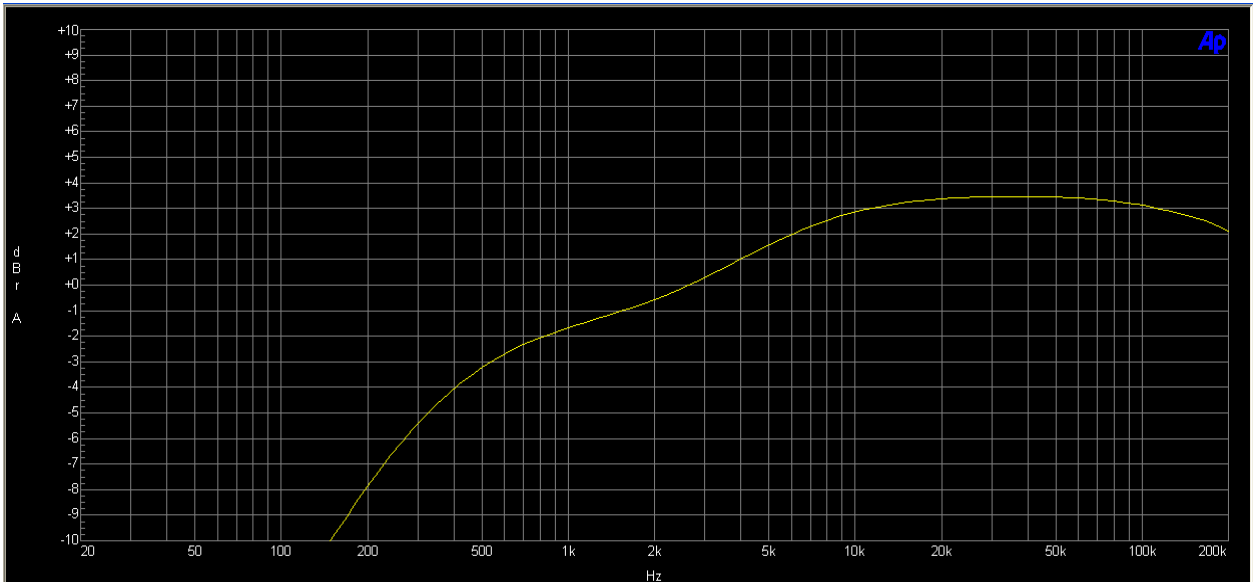


Figure 11: Filter Plot with Settings that Clean Up Muddy Guitar Tracks



The EQ52 can be used as a compressor sidechain filter. An example setting shown below would realize compression that is triggered on mid-highs. This plot uses a combination of the Low and High Cut filters.

