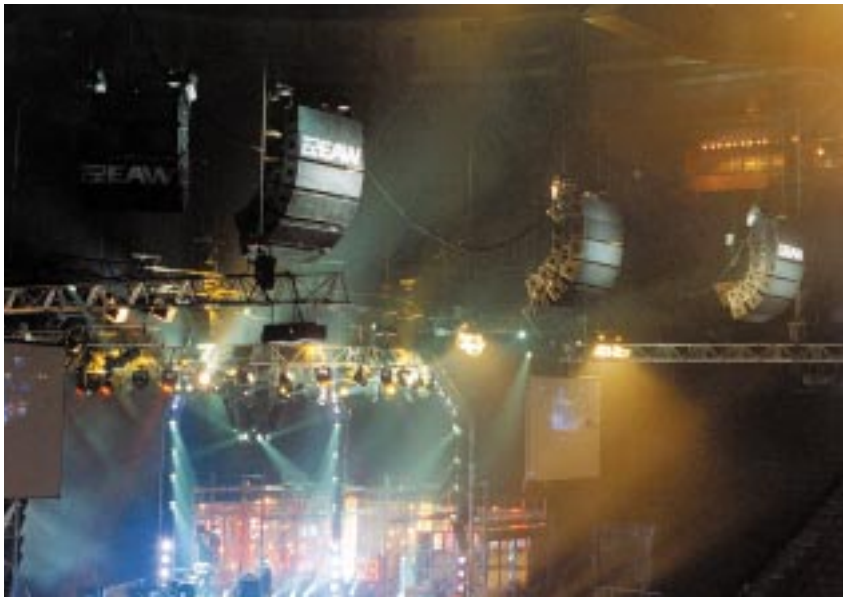
ASG
APPLICATION SUPPORT GROUP
EAW

USER MANUAL

for

KF860 ARRAYS



Juno Awards
GM Place, Vancouver, BC, Canada
Application: Live Sound
Devices Used: KF860, KF850, JF260, KF940, SM200, MX8600
Touring Company: Rocky Mountain Sound

EAW
EASTERN ACOUSTIC WORKS

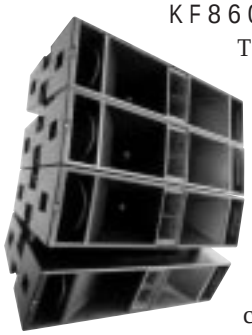
The Laws of Physics / *The Art of Listening*

EASTERN ACOUSTIC WORKS PRODUCT USAGE GUIDE: AN INTRODUCTION

This is the fourth 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. This chapter will focus on the application of the six most common KF860 Series Virtual Line Array configurations.

KF860 SERIES



The KF860/VLA Series comprises two high-output modules optimized to create vertical line arrays. The Series comprises two modules – the KF860 which features a 60° horizontal coverage pattern, and the KF861 which features a 90° pattern for nearfield coverage. Nominal vertical coverage is 30° but the each array's true vertical pattern is determined by the size and configuration of the array as well as by digital signal processor settings.

Each module contains 2x 15-in woofers, 2x horn-loaded 10-in mid frequency cone drivers, and 2x 2-in exit/75mm voice coil compression drivers on constant directivity horns.

KF860 SERIES BACKGROUND AND DESCRIPTION

The KF860/VLA Series was originally developed to help solve specific problems for high-end entertainment industry events that featured both live and broadcast audiences. The key design parameters were minimal array size, high output and broadband pattern control.

Part of the KF860 Series solution was the application of configuration-specific digital signal processing (DSP) to maintain pattern control over an exceptionally wide bandwidth. Settings vary depending on the number of modules in the array and the angle between adjacent modules.Thus two crucial elements of any KF860 Series application are accurately splaying the enclosures and applying the correct DSP settings.

