

MASELEC MASTER SERIES

MEA-2 Precision Stereo Equalizer

Operation Manual
Issue 1.2 17 January 2000



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Manual Revision History

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Product Revision History

This manual is for use with MEA-2 units having serial numbers beginning with '4' (or higher number) thus : MEA-2-4-xx-xxxx

1. INTRODUCTION

The MEA-2 Precision Stereo Equalizer is intended for professional audio use in recording, mixing and mastering applications where high performance is required.

The MEA-2 provides a unique set of tools, carefully crafted to provide an equalizer whose sonic character was the most important design objective.

The unique character of the device is evident in the response curves included at the end of this manual.

The MEA-2 employs state-of-the art analogue electronics and provides a perfect solution to analogue mastering needs, especially used in conjunction with Prism Sound A/D and D/A converters.

Also available in the MASELEC MASTER SERIES is the MLA-2 compressor.

2. SUMMARY OF MEA-2 FEATURES

Operational:

- C Four separate equalizer sections per channel
- C EQ in/out for each channel
- C All sections switchable between shelving & five different peaking responses
- C Precision stepped controls
- C Overlapping frequency ranges in each pair (LF1&2 and HF1&2)
- C 84 frequency settings per channel

Technical:

- C Low noise
- C Extended headroom with maximum input amplitude of +28dBu
- C Extended frequency response
- C Low distortion
- C Electronically balanced inputs and outputs

3. GETTING STARTED

It is not necessary to read all the manual before being able to use the MEA-2 Precision Stereo Equalizer. This section contains all the information required for you to get going straight away.

3.1. Unpacking your MEA-2

Check that you have the following items and that they are undamaged:

- " MEA-2 Precision Stereo Equalizer unit
- " MEA-2 Precision Stereo Equalizer operation manual (this book)
- " IEC320 type mains lead with appropriate plug for your supply

Check that the slide switch mounted on the rear panel is set to the correct mains voltage range ('120' setting : 90V-130Vac 50-60Hz; '240' setting : 180-260Vac 50-60Hz) and that the plug fitted to the mains lead is of the correct type. If not, DO NOT CONNECT THE MAINS SUPPLY, but contact your distributor.

Please keep the packaging for re-use in the event that the unit should be shipped to another location or in the event that it should ever need to be returned to the manufacturer for repair or upgrade.

3.2. Using the MEA-2 for the first time

Connect a source of balanced audio to the input connectors on the MEA-2. Refer to section 10 for details of how to wire up interconnecting cables for the MEA-2.

Connect the output of the MEA-2 to a monitoring system or to a tape recorder input.

Connect the mains supply to the MEA-2 unit. There is a main power switch on the rear of the unit and an auxiliary switch on the front which is more convenient to use if the equipment is rack mounted and the rear panel is inaccessible. It is necessary for the rear-mounted mains switch to be in the 'ON' position before the front panel switch will operate. The front panel switch operates a relay within the unit.

The indicator lamp integral in the rear-mounted mains switch should illuminate when switched on. If it fails to light the power may be absent or the unit may be faulty. Check the mains supply, and try again. If the problem is still evident contact your distributor.

Switch the secondary power switch on the front of the MEA-2 to 'ON'. Press and release the 'In/Out' push buttons for the left and right channels on the front of the unit. When the equalizer for each channel is in-circuit, the button will be illuminated a soft green colour.

Switch the monitor selection to monitor the MEA-2 output.

The unit is now ready to use.

3.3. MEA-2 product concept and capabilities

The MEA-2 Precision Stereo Equalizer is designed to provide very high quality signal processing for the most demanding professional applications. It has been carefully developed in conjunction with balance engineers, producers and mastering engineers to provide a natural and warm sound. Samples of the unique response curves of the MEA-2 are reproduced in section 7 of this manual.

The presentation of the controls is designed to be clear and intuitive.