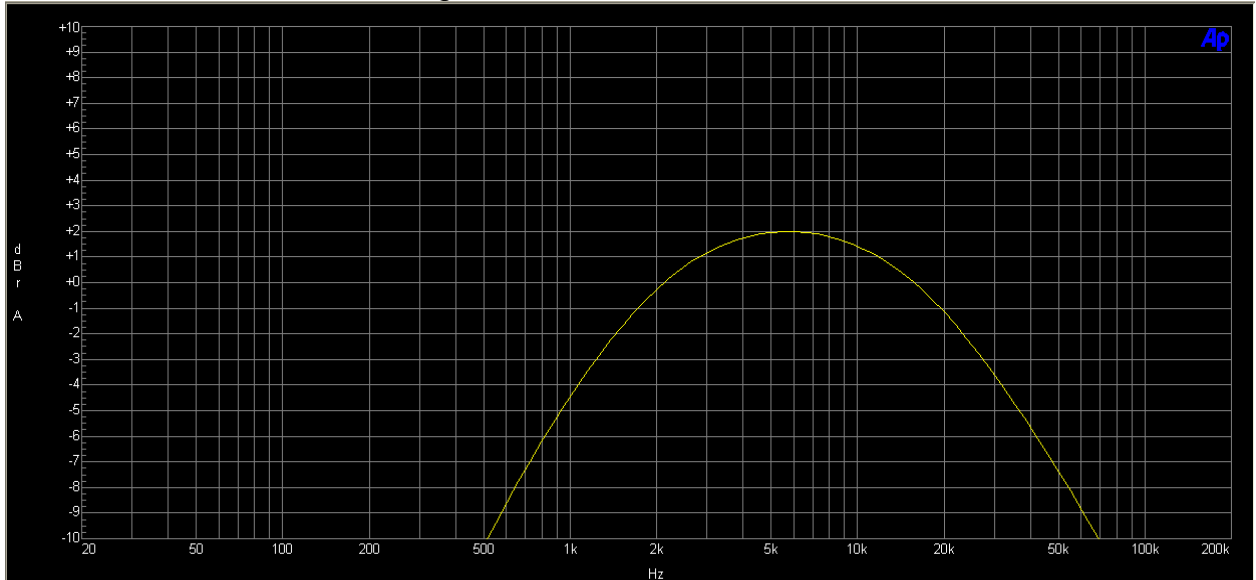


Figure 12: Filter Plot for Compressor Sidechain Filter, Mid-High Trigger Frequency

The sidechain filter example below would realize compression triggered on mid-low frequencies.

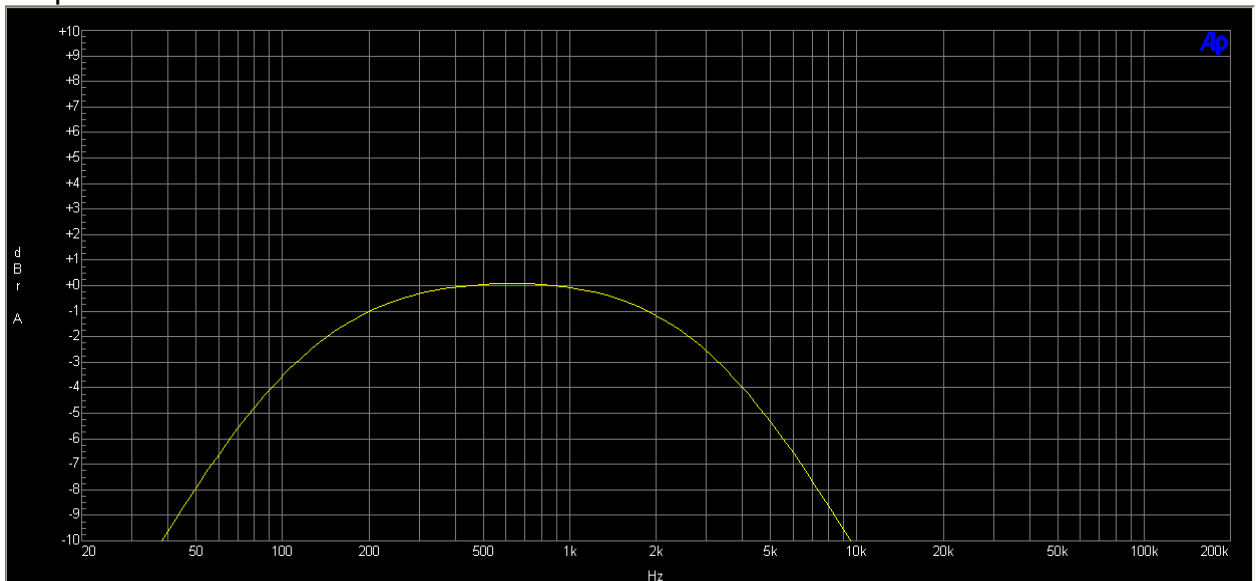


Figure 13: Filter Plot for Compressor Sidechain Filter, Mid-Low Trigger Frequency



Slight low-end boost and high frequency reduction using the See-Saw and High Cut filters.

