

# **CHALLENGE ELECTRONICS**

INDICATORS • SOUND TRANSDUCERS • MICROPHONES • SPEAKERS • ASSEMBLIES

## Short Form Component Catalog



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## ABOUT US

Challenge Electronics is an industry leading audible component, battery assembly supplier and partnered Original Design Manufacturer (ODM) for some of the world's largest Original Equipment Manufacturing (OEM) companies. Our products can be found in a variety of industries, including Medical, Fire & Safety, IoT and many more. We offer value-added engineering to deliver parts customized for design requirements and supply chain management to meet operational needs.



### Engineering Evolution

From initial concept design to Mass Production (MP), Challenge Electronics' extensive global engineering team combines innovative designs with industry knowledge to provide custom engineered components, tailored specifically to our customers' requirements.

Our components are cost-effective, rugged and proven high quality.

### Streamline Supply Chain

Our Supply Chain ships from global locations including Americas, Asia and Europe for both direct shipment and flexible consignment inventory. We work with franchised distributors to support local supply chain needs and streamline a fast sample turnaround timeline.

We support prototype sample runs for EVT, DVT and PDV builds and factory visits are welcome at any point.

Challenge Electronics does more than just providing components. We make sure the components are designed in right. With a skilled engineer assigned to each customer at no additional cost, we assist from start to finish during all product design phases.

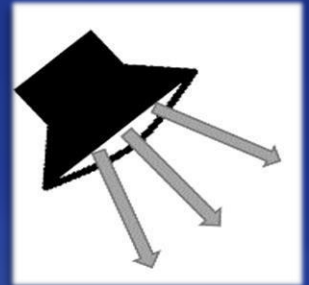


# Challenge Electronics Awarded Patent-Rights for PinPoint Alert Technology

Challenge Electronics PinPoint Alert System Technology has officially been patented under US Patent No. 10,522,008 B1

## *Q: What is Sound Localization?*

- **A: Sound Localization** is the ability for a listener to easily identify the origins of a sound
  - As the human auditory system registers *Sound Localization*, the audio signal "bends" in relation to:
    - Human Aural and Acoustic Cues
    - Direction of Generated Sound
    - Distance between Listener & Generated Sound
  - These "bent" signals create a **crisp, distinguishable acoustic tone** when compared to standard acoustic tones!



## *Q: Can I simply integrate PinPoint into my existing design?*

- **A: Yes! PinPoint Technology** can be synced into your existing product by utilizing:
  - ASIC: PinPoint software is deployed as an Application Specific Integrated Circuit for easy integration to your PCBA design.  
***Minimum Footprint, Maximum Efficiency!***



## *Q: Can I purchase audio components that has PinPoint Technology already installed?*

- **A: Yes! PinPoint Technology** is available in nearly all standard housings at cost
  - Hardware Package: Nearly all Challenge Electronics' Piezoelectric Indicators can incorporate PinPoint Technology!

## *Q: Could you provide an example optimizing this technology?*

- **Ex: A fire spreading in a manufacturing facility, causing electrical blackouts, and producing large quantities of smoke.**
  - PinPoint Alarm Technology creates a clear and natural understanding of where the sound is generated from through Sound Localization, enabling personnel to evacuate the facility safely and efficiently.



**For more information regarding our PinPoint Technology, please contact your local Challenge Sales Representative, or visit our website at:**

**[www.challengeelectronics.com/PinpointAlert](http://www.challengeelectronics.com/PinpointAlert)**



## ***Challenge Electronics Innovates B2B Relations with Powered Sample Kit***

Challenge Electronics is proud to announce the fully powered Sample-Kit, a revolutionary method of presenting our audio component products to our business-to-business customers. Our Sample Kit utilizes **over 55 fully powered components**, spanning all our types of products.

Our Technical Sales Team and Sample Kit provide an on-the-spot demo of our finest products!

### ***Do you Hear the Decibel?***

The human ear can perceive a change in sound levels in 3 decibel increments. If the Sound Pressure Level (SPL) increase by 3 decibels, the listener would notice a difference in sound level.

***Ex: A change from 90 dB to 93 dB WILL register a change in sound level to the human ear!***

When the change in SPL is less than 3 dB, the listener will not notice a change in sound level

***Ex: a change from 90 to 91 dB will NOT register a change in sound level to the human ear!***

When the sound level increases by 10 dB, the generated sound will be twice as loud to the human ear.

***Ex: a change from 90 dB to 100 dB will sound TWICE as loud!***

### ***Doubling Down on Decibel!***

A common misunderstanding regarding audio amplification is the idea that doubling the wattage will cause the amplified sound to be "twice as loud." The smallest perceived change in audio levels is an addition/reduction of 3 decibels. To increase the audio output by 3 dB, twice the rated power is required, while reducing the decibel output by 3 dB only requires half the rated power.

**To increase the desired decibel output, the Decibel-Watt Law is applied:**

$$2.0 \times \text{Rated Power (watts)} = +3\text{dB}$$

$$4.0 \times \text{Rated Power (watts)} = +6 \text{ dB}$$

$$10 \times \text{Rated Power (watts)} = +10 \text{ dB}$$

**To decrease the desired decibel output, the Inverse Decibel-Watt Law is applied:**

$$0.50 \times \text{Rated Power (watts)} = -3\text{dB}$$

$$0.25 \times \text{Rated Power (watts)} = -6\text{dB}$$

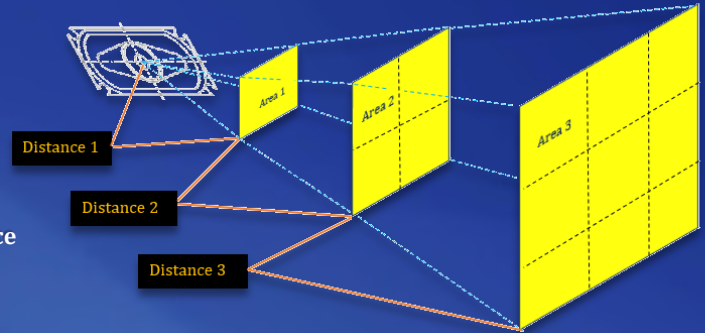
$$0.10 \times \text{Rated Power (watts)} = -10\text{dB}$$

# Sound Propagation

As the distance from the sound source increases, the area covered by the sound wave increases. The same amount of energy is spread over a greater area, resulting in the intensity and loudness of the sound decreasing the farther the sound wave travels from the source.

