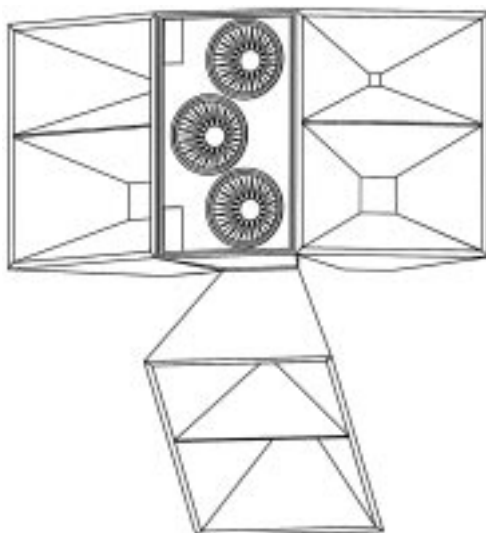




P R O D U C T U S A G E G U I D E

*f o r*

# *MQ Series Systems*



The Laws of Physics / The Art of Listening

**Eastern Acoustic Works' Product Usage Guide:  
An Introduction**

This is the sixth installment in the Eastern Acoustic Works Product Usage Guide series. The goal of this series is to offer concise, accurate guidance on the use EAW loudspeaker products.

Each guide will offer a concise overview of a particular product series and illustrate the most common methods of use. Complementary systems, such as subwoofers, will be recommended for each system and the appropriate MX Series Close Coupled Processor configuration for each combination will be discussed.

This chapter will focus on the MQ Series of dedicated mid/high and low frequency VA<sup>4</sup> loudspeaker systems.

**MQ Series Systems**

The MQ Series of loudspeakers are specifically designed for high-performance in permanent installations. This guide will explain some of the performance features and capabilities and show how MQ Series loudspeakers can be used in a variety of different ways.

**MQ Series Background and Description**

The MQ Series comprises an integrated set of biamplified two-way mid/high frequency modules and low frequency modules optimized to array with them in specific combinations. The MQ Series is intended exclusively for permanent installations. Each mid/high module uses one or two horn-loaded VA<sup>4</sup> 10-in mid cone/radial phase plug assemblies and a 2-in exit/75mm horn-loaded HF compression driver. Horn-loading of the mid and high frequency drivers allows the MQ Series modules to maintain accurate pattern control over their operating bandwidths. This lets the modules array with minimal interference and makes them suitable for a variety of applications where fidelity, control and high output are required. Beamwidth vs. Frequency charts are presented in the appendix to this Application Guide.

The MQ Series mid/high modules offer a variety of horizontal and vertical dispersion patterns. Table 1 below summarizes the primary specifications.

|   | <b>MQ1364</b> | <b>MQ1366</b> | <b>MQ1394</b> | <b>MQ2364</b> | <b>MQ2394</b> |
|---|---------------|---------------|---------------|---------------|---------------|
| <b>Coverage</b><br>(H x V)                    | 60°x40°       | 60°x60°       | 90°x40°       | 60°x40°       | 90°x40°       |
| <b>MF Cone(s)</b><br>(horn-loaded)            | 1x 10-in      | 1x 10-in      | 1x 10-in      | 2x 10-in      | 2x 10-in      |
| <b>Nominal Impedance</b>                      | 8 Ohms        | 8 Ohms        | 8 Ohms        | 4 Ohms        | 4 Ohms        |
| <b>Sensitivity</b><br>(1W @ 1m)               | 109.5 dB SPL  | 109.5 dB SPL  | 108.5 dB SPL  | 112.0 dB SPL  | 111.0 dB SPL  |
| <b>Power Handling</b><br>(AES Standard)       | 400 Watts     | 400 Watts     | 400 Watts     | 800 Watts     | 800 Watts     |
| <b>HF Compression Driver</b><br>(horn-loaded) | 1x 2-in exit  | 1x 2-in exit  | 1x 2-in exit  | 1x 2-in exit  | 1x 2-in exit  |
| <b>Nominal Impedance</b>                      | 8 Ohms        | 8 Ohms        | 8 Ohms        | 8 Ohms        | 8 Ohms        |
| <b>Sensitivity</b><br>(1W @ 1m)               | 114.0 dB SPL  | 112.0 dB SPL  | 110.5 dB SPL  | 114.0 dB SPL  | 110.5 dB SPL  |
| <b>Power Handling</b><br>(AES Standard)       | 200 Watts     | 200 Watts     | 200 Watts     | 200 Watts     | 200 Watts     |