BUILDING AND PROCESSING KF860 SERIES ARRAYS

To maintain accurate and repeatable array angles, EAW developed a unique, all-steel rigging system for the KF860 Series that eliminates guesswork. The steel rigging plates that link modules together fit into steel-tubing brackets on each end of the module and are secured with quick-release pins. The reader will find a complete explanation of this rigging system on pages 7 and 8 of this guide as well as in the companion publication, *KF860 Hardware Instructions*.

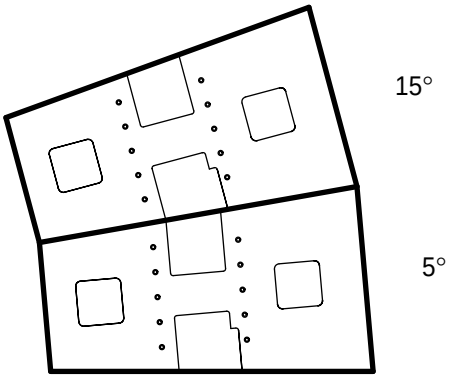
EAW has developed appropriate settings for the MX8600 Close Coupled Digital Processor to control each of the KF860 array configurations discussed in this guide. These settings are available from the ftp (file transfer protocol) section of EAW's website (www.eaw.com) or can be faxed as text files for manual entry. These settings are appropriate to the MX8600 and only the MX8600. Do not attempt to use these settings in any other DSP unit. Contact EAW's Application Support Group for more information.

HANGING AND AIMING KF860 SERIES ARRAYS

Hanging KF860 arrays requires the use of a dedicated "bumper bar" developed for EAW by ATM, Inc. The bumper bar accepts the top portion of the rigging plates at twelve pre-configured locations.

The top module of any array will be aimed at an angle determined by the bumper bar location selected and the size and configuration of the array. As most application require the array to be hung above the intended coverage area, the bar has been designed to aim the array's output down. However, the bar can be reversed to aim the array's output in an upward direction. A chart indicating all possible angles that can be obtained from the rigging system can be found on page 8 of this guide.

EAW has developed a specially modified hand truck to assist in rigging KF860 Series arrays. Specific instruction on its use can be found at EAW's website or by contacting EAW and requesting the KF860 Rigging Hardware Instructions.



Ground-Stacked Application Shown

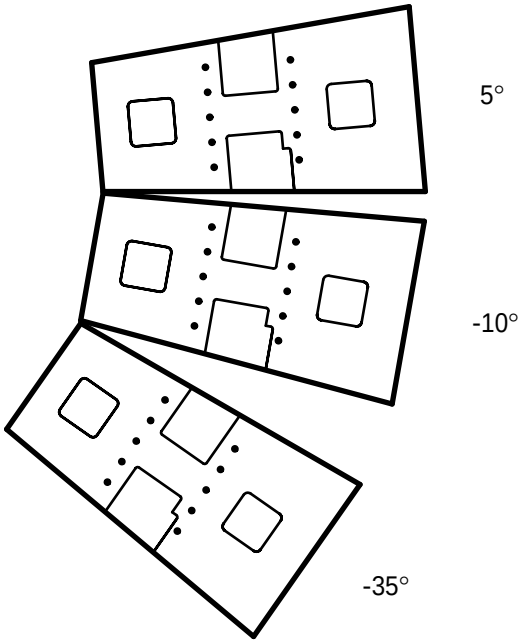
TWO-HIGH KF860 CONFIGURATION

Typical Uses: Distributed ground-stacked clusters, delay clusters on lifts or scaffolds.
Coverage: 20 degrees (specific angles determined by aiming)
Bumper Bar Trim Height (nominal): N/A

Splay: The boxes are nominally splayed 10 degrees, which is the tight-packed configuration. The coverage angle can be opened up or tightened by splaying more or less than the nominal 10 degrees. Ground-stacking note???

Aiming: The cluster should be aimed so that the seam between the two boxes points at the farthest seat. This configuration is tuned for a 200 ft throw.