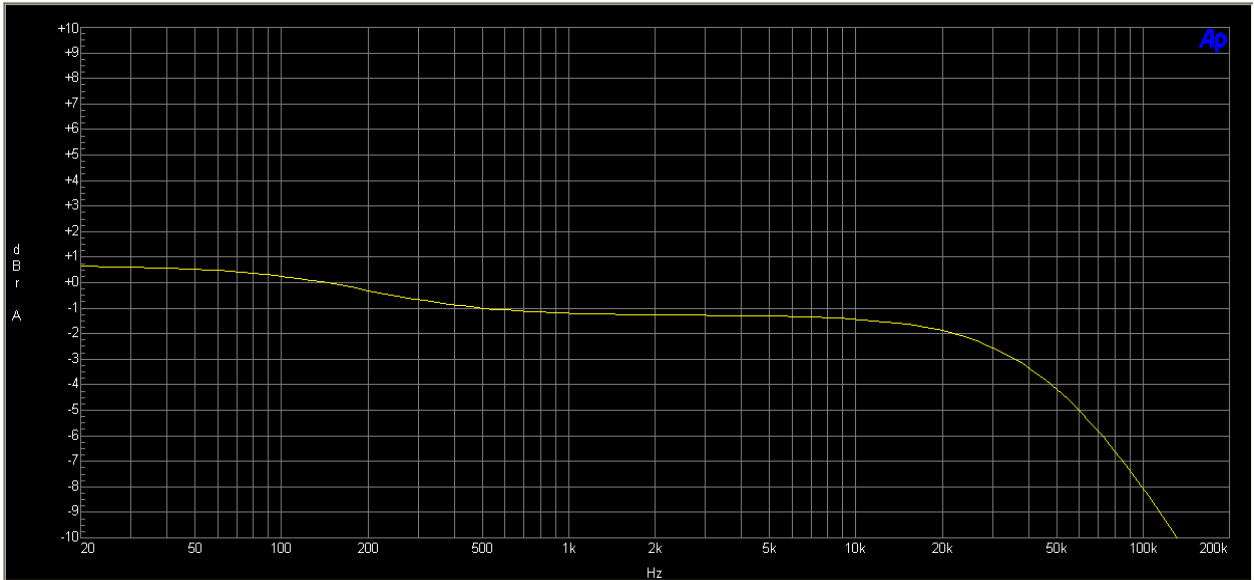


Figure 14: Filter Plot with Presence Boost Settings

High frequency shelving using the See-Saw filter.

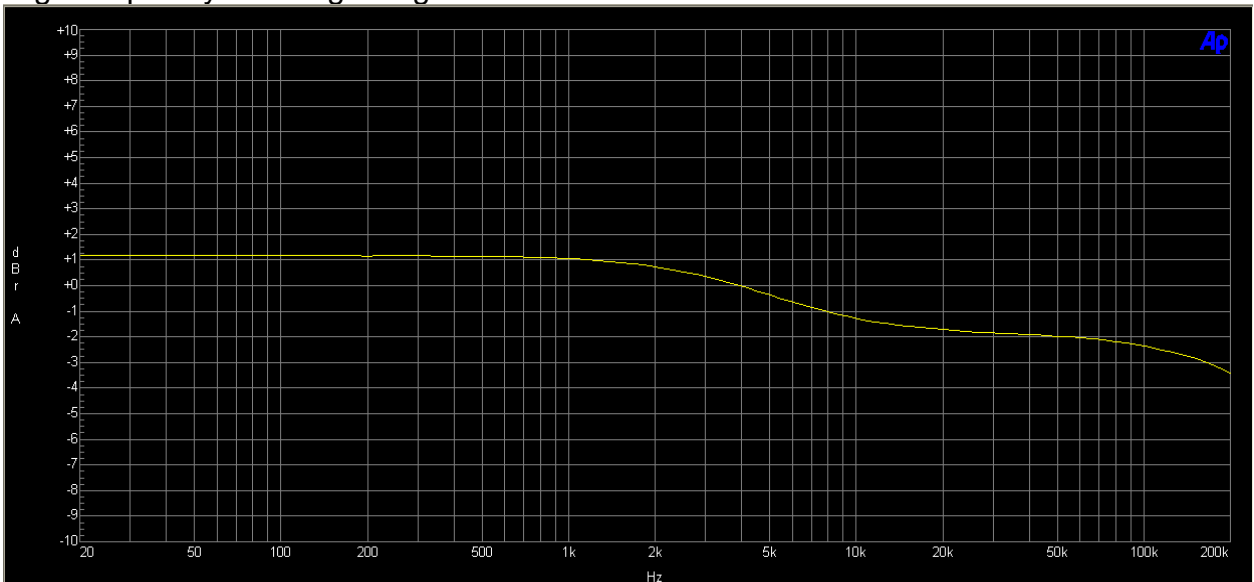


Figure 15: Filter Plot with High Frequency Shelf



ELECTRICAL SPECIFICATIONS

(T_A=+25°C unless otherwise noted)

