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JL AUDIO



How we play.®



C7





## C7: Speaker Components

The C7 project was directed by JL Audio's Chief Engineer and CEO, Lucio Proni, with a clear mission to create our finest-ever automotive component speakers. Challenging performance goals were established and the necessary resources were assigned to develop each C7 speaker as a clean-sheet design, optimized for car audio applications.

C7 design concepts were modeled and refined by JL AUDIO's powerful mechanical and Finite Element Analysis (FEA) modeling systems, including our proprietary Dynamic Motor Analysis (DMA) software. These studies led to innovative motor and suspension solutions, which were key to meeting the C7 design goals for smooth, off-axis response, dynamic stability and low distortion. Several generations of prototypes were evaluated using state-of-the-art measurement systems, testing for acoustical performance, power handling, mechanical reliability, and environmental stability.

No detail, material or design element went unexamined in each of the C7 speakers: from the exotic, corundum ceramic-coated diaphragm of the C7 tweeter, to the intricately machined motor plates of the C7 midrange, which significantly improve linearity. The specially engineered lead wires attach to the rear suspension to prevent noise, without damaging the spider

material's integrity. The woofer's dust cap went through ten prototype generations before arriving at the solution that resulted in the smoothest response and the best mechanical integrity. These details, and hundreds of others like them, simply had to be perfect for Mr. Proni and the design team to approve them and specify them for the C7 drivers.

What you will not find in the C7 line are passive crossover networks. We expect that C7 system designers will seek to avoid technical compromises, so we have designed C7 for use with active crossovers. A high quality DSP, such as the JL Audio TwK™ 88/ D8 is the best approach.

Using the guidelines provided for C7 setup as a starting point, the power of a DSP can be used to optimize the performance of the C7 speaker system to its specific application. The system designer can use delay, crossover parameters and precise equalization to adjust for speaker placement, cabin acoustics and target response. In the end, all these efforts lead to a spectacular musical presentation, easily exceeding the performance boundaries of typical, high-end, car audio speaker systems.

When you listen to C7, you will hear a level of resolution, precision and imaging that suspends disbelief, opening a window to an intensely pure audio experience.







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## C7-650cw: 6.5-inch (165 mm) Component Woofer



### C7-650cw Specifications

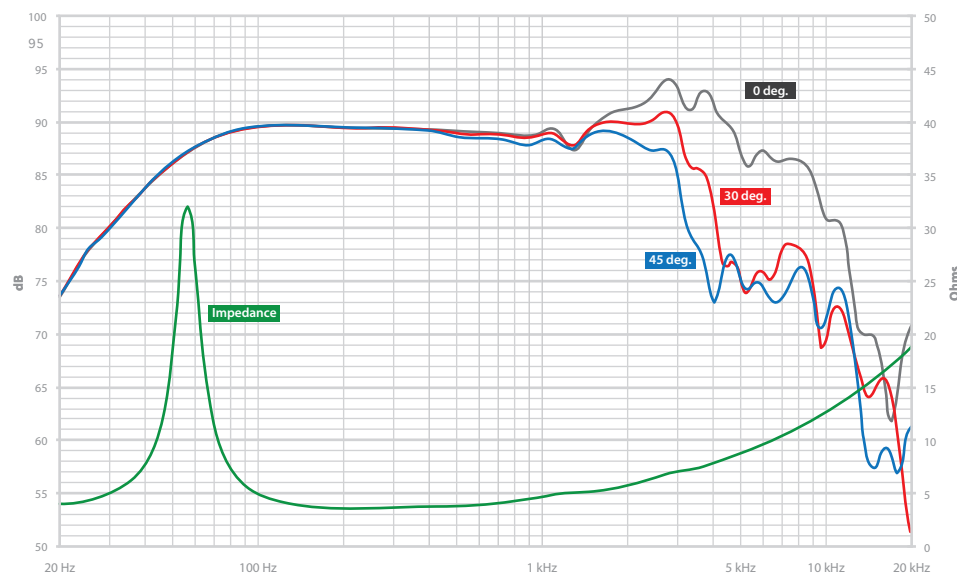
**Speaker Type:** Component Woofer  
**Nominal Diameter:** 6.5 in. (165 mm)  
**Design Bandwidth:** 50 Hz - 5 kHz  
**Nominal Impedance (Z<sub>nom</sub>):** 4 ohms  
**Continuous Power Handling:** 125W  
**Recommended Amplifier Power:** 50-175W  
**Net Weight:** 3.28 lbs. (1.49 kg)  
**Driver Rear Displacement:** 0.0135 cu.ft. (0.382 liters)  
**Min. Recommended Sealed Enclosure:** 0.424 cu.ft. (12 liters)

