

JBL M2 SPEAKERS

Crossover and Filters Implementation on ISP & I.ISP



STORM|AUDIO



INTRODUCTION

StormAudio processors and integrated processors (ISP and I.ISP) allow for the complete management of crossover and filters of multiway active speakers. They offer no less than 20 filters cells per channel that can freely be used to implement Shelving, Bell, Low Pass or High Pass filters types, as well as the required individual and accurate delay adjustment. Any speaker can be defined as a mutiway speaker using StormAudio user friendly Web User Interface.

Below description and configuration is based on ISP & I.ISP firmware revision 3.5r3 and onward.

STORMAUDIO BELL FILTER DEFINITION

In the audio processing world, the definition of the Bell filter with a center frequency (F_c), a quality factor (Q) and a gain (G) is well established. Nevertheless, the interpretation of these parameters can lead to various response when integrated in a digital signal processor. Indeed, there are different standards used to interpret them and one must carefully check whether the parameters given match the processor implementation.

As a prerequisite, we invite you to consult the dedicated technical bulletin clarifying the StormAudio Constant-Q Bell Filter definition available in our website Client Portal (<https://www.stormaudio.com/en/private-access/login.html>) Documents area, as this will not be covered here.

Additionally, StormAudio post-processor works at a fixed 48 kHz Sampling Rate, any incoming signal being accurately resynchronized to a local high precision low jitter clock, thus providing outstanding clarity and precision in the rendering.

JBL M2 SPEAKER CROSSOVERS AND FILTERS

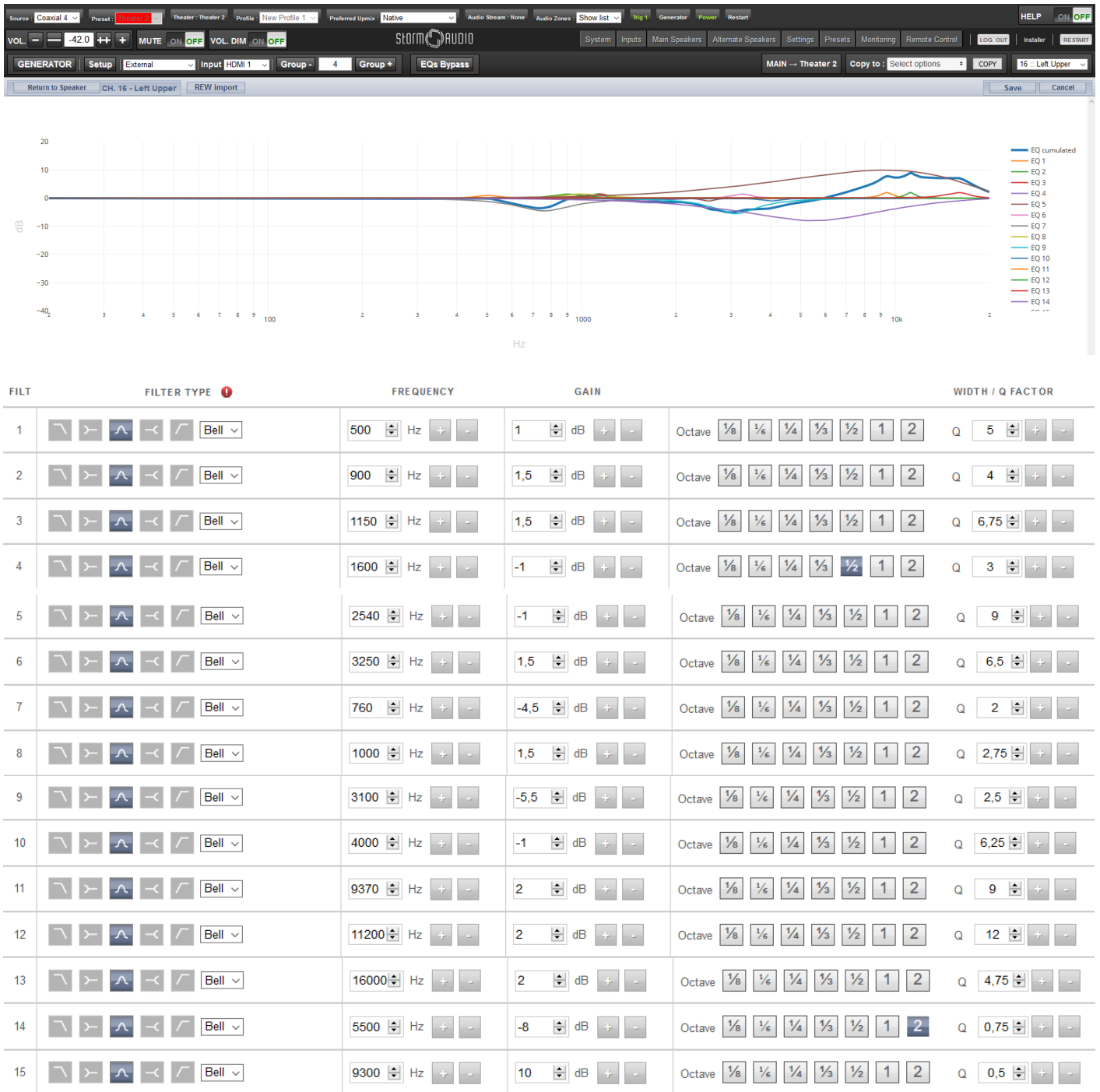
JBL M2 are famous monitoring speakers used in High End Theaters, requiring active corrections. This document presents the crossover settings based on the original Crown DSP amplifier for the JBL M2 loudspeaker, summarized by Thomas Drugeon in his document "JBL M2 active crossover settings" and adapted to StormAudio ISP & I.ISP. We replicated as closely as possible behaviour of the original settings and have them verified through measurements.