Parameter	Min	Typ	Max	Unit	Comments
Input Impedance		48		k Ω	Differential
Output Impedance		100		Ω	Differential
Gain		0		dBr	EQ Engaged, Diff Input
Max Input Level		+20		dBu	With <0.5% THD
Frequency Response	<10		>250k	Hz	±3.0 dB, Equalizer On with Flat Adjustment
Low Cut Filter					
Cutoff Frequency, Range 1	50		600	Hz	
Cutoff Frequency, Range 2	700		5k	Hz	
Stopband Slope		-6		dB/Octave	
High Cut Filter					
Cutoff Frequency Range	3		>200	kHz	
Stopband Slope		-6		dB/Octave	
See-Saw Filter					
Pivot Frequency, Range 1	120		1.7k	Hz	
Pivot Frequency, Range 2	1.9k		26k	Hz	
Boost / Cut	-8		+8	dB	With Control Fully CW or CCW
Filter Slope			6	dB/Octave	With Max Boost/Cut
THD + Noise		0.002		%	With +20 dBu Input, 1 kHz Signal, 22 kHz Bandwidth
Noise		-96		dBu	No weighting, flat filter response
CMRR		90		dB	At 60 Hz
Voltage Supplies		±16		V	
Current		±25		mA	

ENVIRONMENTAL SPECIFICATIONS

Parameter	Min	Typ	Max	Unit	Comments
Operating Temperature	0		85	°C	
Humidity	30		80	%	Non-condensing



CARE AND MAINTENANCE

1. Cleaning

Avoid solvents or chemicals that may dissolve the silkscreen text on the front and back panels.

TROUBLESHOOTING

1. Power does not turn on

First verify that power is being applied to the module by engaging the EQ In function. It has a Green LED that illuminates when the EQ is engaged. If this LED does not come on, verify that the 500-rack has power applied and is switched on. Check the rack AC fuse.

2. Audio Sounds Distorted

Check the level being applied to the EQ52. 0dBu (-4VU) is the best nominal audio level to use with the EQ52. The See-Saw filter can realize 8 dB gain when adjusted to its extremes. If EQ52 input levels exceed 12 dBu, it is possible that the audio is being distorted if extreme See-Saw filter settings are being used.

If distortion cannot be attributed to signal levels or filter settings, check the integrity of the 500-series rack power supply. If these tips do not solve the problem, investigate other system equipment, then contact Ingram Engineering.

3. Hum or Buzz is Audible

Check the integrity of the system cables. If the 500-Series rack includes a ground lift for the balanced audio cable, try lifting the ground. Check the integrity of the 500-Series rack power supply.



CONTACT INFORMATION

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Email: ingramengineeringproaudio@gmail.com

WARRANTY INFORMATION

Ingram Engineering warrants all materials, workmanship and proper operation of this product for a period of three years from the original date of purchase. If any defects are found in the materials or workmanship or if the product fails to function properly during the applicable warranty period, Ingram Engineering, at its option, will repair or replace the product. This warranty applies only to equipment sold and delivered by Ingram Engineering or its authorized dealers. Original purchase receipts showing date and location of purchase must be presented at the time of submission for warranty work.

Failure to register the product will not void the three year warranty.

Service and repairs of Ingram Engineering products are to be performed only at the factory OR at an authorized Ingram Engineering Service Center. Unauthorized service, repairs, or modification will void this warranty. To obtain repairs under warranty, you must have a copy of your sales receipt from the store where you bought the product. It is necessary to establish purchase date and thus determine whether or not your Ingram Engineering product is still under warranty.

To obtain factory service:

Call Ingram Engineering at 678-685-9838 9 AM to 5 PM Monday through Friday (East Coast Time) to get a Return Authorization (RA). Products returned without an RA number will be refused.

Pack the product in its original shipping carton. If you do not have the carton, just ask for one when you get your RA number, and we'll send a shipping carton to you. Please seal the product in a plastic bag.



Also include a note explaining exactly how to duplicate the problem, a copy of the sales receipt showing price and date, and your return street address (no P.O. boxes or route numbers, please). If we cannot duplicate the problem or establish the starting date of your Limited Warranty, we may, at our option, charge for service time.