Processors: Only one EAW MX8600 processor is required.
• For manual entry – use file **2xKF860.TXT** which may be found at ftp://ftp.eaw.com/PPSTfiles/KF860.
• For ECORE – use file **2xKF860.EAC** which may be found at ftp://ftp.eaw.com/Process/MX8600



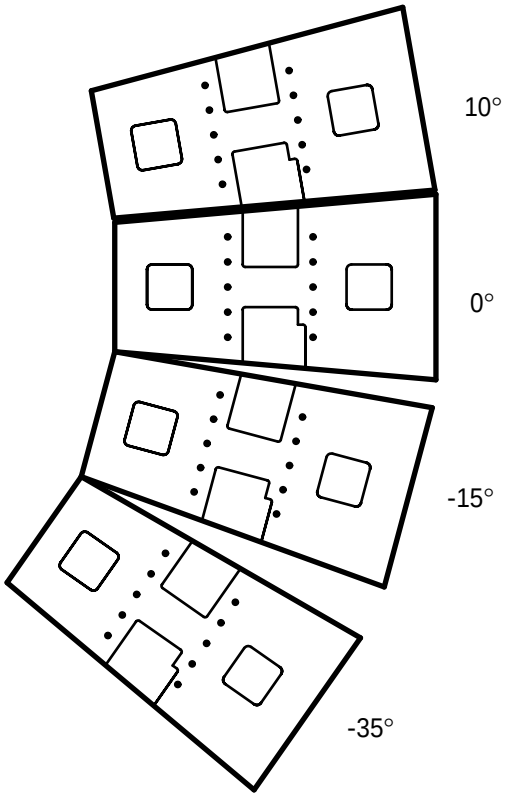
THREE-HIGH KF860 CONFIGURATION

Typical Uses: Theatres
Coverage: +10 degrees to -60 degrees
Bumper Bar Trim Height (nominal): 22 ft

Splay: The three boxes are aimed +5, -10, & -35 degrees, so the boxes should be rigged with 15 degree (upper to middle box), and 25 degree (middle to downfill box) splays.

Aiming: The cluster should be aimed so that the top box points at the highest seating area. This configuration is tuned for a 100 ft throw to the farthest seat.

Processors: One processor should drive the upper two boxes. This processor is referred to as “main” in the settings.
A second processor should drive the lowest box. This processor is referred to as “downfill” in the settings.
• For manual entry – use file **3xKF860.TXT** which may be found at ftp://ftp.eaw.com/PPSTfiles/KF860.
• For ECORE – use file **3xKF860.EAC** which may be found at ftp://ftp.eaw.com/Process/MX8600



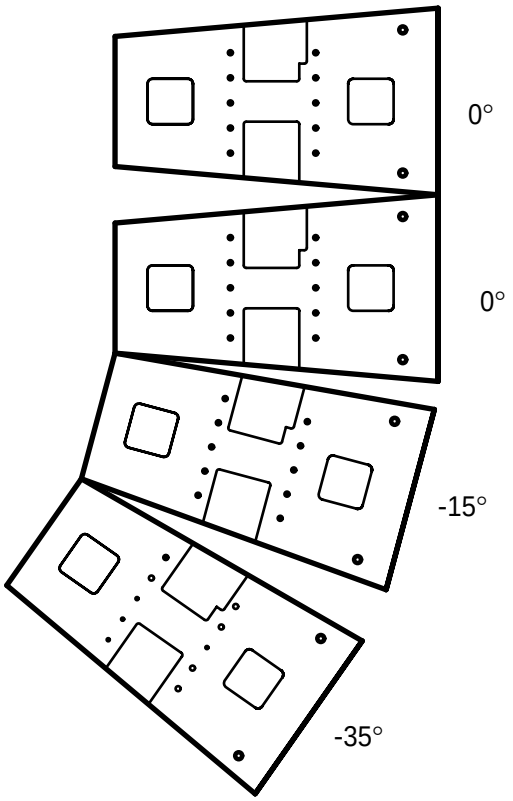
FOUR-HIGH KF860 CONFIGURATION

Typical Uses: Theatres and small arenas
Coverage: +15 degrees to -60 degrees
Bumper Bar Trim Height (nominal): 40 ft

Splay: The boxes are aimed +10, 0, -15, & -35 degrees, so the boxes should be rigged with 10 degree (top to second box), 15 degree (second to third box), and 20 degree (third box to downfill box) splays.

