



Version 2

A P P L I C A T I O N G U I D E

f o r

Nightclubs



Mercury Lounge

SITE .. *New York City*

APPLICATION .. *Live Music Club*

DEVICES USED .. *JF200, SB250, SM500iV*

DESIGNER .. *Matthew Kasha*



The Laws of Physics / The Art of Listening

Eastern Acoustic Works Application Guide: An Introduction

This is the second installment in the Eastern Acoustic Works Application Support Guide series. The goal of this series is to offer concise, accurate guidance on the application EAW loudspeaker products for specific applications.

No general handbook can address every situation you might encounter or realistically cover the full range of options available. Working with the most commonly employed design concepts, we discuss the pros and cons of each option, and suggest a range of EAW products that could be applied to each design.

This chapter will focus on nightclubs, sports bars, and other similar entertainment venues from the intimate nightclub to the extravagant multi-level dance mega-club. As with each facility type this one presents its own unique set of challenges and problems for the sound system designer/installer. EAW's goal, for this and all other application types, is to provide the designer with a comprehensive set of tools that solve specific application problems and let you deliver excellent sound to each and every job you do.

General Design Criteria for Nightclubs

For the majority of facilities in this market segment the main criteria related to sound system design and performance are focused on three areas:

- Mid to high level playback of recorded music sources
- Wide bandwidth capabilities
- Complete coverage of all listening areas

In addition, many nightclubs feature live music which presents its own set of problems.

Sound system designs for larger or "higher end" venues may need to deal with such issues as distributed reinforcement or separately controlled coverage zones.

While the invisibility of the sound system components is rarely an issue in these applications, space limitations (particularly from low ceilings) and the need for open sight lines may be. Aesthetic integration of the sound system with a facility's interior decor and design elements typically plays a significant role in themed establishments. Finally, reliability and simplicity of operation are always important factors in any sound system design, regardless of application.

The ability to reproduce program material at output levels appropriate to the venue is paramount in night spot sound system design. Output levels appropriate to a sports bar or cocktail lounge will typically be lower than those required for a dance club catering to techno/rave fans. Therefore, the venue's maximum SPL requirement must be known before design work can begin.

Nightclubs that feature live music as a primary or secondary source have unique sound system requirements that must be met. Source localization at the stage must be achieved and foldback monitoring for the performers must be achieved.

Virtually all types of entertainment venues, even restaurants, demand full bandwidth reproduction of musical material. This means that sub bass loudspeakers must be incorporated into the overall design. As "half-space loading" can increase their output, subwoofer placement should be given considerable thought. Placing subwoofers on an acoustically reflective floor, for example,

continued

adds 3 dB SPL of output. Placement at the intersection of a wall and a floor adds 6 dB SPL, and where two walls and the floor meet adds 9 dB.

To a certain extent, low frequency soundwaves can "see through" walls and furniture, meaning that they don't need to "see" everywhere they're intended to cover. Thus subwoofers can be built into stages, benches or bars with little or no sacrifice in performance.

The ability to produce smooth, even coverage of reproduced music and other audio feeds (broadcast signals in sports bars for example) is a major design goal for any type of venue. In this regard, configurations range from the simple, rectangular bar-room to the multi-level, multi-theme dance club complete with multiple private rooms.

As mentioned above, aesthetics can also be a principal issue. For example, the ability to match colors to a themed interior design or to insure that speakers do not create a clash with other interior design elements is often necessary. To accommodate these requirements, EAW dealers can special order a color match to any Pan-Tone shade if needed, and other customization options can be employed as required.

Program Material

Although there are as many variations on the mix of program material utilized in clubs and bars as there are clubs and bars, in general the following types of program are found almost everywhere:

- Digital sources (CD/DAT) at moderate to high SPL
- Live music at high SPL
- Speech (paging, DJ announcements, etc.)
- Background music

To ensure that the design meets the establishment's actual needs the system designer/consultant must make an accurate determination of the exact mix of program material to be reproduced. This will help guarantee that the correct choices are made regarding the number of loudspeakers and the types to be installed. Detailed discussions at the initial planning stages of the project are the most accurate way to gather this information. A site visit is also recommended where feasible.