Specific low frequency and sub bass modules complement the MQ Series systems to create three-or four-way arrays. Table 2 below summarizes the primary specifications.

|   | <i><b>MQ1312</b></i> | <i><b>MQ2412</b></i> | <i><b>TD412<br/>inner</b></i> | <i><b>TD412<br/>outer</b></i> | <i><b>TD415<br/>inner</b></i> | <i><b>TD415<br/>outer</b></i> | <i><b>SB528e</b></i> | <i><b>SB1000e</b></i> |
|---|----------------------|----------------------|-------------------------------|-------------------------------|-------------------------------|-------------------------------|----------------------|-----------------------|
| <b>LF Cone(s)</b>                           | 3x 12-in             | 4x 12-in             | 2x 8-in                       | 2x 12-in                      | 2x 12-in                      | 2x 15-in                      | 2x 18-in             | 2x 18-in              |
| <b>Nominal Impedance (Ohms)</b>             | 3x 8                 | 2x 4                 | 2x 12                         | 2x 8                          | 2x 8                          | 2x 8                          | 4                    | 4                     |
| <b>Sensitivity (1W @ 1m/ dB SPL)</b>        | 97                   | 97                   | 101                           | 101                           | 101                           | 101                           | 99                   | 99                    |
| <b>Power Handling (AES Standard/ Watts)</b> | 1500                 | 2000                 | 400                           | 1000                          | 1000                          | 1600                          | 2000                 | 2000                  |

Table 3 below indicates the most typical low frequency-mid/high combinations.

|               | <i><b>MQ1364</b></i> | <i><b>MQ1366</b></i> | <i><b>MQ1394</b></i> | <i><b>MQ2364</b></i> | <i><b>MQ2394</b></i> |
|---------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| <b>MQ1312</b> | X                    | X                    | X                    | —                    | —                    |
| <b>MQ2412</b> | —                    | —                    | —                    | X                    | X                    |
| <b>TD412</b>  | X                    | X                    | X                    | —                    | —                    |
| <b>TD415</b>  | —                    | —                    | —                    | X                    | X                    |

### **VA<sup>4</sup> Technology**

The MQ Series uses the newly designed VA<sup>4</sup> 10-in mid frequency cone and phase plug assembly. Most cone drivers smear arrival times in the upper mids because energy from the dustcap leads that from the cone and surround.

Conventional circular-entrance phase plugs equalize the smear but create directivity problems.

The VA<sup>4</sup> mid cone uses a more logical geometry that equalizes arrivals at all frequencies. The phase plug, consisting of expanding radial slots within a compressing frame, lowers the mechanical reactance of the load facing the transducer without modifying the directivity associated with the source. This allows for faithful reproduction of upper mid frequencies without any narrowing of beamwidth.

### **Arraying MH Series Enclosures**

Unlike most mid/high and LF array module systems that feature both 90° and 60° horizontal coverage, the MQ Series lets users create tight packed clusters with 2x 90° mid/high enclosures separated by an LF module. This is extremely effective for the center channel in large fan-shaped venues using separate left-center-right arrays.

Conversely, arrays of 2x 60° enclosures separated by an LF module require some degree of splay optimized to the particular array's coverage requirements. Rigging systems currently available allow users up to 10° of overlap between mid/high modules.

