



EVID Ceiling Speaker Systems

An Application Guide



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The Ceiling Speaker Systems – An Overview

The EVID ceiling system product line provides premium-level performance at a value price. Their wide coverage and high SPL capability allows the use of fewer speakers, resulting in lower system cost than the tight-spaced layout that low power narrow coverage speakers require. The overall price differential of the EVID units to commodity type speakers is actually quite small when the assembly and component costs of these standard ceiling speakers is taken into consideration. The EVID units are fully assembled and no additional installation components are generally needed. An EVID system “pays for itself” very quickly. Locations with the highest sales per square foot are the ones who are most careful about sound quality, music programming, and customer satisfaction.

VALUE OF PREMIUM PERFORMANCE:

People are getting used to better quality sound in their homes, cars and entertainment spaces. Their expectations have grown for better quality sound in retail, office and other background music spaces. Using premium quality audio systems can help increase sales through improved customer perceptions of the business’s products or services. It has now been well established that the quality of music in commercial spaces greatly impacts the customer’s perceptions of the products or services of the establishment. The dollar payback is substantial. High quality music also increases the friendliness and job satisfaction of the employees.

A Unique Solution to an Age Old Problem

High ceilings and reverberant rooms have long been the downfall of many ceiling based distributed sound installations. The inherent desire for wide dispersion in smaller acoustically dead spaces works against the use of ceiling speakers in larger rooms with reverberant characteristics and higher ceilings. Until now there has not been a cost effective solution that combines good quality full range audio with useful pattern control. Some ceiling products attempted to have pattern control at the high frequencies but this proved largely ineffective at the critical voice spectrum of the audio range. The result was a speaker that had the same poor intelligibility problems when used in reverberant room as conventional ceiling speakers.

The real solution to the problem requires that directionality must exist for the critical mid frequencies as well as the upper end of the spectrum. For this to happen a new approach is needed.

The EVID Solution – Why is it Different?

The EVID C8.2HC – Wide spectrum Pattern Control in a Compact Package

The EVID C8.2HC is designed to provide directionality through the critical voice spectrum by employing a unique (patent pending) ported waveguide to the entire 8” driver. The resultant package is one that is compact, easy to install and provides far more intelligibility in reverberant or high ceiling environments than any other competitive model. The C8.2HC also is designed for higher power, high SPL applications with a

60watt 70/100v transformer standard. No other ceiling speaker available offers this unique solution.

The EVID 4.2 and 8.2 – Full Range Models with Punch

The EVID C4.2 Perfect for conventional rooms. It has excellent bandwidth in an esthetically very unobtrusive installation profile. It's compact design fits in tight areas. Fully rated for use in air handling spaces. It's 4" woofer and waveguide coupled titanium coated dome tweeter give smooth, wide frequency response. The enclosure is ported and tuned to provide surprising bass response in such a compact package. Features an easy 3-point mounting system for quick installations. Comes complete with mounting support ring and tile rails. No additional accessories needed for most installations.

The C4.2 would be ideal for most office spaces along with smaller restaurants and retail space where lower volume levels are used. It fits in close spaces and has a wide 130-degree dispersion pattern for efficient coverage.

The EVID C8.2 is also unique in providing extremely high fidelity in a flush mount ceiling speaker. The secret is the optimally tuned enclosure coupled to a large 8" coaxial driver. The large enclosure ensures a full bottom end while the waveguide coupled tweeter gives uniform coverage for the high frequencies.

The 10.1 - Finally a Compact True Ceiling Subwoofer

So often ceiling systems had to rely on expensive surface mount subwoofers or inadequate ceiling/flush mount options. In designing the 10.1 we started with a mass optimized 10" woofer and a dual ported and tuned enclosure. The internal damping provides resonance free performance down to 45Hz.

The Basics

Selecting & Positioning Ceiling Loudspeakers

Several key criteria determine the type and quantity of ceiling speakers to employ in a job.