### Parameters:

**Voice Coil Resistance (R<sub>e</sub>):** 3.114 ohms  
**Free Air Resonance (F<sub>s</sub>):** 54.5 Hz  
**Reference Efficiency (η<sub>o</sub>):** 0.304%  
**Efficiency @ 1W/1m:** 87.0 dB SPL  
**Sensitivity @ 2.83V/1m:** 90.0 dB SPL  
**Electrical "Q" (Q<sub>es</sub>):** 0.669  
**Mechanical "Q" (Q<sub>ms</sub>):** 6.265  
**Total Speaker "Q" (Q<sub>ts</sub>):** 0.605  
**Equivalent Compliance (V<sub>as</sub>):** 0.461 cu.ft. (13.05 liters)  
**Moving Mass (M<sub>ms</sub>):** 17.679 g  
**Mechanical Compliance (C<sub>ms</sub>):** 0.000482 m/N  
**Magnetic Strength (BL):** 5.31 N/A  
**Effective Piston Area (S<sub>d</sub>):** 21.4 sq.in. (0.013807 sq. m)  
**One-Way Linear Excursion (X<sub>max</sub>):** 5 mm

### Please Note:

The specifications in this document are based on pre-production testing and are subject to change once production begins.



### DESIGN NOTES

**Cone and Dust Cap:** Vacuum-formed, mineral-filled polypropylene material offers excellent damping and low mass. The cone body features a gentle curvilinear profile to optimize response. A specially shaped dust cap attaches to the cone body and the voice coil former to improve high frequency behavior.

**Suspension design:** The moving assembly is suspended and damped via a large-diameter, linear profile spider formed from a Nomex®/polycotton blend, and a positive-roll, rubber surround. The two combine to provide optimum damping without prematurely restricting the C7-650cw's outstanding excursion capability.

**Motor Design:** The C7-650cw employs a high-density magnetic circuit with a high-grade Y35 Strontium-ferrite magnet, and a specially machined, T-Yoke motor topology. Motor magnetics have been precisely optimized utilizing advanced FEA tools to reduce distortion and provide linear motor force throughout the driver's performance range.

A 32 mm (1.27 inch) diameter, overhung voice coil is employed, wound with copper wire onto a fiberglass voice coil former. The oversized voice coil offers extended power handling capability, minimizing thermal compression and distortion at higher listening levels.

**Chassis Design:** A purpose-engineered cast alloy basket is employed, featuring thin spokes to maximize rear open area, and our Patented Elevated Frame Cooling technology.

### Design Bandwidth:

With 48 dB/octave filters: 50 Hz - 5 kHz  
With 24 dB/octave filters: 60 Hz - 5 kHz  
With 12 dB/octave filters: 70 Hz - 5 kHz

### Built in USA with Global Components

Sold individually, with a cast-alloy grille tray and a specially perforated steel grille insert.