Since a club's needs may change at any time, the wise designer will always plan for the "worst case scenario" in nightclubs as far as budgets will permit.

General Design Concepts for Nightclubs

With the vast majority of night spots, the maximum desired SPL will determine the type and placement of loudspeakers. Venues in which live performances take place require the sound system to provide source localization at the stage to the greatest degree possible. Also, sports bars that rely heavily on video screens need to associate sound to particular screens.

Outside these situations, distributed approaches work best for the diverse architectural styles the designer will encounter. Distributed systems can provide superior coverage of venues with out-of-the-way nooks, oddly configured bars and multiple rooms. Also, this approach permits the separate control of sound levels for the different areas that can exist within even a small establishment.

Small Bar/Club

As with any venue, the desired ambiance and intended use of the space will determine the type of sound system to be installed and no rule-of-thumb truly applies. Some restaurants want high-impact music; some live music clubs strive for intimacy.

Many smaller establishments break their limited floor space into separate zones that each serve a desired function. Typically, a dance floor will require higher sound levels than seating areas. Loudspeakers should be placed to keep the higher SPLs within the dance floor space, permitting patrons to enjoy both the bar/dining area and the entertainment spaces without significant overlap or acoustic spill.

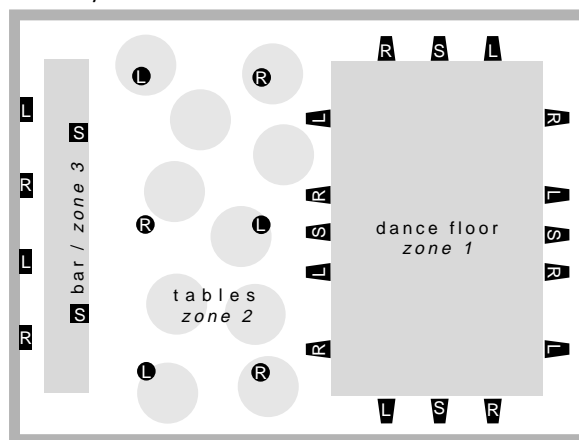
To accomplish this a distributed sound system approach is the most efficient methodology. This technique permits precise choices to be made in the selection of loudspeakers to control coverage and accommodate the level variations needed in these distinct areas.

In many small clubs where floor space is at a premium, EAW's DS Series of slant-baffled loudspeakers provide an excellent solution. Specifically designed for overhead mounting, the series offers high output two- and three-way systems that provide smooth frequency response in the nearfield.

The MK Series of two-way loudspeakers offer an enhanced level of pattern control in reverberant spaces or in situations where a high degree of separation between coverage zones is desired. Powerful, compact subwoofers such as the SB180 or SB250 can be built into architectural features to provide sub bass impact without sacrificing floor space.

Compact distributed loudspeakers are usually the choice for the bar/dining areas. The UB Series of ultra compact two-way systems can be mounted overhead where they virtually disappear. For venues requiring higher output, the JF Series of compact two-way systems offers a variety of capable problem-solvers.

Small Club/Bar



- ▣ = Suspended Speaker
- ▣ = Suspended Subwoofer
- = Ceiling Mounted Speaker
- = Wall Mounted Speaker
- ▣ = Built-in Subwoofer

SUGGESTED SUSPENDED LOUDSPEAKERS

ASR695
ASR665
ASR690
ASR660
DS122e
DS123e
DS153e
DS223e
FL103
FR122e
FR152e
FR153e
JF100e
JF200e
JF260e
JF560e
LA212
LA215
MK2164
MK2194
MK5164
MK5194