Sound Propagation is calculated using the Inverse Square Law:

- $SPL_2 = SPL_1 - 20 * \log (R_2 / R_1)$ 
  - $SPL_1$ : The Sound Pressure Level at origin
  - $SPL_2$ : The Sound Pressure Level at end-distance
  - $R_1$ : The distance from the sound source to origin
  - $R_2$ : The distance from the sound source to end-distance



## No Need to Freq Out!

One of the most critical design components is the frequency of the audio signal. An audio frequency is how often a sound wave fluctuates over a given time-frame. These fluctuations are measured in Hertz (Hz), which identifies the number of cycles the audio signal oscillates and travels through a medium (air, plastic, water, etc....) per second.

**Example: A smoke alarm rated for 3000 Hz oscillates at a rate of 3000 times per second.**

For the audio signal to be received, it must travel through a medium. These materials are all around us; the most easily recognizable medium is air. As the audio signal is created, the surrounding air begins to compress and expand in correlation with the frequency of the audio signal.

## All in Harmony

**Total Harmonic Distortion (THD)** is the summation of all additional unwanted audio signals created from the fundamental audio signal along the harmonic multiples of the fundamental frequency. As the audio components frequency increases, the harmonic's amplitude decreases.

**Example: Harmonics of a 3,000 Hz signal would be located at 6,000 Hz and 9,000 Hz.**

**Intermodulation Distortion (IMD)** is the addition of unwanted audio signals at sums or differences of multiple input signals. IMD is more noticeable to the human auditory system than Total Harmonic Distortion.

**Example: An input signal of 2,000 Hz and 3,000 Hz would create IMD distortion at 1,000 Hz and 5,000 Hz.**



## Know Your Tone!

At Challenge, we incorporate both our patented and proprietary audio signals as well as industry-standard tones into all our audio alarm systems. Whether for smoke detectors, home security, entertainment systems or emergency response equipment, our components are calibrated and designed to meet all applications.

### Continuous Tone

Single output tone at a defined frequency

Allows user to control rate of signal by pulsing overall power

### Multi-Tone

A single device with multiple user selected output tones

Multiple use environments included within a single device

### Pulsating Tone

Repeated output tone at a defined frequency and rate

Ensures user attention by creating an intermittent interruption

### Sweeping Tone

Increases or decreases at a defined rate over a defined range of frequencies

Customize to indicate urgency in response

### Pinpoint Tone

Provides Sound Localization

Creates a crisp, distinguishable acoustic tone

## Electrical Connectivity Options

At Challenge, we incorporate innovative Connector Options, as well as industry standard Connection Options. Almost all connection types can be customized at a customer request to utilize a design which better fits the customers end application.

### Solder Tab/Point

Customizable connectivity options

Proprietary "Quick Connect Front Panel Mount" technology

### Surface Mount

Reflow Oven, Wave Solderable and many more application options

Easily integrated into PCBAs through Pick and Place

### Spring Mount

Direct deployment onto PCBA without added solder

Minimal footprint design

### Through Hole

Utilizes Industry Standard PCBA Connectivity

Easily integrated into pre-fabricated vias on PCBA

### Wire Leaded

Optimized for far distances between mounting location and PCBA

Customizable wire gauge, wire length and connector



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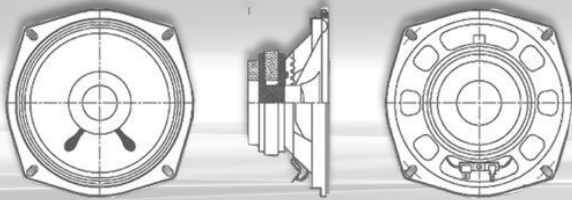


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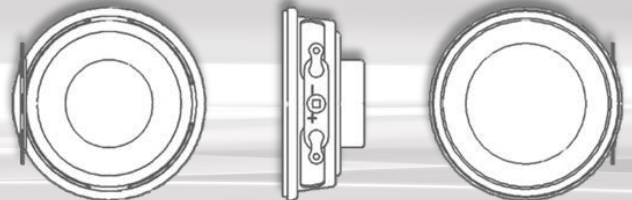
# Round/Square Speakers

**Round Speakers** are one of the most popular audio components, optimizing space without affecting the audio signal. As a result of the symmetrical cone design, the projected audio signal generates an Even Audio Flex for a flat frequency response across the frequency spectrum. Some materials used for diaphragms include: Polypropylene (PP) Polyetheretherketone (PEEK) and Polyethylene (PET).

**Square Speakers** are designed to be directly mounted to the customers housing, providing less constraints during the design-phase while utilizing the same audio benefits of a round speaker.



CS86-05D50-35-1

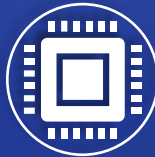


CS28-01W70-04-2



## **Power to the Speaker!**

Round and Square Speakers provide the greatest power handling over all speaker types, meaning the greatest efficiency of input signal to loudness.



## **Surfs Up!**

Our Surface Mounted Technology (SMT) Speakers are designed to require minimal PCBA space, while maintaining the Even Audio Flex of our popular Round Speaker products!



## **Even Audio Flex!**

Our Round and Square Speakers are calibrated to distribute an evenly balanced audio signal, resulting in a flat frequency response curve with minimal distortion.



## **Sample Serving!**

We stock ready-to-ship product-samples of almost every Round and Square Speaker with little to no wait!