Ship the product in its original shipping carton, freight prepaid to:
Ingram Engineering Service Department
926 Bruce Circle
Atlanta, Ga. 30316 USA

IMPORTANT: Make sure that the RA number is plainly written on the shipping carton.

To obtain service from an Authorized Ingram Engineering Service Center:

Call Ingram Engineering at 678-685-9838, 9 AM to 5 PM Monday through Friday (East Coast Time) to receive: 1) The name and address of your nearest Authorized Ingram Engineering Service Center and 2) A return authorization (RA). You must have an RA number before taking your unit to a service center.

Make sure that you have a copy of your sales receipt from the store where you bought the product. If you can't find it, the Authorized Service Center may charge you for repairs even if your Ingram Engineering product is still covered by the Three Year Limited Warranty. Make sure the problem can be duplicated. If you bring your Ingram Engineering product to an Authorized Service Center and they can't find anything wrong with it, you may be charged a service fee.

If the Authorized Ingram Engineering Service Center is located in another city, pack the product in its original shipping carton.

Contact the Authorized Ingram Engineering Service Center to arrange service or bring the Ingram Engineering product to them.

Ingram Engineering and Authorized Ingram Engineering Service Centers reserve the right to inspect any products that may be the subject of any warranty claims before repair or replacement is carried out. Ingram Engineering and Authorized Ingram Engineering Service Centers may, at their option, require proof of the original date of purchase in the form of a dated copy of the original dealer's invoice or sales receipt. Final determination of warranty coverage lies solely with Ingram Engineering or its Authorized Service Centers.

Ingram Engineering products returned to Ingram Engineering and deemed eligible for repair or replacement under the terms of this warranty will be repaired or replaced within sixty days of receipt by Ingram Engineering. Ingram Engineering may use refurbished parts for repair or



replacement of any product. Products returned to Ingram Engineering that do not meet the terms of this Warranty will be repaired and returned C.O. D. with billing for labor, materials, return freight, and insurance. Products repaired under warranty at the factory will be returned freight prepaid by Ingram Engineering to any location within the boundaries of the USA.

Ingram Engineering warrants all repairs performed for 90 days or for the remainder of the warranty period. This warranty does not extend to damage resulting from improper installation, misuse, neglect or abuse, or to exterior appearance. This warranty is recognized only if the inspection seals and serial number on the unit have not been defaced or removed.

Ingram Engineering assumes no responsibility for the quality or timeliness of repairs performed by Authorized Ingram Engineering Service Centers.


This warranty is extended to the original purchaser and to anyone who may subsequently purchase this product within the applicable warranty period. A copy of the original sales receipt is required to obtain warranty repairs.

This is your sole warranty. Ingram Engineering does not authorize any third party including any dealer or sales representative, to assume any liability on behalf of Ingram Engineering or to make any warranty for Ingram Engineering.

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EQ52 EQUALIZER RECALL SHEET

Ingram Engineering 

EQ IN

LOW CUT IN / OUT

110 2.2k 220
 1.1k + 3.1k LOW CUT FREQ
 60 - 340
 720 4.5k
 50 600 RANGE
 700 5k 50 - 600 Hz
 700 - 5kHz (IN)

0 SEE SAW BOOST
 LF | HF
 3 + 3 HI CW
 5 5 LOW CCW
 PIVOT RANGE
 120 - 1.7k
 1.9k - 26k (IN)

220 5.4k 410
 2.6k + 8.1k SEE SAW PIVOT FREQ
 140 - 740
 2k 18.5k
 120 1.7k
 1.9k 26k

7.6k 14.5k 19k
 5k + 27k HI CUT FREQ
 3.7k - 45k
 3.1k 80k
 3k 200k

EQ52

Notes:



NOTES:

IMPORTANT NOTICE

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Ingram Engineering reserves the right to make changes to its products and/or documents or to discontinue any product at any time without notice. The product specifications contained herein are subject to change. Ingram Engineering assumes no responsibility for inaccuracies, and urges customers to verify that the information they are using is current.

WARNING

Ingram Engineering products are not intended for use in life support appliances, devices or systems. Use of an Ingram Engineering product in any such application without written consent is prohibited.

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