



OPTIMIZING SYSTEM PERFORMANCE WITH THE 112.HSB

The One Systems 112.HSB is a 12-inch (305 mm) subwoofer / bass module designed to augment the low-end response of all variants of One Systems full-range speakers including the 104, 106, 108, 208, 112 and 212 models.

There are two basic system configurations for using the 112.HSB: 1). As a “classic” subwoofer or 2). In an “overlap” mode that can double the system’s acoustic output from 50 Hz to the upper overlap frequency range of 80 Hz - 120 Hz.

All of the small and medium-format speakers - the 104, 106, 108 and 208 models - should be used with the 112.HSB in the “classic” subwoofer mode only.

The “overlap” mode is most suited for using the subwoofer with the 112 and 212 models to maximize low-frequency output and to improve the system’s very low-frequency polar control.

Recommended processor settings are shown for the “classic” subwoofer mode and for the “overlap” mode. Both configurations require use of a DSP-based loudspeaker system processor and two amplifier channels (bi-amplification). An analog crossover may be used for the “classic” subwoofer mode, but only a DSP-based processor may be used for the “overlap” mode.

“CLASSIC” SUBWOOFER MODE				
	<i>Parameter</i>	<i>Frequency</i>	<i>Filter Alignment</i>	<i>Sub Channel Gain</i>
112.HSB Output	High-Pass Filter	45 Hz	4th order Butterworth	Set to personal taste
	Low-Pass Filter	80 Hz - 120 Hz	4th order Linkwitz-Riley	
Parametric Filter Settings for sub	PEQ 1	60 Hz	PEQ Gain = + 4 dB	PEQ Bandwidth = 0.3 octave
	PEQ 2	80 Hz	PEQ Gain = +2.5 dB	PEQ Bandwidth = 0.3 octave
Output for Full-Range Speaker	High-Pass Filter	80 Hz - 120 Hz (same as low-pass filter setting for sub)	4th order Linkwitz-Riley	n.a.
Parametric Filter Settings	Use the recommended settings for the specific One Systems model being used			
Any parametric EQ used on the output for the full-range speaker should use the specific parameters recommended for the model being used. Any EQ recommendations with center frequencies below the high-pass filter frequency should be set to 0 dB (not used).				

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As noted, the "OVERLAP" Mode is best suited for using with 112 and 212 models with the 112.HSB subwoofer.

"OVERLAP" MODE				
	<i>Parameter</i>	<i>Frequency</i>	<i>Filter Alignment</i>	<i>Sub Channel Gain</i>
112.HSB Output	High-Pass Filter	45 Hz	4th order Butterworth	Set to personal taste
	Low-Pass Filter	80 Hz - 120 Hz	4th order Linkwitz-Riley	
Parametric Filter Settings for sub	PEQ 1	60 Hz	PEQ Gain = + 4 dB	PEQ Bandwidth = 0.3 octave
	PEQ 2	80 Hz	PEQ Gain = +2.5 dB	PEQ Bandwidth = 0.3 octave
Output for Full-Range Speaker	High-Pass Filter	45 Hz	4th order Butterworth	n.a.

In the "Overlap" mode, the acoustic summing of the low-frequency section (112.HSB output) will require delay applied to the full-range output. The specific amount of delay required will be based on the group delay associated with the low-pass filter of the 112.HSB's output, but also based on the physical location of the 112.HSB relative to the full-range speaker.

The recommended initial delay on the full-range output should be approximately 5 mSec to 6 mSec.

This value can be varied to achieve the best low-frequency summing. In general, the lower the frequency of the low-pass filter in the 112.HSB's output, the larger the required time delay on the full-range channel (Approximately 6 mSec for an 80 Hz low-pass frequency to 5mSec for a 120 Hz low-pass frequency). The delay should be applied to the full-range output! The delay value may require additional tuning based on the physical location of the two enclosures.



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DSP PARAMETERS FOR ONE SYSTEMS FULL-RANGE MODELS

Please note - the settings are identical for the HTH / HTC models and the previous IM Series versions of those models.