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## Round & Square Speakers Catalog

Part Number	Product Type	Dimensions (mm)	Rated/Max (W)	Resonant Frequency (Hz)	SPL Rated Power/10 cm* (dB)	Impedance (Ω)	Termination	IP Capable
CS10-00P100-02-1	Round	10.1 Ø x 2.9	0.5/0.7	1000	87	8	Solder Point	Yes
CS15-00P85-03-3	Round	15.0 Ø x 3.4	0.5/1.0	850	95	8	Solder Point	No
CS18-01P50-05-1	Round	18.0 Ø x 5.7	1.0/1.5	500	95	8	Solder Point	No
CS20-00P55-04-1	Round	20.0 Ø x 4.1	0.5/0.8	550	91	8	Solder Point	Yes
CS22-02W30-06-1	Round	22.0 Ø x 6.7	2.0/2.5	300	97	4	Wire Ledged	No
CS28-00W50-05-3	Round	28.0 Ø x 5.0	0.5/1.0	500	96	8	Wire Ledged	Yes
CS28-02W220-05-1X	Round	28.0 Ø x 5.0	2.0/2.5	2200	109	8	Wire Ledged	Yes
CS28-02W57-07-1	Round	28.0 Ø x 7.9	2.0/3.0	570	103	4	Wire Ledged	Yes
CS40-05D18-21-1	Round	40.0 Ø x 21.5	5.0/6.0	180	107	4	Solder Tab	No
CS13-00P105-03-1	Round	13.0 Ø x 3.0	0.5/0.8	1050	94	8	Solder Point	Yes
CS33-03D35-17-1	Round	33.9 Ø x 17.1	3.0/4.0	350	103	4	Solder Tab	No
CS50-01D38-18-1	Round	50.0 Ø x 18.2	1.5/3.0	380	104	8	Solder Tab	Yes
CS57-03W20-26-1	Round	57.0 Ø x 26.0	3.0/6.0	200	103	4	Wire Ledged	No
CS13-00S85-04-5	Square	13.0 x 13.0 x 4.0	0.7/1.0	850	88	8	Surface Mount	Yes
CS16-00S95-04-1	Square	16.0 x 15.0 x 4.3	0.3/0.5	950	89	8	Surface Mount	Yes
CS19-00S57-04-1	Square	19.8 x 18.0 x 4.8	0.3/0.5	575	89	8	Surface Mount	No
CS41-05D20-24-1	Square	41.0 x 41.0 x 24.6	5.0/7.0	200	107	8	Solder Tab	No
CS66-04D35-30-1	Square	66.0 x 66.0 x 30.0	4.0/5.0	350	115	8	Solder Tab	Yes
CS87-08D40-28-1	Square	87.0 x 87.0 x 28.5	8.0/16.0	400	116	8	Solder Tab	Yes
CS87-06D50-32-1	Square	87.0 x 87.0 x 32.5	6.0/12.0	500	107	8	Solder Tab	No
CS114-10D08-56-2	Square	114.0 x 114.0 x 56.5	10.0/20.0	85	88	32	Solder Tab	No
CS134-15D07-55-1	Square	134.2 x 134.2 x 55.0	15.0/30.0	75	120	4	Solder Tab	No

For additional Round/Square Speakers, please visit our website at:

[www.challengelectronics.com/speakers](http://www.challengelectronics.com/speakers)

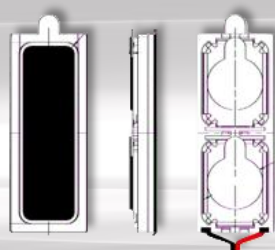
\* SPL values are standardized to a consistent distance and rated wattage. For production values, please reference the corresponding specification sheet.



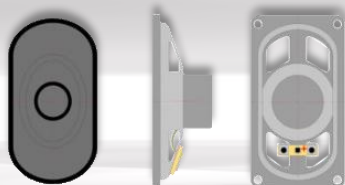
## Mobile/ Oval Speakers

**Mobile Speakers** are optimized to incorporate a symmetric alignment between the voice coil and magnet within a compact product. This allows the Total Harmonic Distortion (THD) to be reduced, and provide a crisp, clean audio signal. In addition to these speakers being designed for limited-space designs, Challenge Electronics' Mobile Speakers can be easily implemented into side, top or bottom ported speaker chamber applications routing the sound anywhere desired.

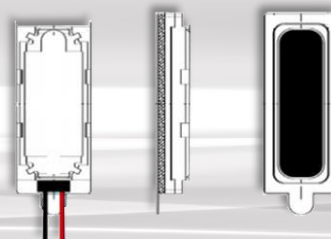
**Oval Speakers** provide our customers an ideal alternative to space-limited designs, incorporating form-factors from both mobile & round speakers. If only a rectangular space is available and you want loud, Oval Speakers are right for you!



CS30-01W85-03-1



CS71-03D25-25-1



CS25-01W75-03-1

### **Oval Speaker Design Capability!**

Rounded edges and flat sides allow for a directional projection of sound. Wider diaphragms results in a higher bass presence.



### **Mobile Speaker Precision Porting!**

Asymmetrical shaped voice coils enables excellent acoustic porting capabilities in space-limited systems.



### **Mobile Speaker Design Capability!**

Mobile Speakers remove major design constraints from speaker implementation into rectangular spaces with a symmetrical voice coil.



### **No Peaking!**

Our Mobile Speakers are designed with a unique-shaped voice coil and diaphragm that minimizes THD, IMD, and provides a flat frequency response.



### **Sample Serving!**

We stock Ready-to-Ship samples of almost every product, with little to no wait!



### **Think Inside the Chamber!**

Our Mobile Speakers are designed and calibrated to optimize the benefits of one of the Challenge Electronics proprietary Chamber Assembly designs for ultra thin solutions and side porting.