SUGGESTED SUSPENDED SUBWOOFERS

SB150P
SB180P
SB250P

SUGGESTED CEILING LOUDSPEAKERS

L8Cx2x0
DS122e
DS123e
JF60
JF80
UB12S
UB22

SUGGESTED BUILT-IN SUBWOOFERS

SB150P
SB180P
SB250P
SB528eP

SUGGESTED WALL-MOUNTED LOUDSPEAKERS

DS122e
DS123e
DS153e
DS223e
JF60
JF80
JF100e
JF200e
UB22
UB80
UB82

Small/Medium Sized Live Music Club

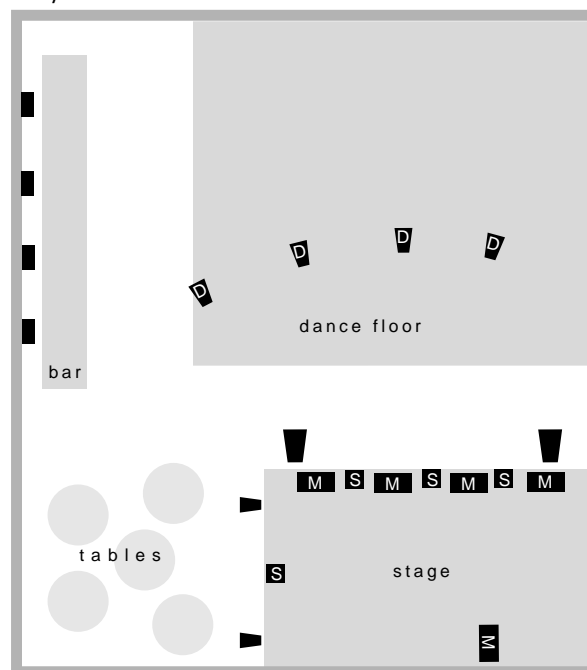
Faithfully reproducing high energy live music may be the most challenging application the sound system designer is likely to encounter. These spaces are rarely chosen for their acoustics and may feature a low ceiling, concrete floors, cinderblock walls or a combination of all three.

Generating live music SPL's requires very robust loudspeakers. To cover the patrons standing directly in front of the performers, these loudspeakers may "see" the microphones, creating feedback problems. Horn-loading the high frequency or mid/high elements will improve pattern control, but at the expense of smooth nearfield response.

EAW loudspeakers with HF drivers loaded with Wave Guide Plates™ (WGP's) offer a "best of both worlds" solution. These shallow, throatless horns are engineered for wide angled dispersion. In the LA Series they load mighty 2-in exit compression drivers, providing HF pattern control over a wide area. Since they have no throat, distortion is greatly reduced, improving nearfield response.

Live music venues must also provide accurate foldback monitoring for performers onstage. EAW's SM Series of stage monitors are designed to cut through the onstage cacophony to give performers accurate reference. The series offers a range of systems in a variety of configurations with a variety of coverage patterns.

Small/Medium Live Club



- V** = Suspended/Stacked Main Speaker
- S** = Suspended Subwoofer
- D** = Delayed Speaker
- W** = Wall Mounted Speaker
- B** = Built-in Subwoofer
- M** = Stage Monitor

SUGGESTED SUSPENDED/STACKED MAIN LOUDSPEAKERS

ASR695
ASR665
ASR690
ASR660
AS660i
AS690i
AS460 or
AS490
w/ AS422 or
w/ AS415
KF300e
KF650e
KF695e
JF100e
JF200e
JF260e
JF560e
LA325
LA460

SUGGESTED DELAY LOUDSPEAKERS

AS660i
AS690i
FL103
FR122e
FR152e
FR153e
JF100e
JF200e
JF260e
JF560e
LA212
LA215
MK2164
MK2194
MK5164
MK5194
UB82

SUGGESTED BUILT-IN SUBWOOFERS

SB250P
SB528eP
SB1000e

SUGGESTED STAGE MONITOR LOUDSPEAKERS

LA212
LA215
SM122e
SM155e
SM200iH
SM260iV
SM400iH
SM500iV

SUGGESTED WALL-MOUNTED LOUDSPEAKERS

DS122e
DS123e
DS153e
DS223e
JF60
JF80
JF100e
JF200e
UB82

Medium Sized Dance Club/Sports Bar

System designs for these applications can become complex when the sound system must be tied into a video or Karaoke display and/or multiple zones are specified, with each capable of carrying a separate feed.