4. OPERATION

The unit is designed for either stereo or 2-channel operation and each channel is controlled independently by an identical set of controls.

Each channel has four equalizer sections, denoted in this manual as LF1, LF2, HF1 & HF2. These are presented on the front panel in the same order as above with LF1 being on the left.

Each section has controls for

- C Response/Q
- C Frequency
- C Cut/Boost

These parameter adjustments are interactive to a degree; for example filter bandwidth is adjusted automatically while adjusting the cut/boost control. For further information see the sample curves in section 7.

For reference, the settings available on the unit are reproduced here:

4.1. Shelf/bandwidth and boost/cut settings

The numerical bandwidth settings relate to the Q factor or sharpness of the peaking filters. As a result of the asymmetric shape of the MEA-2 Equalizer curves it becomes difficult to define Q factor in a meaningful way. These settings should therefore be regarded as indicating the relative bandwidths with 4 being the broadest and 20 the narrowest. For more detail, see section 15.

All sections **shelf/bandwidth** settings:

Shelf, 4, 6, 9, 14, 20

All sections cut/boost settings (dB):

Boost (dB)	Cut (dB)
+8.0	-8.0
+6.0	-6.0
+5.0	-5.0
+4.0	-4.0
+3.0	-3.0
+2.5	-2.5
+2.0	-2.0
+1.5	-1.5
+1.0	-1.0
+0.5	-0.5
0.0	

4.2. Frequency selections by Eq band

LF1 (Hz)	LF2 (Hz)	HF1 (Hz)	HF2 (Hz)
19	21	617	665
22	24	727	787
26	29	862	937
31	34	1k	1k1
37	41	1k2	1k3
43	48	1k4	1k5
51	57	1k7	1k8
60	67	2k0	2k2
71	79	2k4	2k6
84	92	2k8	3k0
98	108	3k3	3k6
114	126	3k9	4k2
134	148	4k6	5k0
158	173	5k4	5k9
185	203	6k4	7k0
218	240	7k6	8k2
258	280	9k0	9k7
305	332	11k	12k
364	400	13k	14k
435	477	17k	19k
530	572	24k	27k

5. CONNECTORS

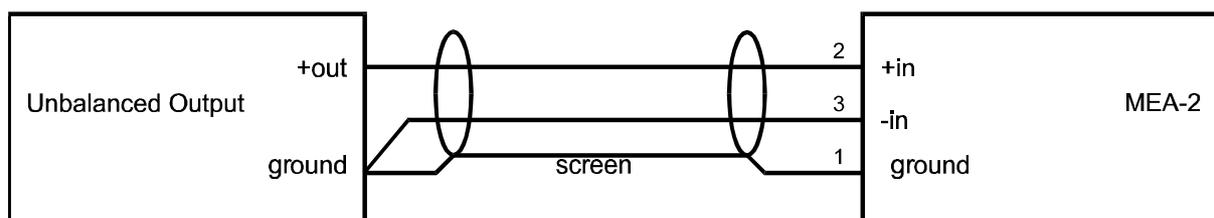
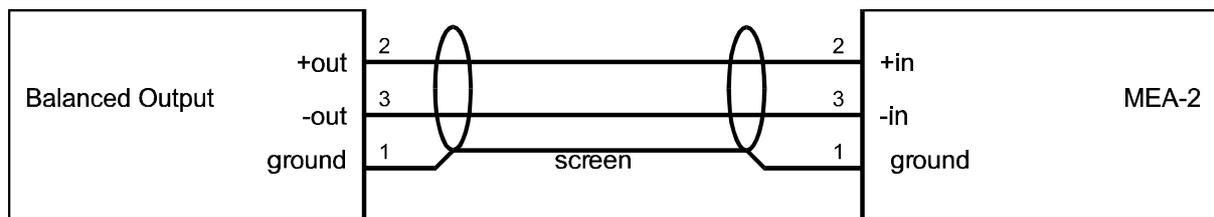
For this equipment, the convention for balanced XLR connections pin 2 is 'hot' or '+' and pin 3 'cold' or '-'. Some users and equipment implement the opposite. This should not be problematic providing a consistent implementation is used throughout.