## *Mobile/Oval Speakers Catalog*

Part Number	Product Type	Dimensions (mm)	Rated/Max Power (W)	Resonant Frequency (Hz)	SPL Rated Power/10 cm (dB)*	Impedance ( $\Omega$ )	Termination	IP Capable
CS12-00R110-02-1X	Mobile	12.0 x 6.0 x 2.8	0.5/0.75	1100	84	8	Spring	Yes
CS14-00R80-02-1	Mobile	14.2 x 9.6 x 2.9	0.3/0.8	800	82	8	Spring	Yes
CS16-00W130-03-1	Mobile	16.0 x 9.0 x 3.0	0.7/1.0	1300	91	8	Wire Leaded	Yes
CS18-01P85-02-1	Mobile	18.0 x 13.0 x 2.5	1.0/1.2	850	96	8	Solder Point	Yes
CS25-01W60-03-1	Mobile	25.0 x 9.0 x 3.0	1.5/2.0	600	92	8	Wire Leaded	Yes
CS30-01W85-03-1	Mobile	30.0 x 11.0 x 3.6	1.5/2.0	850	95	4	Wire Leaded	Yes
CS40-01P50-04-1	Mobile	40.0 x 13.0 x 4.0	1.0/1.2	500	98	8	Solder Point	Yes
CS25-02P65-07-1X	Oval	25.0 x 14.0 x 7.5	2.0/2.5	650	98	8	Solder Point	Yes
CS35-01D50-08-1	Oval	35.0 x 20.0 x 8.0	1.0/2.0	500	104	8	Solder Tab	No
CS40-01D38-12-1	Oval	40.0 x 28.3 x 12.0	1.0/2.0	380	98	8	Solder Tab	No
CS57-02W70-14-1	Oval	57.5 x 23.0 x 14.8	2.0/3.0	700	101	8	Wire Leaded	No
CS71-03D25-25-1	Oval	71.0 x 40.0 x 25.5	3.0/5.0	250	105	8	Solder Tab	No

For additional Mobile Speakers, please visit our website at:

[www.challengelectronics.com/speakers](http://www.challengelectronics.com/speakers)

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# Chamber Assemblies

The Engineering Team at Challenge Electronics utilizes innovative composite materials, industry-leading chamber designs, and unique acoustic insulation methods to provide the maximum desired audio tone in a minimal chamber footprint. We design our Chamber Assemblies in direct correlation to customer requirements through multiple design reviews at no additional expense to the customer. Final products can include a plug and play assembly with all mounting features integrated into the design including all gasketing material, subassemblies and custom defined wires and connector for easy integration. Best of all, all Chamber Assemblies are fully acoustically tested prior to shipment so you can rest easy knowing each unit is 100% reliable for your voice to the end user.

## Q: What is the purpose of a Chamber Assembly?

- **A: Acoustic Prioritization is design of a speaker chamber to reinforce only the ranges of the acoustic signal interested in being reproduced.**
  - Through precise calculations, innovative materials, and calibration, Acoustic Prioritization can boost certain frequency ranges, while naturally dampening unwanted ranges simply through mechanical design of the chamber.
    - This natural cancelation of sound within certain frequency bands is known as **Mechanical Filtering**.

## Q: What is "Acoustic Prioritization"?

- **A: Chamber Assemblies handle the dynamic nature of a speaker effectively to produce as accurate a reproduction of the input signal as possible.**
  - As the speaker diaphragm oscillates, the sound generated from each side of the diaphragm are out of phase. If the out of phase signals interact, constructive or destructive interference can occur at various frequencies.
  - Placing the speaker into a Chamber Assembly isolates the front and rear waveforms ensuring no unintentional cancelation or distortion occurs to the output signal.



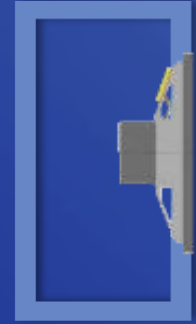
**Ported Assembly**  
Low-Frequency  
Boosting



**Aperiodic Assembly**  
Smallest Dimensional  
Footprint



**Passive Radiator Assembly**  
Low-Frequency Boosting &  
Improved Dimensional Footprint



**Sealed Assembly**  
Flattest Response & Small  
Dimensional Footprint



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## Chamber Assembly Catalog

Part Number	Dimensions (mm)	Speaker Type	Rated/Max (W)	Impedance ( $\Omega$ )	Resonant Frequency (Hz)	SPL Rated Power/10 cm (dB)*	Termination	IP Capable
CAC24-00W85-08-1	24.0 x 20.0 x 8.0	Mobile	0.7/1.0	8	850	86	Wire Leaded	Yes
CAC27-00W85-04-1	27.0 x 49.0	Mobile	0.8/1.0	8	850	90	Wire Leaded	Yes
CAC45-02W20-19-1	52.8 x 36.0 x 19.9	Round	2.0/3.0	8	200	88	Wire Leaded	No
CAC36-01P40-19-1	55.0 x 36.0 x 19.0	Round	1.5/2.0	8	400	95	Wire Leaded	No
CAC50-02W85-08-1X	65.0 x 50.0 x 8.7	Round	2.5/3.0	4	850	95	Wire Leaded	IP-67
CAC66-01W85-07-1	66.3 x 50.8 x 7.0	Round	1.0/1.5	8	850	115	Wire Leaded	No
CAC58-02W85-10-1	74.1 x 22.6 x 10.3	Oval	2.0/3.0	8	850	92	Wire Leaded	No
CAC60-02W80-18-1X	83.5 x 33.0 x 18.3	Oval	2.0/4.0	4	800	104	Wire Leaded	IP-67
CAC83-03W45-15-1	96.4 x 30.0 x 15.3	Round	3.0/4.0	4	450	87	Wire Leaded	No

For additional Chamber Assembly products, please visit our website at:

[www.challengelectronics.com/assembly](http://www.challengelectronics.com/assembly)

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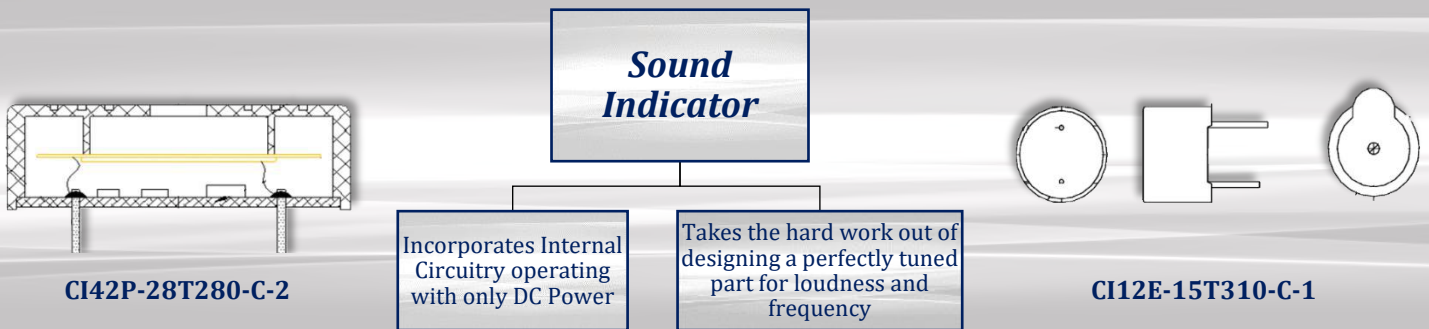


# Piezoelectric/Electromagnetic/Mechanical Sound Indicators

**Piezoelectric Sound Indicators** incorporate a piezoelectric element connected to the precisely designed internal circuitry for maximum loudness.