Aiming: The cluster should be aimed so that the top box points at the highest seating area. This configuration is tuned for a 150 ft throw to the farthest seat and maximized vertical coverage.

Processors: One processor should drive the upper three boxes. This processor is referred to as "main" in the settings.
A second processor should drive the lowest box.
This processor is referred to as "downfill" in the settings.
• For manual entry – use file **4xKF860.TXT** which may be found at ftp://ftp.eaw.com/PPSTfiles/KF860.
• For ECORE – use file **4xKF860.EAC** which may be found at ftp://ftp.eaw.com/Process/MX8600



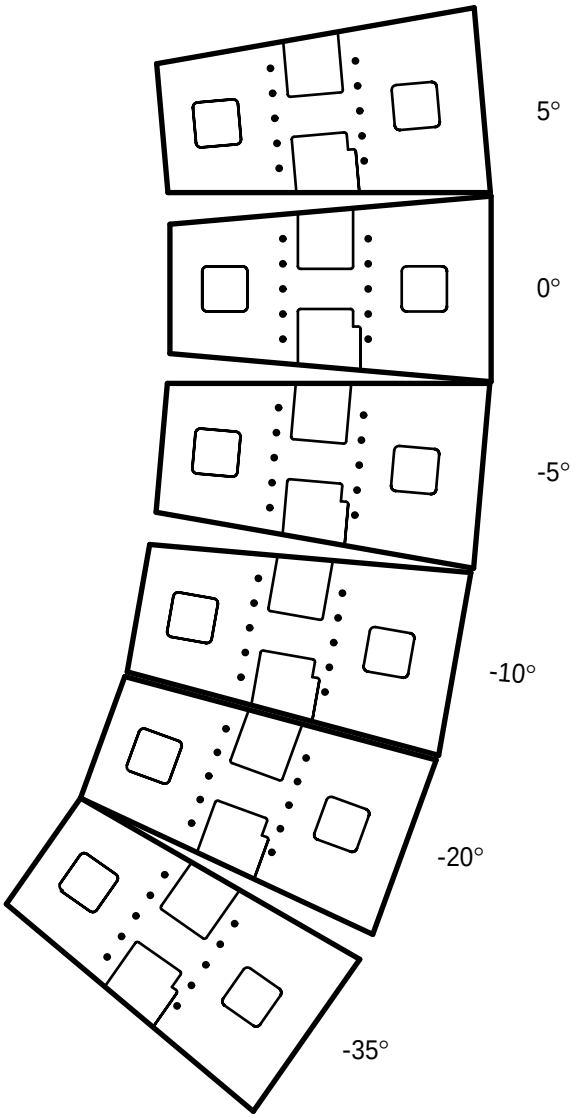
FOUR-HIGH "SHED" KF860 CONFIGURATION

Typical Uses: Sheds and small festivals.
Coverage: +2 degrees to -60 degrees
Bumper Bar Trim Height (nominal): 27 ft

Splay: The boxes are aimed 0, 0, -15, & -35 degrees, so the boxes should be rigged with 0 degree (top to second box), 15 degree (second to third box), and 20 degree (third box to downfill box) splays.

Aiming: The cluster should be aimed so that the top box points at the farthest seat, or straight out for festivals.
This configuration is tuned for a 200 ft throw to the farthest seat and cuts off very quickly above horizontal.