Note: When interfacing to other devices such as A/D and D/A converters it may be necessary to check the manufacturers polarity convention if the correct absolute phase is to be maintained. However, this does not affect use of the MEA-2 with either polarity convention.

Balanced analogue audio connections should use a good-quality screened twisted-pair lead. Unbalanced connections must also be screened.

5.1. Input connections

The following diagrams illustrate correct connection for balanced and unbalanced sources:

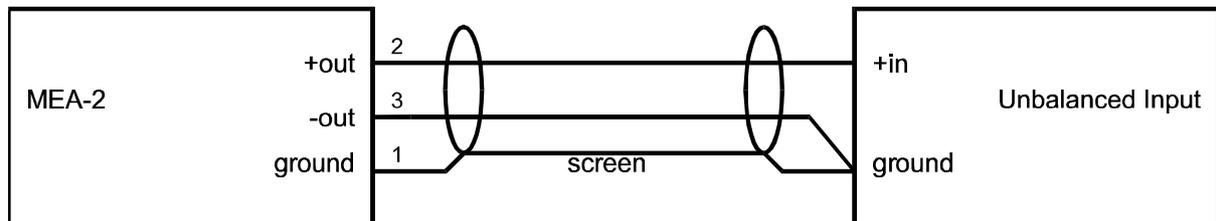
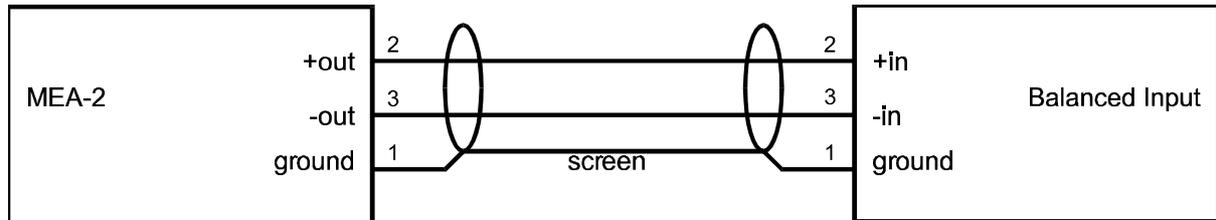


Using the above method when driving the MEA-2 with unbalanced sources should provide best results.

Note: The maximum input amplitude is reduced by approximately 6dB from the nominal +28dBu when driving the MEA-2 from an unbalanced source.

5.2. Output connections

The following diagrams illustrate correct connection for balanced and unbalanced sources:



Using the above method for driving unbalanced loads should provide best results. It employs 'Ground Loop Compensation' and the signal level remains unchanged compared to balanced operation.

Note: When driving unbalanced loads with the MEA-2 the maximum output level is reduced by approximately 6dB from the nominal +28dBu.

5.3. Rear panel connectors

A. Audio I/O

C Left Channel Input
C Left Channel Output

C Right Channel Input
C Right Channel Output

B. Earthing Stud - Link to a good-quality ground connection by the most direct route.

C. IEC Mains Inlet (Switched).

6. SPECIFICATION

6.1. Analogue inputs

The analogue inputs are on a three pin XLR connector with positive and negative signal polarities on pins 2 and 3 respectively, and screen on pin 1. Pins 2 & 3 have a high impedance path to the chassis earth.

Differential input impedance:	27 kS(*)	(pin 2 to pin 3)
Single-ended input impedance:	27 kS(*)	(pin 1 to 2 or 3)
Coupling impedance to chassis:	1.0 MS	(chassis/pin 1 to 2 or 3)
Common-mode range:	20 Vrms	

* Note : Some earlier units are 38.4 kS

6.2. Analogue outputs

The analogue outputs are on a three pin XLR connector with positive and negative signal polarities on pins 2 and 3 respectively, and the mid-point on pin 1.