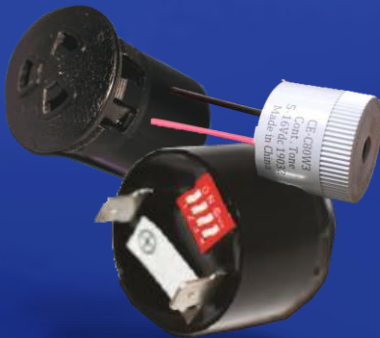
**Electromagnetic Sound Indicators** utilize a stationary magnet, voice coil and floating disk for lower frequency output and reduced footprint.

**Mechanical Sound Indicators** feature a vibrating membrane to physically interfere with another medium for the lowest resonant frequency.



## Patent Product

Our Piezoelectric Sound Indicators are optimized to use our patented PinPoint Alert & Alarm Technology. (US Patent No. 10,522,008 B1)



## Front Panel Mount Design

Our Indicator Product Lines incorporate the Challenge Electronics proprietary Front Panel Mount technology allowing an assembler to easily press fit a unit into a mounting panel.



## Tune In

Our Sound Indicators utilize a vast array of patented and industry leading tones, including: Pinpoint, Continuous, Pulsating, Sweeping and Multi-Tone.



## Sample Serving

We stock ready-to-ship product-samples of all our Sound Indicators with little to no wait!



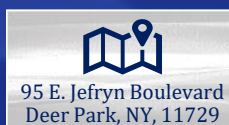
# Piezoelectric/Electromagnetic/Mechanical Sound Indicators Catalog

Part Number	Product Type	Dimensions (mm)	Resonant Frequency (Hz)	SPL Rated VDC/10 cm (dB)*	Rated/Max Input Voltage (VDC)	Max Current at Vmax (mA)	Tone	Termination
CI13P-16T400-C-3	Piezoelectric	13.8 Ø x 7.5	4000	80	12.0/16.0	7	Continuous	Through Hole
CI23P-28T350-C-1	Piezoelectric	23.0 Ø x 9.8	3500	96	12.0/28.0	9	Continuous	Through Hole
CI25P-16W290-C-2	Piezoelectric	25.4 Ø x 21.8	2900	114	12.0/16.0	40	Continuous	Wire Ledged
CI35P-30E240-C-9	Piezoelectric	35.2 Ø x 41.8	2400	87	12.0/30.0	35	Continuous	Terminal
CI36P-16W300-P-1X	Piezoelectric	36.0 Ø x 35.0	3000	110	12.0/16.0	25	Intermittent	Wire Ledged
CI36P-15E210-S-8X	Piezoelectric	36.0 Ø x 35.0	2100	120	12.0/15.0	70	Siren	Terminal
CI36P-50E290-S-1X	Piezoelectric	36.0 Ø x 35.5	2900	111	36.0/50.0	25	Siren	Terminal
CI36P-16E300-M-1X	Piezoelectric	36.0 Ø x 35.5	3000	119	12.0/16.0	60	Continuous	Terminal
CI36P-16E300-M-4X	Piezoelectric	36.0Ø x 35.5	3000	107	12.0/16.0	100	Localization/ Intermittent	Terminal
CI37P-14T275-S-1	Piezoelectric	37.4 Ø x 41.2	2750	118	12.0/14.0	150	Siren	Through Hole
CI09E-07T250-C-1	Electromagnetic	9.6 Ø x 5.0	2500	80	5.0/7.0	30	Continuous	Through Hole
CI12E-07T230-C-3	Electromagnetic	12.0 Ø x 9.5	2300	85	5.0/7.0	30	Continuous	Through Hole
CI13E-07S240-C-6	Electromagnetic	13.8 x 12.8 x 10.3	2400	90	5.0/7.0	30	Continuous	Surface Mount
CI16E-15T230-C-1	Electromagnetic	16.0 Ø x 14.0	2300	85	12.0/15.0	30	Continuous	Through Hole
CI09E-07T250-C-1	Electromagnetic	9.6 Ø x 5.0	2500	80	5.0/7.0	30	Continuous	Through Hole
CI33M-15W40-C-1	Mechanical	33.5 x 23.0 x 15.5	400	81	12.0/15.0	25	Continuous	Wire Ledged

For additional Audio Indicator products, please visit our website at:

[www.challengeelectronics.com/indicators](http://www.challengeelectronics.com/indicators)

\* SPL values are standardized to a consistent distance and wattage, for production values, please reference the corresponding specification sheet.

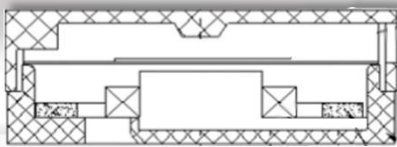


# Piezoelectric/Electromagnetic Sound Transducers

**Piezoelectric Sound Transducers** are externally driven piezoelectric elements mounted in a perfectly tuned Helmholtz Resonator for optimal performance.

**Electromagnetic Sound Transducers** are an externally driven stationary magnet, voice coil and floating disk for lower frequency output and minimized footprint.