Processors: One processor should drive the upper three boxes. This processor is referred to as "main" in the settings.
A second processor should drive the lowest box.
This processor is referred to as "downfill" in the settings.
• For manual entry – use file **4xKF860shed.TXT** which may be found at ftp://ftp.eaw.com/PPSTfiles/KF860.
• For ECORE – use file **4xKF860shed.EAC** which may be found at ftp://ftp.eaw.com/Process/MX8600



SIX-HIGH KF860 CONFIGURATION

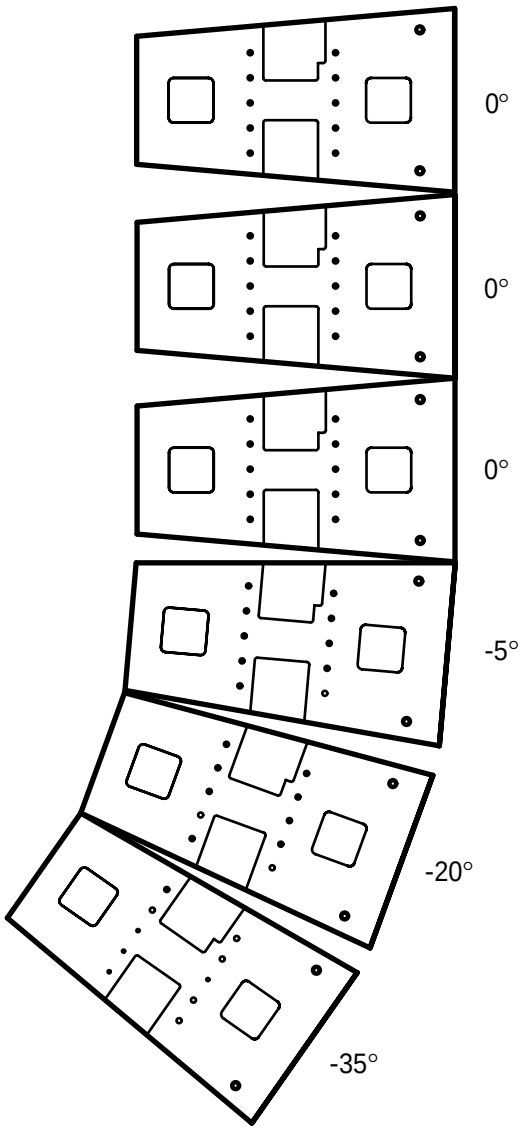
Typical Uses: Arenas
Coverage: +15 degrees to -60 degrees
Bumper Bar Trim Height (nominal): 40 ft

Splay: The boxes are aimed +5, 0, -5, -10, -20, & -35 degrees, so the boxes should be rigged with 5 degree (top to second box), 5 degree (second to third box), 5 degree (third to fourth box), 10 degree (fourth to fifth box), and 15 degree (fifth to sixth box) splays.

Aiming: The cluster should be aimed so that the top box points at the farthest seat. This configuration is tuned for a 300 ft throw to the farthest seat with maximized vertical coverage.

Processors: One processor should drive the upper four boxes. This processor is referred to as "main" in the settings. A second processor should drive the two lowest boxes. This processor is referred to as "downfill" in the settings. NOTE: This is different from all of the smaller rigs, which treat only the one bottom box as "downfill".

- For manual entry – use file **6xKF860.TXT** which may be found at ftp://ftp.eaw.com/PPSTfiles/KF860.
- For ECORE – use file **6xKF860.EAC** which may be found at ftp://ftp.eaw.com/Process/MX8600