### **Mounting/Suspension Facilities**

Each MQ Series and associated woofer and subwoofer system described herein contain (16) 3/8"-16 threaded mounting/suspension points per cabinet, 4 each on the top, bottom and sides. The exceptions are as follows:

MQ433: (24) 3/8"-16 mounting/suspension points per cabinet, 6 each on the top, bottom and sides.

SB1000e: (4) 3-Position Flytracks (2 per side)

The integral mounting/suspension facilities can be used with either commercially-available or custom fabricated suspension systems. Any suspension systems should be reviewed by a qualified structural engineer to ensure adequate safety and compliance with local codes.

### **Processors**

EAW MX Series processors are factory-configured to provide the correct crossover, alignment, equalization and protection for the loudspeaker systems served. The following lists the processor units most commonly used with MQ Series systems:

| <b>Processor Series</b> | <b>Processor Type</b> | <b>Description</b>                                  |
|-------------------------|-----------------------|---|
| MX300i                  | Analog                | Stereo Three-Way                                    |
| MX800i                  | Analog                | Stereo Four-Way                                     |
| MX8600                  | Digital               | Stereo Two-Way/<br>Mono Three-Way/<br>Mono Four-Way |

The MX8600 affords the most flexible approach to any system. In addition to the loudspeaker-specific functions required for proper system operation (crossover, driver alignment, etc.), the MX8600 provides 5 bands of parametric equalization which are fully accessible to the user. These can be used for "house equalization" or other functions. There is also a user-adjustable system delay which can be used to synchronize loudspeaker clusters. Additional information about the MX8600's features and capabilities are included in the appendices to this application guide.

### **Special Versions**

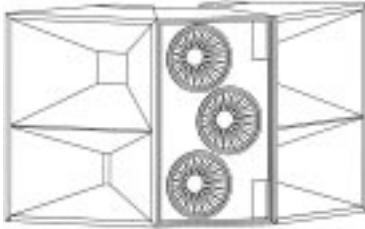
As with most EAW products, special versions of MQ Series products are available. Some of the most frequently requested variants are:

**Finish:** Products can be factory painted to match any paint color. Either the Pantone number of the desired color or a paint chip is required.

**Passive Crossovers:** MQ Series systems and TD412 low frequency systems can be furnished with internal passive crossovers.

**Weatherproof:** Any MQ Series products can be ordered in weatherproof versions.

## TYPICAL MQ SERIES CONFIGURATIONS

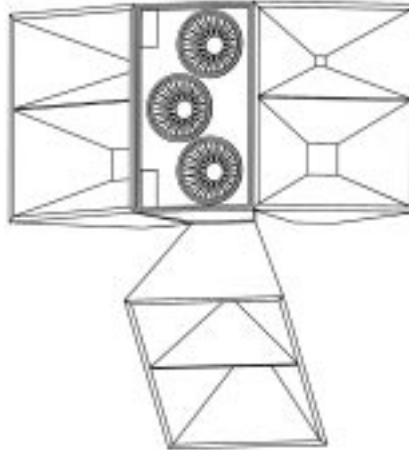


**Figure 1**

Small cluster used for auditorium, church etc.

2x MQ1394 separated by 1x MQ1312.

Note that the 90° horizontal coverage mid/high modules tight pack with the MQ1312 to form an optimized array. This is unique for any 90° system.

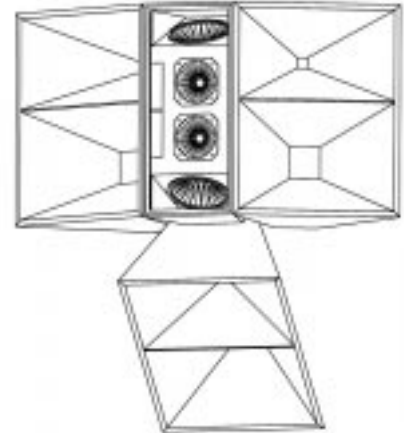


**Figure 2**

Small cluster used for auditorium, church etc.

2x MQ1364 separated by 1x MQ1312 with 1x MQ1394 for downfill.

This system is desirable when off-axis radiation from the LF system is needed to cover the downfill area.