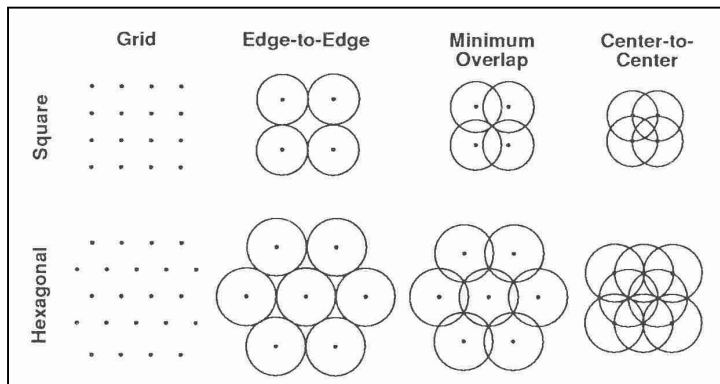
- Room size
- Coverage density desired
- Ceiling height
- Type of audio program material being played

There are specific EVID ceiling models for the job depending on the specifics of these criteria.

In the traditional approach to overhead-distributed systems, loudspeakers are located in a grid arrangement whose dimensions are dictated by the room height and the directivity of the speaker elements. Two basic placement patterns prevail: square spacing, and hexagonal (or crisscross) spacing.

In addition to the spacing pattern, the designer must choose between three density types, designated respectively as edge-to-edge, minimum overlap and center-to-center. The

greater the overlap, the more uniform the coverage — and the higher the cost. Budgetary constraints tend to favor sacrificing density, so the optimum center-to-center configuration is, in practice, the least common of the three. The illustration below shows these various layout patterns.



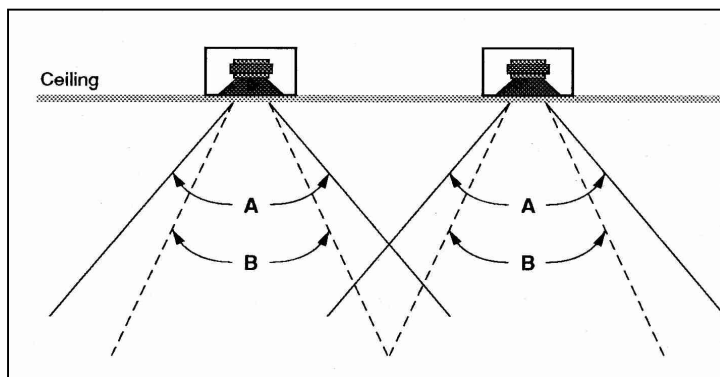
Ceiling Systems – Size vs. Coverage

In the past system designers usually specified 8-inch cone loudspeakers for distributed overhead systems, at least in part because they represented the traditional choice. The EVID systems however allow for far more flexible options.

In many cases, you can achieve excellent results — at a significant savings — by using 4-inch elements. This is true in jobs that do not require extended low-end response or high SPL levels. 4-inch elements such as used in the EVID the C4.2 offer wider dispersion to allow for fewer speakers to be employed in the job.

For example, due to its smaller cone diameter, the C4.2 exhibits significantly wider dispersion (130 degrees) than the C8.2 (110 degrees) at the -6 dB points.

The effect of this characteristic on an overhead system is indicated in the illustration below. In replacement applications where existing speaker positions are used, the C4.2 (shown in angle “A”) offers greater overlap and, thus, more uniform coverage than an older conventional 8-inch unit (shown in angle “B”). When specifying a new system, you can take advantage of the C4.2’s wider dispersion to decrease the number of speakers



required to cover a given area. This will result in even greater savings.

Of course, the C4.2 is somewhat less sensitive than the 8-inch C8.2. The difference is -7 dB. The C4.2 will also have slightly reduced low-frequency capabilities below 90 Hz.