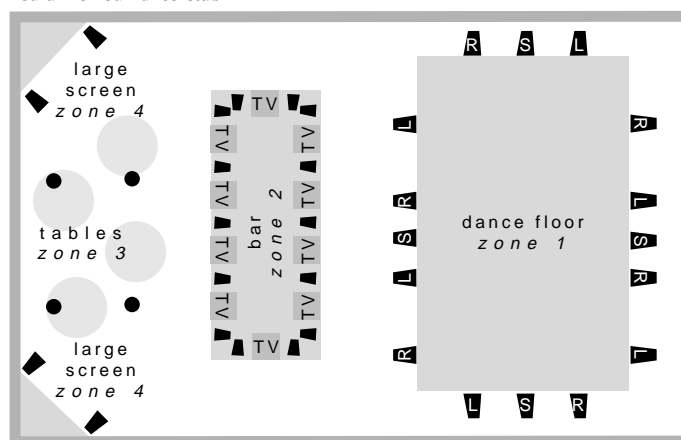
When source localization is required, loudspeakers should be clustered around the video source. These are typically projection systems, but should a CRT monitor be involved, loudspeakers selected must be magnetically shielded. EAW's UB12S and JF50S two-way systems provide this function.

While a similar distributed system to that employed in the smaller clubs and bars will usually suffice for the bar/seating/dining areas, larger two or three way systems such as the EAW AS660 or KF650 will be needed for the dance floor areas.

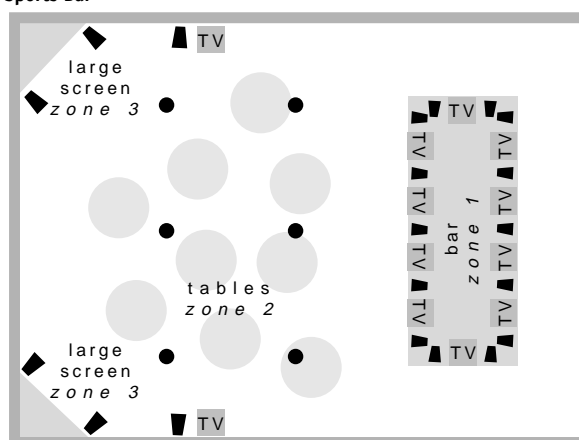
A sufficient number of sub woofer systems will need to be specified to insure both adequate SPL and perceived sub bass presence. Please refer to the discussion on "half-space loading" in the introduction to this guide. To a certain extent, low frequency soundwaves can "see through" walls and furniture, meaning that they don't need to "see" everywhere they're intended to cover. Thus subwoofers can be built into risers, bars or DJ booths with little or no sacrifice in performance. SB Series systems up to SB528 dual 18-in system are appropriate.





In many ways, today's DJ is himself a performer, mixing back and forth between pop music and "canned" beat tracks, and adding ad lib "scratching." As such, DJ's today require accurate reference monitoring. EAW's MS Series of two- and three-way systems offer studio-quality reference at sound reinforcement output levels.

Medium-Sized Dance Club



Sports Bar



-  = Suspended Speaker
-  = Suspended Speaker, Left or Right Channel
-  = Suspended Subwoofer
-  = Ceiling Mounted Speaker

SUGGESTED MAIN VIDEO MONITOR LOUDSPEAKERS	SUGGESTED AUXILIARY VIDEO MONITOR LOUDSPEAKERS	SUGGESTED CEILING LOUDSPEAKERS	SUGGESTED DANCE FLOOR LOUDSPEAKERS	
AS660i	JF50S	L8Cx2x0		
AS690i	JF60	DS122e	ASR695	LA325
JF100e	JF80	DS123e	ASR665	LA460
JF200e	MS20	JF60	ASR690	MK2164
JF260e	MS30C	JF80	ASR660	MK2194
JF560e	UB12S	UB12S	DS123	MK5164
KF300e	UB82		DS153	MK5194
KF650e			DS223	
LA212	SUGGESTED SUSPENDED		JF100e	
LA215	SUBWOOFERS		JF200e	
MK2164	SB150P		JF260e	
MK2194	SB180P		JF560e	
MK5164	SB250P		KF300e	
MK5194			KF650e	

Large Dance Club

While some clubs may take the approach of using large touring sound arrays for the dance floor areas, a distributed three-way system will usually provide both more consistent and controlled coverage and a more spectrally balanced, higher overall SPL capability. For this purpose, EAW's MH Series of mid/high Virtual Array systems provide the output and pattern control required. Paired with a BV Series low frequency system, they create true three-way arrays that fill the largest spaces with high quality, high energy sound.