*Worried about designing the end circuitry? No problem! Challenge Electronics will provide free consultations and application circuits to make sure you get the best sound!*

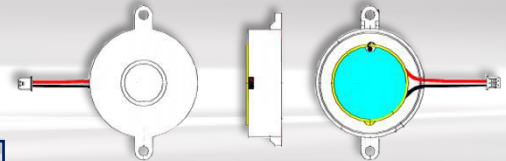


CT05E-04S310-1

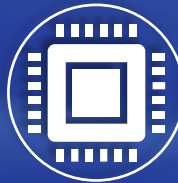
## Sound Transducer

No internal circuitry minimizing cost

Can Play any AC-powered tone on the components Frequency Response Curve as defined by you

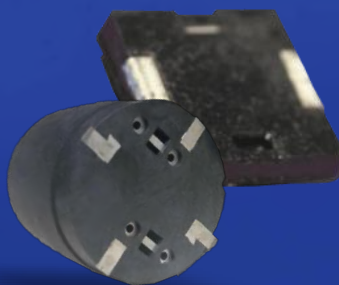


CT64P-60W340-1



### Surfs Up!

Our Piezoelectric and Electromagnetic products offer the largest dimensional variety of transducers incorporating Surface Mount Technology.



### Simplicity is Key

Our Sound Transducers use no internal circuitry, resulting in a low cost, high performance component.



### Full Automation

Many of the Challenge Electronics Transducers are manufactured with no human interaction from initial assembly to quality control and end packaging for the highest reliability and lowest cost!



### Sample Serving

We stock ready-to-ship product-samples of almost every Piezoelectric and Electromagnetic Transducer with little to no wait!



95 E. Jefryn Boulevard  
Deer Park, NY, 11729



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sales@challelec.com



challengeelectronics.com



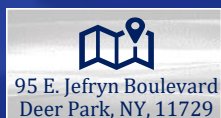
## *Piezoelectric/Electromagnetic Sound Transducer Catalog*

Part Number	Product Type	Dimensions (mm)	Resonant Frequency (Hz)	SPL Rated V/10 cm (dB)*	Rated/Max Input Voltage (Vp-p/Vo-p)	Max Current V-rated (mA)	Capacitance at 1 kHz (pF)	Termination
CT09P-20S210-1	Piezoelectric	9.0 x 9.0 x 1.8	2100	73	3.0/20.0 Vp-p	3	15,000	Surface Mount
CT12P-25S275-1	Piezoelectric	12.0 x 12.0 x 3.0	2750	70	3.0/25.0 Vp-p	3	20,000	Surface Mount
CT14P-30T400-2	Piezoelectric	14.0 Ø x 6.9	4000	85	5.0/30.0 Vp-p	3	12,000	Through Hole
CT17P-25S200-2	Piezoelectric	17.0 Ø x 8.7	2000	80	12.0/25.0 Vp-p	2	19,000	Surface Mount
CT22P-25T400-2	Piezoelectric	22.1 Ø x 11.8	4000	85	3.0/25.0 Vp-p	3	15,000	Through Hole
CT30P-30T260-1X	Piezoelectric	30.0 Ø x 14.0	2600	104	12.0/30.0 Vp-p	10	26,000	Through Hole
CT34P-50T340-1	Piezoelectric	34.5 x 30.0 x 8.4	3400	115	30.0/50.0 Vp-p	150	200,000	Through Hole
CT38P-15T320-1	Piezoelectric	38.8 Ø x 15.8	3200	85	12.0/15.0 Vp-p	30	26,000	Through Hole
CT64P-60W340-1	Piezoelectric	64.2 x 45.0 x 16.0	3400	110	12.0/60.0 Vp-p	10	140,000	Wire Ledged
CT03E-04S400-1	Electromagnetic	3.2 x 3.2 x 2.0	4000	72	3.0/4.0 Vo-p	120	NA	Surface Mount
CT04E-04S400-1	Electromagnetic	4.0 x 4.0 x 2.0	4000	70	3.0/4.0 Vo-p	90	N/A	Surface Mount
CT05E-05S400-5	Electromagnetic	5.5 x 5.3 x 2.1	4000	80	3.0/5.0 Vo-p	100	N/A	Surface Mount
CT06E-01T300-1	Electromagnetic	6.7 Ø x 3.6	3000	70	1.5/1.7 Vo-p	119	N/A	Through Hole
CT08E-05S210-1	Electromagnetic	8.5 x 8.5 x 4.0	2100	87	3.6/5.0 Vo-p	90	N/A	Surface Mount
CT10E-04S283-4	Electromagnetic	10.8 x 10.0 x 3.5	2830	93	3.6/5.0 Vo-p	100	N/A	Surface Mount
CT12E-05T204-8	Electromagnetic	12.0 Ø x 8.5	2048	88	3.5/5.0 Vo-p	30	N/A	Through Hole
CT14E-03S320-1	Electromagnetic	14.0 x 11.0 x 3.0	3200	85	1.5/3.0 Vo-p	65	N/A	Surface Mount
CT16E-08T204-1	Electromagnetic	16.0 Ø x 14.0	2048	85	6.0/8.0 Vo-p	40	N/A	Through Hole
CT25E-16T150-1	Electromagnetic	25.0 Ø x 12.5	1500	104	12.0/16.0 Vo-p	55	N/A	Through Hole

For additional Audio Transducer products, please visit our website at:

[www.challengeelectronics.com/sound\\_transducers](http://www.challengeelectronics.com/sound_transducers)

\* SPL values are standardized to a consistent distance and rated voltage. For production values, please reference the corresponding specification sheet.



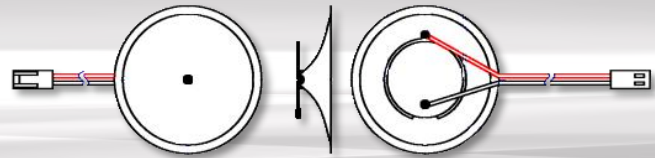
# Piezoelectric Elements

**Piezoelectric Elements** are components that translate an electrical signal to a physical vibration yielding a change in air pressure otherwise known as sound. These lightweight, small-footprint units are ideal for audio signals to be produced in space-sensitive systems and can even provide an IP Rated end application. A piezoelectric element can be used both as a transmitter and receiver of audio signals.

*Worried about designing the perfect mounting chamber? No problem! Challenge Electronics will provide free consultations and mounting constraints to make sure you get the best sound!*



CT15Z-30N630-1



CT48Z-30W250-1



## Mounted Mylar Magic

Our Piezoelectric Elements can be optimized with a Mounted Mylar Diaphragm, reaching over 110 dB in an IP rated, small footprint enclosure.