Neither of these factors is a significant problem in many distributed systems, however. The C4.2 is conservatively rated to handle 50 watts of continuous power equal to or greater than most other brands of 8-inch units so its continuous SPL output will be more than adequate. Moreover, its reduced output below 90 Hz can easily be overcome with the addition of the C10.1 subwoofer. For these reasons, the C4.2 represents a great way for you to maintain good

audio coverage while maintaining a competitive edge in price quotes in installations that do not need the extended performance of the larger models.

SPL Requirements – How Loud?

The EVID C8.2 is a great speaker to employ when higher SPL are required. The fidelity and bandwidth of the unit is substantial and is ideal for applications requiring high quality foreground music reproduction. The C8.2 has substantial low frequency energy down below 70Hz. This is more than sufficient for most applications.

Layout – How Many?

As we indicated earlier the number of speakers required to cover the job will vary depending on three factors:

- Coverage angle specification of the speaker
- Ceiling height
- Degree of overlap desired

The chart below shows the effective coverage diameter of the EVID models assuming a 4-foot listening plane height. Using these figures you can lay out a coverage pattern for the job after deciding the overlap criteria.

MODEL	CEILING HEIGHT			
	8	12	20	24
C4.2	17'	34'	68'	85'
C8.2	11.5'	23'	45'	57'
C8.2HC	6.5'	12'	24'	30'
C10.1	180 degree coverage			

The “High Ceiling” Solution - A Replacement for the 920-8B

The EVID C8.2HC is the perfect replacement for the EV 920-8B in many installations. The waveguide coupled controlled coverage acoustic design and the high power-handling make the package ideal for Ballrooms, Gymnasiums, Smaller convention centers etc. The chart below gives a summary of the critical specifications of the C8.2HC and the 920-8B. Note that while the 920-8B can deliver more absolute SPL, the tighter coverage pattern of the C8.2HC provides more intelligibility at lower volumes so the net effect is a more efficient system design.

	EV C8.2HC	EV 920-8B
Sensitivity	91 db	98 dB
Maximum Power Handling	150 watts	125 watts
Max. Transformer Tap	60 watts	32 watts
Frequency Response	60Hz - 18kHz	70Hz - 15kHz
Max. cont. SPL @ 8ohms	113.1 dB	118.8 dB
Max. SPL w/standard transformer	109 dB	113 dB
Coverage Pattern	75 deg. Conical	120 deg. Conical

FAQ's For EVID Ceiling Systems

System Design Questions

Can I paint the EVID speakers to match the environment?

Yes, the bezel of the EVID C4.2, C8.2, C8.2HC & C10.1 are made of high impact ABS that accepts a wide variety of paints. The grille is powder coated steel and is easily painted as well.

What finishes are the EVID models available in?

The EVID ceiling speaker lineup is available only in white. They are pre-coated to eliminate fading, improve appearance and provide an easy to paint surface.

The installation requires no logo is visible on the speaker. What can I do?

In this situation it is easy to “white out” the logo so that it becomes nearly impossible to see. Since the design of the EVID line is attractive and subtle, these requests will generally be quite rare.

Can I use the EVID C10.1 outdoors?

In general it should be OK. Since the EVID C10.1 subwoofer is installed in a ceiling it will be protected from contact with moisture. The woofer is constructed of polypropylene so it is inherently weather resistant.

Can I use the C10.1 ceiling subwoofer with an external crossover and separate power amp channel?

Yes. The C10.1 has an internal passive crossover but you can also use an active crossover and power the subwoofers from a different amplifier channel than the satellite speakers. Using the C10.1 this way also allows for larger and more flexible installations.

When using an active crossover, the recommended crossover range is anywhere between 60 Hz and 160 Hz. Use higher frequencies for the C4.2, and lower ranges for the C8.2 and C8.2HC. Different rooms can sound better with different crossover points, even using the same speakers, so experiment with what sounds best for your speakers and room. Use as 12dB to 24db crossover slope.