A sufficient number of sub woofer systems will need to be specified to insure both adequate SPL and perceived sub bass presence. Please refer to the discussion on "half-space loading" in the introduction to this guide. To a certain extent, low frequency soundwaves can "see through" walls and furniture, meaning that they don't need to "see" everywhere they're intended to cover. Thus subwoofers can be built into risers, bars or DJ booths with little or no sacrifice in performance.

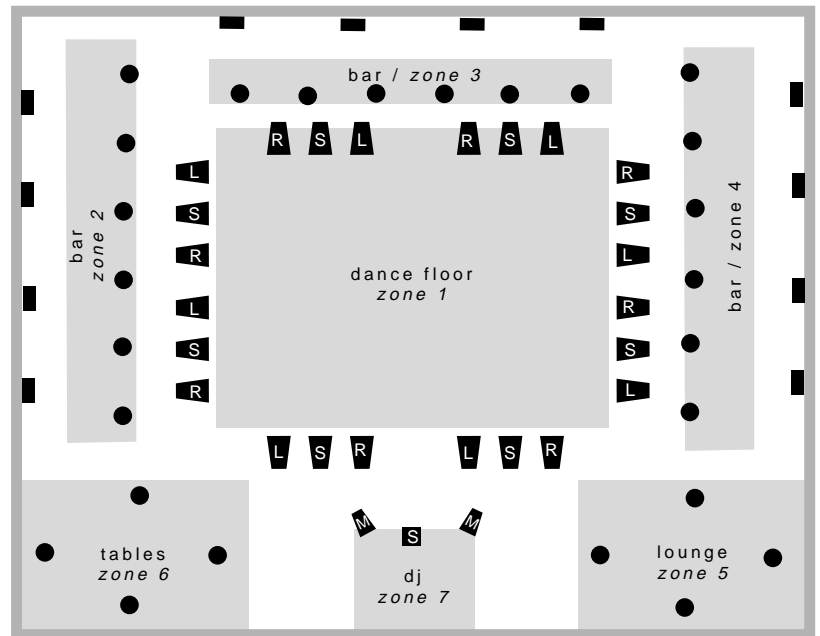
Multi-channel sound effects playback or surround style reinforcement will necessitate the use of carefully positioned satellite mini-clusters or similar designs. Both directional realism and controlled coverage are the targets for these systems. Products such as the EAW KF300e or AS660 systems are ideal solutions for those applications.

In larger venues, the total sound system includes a separate high quality two-way distributed system to cover auxiliary areas such as a VIP lounge. This allows both level control and source selection to be accomplished while still ensuring quality sound and a seamless acoustic splice between areas. EAW's MK or JF Series systems can capably fill these spaces with high definition sound at high output levels.

In many ways, today's DJ is himself a performer, mixing back and forth between pop music and "canned" beat tracks, and adding ad lib "scratching." As such, DJ's today require accurate reference monitoring. EAW's MS Series of two- and three-way systems offer studio-quality reference at sound reinforcement output levels.

In those establishments with multiple floors or themed areas, a combination of all of the above concepts may be used to deliver the needed sound, while controlling acoustic spill and level where appropriate.

Large Dance Club



- L R** = Suspended Speaker, Left or Right Channel
- S** = Suspended Subwoofer
- = Ceiling Mounted Speaker
- = Wall Mounted Speaker
- S** = Built-in Subwoofer
- M** = Monitor Speaker

SUGGESTED SUSPENDED/STACKED MAIN LOUDSPEAKERS

KF650e
KF695e
KF850EP
LA325
LA460
MH660iE or
MH690iE
w/ BV525P
MH662iE or
MH692iE
w/ BV535P

