FW15

15 inch Coaxial Cardioid Stage Monitor



Overview

The FW15 15 inch coaxial, passive cardioid stage monitor provides 6 dB of low frequency attenuation in the rear hemisphere and tour-grade output in a low-profile package. Its neodymium coaxial transducer and 75°x75° horn provide optimal coverage for monitoring applications, and its large-format 3 inch compression driver assures HF headroom. The coaxial design, coupled with Fulcrum's **TQ**™ DSP processing, allows stability and gain-before-feedback both on- and off-axis. The clarity and source separation of the FW15 allows performers to clearly distinguish their own voice and instrument amongst others. This capability benefits mix engineers as well as performers.

The FW15's enclosure includes 40° and 55° angles for downstage and upstage distances respectively. Its road-ready, ergonomic design includes stout double-grille construction, 4 input options positioned close to the stage to reduce the visual impact of connected cables, and integrated dual-grip handles to facilitate carrying and packing into road cases.

The FW15's unique **TQPassive**™ internal crossover is designed to work in conjunction with **TQ**™ processing. It provides the high efficiency, excellent damping, and precise directional control normally associated with bi-amplified operation, but it does not require a second amplifier and processor channel. There are no resistive components in the crossover to heat up, so its response remains consistent even at high levels.

The FW15's high performance, aesthetic appeal, and cost effective operation makes it a compelling choice for A/V rental companies, live performance venues, corporate A/V, nightclub PA, theatrical productions, and more.

Performance Specifications[1]

Operating Mode
Single-amplified w/ DSP

Operating Range [2]
67 Hz to 19 kHz

Nominal Beamwidth
75° x 75°

Transducers
HF/LF: Coaxial 3.0" titanium diaphragm compression driver; 15.0" woofer, 3.5" voice coil; single neodymium magnet

Power Handling @ Nominal Impedance [3]
63 V / 500 W @ 8 Ω

Nominal Sensitivity @ Input Voltage [4] (whole space)
102 dB @ 2.83 V

Nominal Maximum SPL (peak / continuous)
135 dB / 129 dB

Equalized Sensitivity @ Input Voltage [5]
99 dB @ 2.83 V

Equalized Maximum SPL [6] (peak / continuous)
132 dB / 126 dB

Recommended Power Amplifier
500 W to 1000 W @ 8 Ω

Physical Specifications

Connections
(4) Neutrik NL4 Speakon
Pin 1+/-: Full Range
Pin 2+/-: No Connection

Mounting / Suspension Points
None

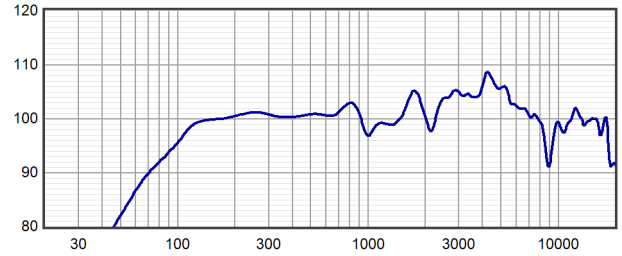
Dimensions / Weight
See page 6

Finish
Black painted enclosure w/ matte black dual-layer grille

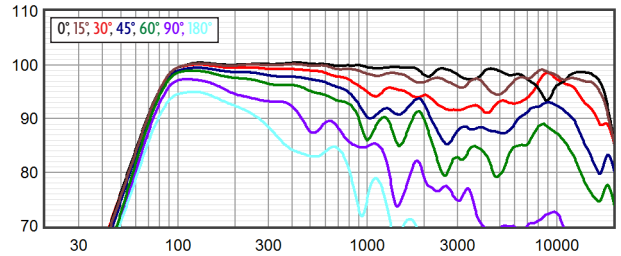
Options

White or custom color finish

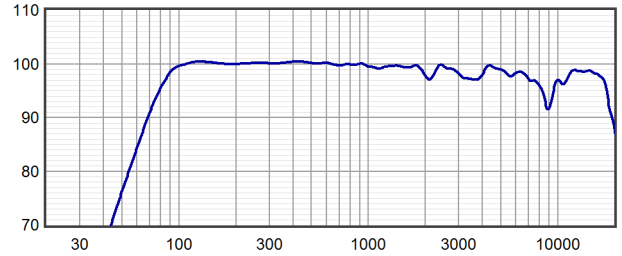
Axial Sensitivity (dB SPL, 2.83 V @ 1 m)[7, 8]