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## C7-350cm: 3.5-inch (90 mm) Component Midrange



### C7-350cm Specifications

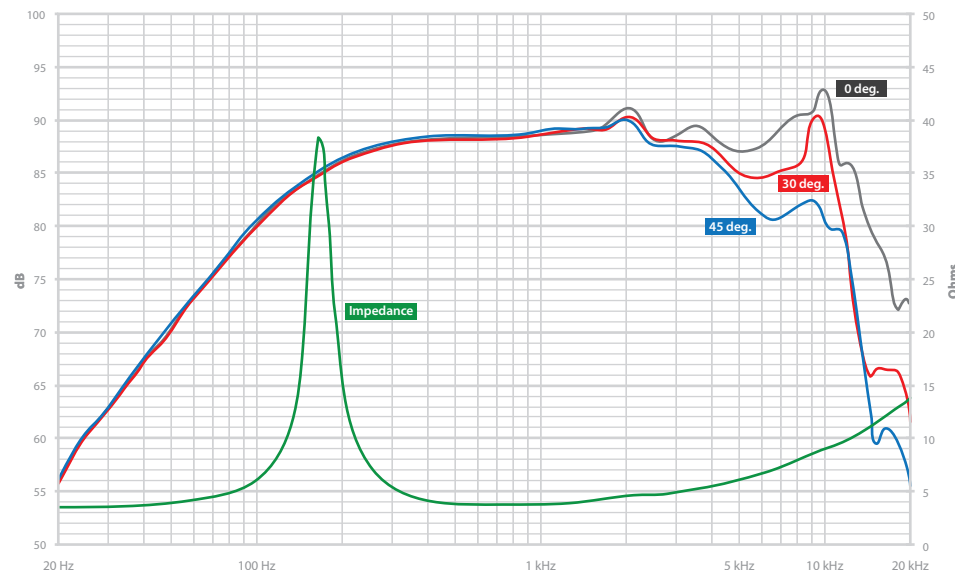
**Speaker Type:** Component Midrange  
**Nominal Diameter:** 3.5 in. (90 mm)  
**Design Bandwidth:** 300 Hz - 10 kHz  
**Nominal Impedance (Z<sub>nom</sub>):** 4 ohms  
**Continuous Power Handling:** 100W  
**Recommended Amplifier Power:** 50-150W  
**Net Weight:** 0.71 lbs. (0.32 kg)  
**Driver Rear Displacement:** 0.0024 cu.ft. (0.068 liters)  
**Min. Recommended Sealed Enclosure:** 0.014 cu.ft. (0.4 liters)

### Parameters:

**Voice Coil Resistance (R<sub>e</sub>):** 3.245 ohms  
**Free Air Resonance (F<sub>s</sub>):** 156.9 Hz  
**Reference Efficiency (no):** 0.270%  
**Efficiency @ 1W/1m:** 86.5 dB SPL  
**Sensitivity @ 2.83V/1m:** 89.5 dB SPL  
**Electrical "Q" (Q<sub>es</sub>):** 0.590  
**Mechanical "Q" (Q<sub>ms</sub>):** 6.454  
**Total Speaker "Q" (Q<sub>ts</sub>):** 0.541  
**Equivalent Compliance (V<sub>as</sub>):** 0.015 cu.ft. (0.430 liters)  
**Moving Mass (M<sub>ms</sub>):** 4.009 g  
**Mechanical Compliance (C<sub>ms</sub>):** 0.000257 m/N  
**Magnetic Strength (BL):** 4.66 N/A  
**Effective Piston Area (S<sub>d</sub>):** 5.31 sq.in. (0.003426 sq. m)  
**One-Way Linear Excursion (X<sub>max</sub>):** 1 mm

### Please Note:

The specifications in this document are based on pre-production testing and are subject to change once production begins.



### DESIGN NOTES

**Cone and Dust Cap:** Vacuum-formed, mineral-filled polypropylene material offers excellent damping and low mass. The cone body features a gentle curvilinear profile to optimize response. A concave dust cap further improves high frequency behavior.

**Suspension design:** The moving assembly is suspended and damped via a linear profile spider formed from a Nomex®/polycotton blend, and a positive-roll, rubber surround. The two combine to provide optimum damping without prematurely restricting excursion.

**Motor Design:** The C7-350cm employs a high-density magnetic circuit with a high-grade, neodymium magnet, and a specially machined, U-Yoke motor topology. Motor magnetics have been precisely optimized utilizing advanced FEA tools to reduce distortion and provide linear motor force throughout the driver's performance range.