What general guidelines do I consider when deciding on the physical placement of the EVID C10.1 ceiling subwoofer?

It is often desirable to place the subwoofer in the middle of the room to get the most uniform coverage. Even though a subwoofer projects sound omni directionally and that the sound is generally not localizable, there is still a reduction in subwoofer sound level the farther away one gets from the subwoofers installed location. Placement in the middle of a room however lowers the sensitivity and ultimate maximum SPL of the subwoofer. You can also use additional subwoofers in order to attain more even

coverage. To get good SPL levels, it might be necessary in some applications to install the C10.1 subwoofer along a wall or in a corner.

What typical subwoofer/satellite system configurations are possible?

The EVID Series contains a variety of models, allowing great flexibility to configure a system to fit the requirements of many different applications. Some typical examples are illustrated at the end of this guide. It is important to remember that the C10.1 works very well with all of the EVID surface mount models also.

How large an area can an EVID ceiling system cover?

A system consisting of one C10.1 subwoofer and six to eight C4.2 or eight C8.2 satellites can cover up to a 4000 square foot room with balanced, even coverage. The estimate of 4000 square feet is a typical coverage area. You can scale the coverage up or down to adjust for applications with different SPL requirements and different size rooms.

What are some techniques to properly balance the levels between the subwoofer and satellites?

The required sensitivity balance between the subwoofer and satellites varies by the musical requirements of the application. A sports bar or health club for example might require much more bass content than does a low level background music system.

Sensitivity of the satellite section varies depending on the particular satellite model chosen, the number of speakers employed and the wiring configuration. Higher satellite sensitivities result in less relative subwoofer level.

It's generally best to position the subwoofer after the rest of the system is installed, changing its location to achieve the optimum bass level. The acoustic volume level of the subwoofer can be raised or lowered by moving its position within the room. Beginning at a corner junction in the room you can enhance bass output by moving the subwoofer closer to the ceiling or floor; you can reduce apparent bass output by moving it out onto the center of a wall. You can decrease bass output further by suspending it in the middle of the room.

Specification Questions

Are the EVID ceiling speakers protected against excessive input power?

Yes, protection circuitry is included inside all models. This circuit gives full-range protection including the woofer and tweeter. The protection circuit operates in all modes.

What are the characteristics of the matching transformers in the EVID models?

EVID ceiling speakers incorporate high performance transformers that are very stable at all frequencies in their range and exhibit very little low-frequency saturation. The matching transformers in all the EVID units are designed to provide full rated output

down to the low frequency limit in its specification with virtually no saturation. In addition, the insertion loss of less than 0.5 db is extremely low. This results in less heat generation, higher power transfer and more speaker efficiency.

Do the EVID ceiling speakers work with both 70v and 100v systems?

Yes all ceiling speaker models work on both 100v and 70.7v lines.

What are the power taps for the various EVID “t” models”?

- **C4.2 and the C8.2:** The power taps are 30w, 15w, 7.5w, 3.75w and 1.88w both 70.7v and 100v.
- **C8.2HC and the C10.1:** The power taps are 60w, 30w, 15w and 7.5w at both 70.7v and 100v.

A rotary switch on the baffle selects the taps for all models. The switch is marked showing the positions to use for the settings at 70v and 100v.

What equalization should I use for EVID ceiling systems?

The proper equalization settings depend on many factors, such as the quantity of speakers, the room characteristics, the typical operating level, the residual background noise in the venue, and the type of audience. The wide frequency response and high power handling of EVID systems lets you use a wide variety of equalization settings.

EVID Ceiling Speaker System Designs

What are some typical systems designs incorporating EVID series speakers?

The EVID series of ceiling speaker systems are especially well suited to working with the MA series mixer amps or the CPS-1, CPS-2 and CPS2T power amplifiers. In the following section there are a number of suggested installation examples for a variety of environments incorporating EV amplification products.