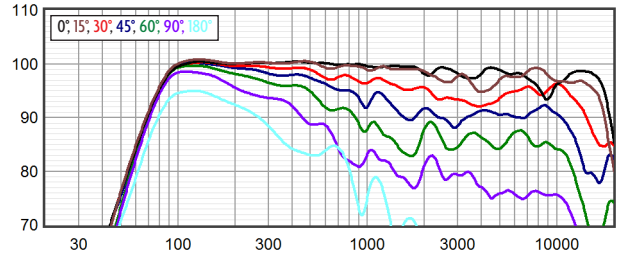
Horizontal Off Axis Response[7, 11]



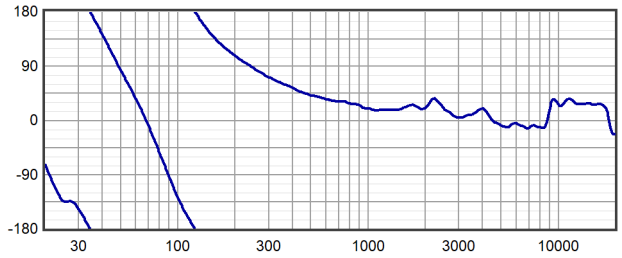
Axial Processed Response (dB)[7, 9]



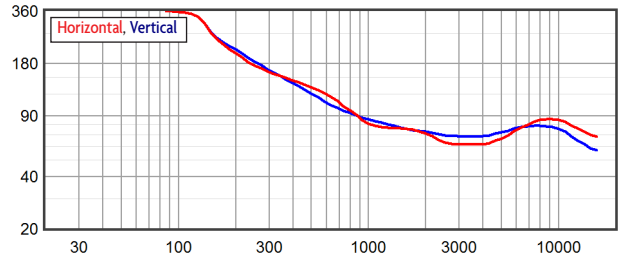
Vertical Off Axis Response[7, 11]



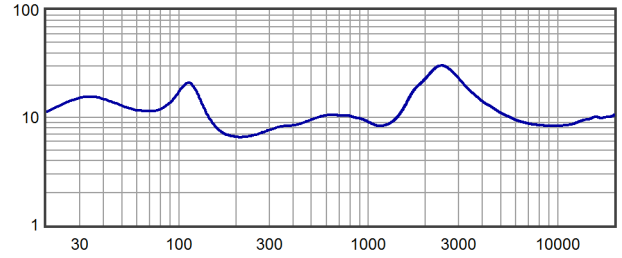
Axial Processed Phase Response (degrees)[7, 10]



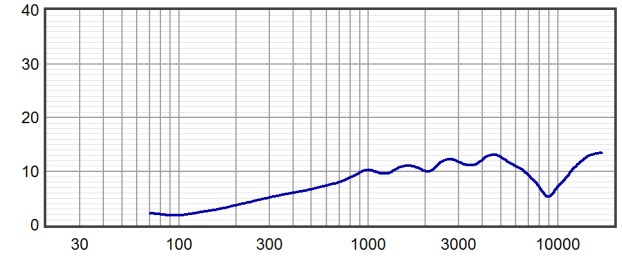
Beamwidth[7, 12]