## Creative Compact Capability

We optimize the advantageous dimensions of our Piezoelectric Elements to provide a low-cost, high performance product from as small as 0.11 mm!



## Electrical Output Options

Challenge Electronics' Piezoelectric Elements incorporate almost all our Electric Output Connectors



## Sample Serving

We stock ready-to-ship product-samples of almost every Piezoelectric Element with little to no wait!



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Deer Park, NY, 11729



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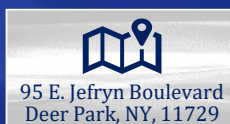


## *Piezoelectric Elements Catalog*

Part Number	Dimensions (mm)	Resonant Frequency (Hz)	Max Resonant Impedance at 1 KHz ( $\Omega$ )	Capacitance at 1 KHz (pF)	Max Input Voltage (Vpp)	Material	Termination
CT09Z-30N800-1	9.0 $\varnothing$ x 0.1	8000	1200	11000	30	Brass	Non-Terminated
CT12Z-30N550-1	12.0 $\varnothing$ x 0.1	5500	1000	15000	30	Nickel Alloy	Non-Terminated
CT12Z-30N900-1	12.0 $\varnothing$ x 0.5	9000	500	8000	30	Brass	Non-Terminated
CT19Z-30N360-1	19.9 $\varnothing$ x 0.2	3600	300	20000	30	Nickel Alloy	Non-Terminated
CT19Z-30R360-2	19.9 $\varnothing$ x 2.2	3600	1500	20000	30	Nickel Alloy	Spring
CT20Z-30N320-1	20.0 $\varnothing$ x 0.2	3200	600	20000	30	Brass	Non-Terminated
CT27Z-50N290-1	27.0 $\varnothing$ x 0.4	2900	1000	15000	50	Brass	Non-Terminated
CT32Z-50W230-1	32.0 $\varnothing$ x 0.5	2300	200	25000	50	Brass	Wire Leaded
CT41Z-50N120-2	41.0 $\varnothing$ x 0.2	1200	800	70000	50	Brass	Non-Terminated

For additional Piezoelectric Elements, please visit our website at:

[www.challengeelectronics.com/sound\\_transducers](http://www.challengeelectronics.com/sound_transducers)



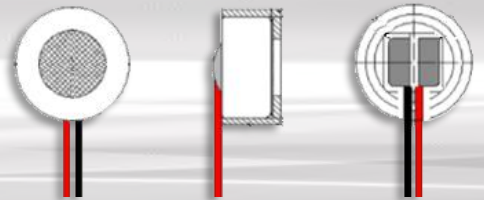
# ECM & MEMS Microphones

**Electric Condenser Microphones (ECM)** are a staple in audio component technology. These microphones consist of a capacitive plate coupled to a diaphragm. When a sound enters the acoustic port, the diaphragm vibrates and the capacitance changes to the rhythm of the sound waves, ultimately converting the sound into an electrical signal. Our precision-made ECM microphones are designed, inspected, and calibrated to be integrated effortlessly into our customers products without compromising efficiency.

**Micro-Electro-Mechanical-Systems (MEMS)** are the smallest form factor microphones Challenge Electronics offers. MEMS microphones incorporate an ASIC (Application-Specific Integrated Circuit), and a transducer consisting of a silicon or piezoelectric diaphragm. Challenge Electronics has been able to design, develop, and stock high performance microphones of increasingly smaller geometries and designs. Our precision-made, fully automated MEMS microphones are fully pick and place capable and are perfect for designs with limited space and power constraints.



CM03M-03S42-MA-2



CM06M-10W44-BA-3X

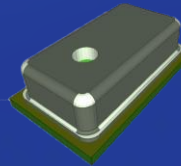
## Small-Scale Footprint

Smallest MEMS: 2.8 mm x  
1.9 mm x 0.9 mm!



## Modern Design

Our ECM and MEMS microphones incorporate all directionality types at your preference.



## Saving Cents with Sensitivity

All ECM and MEMS microphones are calibrated for optimal and efficient audio sensitivity using open circuit output voltage testing



## Electrical Output Options

Our ECM and MEMS microphones incorporate all Electrical Connectivity Options utilized by Challenge Electronics and can be customized for an IP Rated application.



## Precision Phase and Sensitivity Control

All our MEMS microphones are perfect for high sensitivity beamforming applications!



## Sample Serving!

We stock ready-to-ship product-samples of almost every ECM and MEMS Microphone with little to no wait!



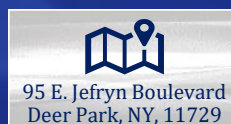


## *ECM & MEMS Microphone Catalog*

Part Number	Product Type	Dimensions (mm)	Directivity	Sensitivity (dBV/Pa)	Min SNR (dB)	Communication Format	Termination	IP Capable
CM02M-03S38-MA-1	MEMS	2.8 x 1.9 x 0.9	Omni Directional	-38	60	Analog	Surface Mount	No
CM03M-03S26-MD-1	MEMS	3.5 x 2.6 x 1.0	Omni Directional	-26 dBFS	65	Digital	Surface Mount	No
CM03M-03S38-MA-3	MEMS	3.5 x 2.7 x 1.0	Omni Directional	-38	65	Analog	Surface Mount	No
CM03M-03S42-MA-1X	MEMS	3.8 x 3.0 x 1.1	Omni Directional	-42	59	Analog	Surface Mount	Yes
CM03M-03S42-MA-2X	MEMS	3.8 x 2.2 x 1.1	Omni Directional	-42	58	Analog	Surface Mount	Yes
CM04M-03S26-MD-3	MEMS	4.0 x 3.0 x 1.0	Omni Directional	-26 dBFS	64	Digital	Surface Mount	No
CM03M-05W42-BA-1	Electret Condenser	3.0 Ø x 1.5	Omni Directional	-42	50	Analog	Wire Leaded	No
CM04M-10S42-BA-1	Electret Condenser	4.0 Ø x 1.4	Omni Directional	-42	58	Analog	Solder Point	No
CM04U-05P40-BA-1	Electret Condenser	4.0 Ø x 1.5	Uni Directional	-40	55	Analog	Solder Point	No
CM05M-10T32-BA-1	Electret Condenser	5.8 Ø x 2.2	Omni Directional	-32	75	Analog	Through Hole	No
CM06M-10W44-BA-3X	Electret Condenser	6.0 Ø x 1.8	Omni Directional	-44	58	Analog	Wire Leaded	No
CM06N-05P34-BA-1	Electret Condenser	6.0 Ø x 2.2	Noise Cancelling	-34	58	Analog	Solder Point	Yes
CM06M-03S28-BD-1	Electret Condenser	6.0 Ø x 2.2	Omni Directional	-26 dBFS	57	Digital	Solder Point	No
CM06U-10P44-BA-1	Electret Condenser	6.0 Ø x 2.7	Uni Directional	-44	58	Analog	Solder Point	No
CM06M-10S35-BA-2	Electret Condenser	6.0 Ø x 3.5	Omni Directional	-35	58	Analog	Solder Point	No
CM10M-10P28-BA-1	Electret Condenser	10.0 Ø x 4.5	Omni Directional	-28	80	Analog	Solder Point	No