Please note: The equipment lists which follow do not list other required pieces commonly used in sound installations such as source playback equipment and paging hardware.

System Design Examples

Small Bar or Restaurant

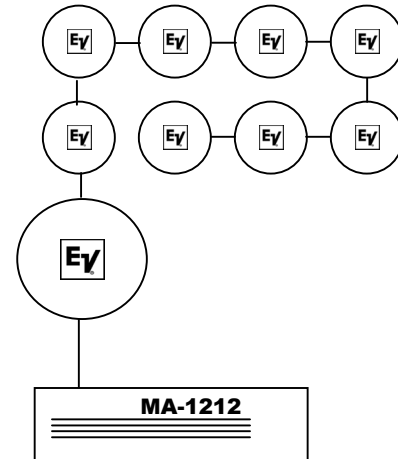
Room size: 2500 Sq Ft.

Source: Mid level music

70.7v system tapped at 7.5 watts

Equipment List

<i>Item</i>	<i>Quantity</i>	<i>Model</i>
<i>Speakers</i>		
<i>Main – Full Range</i>	8	EVIDC4.2
<i>Subwoofer</i>	1	EVID C10.1
<i>Amplification</i>		
<i>Mixer/Amplifier</i>	1	MA-1212



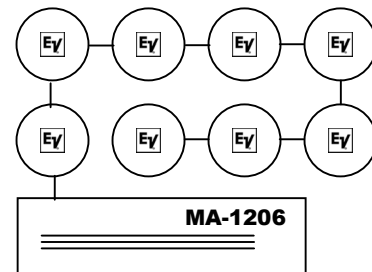
Doctors Office

Room size: 300 Sq Ft.

Source: Low level programmed music & voice paging

Equipment List

<i>Item</i>	<i>Quantity</i>	<i>Model</i>
<i>Speakers</i>		
<i>Main – Full Range</i>	8	EVID C4.2
<i>Subwoofer</i>	N/A	
<i>Amplification</i>		
<i>Mixer/Amplifier</i>	1	MA-1206



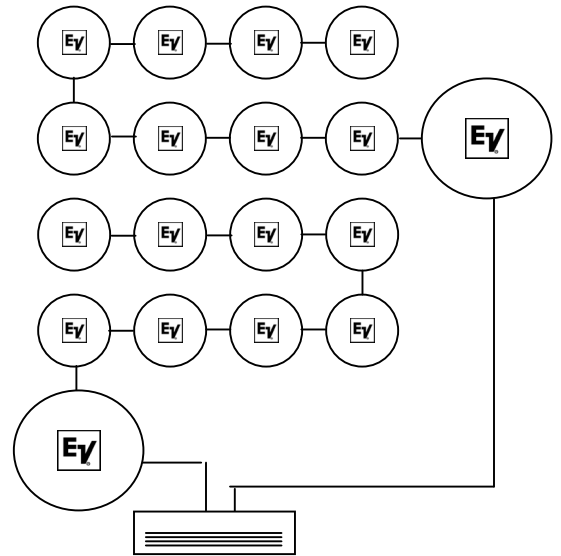
Large Retail Store

Room size: 6000 Sq Ft.

Source: Mid level music & voice paging

Equipment List

<i>Item</i>	<i>Quantity</i>	<i>Model</i>
Speakers		
<i>Main – Full Range</i>	16	EVID C8.2
<i>Subwoofer</i>	2	EVID C10.1
Amplification		
<i>Power Amplifier</i>	1	CPS-2T



Shopping Mall

Total area: 100000 Sq Ft.

Source: Low level music & voice paging

C8.2HC's tapped at the 7.5 watt setting

Equipment List

<i>Item</i>	<i>Quantity</i>	<i>Model</i>
Speakers		
<i>Main – Full Range</i>	80	EVID C8.2HC
<i>Subwoofer</i>	N/A	
Amplification		
<i>Power Amplifier</i>	1	CPS-2T