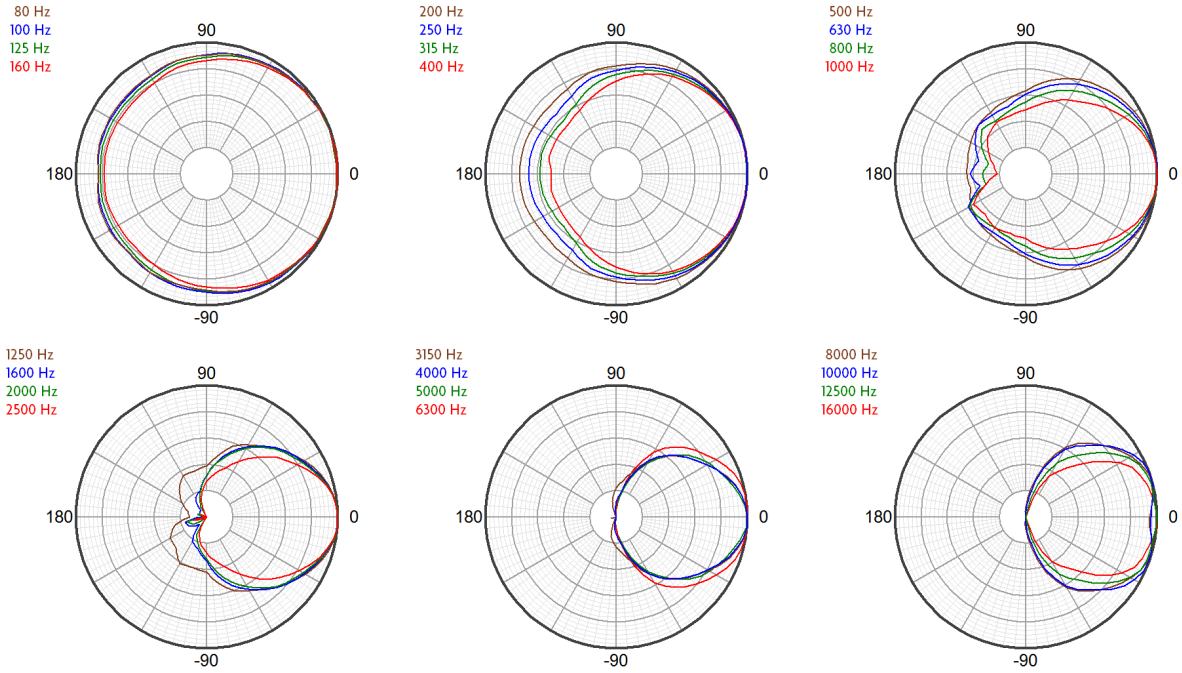
Impedance (ohms)



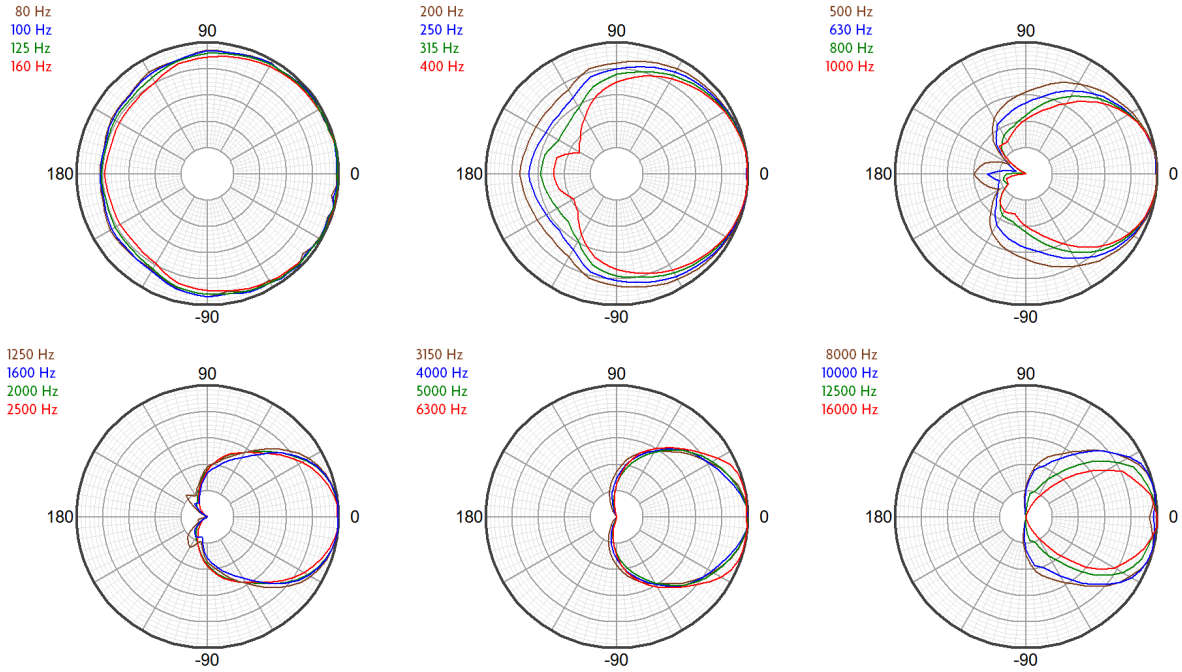
Directivity Index (dB)[13]



Horizontal Polar Response (30 dB Scale, 6 dB per Major Division)



Vertical Polar Response (30 dB Scale, 6 dB per Major Division)



Technologies

The FW15 incorporates Fulcrum's patented Passive Cardioid Technology™ to overcome one of the major challenges of other loudspeakers: rear LF radiation. Unlike active cardioid loudspeakers, Fulcrum's passive cardioid technology does not require an additional amplifier channel or additional transducer to achieve its 6 dB of rear rejection.