Differential output impedance:	62 S	(pin 2 to pin 3, balanced)
Single-ended output impedance:	31 S	(pin 1 to 2 or 3, unbalanced)

6.3. Performance specification

Specifications quoted in this section are to AES17-1991 (ANSI S4.51-1991) [Ref. 1], with input level set to +22dBu except where stated. For 'EQ in' measurements, the CH1/CH2 'In' buttons are illuminated and other settings are : LF1 - Shelf, LF2 - Bell, slope 9, HF1 Bell, slope 9, HF2 Shelf. Gain for each section is set to 0dB.

Maximum input amplitude :	+28dBu
Output noise :	EQ out < -97dBu EQ in < -89dBu
Frequency response :	+ 0.1, -0.4dB, <1Hz to > 50 kHz
Crosstalk :	less than -100 dB, 20 Hz to 20 kHz Un-driven input terminated 150R
Harmonic distortion and noise, EQ in :	<-105dB (<0.0006%), 997 Hz
Dynamic range : (Measured at -32dBu)	EQ out > 125dB EQ in > 117dB

6.4. Servicing and repair

There are no user serviceable parts inside this unit. Repairs should only be undertaken by qualified electronics technicians or engineers.

6.5. Mains transformer voltage selection

The mains transformer has a tapped primary to allow operation at nominal voltages of 120V or 240V. A rear-panel slide switch selects the mains voltage range. Ensure that the correct voltage range is selected before using the MEA-2.

- 6.5.1. Mains voltage range : 90-130V (nominally 120V) or 180-260V (nominally 240V) operation. The selected supply voltage range is indicated on the rear panel slide switch.
- 6.5.2. Power consumption : 15W max.

6.6. Fuse

There is one mains fuse, accessible externally in the IEC320 mains inlet. If this fuse is blown it should be replaced by an identical value and type. (20x5mm 250V 315mAT (anti-surge, slow)).

6.7. Earthing

The unit has an internal link connecting the audio ground to the chassis. A chassis earth stud is provided on the rear of the unit.

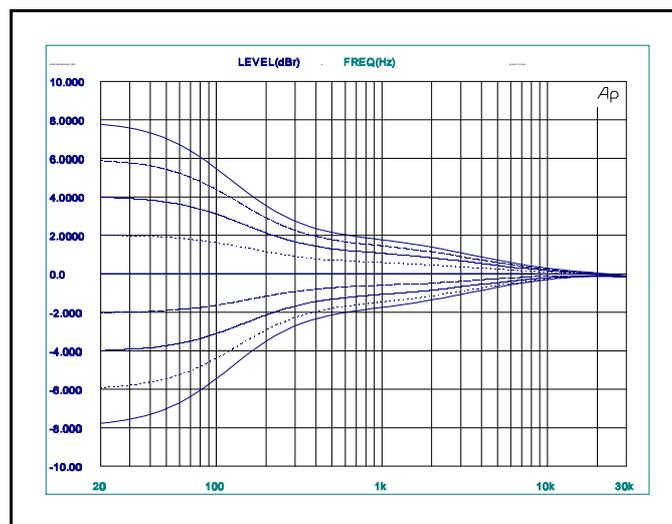
6.8. Physical dimensions

Weight : 11 lb (5 kg)
Width : 19 inch (483mm) (rack-mountable)
Height : 3U (77mm)
Depth : 10.5 inches (267mm) front face to rear face. (Add clearance for connectors)