MODEL	104.HTH	106.HTH	108.HTC
High-Pass Filter:	Butterworth 24 dB	Butterworth 24 dB	Butterworth 24 dB
High-Pass Frequency:	70 Hz	70 Hz	70 Hz
Filter 1 Type:	PEQ	PEQ	PEQ
Filter 1 Frequency:	4,000 Hz	800 Hz	100 Hz
Filter 1 Bandwidth:	0.33 octave / Q = 4.3	0.33 octave / Q = 4.3	0.33 octave / Q = 4.3
Filter 1 Level (dB):	- 2.0 dB	- 2.0 dB	+ 3.0 dB
Filter 2 Type:	PEQ	PEQ	PEQ
Filter 2 Frequency:	2,500 Hz	1,000 Hz	125 Hz
Filter 2 Bandwidth:	0.33 octave / Q = 4.3	0.33 octave / Q = 4.3	0.33 octave / Q = 4.3
Filter 2 Level (dB):	- 2.0 dB	- 2.0 dB	+ 3.0 dB
Filter 3 Type:	Low Shelf	PEQ	PEQ
Filter 3 Frequency:	150 Hz	1,250 Hz	160 Hz
Filter 3 Bandwidth:	12 dB / octave	0.33 octave / Q=4.3	0.33 octave / Q = 4.3
Filter 3 Level (dB):	+ 3.0 dB	-2.0 dB	+ 3.0 dB
Filter 4 Type:		Low Shelf	PEQ
Filter 4 Frequency:		125 Hz	4,000 Hz
Filter 4 Bandwidth:		12 dB / octave	0.33 octave / Q = 4.3
Filter 4 Level (dB):		+3.0 dB	- 3.0 dB



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MODEL	108.HTH with ETS 60/40 Horn	108.HTH with ETS 105/60 Horn	208.HTC
High-Pass Filter:	Butterworth 24 dB	Butterworth 24 dB	Butterworth 24 dB
High-Pass Frequency:	65 Hz	65 Hz	65 Hz
Filter 1 Type:	PEQ	PEQ	PEQ
Filter 1 Frequency:	100 Hz	1,250 Hz	100 Hz
Filter 1 Bandwidth:	0.33 octave / Q = 4.3	0.33 octave / Q = 4.3	0.5 octave / Q = 2.87
Filter 1 Level (dB):	- 2.0 dB	- 2.5 dB	- 2.5 dB
Filter 2 Type:	PEQ	PEQ	
Filter 2 Frequency:	100 Hz	100 Hz	
Filter 2 Bandwidth:	0.5 octave / Q = 2.87	0.5 octave / Q = 2.87	
Filter 2 Level (dB):	+ 2.0 dB	+ 2.0 dB	



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For best results, use the “Overlap” mode when combining the 112 and 212 models with the 112.HSB subwoofer

MODEL	112.HTH with ET 60/40 Horn	112.HTH with ET 105/60 Horn	212.HC
High-Pass Filter:	Butterworth 24 dB	Butterworth 24 dB	Butterworth 24 dB
High-Pass Frequency:	50 Hz	50 Hz	55 Hz
Filter 1 Type:	PEQ	PEQ	PEQ
Filter 1 Frequency:	1,000 Hz	1,000 Hz	1,000 Hz
Filter 1 Bandwidth:	0.5 octave / Q = 2.87	0.4 octave / Q = 3.59	0.33 octave / Q = 4.3
Filter 1 Level:	- 2.0 dB	- 2.0 dB	- 2.5 dB
Filter 2 Type:	PEQ	PEQ	PEQ
Filter 2 Frequency:	65 Hz	65 Hz	70 Hz
Filter 2 Bandwidth:	0.33 octave / Q = 4.3	0.33 octave / Q = 4.3	0.33 octave / Q = 4.3
Filter 2 Level:	+ 3.0 dB	+ 3.0 dB	+ 2.0 dB
Filter 1 Type:			PEQ
Filter 1 Frequency:			3,000 Hz
Filter 1 Bandwidth:			0.33 octave / Q = 4.3
Filter 1 Level:			- 2.5 dB



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