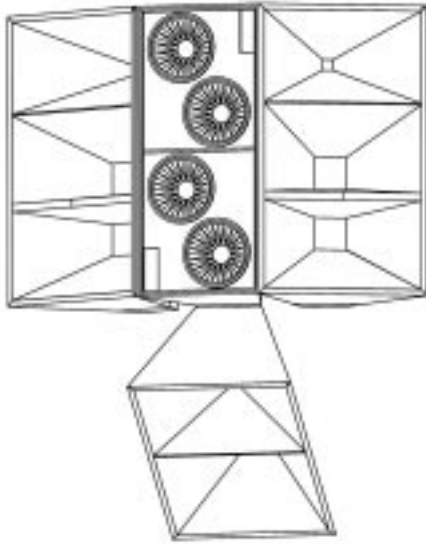
**Figure 3**

Medium cluster used for larger auditorium, church or sports facility.

2x MQ1364 separated by 1x TD412 with 1x MQ1394 for downfill.

This system offers enhanced low frequency pattern control and is best suited to applications where the primary microphone position is directly below the cluster.

## TYPICAL MQ SERIES CONFIGURATIONS (CONT.)

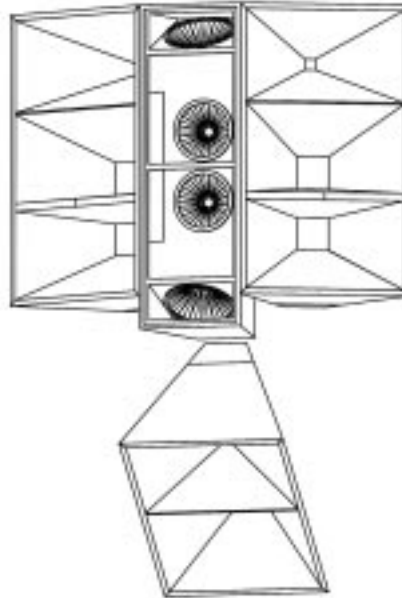


**Figure 4**

Medium cluster used for larger auditorium, church or sports facility.

2x MQ2364 separated by 1x MQ2412 with 1x MQ1394 for downfill.

This system is desirable when off-axis radiation from the LF system is needed to cover the downfill area.

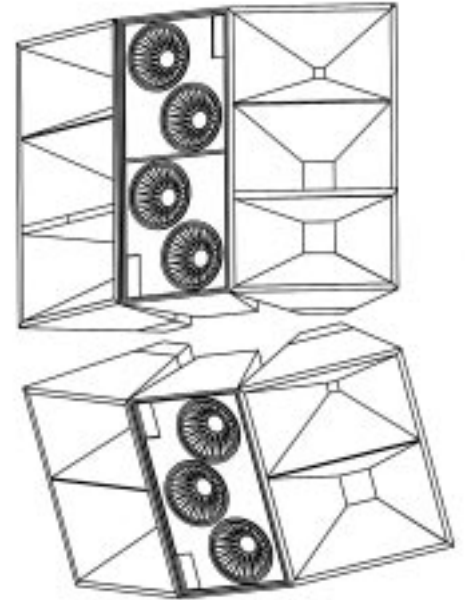


**Figure 5**

Large cluster used for major league sports facility.

2x MQ2364 separated by 1x TD415 with 1x MQ1394 for downfill.

This system offers enhanced low frequency pattern control. It is best suited to reverberant spaces and to applications where the primary microphone position is directly below the cluster.



**Figure 6**

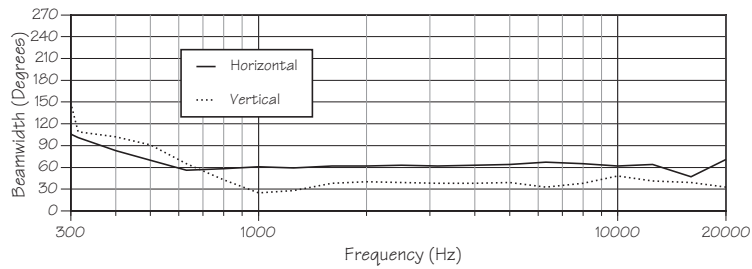
Very large cluster used for major league sports facility.