A 36 mm (1.42 inch) diameter, overhung voice coil is employed, wound with copper-clad aluminum wire onto a fiberglass voice coil former. The oversized voice coil offers extended power handling capability, minimizing thermal compression and distortion at higher listening levels.

**Chassis Design:** A purpose-engineered cast alloy basket is employed, featuring thin spokes to maximize rear open area.

### Design Bandwidth:

With 48 dB/octave filters: 300 Hz - 6,000 Hz  
With 24 dB/octave filters: 400 Hz - 5,000 Hz  
With 12 dB/octave filters: 500 Hz - 4,000 Hz

### Built in USA with Global Components

Sold individually, with a cast-alloy grille tray and a specially perforated steel grille insert.











## C7-100ct: 1-inch (25 mm) Component Tweeter



### C7-100ct Specifications

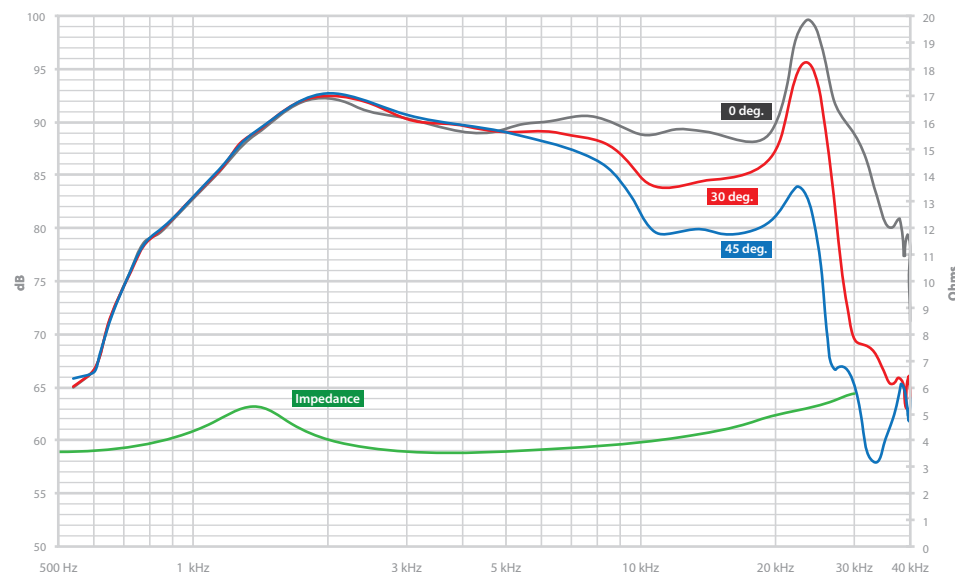
**Speaker Type:** Component Tweeter  
**Nominal Diameter:** 1 in. (25 mm)  
**Design Bandwidth:** 3 kHz - 30 kHz  
**Nominal Impedance (Znom):** 4 ohms  
**Continuous Power Handling:** 100W  
**Recommended Amplifier Power:** 50-150W  
**Net Weight:** 0.25 lbs. (110 g)

### Parameters:

**Voice Coil Resistance (Re):** 3.20 ohms  
**Free Air Resonance (Fs):** 1450 Hz  
**Reference Efficiency (no):** 0.267%  
**Efficiency @ 1W/1m:** 86.5 dB SPL  
**Sensitivity @ 2.83V/1m:** 89.5 dB SPL

### Please Note:

The specifications in this document are based on pre-production testing and are subject to change once production begins.



### DESIGN NOTES

**Dome Diaphragm:** Corundum ceramic coated aluminum alloy diaphragm exhibits high stiffness, very low mass and excellent environmental stability. It also helps the tweeter dome to hold its shape and operate as a true piston at higher frequencies, without a penalty in moving mass.

**Suspension design:** The diaphragm's motion is centered, sprung and damped by a treated silk, s-roll surround. Ferrofluid in the magnetic gap acts as a rear suspension element in this design. The two combine to provide optimum damping without unduly restricting excursion.

