# Exciter Speakers vs Conventional Speakers: The Advantages

An exciter speaker's main advantage is that it needs no grille, no hole and no enclosure of its own: it hides behind a surface and makes that surface the speaker. That brings sealed, water-resistant designs, thinner and lighter products, wide sound dispersion and complete design freedom. The trade-off is less bass and a response that depends on the panel, so exciters suit some products far better than others.
This article explains how an exciter works, walks through each advantage, compares the two technologies side by side, and covers when a conventional speaker is still the better choice.

## How an exciter differs from a conventional speaker

A conventional speaker has a motor (magnet and voice coil) driving its own cone or diaphragm. The cone moves like a piston, and the speaker needs an enclosure to separate the sound from its front and back, plus an opening for the sound to escape.
An exciter keeps the motor but drops the cone. Its voice coil attaches to a mounting plate that is bonded to a panel: glass, wood, acrylic, drywall, a display or a product housing. When the coil moves, it sets up bending waves across the panel, and the whole surface vibrates and radiates sound. The panel becomes the diaphragm, and the product's own structure takes the place of the speaker box.

## The advantages

### 1. Invisible audio

With no grille or sound port, the speaker disappears. Designers get clean, uninterrupted surfaces on TVs, appliances, car interiors, walls and furniture. In a display, the sound can come from the picture itself, so voices seem to come from the person on screen.

### 2. Sealed, water-resistant and easy-to-clean designs

Because sound passes through the panel rather than through a hole, the product front can be fully sealed. That makes water and dust protection simpler and cheaper than with a ported speaker behind an acoustic membrane, and it removes the grille where dirt collects. This matters for outdoor equipment, kitchen and bathroom appliances, medical devices and food-service equipment that needs regular wiping down.

### 3. Thinner and lighter products

A conventional speaker needs depth for its cone's travel and air volume behind it. An exciter needs only its own motor depth and uses the existing panel as the diaphragm. That frees space inside slim products and can save weight, which is why automotive makers use exciters to replace door and dashboard speakers.

### 4. Wide, even sound dispersion

A cone speaker beams sound forward, especially at high frequencies, so listeners off to the side hear less treble. A panel driven by an exciter vibrates in many complex patterns at once and radiates more diffusely. Sound level varies less as you move around the room, which suits retail spaces, conference rooms, ceilings and signage that serve listeners at many angles.

### 5. Durability and vandal resistance

There is no exposed cone to puncture and no grille to pry off. In kiosks, transit shelters, elevators and public displays, sound comes through a solid surface that withstands knocks, cleaning chemicals and tampering.

### 6. Large radiating area from a small part

A small exciter can drive a large surface, such as a shop window, a ceiling tile or a wall panel. The large area moves a lot of air for its size, so modest power can fill a space that would otherwise need a bigger visible speaker.

### 7. Sound and touch in one part

The same technology delivers felt vibration. Low-frequency exciters act as tactile transducers in seats and simulators, and smaller ones provide haptic feedback in touch panels, so one component can provide both sound and touch confirmation.

### 8. Design freedom

The speaker can be any shape and in almost any material, and it can be placed where a cone speaker wouldn't fit. Audio can be added late in a design without new openings in the housing.

## Side by side

| Feature | Exciter | Conventional speaker |
|---|---|---|
| Visible grille or opening | None | Required |
| Sealing and water resistance | Simple; front stays solid | Needs membranes or gaskets at the port |
| Depth needed | Motor depth only | Cone travel plus back volume |
| Enclosure | Uses the product's panel | Needs its own sealed or ported box |
| Dispersion | Wide and diffuse | Directional, narrowing at high frequencies |
| Bass extension | Limited; depends on panel size | Better for its size |
| Frequency response | Panel-dependent, usually needs EQ | Predictable from the datasheet |
| Efficiency | Lower; some energy goes into the panel | Higher |
| Durability in public spaces | High; no exposed cone | Lower; grille and cone exposed |
| Haptic capability | Yes | No |

## The trade-offs to weigh

Exciters are not a drop-in replacement for every speaker. Plan for these from the start.

- **Less bass.** Low-frequency output depends on panel size and stiffness. Small or stiff panels roll off early, so pair exciters with a conventional woofer or tactile transducer if deep bass matters.
- **The panel sets the sound.** The same exciter sounds very different on glass, wood, acrylic or a metal housing. Expect to prototype on the actual panel and tune with EQ.
- **Less even response.** Panel resonances create peaks and dips. DSP equalization is usually needed to get a smooth result.
- **Lower efficiency.** Some energy goes into bending and damping the panel, so an exciter may need more amplifier power than a cone speaker for the same level.
- **Sound from both sides.** The panel radiates from its back as well as its front. In a product, that can mean sound inside the housing or the room behind a wall.
- **Mounting matters.** How the panel's edges are clamped or isolated strongly affects bass and resonances, and the exciter's bond must survive vibration, heat and aging.

# When to choose an exciter

Choose an exciter when appearance, sealing or space matters more than deep bass:

- The product must have a clean, grille-free surface, such as a TV, appliance, car interior or architectural panel.
- The front must be sealed against water, dust or cleaning chemicals.
- The design is too thin for a cone speaker and its back volume.
- Sound must reach listeners spread across a wide area.
- The installation is public and needs to resist damage.
- You want sound and haptic feedback from one part.

Stick with a conventional speaker when you need strong bass from a small product, a predictable response straight from the datasheet, or maximum loudness from limited amplifier power. Many products combine both: exciters for voice and mid-range behind the panel, and a small conventional woofer or tactile transducer for the low end.

Soberton's application engineers can help match an exciter to your panel material and size and suggest mounting and EQ starting points.

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