The cardioid behavior is produced by a meticulously conceived acoustical circuit which balances the position of the low frequency driver, the enclosure depth and volume, and specially constructed side-mounted ports which include a calibrated resistive element. By opting for a subcardioid pattern as opposed to a pure, hyper or super cardioid pattern, the attenuation is more consistent over the rear hemisphere, and low frequency efficiency is preserved.

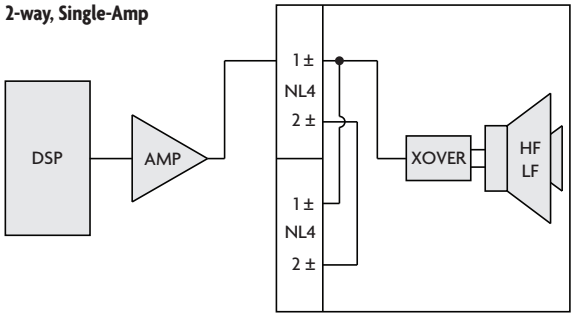
The proprietary horn employed in the FW15 represents a modern digital-signal-processing-aware update to the traditional horn-loaded coaxial loudspeaker concept. The well-known benefits of the coaxial approach have been realized without the familiar shortcomings of historical designs. Fulcrum Acoustic's **Temporal Equalization™ (TQ™)** digital signal processing techniques eliminate midrange colorations and high frequency harshness while producing a smooth, seamless coverage pattern through the crossover range.
In fact, the coaxial transducers were designed from the ground up to take advantage of the unique capabilities of **TQ™**.

The coaxial transducer in the FW15 includes a 3 inch diaphragm compression driver. The large diaphragm area permits the compression driver to operate at frequencies too low for smaller compression drivers to handle. This allows the high frequency horn to smooth the polar response of the low frequency section in the frequency range where the horn would otherwise cause shadowing. It also allows the compression driver to produce extreme sound pressure levels with an effortless sonic character.

The coaxial woofer's large radiating surface works in conjunction with the HF horn to improve directional control at the bottom of the horn's operating range, increasing directional control beyond what can be accomplished by the horn alone. The coaxial transducer's compact, neodymium magnet not only minimizes weight, but also allows very tight spacing between the compression driver and woofer voice coils. The delay between the driver outputs is thereby minimized, which allows the coaxial device to work well with a passive crossover.

Connection Diagram

2-way, Single-Amp



Mechanical Specification Drawings

2D and 3D DWG dimensional drawings are available for download at www.fulcrum-acoustic.com/resources

Notes

[1] **Performance Specifications** *All acoustic specifications rounded to nearest whole number. External DSP with Fulcrum Acoustic-provided settings is required to achieve the specified performance.*

[2] **Operating Range** *The frequency range within which the processed response is within 10 dB of the average.*

[3] **Power Handling** *Based on the AES power handling of the transducers.*

[4] **Nominal Sensitivity** *The 1-meter-referenced SPL produced by a 1 watt band limited pink noise signal, with no processing applied.*

[5] **Equalized Sensitivity** *The 1-meter-referenced SPL produced when an EIA-426-B signal is applied to an equalized loudspeaker system, at a level which produces a total power of 1 watt, in sum, to the loudspeaker subsections.*

[6] **Equalized Maximum SPL** *The 1-meter-referenced SPL produced when an EIA-426-B signal is applied to an equalized loudspeaker system, at a level which drives at least one subsection to its rated power.*

[7] **Resolution** *All response graphs are subjected to 1/6 octave cepstral smoothing with a gaussian weighting function.*

[8] **Axial Sensitivity** *The SPL plotted against frequency for a 1 watt swept sine wave, referenced to 1 m with no signal processing.*

[9] **Axial Processed Response** *The axial magnitude response with recommended signal processing applied.*