**Motor Design:** The C7-100ct employs a high-density magnetic circuit with a neodymium magnet and U-Yoke motor topology. An under-hung voice coil is employed, wound with copper-clad aluminum wire onto an aluminum voice coil former. Motor magnetics have been precisely optimized utilizing advanced FEA tools to lower even order distortion and IMD/AMD.

**Acoustical Design:** The shape of the tweeter housing is designed to boost sensitivity in a very specific bandwidth, helping to flatten the frequency response. It also provides improved control of directivity.

### Design Bandwidth:

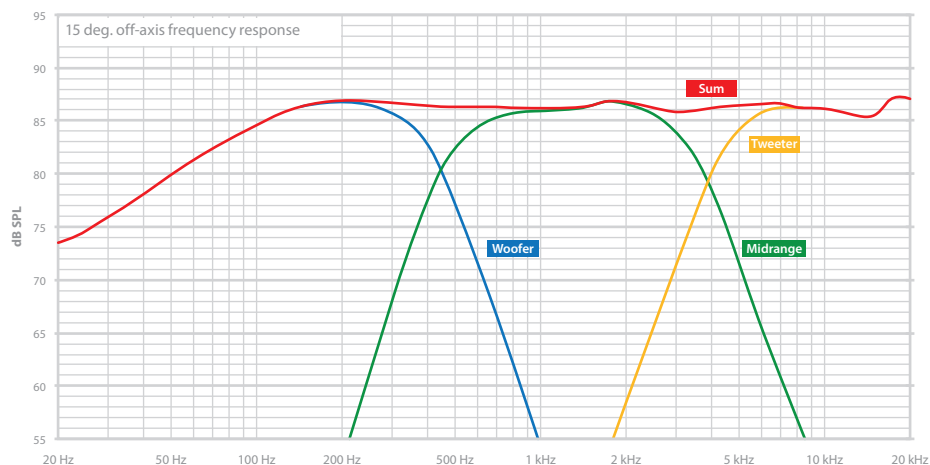
With 48 dB/octave filters: 3,000 Hz - 30,000 Hz  
With 24 dB/octave filters: 4,000 Hz - 30,000 Hz  
With 12 dB/octave filters: 5,000 Hz - 30,000 Hz

Sold individually, with flush and surface mounting fixtures and hardware. One tweeter protection capacitor is also included.





## C7: Sample Active Crossover Settings for 2-Way and 3-Way Systems



### C7 3-Way Speaker System

#### C7-650cw Woofer

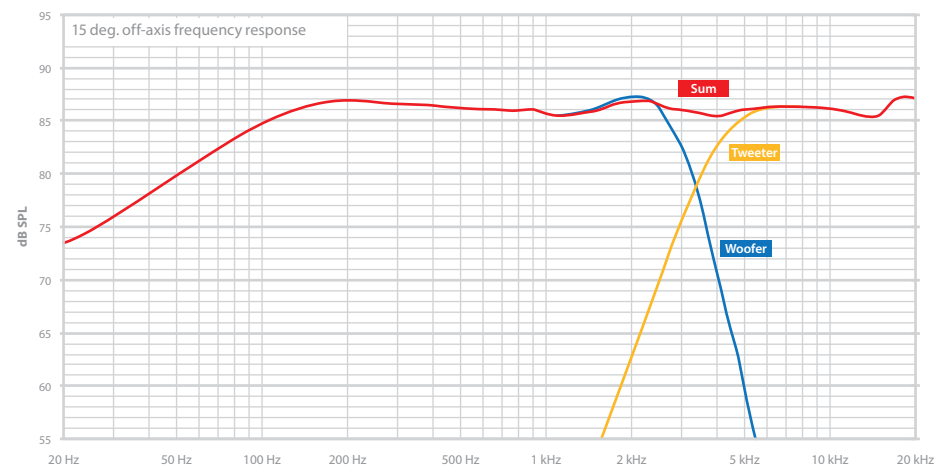
Low-Pass: 24 dB/octave Linkwitz-Riley @ 400 Hz  
Level Offset: 0 dB