CROSSOVER, DELAY & GAIN

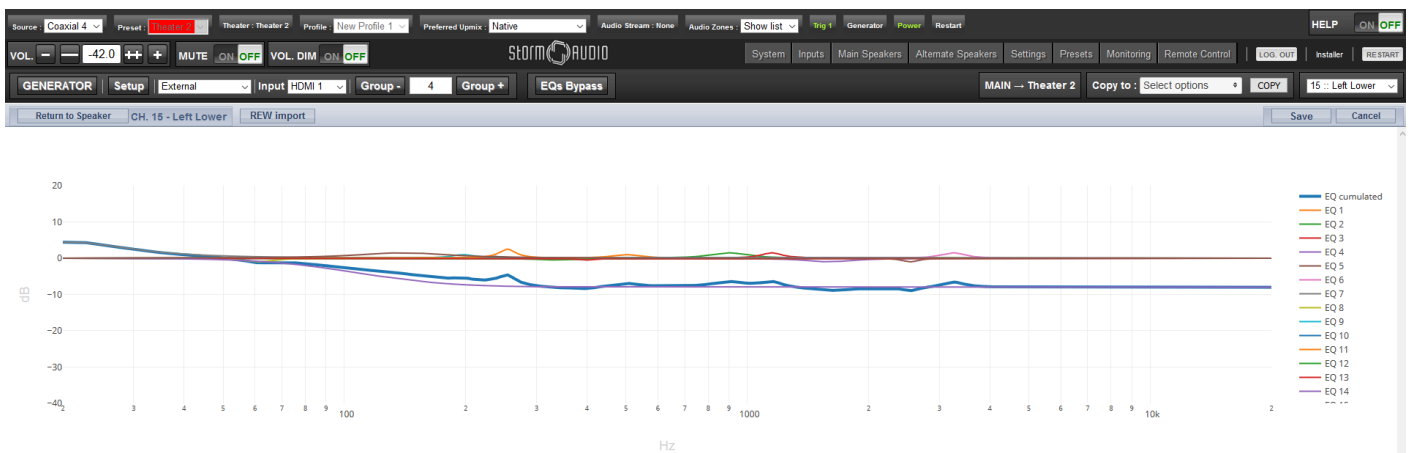
The crossover, delay & gain should be adjusted according to below screenshot of ISP WebUI while editing the Theater in the Speakers Tab.

Channels				Multiway Management			Delay	Level
Ch.	Status	EQ	Signal	Channel Name	Crossover		Distance	Level +0 dB Gain
16	On	On	LF	Left Upper	High	LPF 0 Hz HPF 782 Hz BT 6	4.000 m	-0.6 dB
15	On	On	LF	Left Lower	Low	LPF 790 Hz LR 36 HPF 0 Hz	4.093 m	0.0 dB
14	On	On	RF	Right Upper	High	LPF 0 Hz HPF 782 Hz BT 6	4.000 m	-0.6 dB
13	On	On	RF	Right Lower	Low	LPF 790 Hz LR 36 HPF 0 Hz	4.093 m	0.0 dB

UPPER EQ SETTINGS

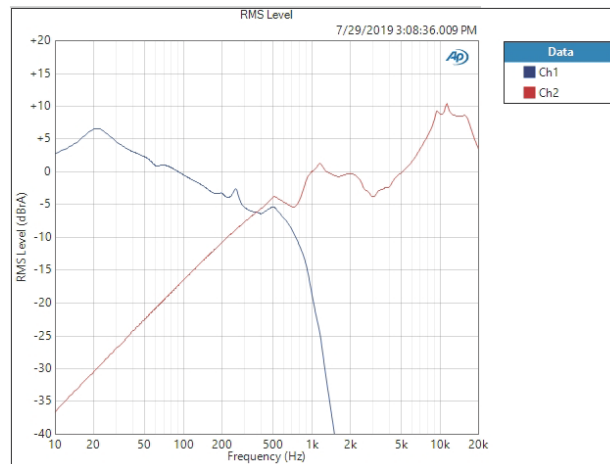


LOWER EQ SETTINGS



FILT	FILTER TYPE	FREQUENCY	GAIN	WIDTH / Q FACTOR
1	Bell	500 Hz	1 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 5
2	Bell	900 Hz	1.5 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 4
3	Bell	1150 Hz	1.5 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 6.75
4	Bell	1600 Hz	-1 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 3
5	Bell	2540 Hz	-1 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 9
6	Bell	3250 Hz	1.5 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 6.5
7	Bell	21 Hz	4.5 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 1.25
8	Bell	61 Hz	-1 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 5
9	Bell	197 Hz	1 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 6
10	Bell	236 Hz	0.5 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 6.5
11	Bell	254 Hz	2.5 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 8.5
12	Bell	340 Hz	-0.5 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 3
13	Bell	400 Hz	-0.5 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 7.25
14	High Shelf	135 Hz	-8 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 0.25
15	Bell	140 Hz	1.5 dB	Octave 1/8 1/6 1/4 1/3 1/2 1 2 Q 1.5

MEASURED CORRECTION AT THE OUTPUT OF ISP



MEASURED CORRECTED RESPONSES: JBL SDA VS STORMAUDIO ISP WITH CORRECTION ACTIVE IN A STANDARD ROOM

Measurement comparison between: - green: JBL SDA EQ + Crossover, - red: StormAudio ISP EQ + Crossover approximation