2x MQ2364 separated by 1x MQ2412 over 2x MQ1364 separated by 1x MQ1312 for downfill.

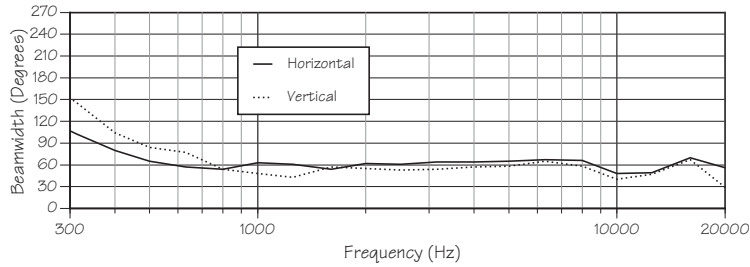
The overall system provides very high output with excellent wide band pattern control. The low frequency line array created by the LF modules provides extended LF pattern control. This cluster is best suited to large scale installations.

## Appendix – Beamwidth vs. Frequency Charts

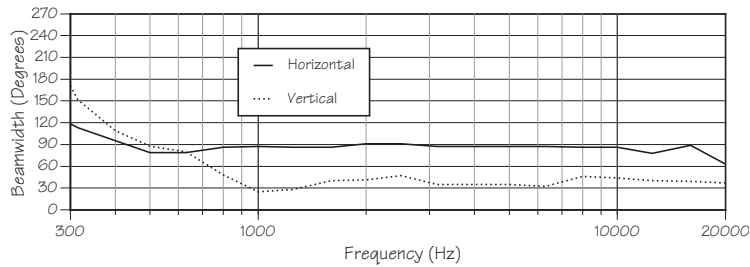
MQ1364



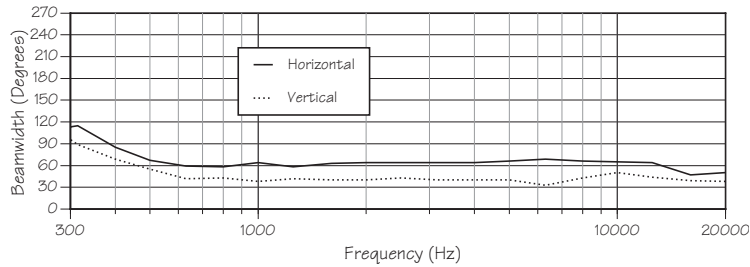
MQ1366



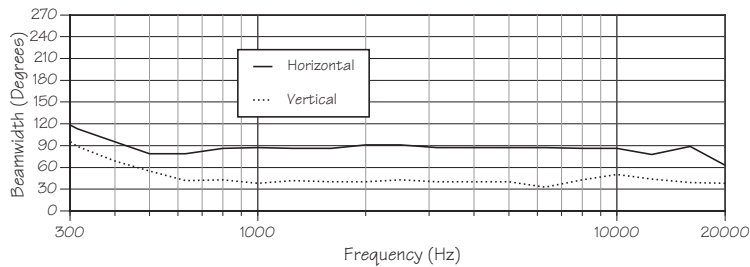
MQ1394



MQ2364



MQ2394



### For More Help...

This application guide was intended to give an overview of some applications for the MQ Series of loudspeaker systems.

For more information, please contact EAW's Application Support Group (ASG) at 1-800-992-5013 or by e-mail at [asg@eaw.com](mailto:asg@eaw.com).



*The Laws of Physics / The Art of Listening*

One Main Street, Whitinsville, MA 01588 tel..800 992 5013 ..508 234 6158 fax..508 234 8251 web..http://www.eaw.com  
EUROPE: EAW International Ltd., tel..+44 1494 539090 fax..+44 1494 539091