#### C7-350cm Midrange

High-Pass: 24 dB/octave Linkwitz-Riley @ 480 Hz  
Low-Pass: 24 dB/octave Linkwitz-Riley @ 3500 Hz  
Level Offset: 0 dB

#### C7-100ct Tweeter

High-Pass: 24 dB/octave Linkwitz-Riley @ 4500 Hz  
Level Offset: -1.0 dB



### C7 2-Way Speaker System

#### C7-650cw Woofer

Low-Pass: 24 dB/octave Linkwitz-Riley @ 2700 Hz  
Level Offset: 0 dB

#### C7-100ct Tweeter

High-Pass: 24 dB/octave Linkwitz-Riley @ 4000 Hz  
Level Offset: -1.0 dB



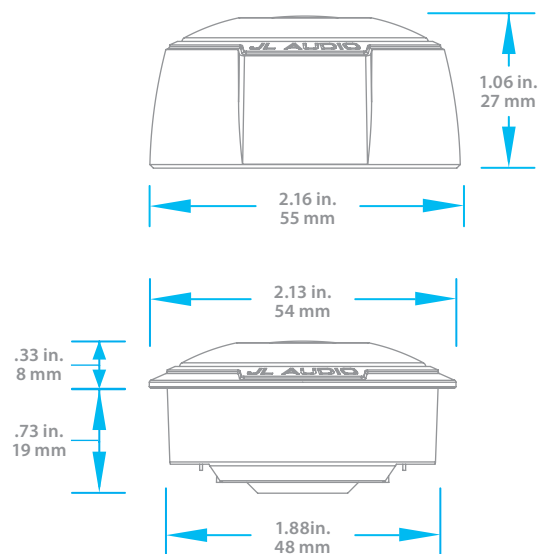
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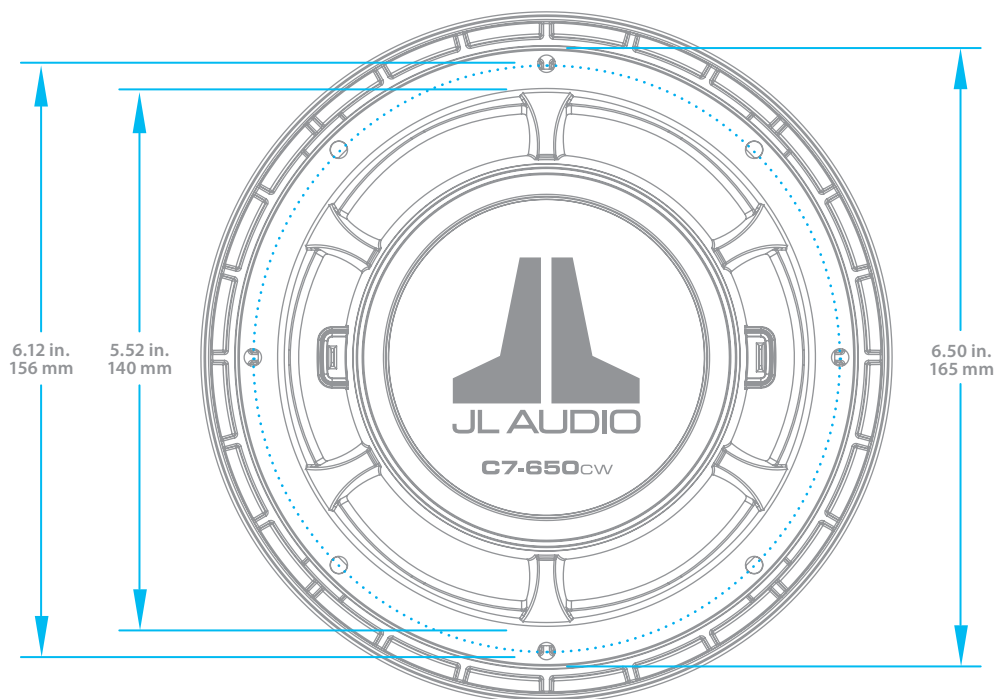
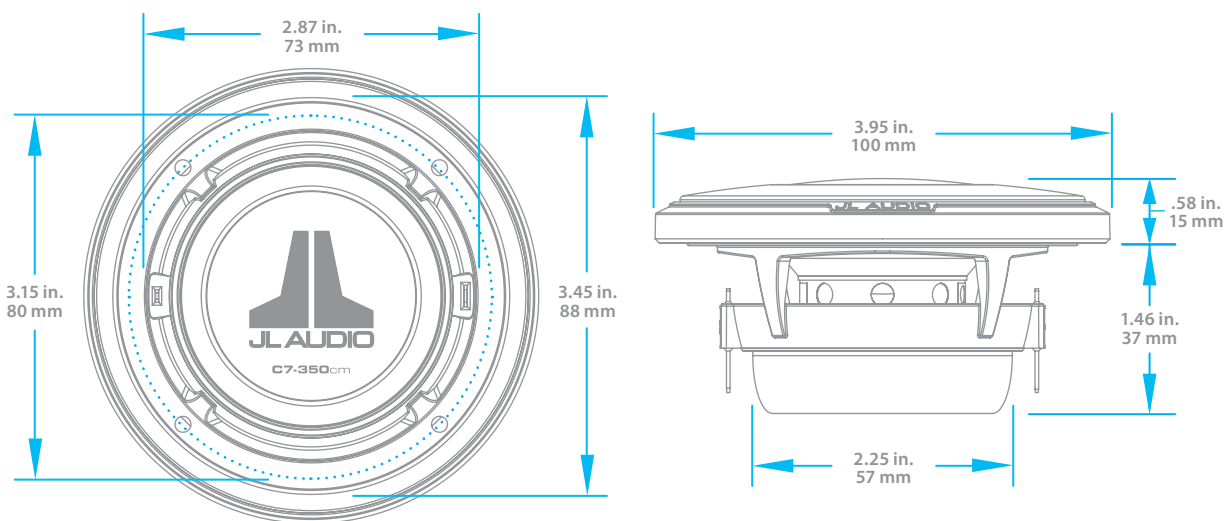