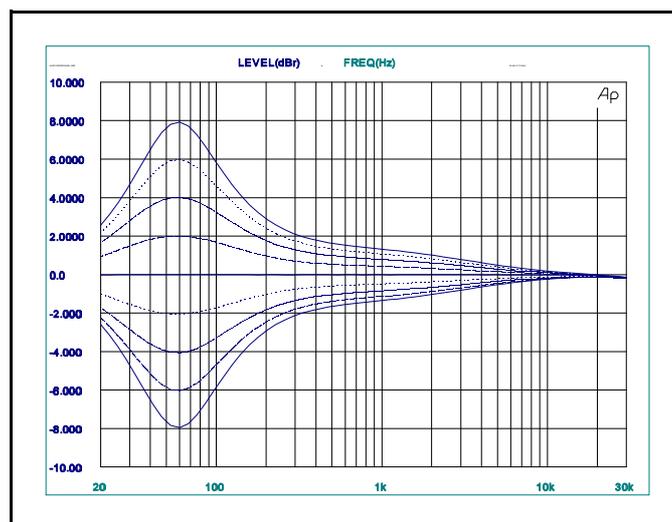
7. EQUALIZER RESPONSE CURVES

The following plots are samples of the responses of the MEA-2 equalizer. All section types are represented, but for brevity only a small selection of the total number of possible settings are included.

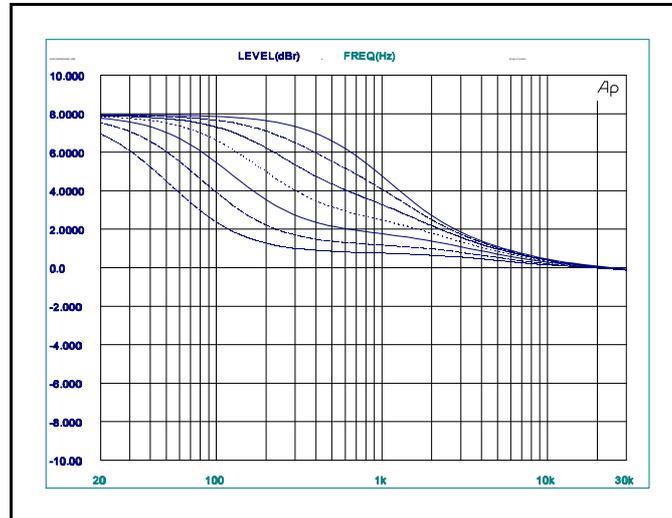
7.1. Range of cut/boost for 60Hz shelf on LF1



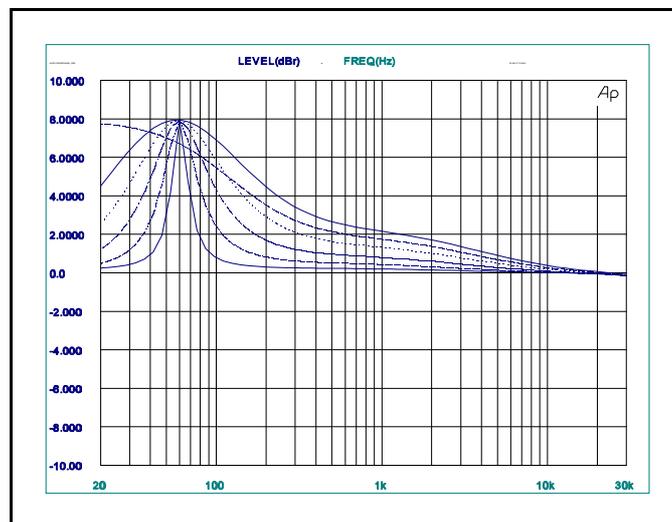
7.2. Range of cut/boost for 60Hz bell curve on LF1