SIX-HIGH "FESTIVAL" KF860 CONFIGURATION

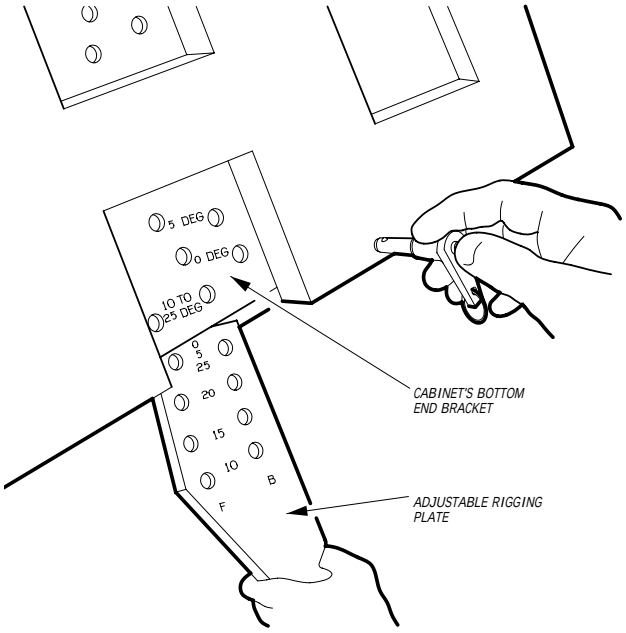
Typical Uses: Festivals, large sheds
Coverage: +2 degrees to -60 degrees
Bumper Bar Trim Height (nominal): 27 ft

Splay: The boxes are aimed 0, 0, 0, -5, -20, & -35 degrees, so the boxes should be rigged with 0 degree (top to second box), 0 degree (second to third box), 5 degree (third to fourth box), 15 degree (fourth to fifth box), and 15 degree (fifth to sixth box) splays.

Aiming: The cluster should be aimed so that the top box points at the highest/farthest seat or straight out for festivals. This configuration is tuned for a 400 ft throw to the farthest seat. The response falls off quickly above horizontal.

Processors: One processor should drive the upper four boxes. This processor is referred to as "main" in the settings.
A second processor should drive the two lowest boxes. This processor is referred to as "downfill" in the settings.
NOTE: This is different from all of the smaller rigs, which treat only the one bottom box as "downfill".

- For manual entry – use file **6xKF860fest.TXT** which may be found at ftp://ftp.eaw.com/PPSTfiles/KF860.
- For ECORE – use file **6xKF860fest.EAC** which may be found at ftp://ftp.eaw.com/Process/MX8600



ACHIEVING VARIOUS SPLAY ANGLES BETWEEN KF860 SERIES ARRAY MODULES

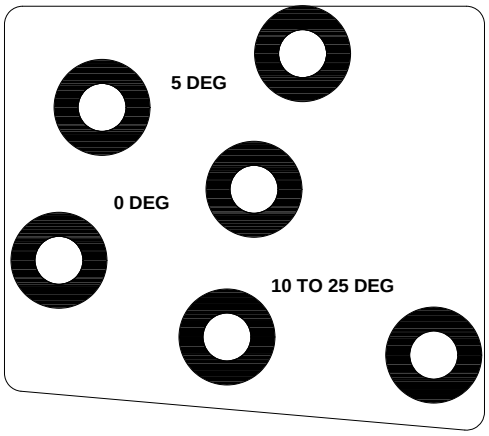
Achieving the proper splay angles between KF860 Series array modules is a relatively straight-forward procedure. As shown in the illustrations below, each module's bottom end bracket holes are marked to indicate the angle(s) they will produce when the rigging plate is connected through them. Each rigging plate's holes are marked similarly.

To produce a given splay angle, simply align the proper holes on the rigging plate with the proper holes on the module's bottom end bracket and insert quick release pins.

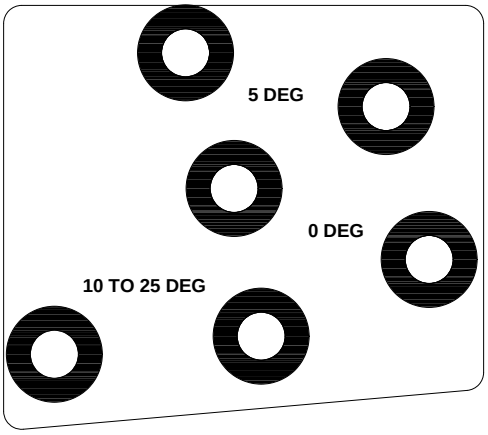
Each modules top end bracket is equipped with a spring-loaded cam device that accepts the bottom of the rigging plate. The spring-loaded cams hold the rigging plate in place while quick release pins are inserted to lock the plate in place. Please consult EAW's KF860 Hardware Instructions for further information.