[10] **Axial Processed Phase Response** *The axial phase response with recommended signal processing applied, and latency removed.*

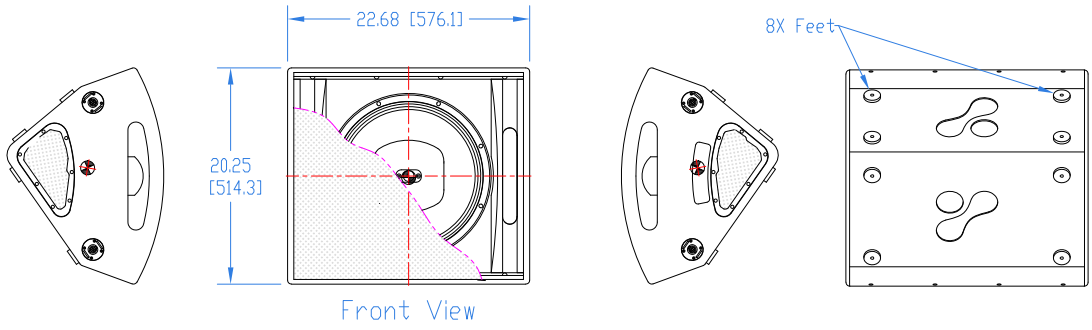
[11] **Horizontal / Vertical Off Axis Responses** *The magnitude response at various angles off axis, with recommended signal proceessing applied.*

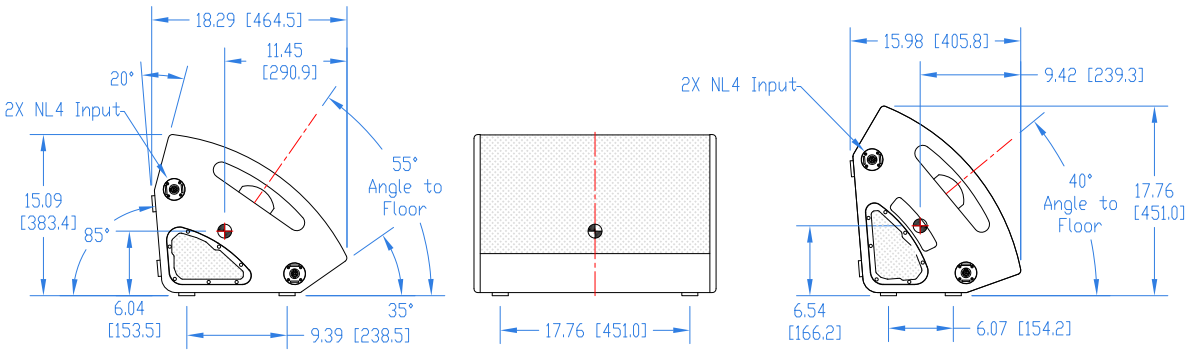
[12] **Beamwidth** *The angle between the -6 dB points in a loudspeaker's polar response.*

[13] **Directivity Index (D_i)** *The ratio of the on-axis sound pressure squared to the spherical average of the sound pressure squared at a particular frequency expressed in dB. To convert the directivity index to directivity factor (Q) use the formula* $10^{Di/10}$.

Notes:
1. Net Weight = Approx. 53.0 lb / 24.0 kg
2. Symbol ⊕ = CoG

REVISIONS		
REV	DESCRIPTION	APPR / DATE
1	NEW ISSUE	RAF 3/22/18
2	UDPATE WEIGHT	RAF 5/29/18
3	UPDATE NOTES	RAF 2/14/26





THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED: ALL DIMENSIONS ARE IN INCHES TOLERANCE IN INCHES .X±.1 .XX±.015 .XXX±.005 FRACTIONS ±1/32 ANGLES ±1/2° (X.XX) = REF DIMS NO TOLERANCE IMPLIED TSC = THEORETICAL SHARP CORNER DIMENSIONS ACROSS CENTERLINES TO BE SYMETRICAL	STATUS RELEASED	FULCRUM ACOUSTIC, LLC 1 MAIN STREET, WHITINSVILLE, MA 01588 USA
		APPROVALS / DATE	TITLE: Mechanical Spec. FW15
		DRAWN: DEW 3/26/18	
		CHECKED: RAF 3/26/18	
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