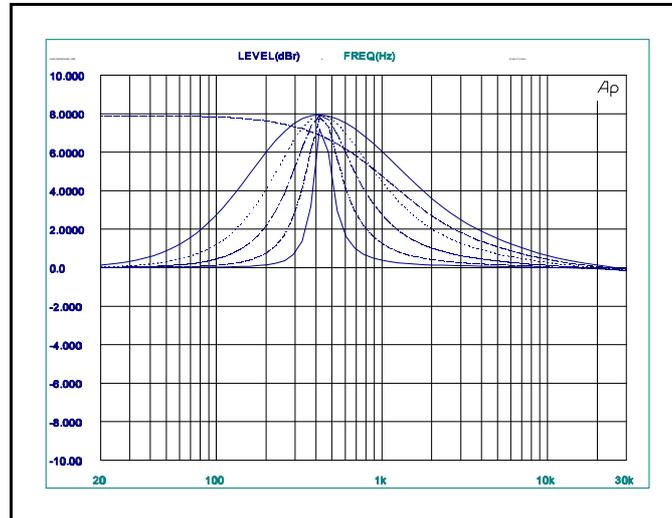
7.3. Range of frequency for +8dB shelf on LF1



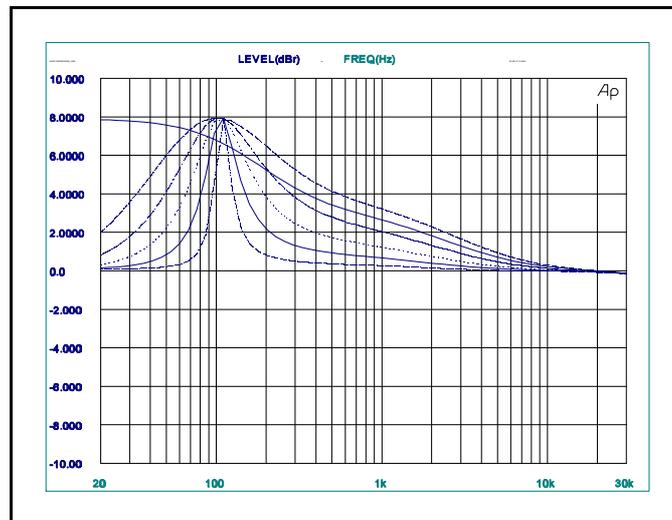
7.4. Range of bandwidths for +8dB 530Hz bell on LF1



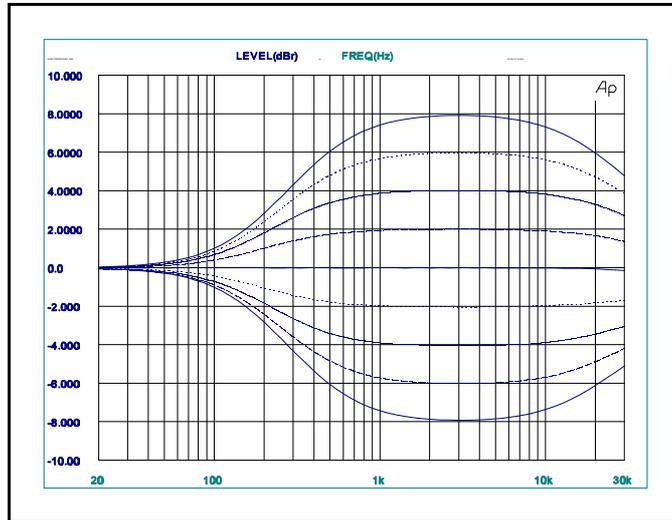
7.5. Range of bandwidth and shelf curve at 435Hz on LF1



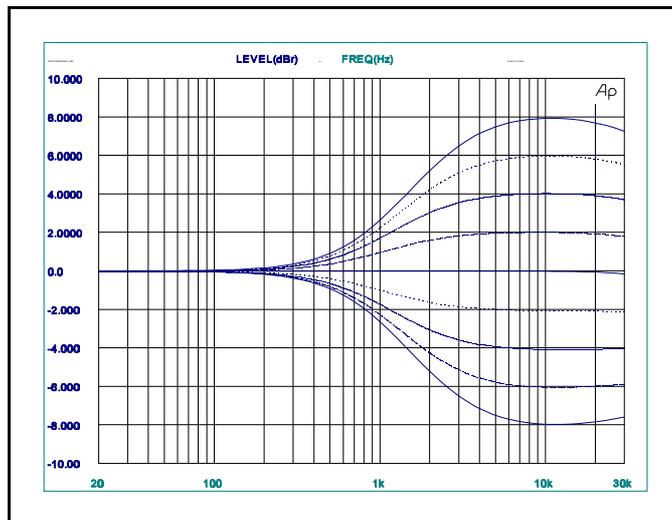
7.6. Range of bandwidth and shelf curve at 108Hz on LF2