SUGGESTED CEILING LOUDSPEAKERS

L8Cx2x0
DS122e
DS123e
JF60
JF80
UB12S

SUGGESTED BUILT-IN SUBWOOFERS

SB150P
SB180P
SB250P
SB528eP
SB1000e

SUGGESTED WALL-MOUNTED LOUDSPEAKERS

ASR695
ASR665
ASR690
ASR660
DS122e
DS123e
DS153e
DS223e

JF60
JF80
JF100e
JF200e
UB82

SUGGESTED SUSPENDED SUBWOOFERS

SB150P
SB180P
SB250P
SB1000e

Large Live Music Club

For reinforcement of big-name acts in showcase live music venues, EAW's KF850 three-way loudspeaker is specified on more artists rider's than any other loudspeaker. For this reason it is known as "The World Touring Standard."

For venues where the KF850 is too large, the KF650 or KF300e provide many of the same performance qualities in more compact enclosures. Properly sized SB Series subwoofers complement each KF Series full range system. Subwoofers in trapezoidal enclosures can be flown or arrayed with the full range systems.

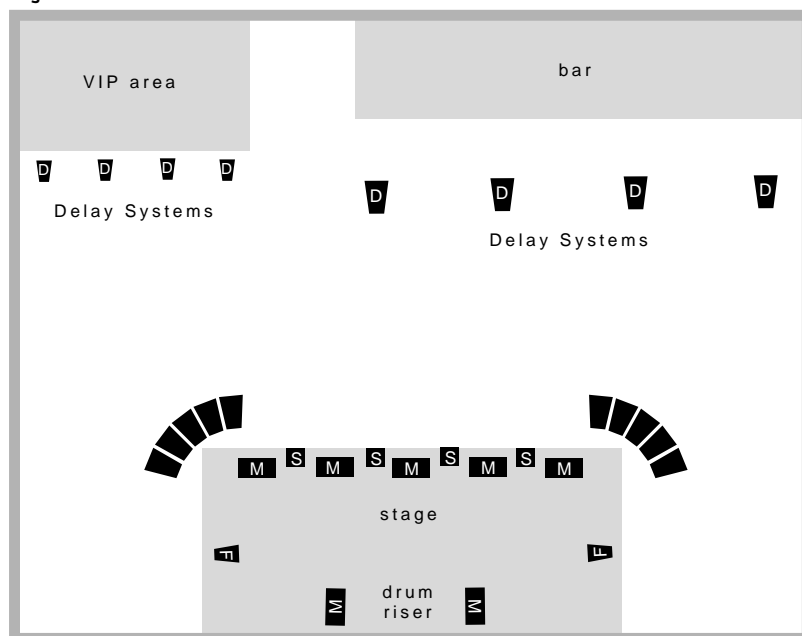
Typically, a central or left/right cluster approach will provide excellent source localization and complete coverage at the necessary SPL's to fulfill the audience's expectations of excitement. An appropriate number of subwoofers should be specified to ensure adequate LF response.

Live music venues must also provide accurate foldback monitoring for performers onstage. EAW's SM Series of stage monitors are designed to cut through the onstage cacophony to give performers accurate reference. The series offers a range of systems in a variety of configurations with a variety of coverage patterns.

The largest live music venues should also include sidefill monitors. The FR253e and LA325 three-way systems provide high output, high definition sound without sounding harsh in the nearfield.

Auxiliary areas require coverage from a distributed system such as is discussed in the "Large Dance Club" section above.

Large Live Music Club



- = Suspended/Stacked Speaker
- = Monitor Speaker
- = Built-in Subwoofer
- = Sidefill Speaker
- = Delayed Speaker

SUGGESTED SUSPENDED/ STACKED MAIN/SIDEFILL LOUDSPEAKERS

KF650e
KF695e
KF850e
FR253e (fill only)
LA325 (fill only)

SUGGESTED DELAY LOUDSPEAKERS

ASR695
ASR665
ASR690
ASR660
JF100e
JF200e
JF260e
JF560e

SUGGESTED BUILT-IN SUBWOOFERS

SB528eP
SB1000e

SUGGESTED STAGE MONITOR LOUDSPEAKERS

JH15
SM200iH
SM260iV
SM400iH
SM500iV