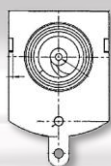
For additional ECM and MEM microphone products, please visit our website at:

[www.challengeelectronics.com/microphones](http://www.challengeelectronics.com/microphones)

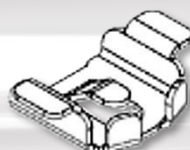


## Battery/Wire Assemblies

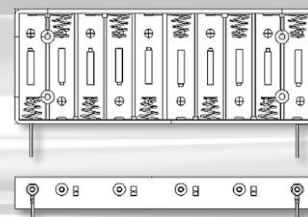
At Challenge, our battery assemblies are equipped with many unique Electric Output Connection-types for all industry standard battery cells including: 9V, AA, Half AA, AAA to name a few. Alongside our extensive inventory, Challenge Electronics offers custom designed assemblies for every battery holder application. We provide our customers a variety of plastic and non-plastic materials, innovative battery placement, and ease-of-installation design into your product!



CAB07MC-01S-1



CAB34CT-01R-2



CAB151A2-10W-1



### Custom Creation

We provide our customers with innovative & custom Battery Assemblies designed to fit for any power application.



### Safety First!

Our Battery Assemblies are rated from -20 Degrees C to over 100 Degrees C!



### Wild World of Wires!

Challenge Electronics provides low cost, high reliability wire assemblies, custom designed with any wire type and connector for all your signal routing needs!



### Sample Serving!

We stock Ready-to-Ship product samples of almost every Battery & Wire Assembly, with little to no wait!



95 E. Jefryn Boulevard  
Deer Park, NY, 11729



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sales@challelec.com



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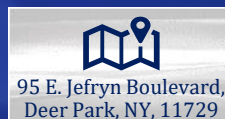


## Challenge Electronics Battery/Wire Assembly Catalog

Part Number	Battery Type	Battery Quantity	Dimensions (mm)	Termination
CAB57V9-01R-1	9 V	1	57.6 x 53.4 x 29.0	Spring
CAB34HA-01T-2	Half AA	1	34.4 x 17.5 x 15.0	Through Hole
CAB159A2-06N-1	AA	6	159.0 x 32.0 x 15.9	Snap
CAB63A2-04T-1	AA	4	63.1 x 58.0 x 16.0	Through Hole
CAB13TB-01T-1	AAA	1	12.2 x 13.0 x 9.2	Through Hole
CAB53A3-06W-1	AAA	6	53.0 x 38.0 x 27.0	Wire Leaded
CAB97A3-08N-1	AAA	8	97.0 x 24.4 x 23.8	Snap
CAB44TC-02R-1	C Cell	2	44.7 x 16.5 x 17.0	Spring
CAB62CC-02N-1	C Cell	2	62.5 x 55.8 x 23.5	Snap
CAB159CC-06W-1	C Cell	6	159.0 x 57.0 x 25.0	Wire Leaded
CAB105DC-06W-1	D Cell	6	105.0 x 70.0 x 56.0	Wire Leaded
CAB18CT-01T-1	Contact	1	18.8 x 6.0 x 5.0	Through Hole
CAB75LA-02T-1	18650	2	75.0 x 38.6 x 19.6	Through Hole
CAB24LF-02S-1	CR20 Series	2	24.6 x 14.7 x 4.0	Surface Mount
CAB28LF-01T-1	CR20 Series	1	28.6 x 3.7 x 5.0	Through Hole
CAB32LG-01S-1	Metal Coin Holder	1	32.7 x 24.5 x 3.9	Surface Mount
CAB22PC-01T-4	Plastic Coin Holder	1	22.8 x 22.8 x 3.8	Through Hole

For additional Battery Assembly products, please visit our website at:

[www.challengeelectronics.com/assembly](http://www.challengeelectronics.com/assembly)



# Company Promise

## Quality is Key

For over 30 years, Challenge Electronics has supplied thousands of unique audible components and battery assemblies to a variety of industries, including Medical, Fire & Safety, IoT and many more. We pride ourselves on our world class innovation such as our patented Pinpoint Alarm System. We continue to incorporate innovative thinking, engineering skills, and sales knowledge to enhance our product lines.

Our Quality Control and Product Assurance procedures ensure our components are designed in accordance with ISO 9001:2015/14001:2015 operational guidelines and all relevant environmental industry standards.

## Audible Assistance

From sketch to sales order, our customers enjoy our technical support from both our engineering & sales teams. Whether it's swapping a speaker with a piezoelectric element for space-to-sound benefits, calculating an ideal SPL, or incorporating a custom chamber to add clarity, our team will help every step of the way and are prepared for any inquiry.

Datasheets, product information and our complete component catalog are available online at:  
[www.challengeelectronics.com](http://www.challengeelectronics.com)

## Sample Serving

Challenge Electronics stocks sample products of nearly every component on our site! This allows our customers to receive, install, and test our sample products with no charge and no loss of time!

To order a Sample Product Component, please contact: [sales@challelec.com](mailto:sales@challelec.com)

***Thank you for taking the time reviewing what Challenge Electronics has to offer.  
For more information on any topic, contact your local Challenge Electronics  
Representative!***

***We look forward to hearing from you.***