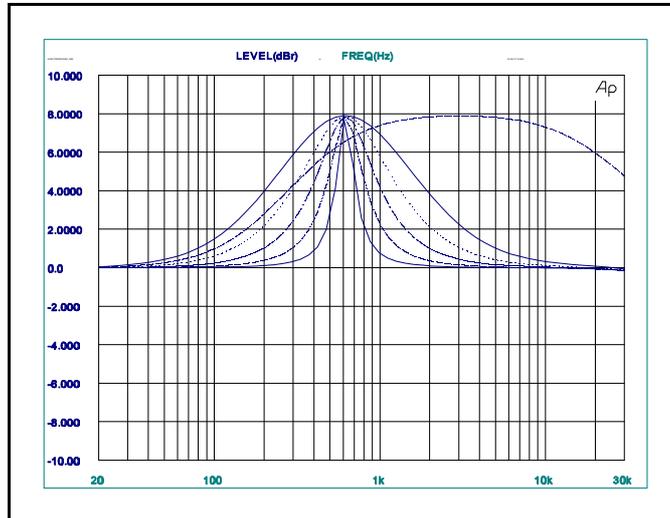
7.7. Range of boost/cut for 617Hz shelf on HF1



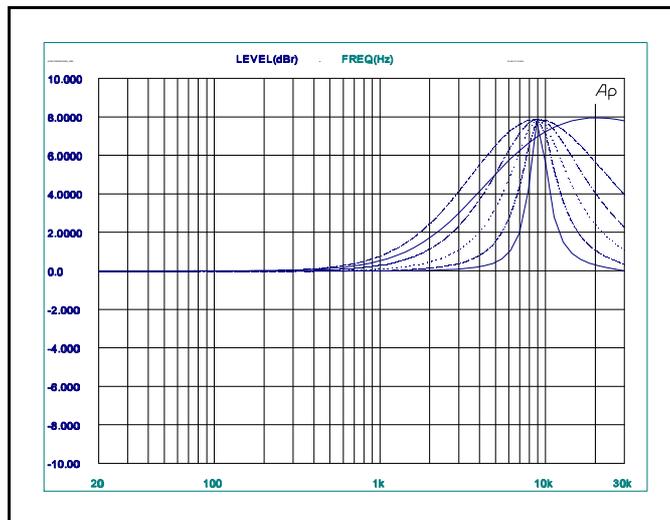
7.8. Range of boost/cut for 3300Hz shelf on HF1



7.9. Range of bandwidth plus shelf curve at 617Hz on HF1



7.10. Range of bandwidth plus shelf curve at 9000Hz on HF1



8. ELECTROMAGNETIC COMPATIBILITY

This equipment is intended for use in an electromagnetically controlled environment. To maintain the performance specification it should not be subject to strong magnetic fields (such as in the immediate vicinity of a power amplifier or cathode ray tube) and all connections should be terminated as described below. This equipment does not include digital circuitry or generate high-frequencies that could be radiated or conducted from the unit.

All XLR connections should use a screened twisted pair cable with the screen connected to pin 1 of the XLR connector at both ends.

9. REFERENCES

- [1] AES17-1991 - 'AES Standard Method for Digital Audio Engineering - Measurement of Digital Audio Equipment' *J. Audio Eng. Soc.*, Vol. 39 No. 12, pp 961-975 (December 1991)

FURTHER INFORMATION

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