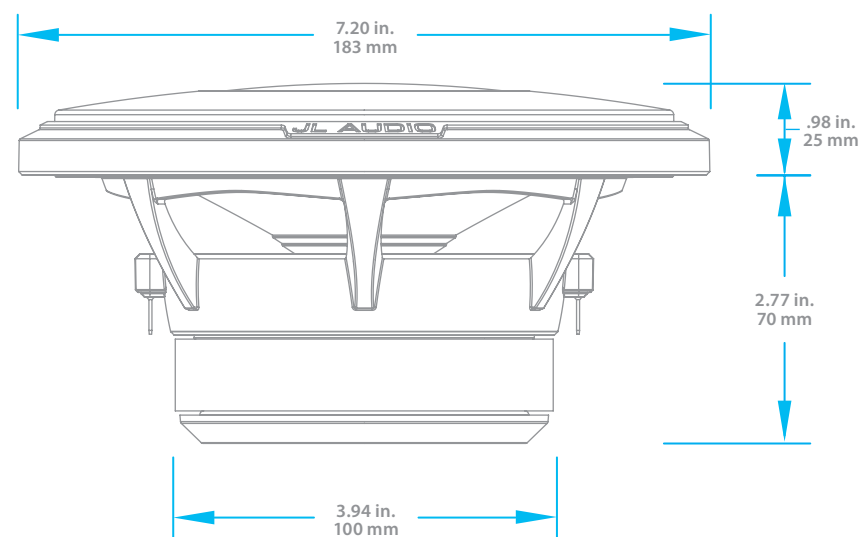
C7-100ct Dimensions



C7-350cm Dimensions



C7-650cw Dimensions





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