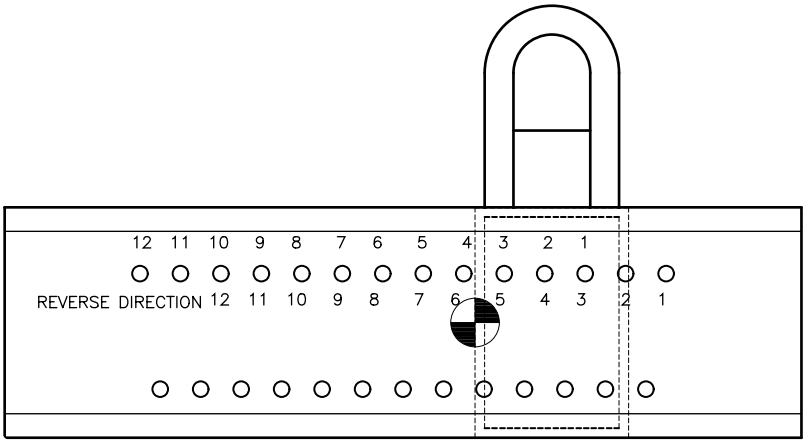
KF860 SERIES ARRAY MODULE BOTTOM END BRACKET HOLES

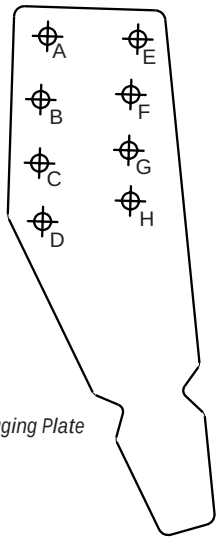
Stage Left



Stage Right







KF860 Rigging Plate

HANGING AND AIMING KF860 SERIES ARRAYS

The drawing above illustrates the KF860 Series bumper bar created for EAW by ATM Flyware. By properly selecting the holes to which the top module is connected, users can aim an array's coverage over a wide range of angles.

Most applications require aiming the array in a downward direction. Thus the bumper bar's forward direction (to the left in the illustration above) allows a variety of down angles. Should the user require aiming the array in an upward direction (such as in sports arenas where upper decks are above the array height, simply set the bumper bar in the revers direction (to the right in the illustration above).

Always use holes "A" and "G" on the rigging plate (as shown in the rigging plate illustration) to connect the top module to the bumper bar. Hole "A" should always be frontmost, no matter which direction the bumper bar is facing.

Please consult the chart below to determine the appropriate bumper bar position to achieve your desired array angle. Note: the angles in the chart indicate the topmost module's centerline relative to the horizontal axis.

	Pos. #1	Pos. #2	Pos. #3	Pos.#4	Pos.#5	Pos.#6	Pos.#7	Pos.#8	Pos.#9	Pos.#10	Pos.#11	Pos.#12
2x Standard	1.0	-1.0	-3.0	-5.5	-7.5	-9.5	-11.5	-13.5	-15.5	-18.0	-20.0	-22.0
2x Reverse	-5.0	-3.0	-1.0	1.0	3.5	5.5	8.0	10.0	12.5	15.0	17.5	20.0
3x Standard	7.5	6.0	4.0	2.5	0.5	-1.0	-3.0	-4.5	-6.0	-8.0	-9.5	-11.0
3x Reverse	2.0	4.0	5.5	7.0	9.0	11.0	13.0	15.0	16.5	18.5	21.0	23.0
4x Standard	9.5	8.0	6.5	5.0	3.0	2.0	0.0	-1.0	-2.5	-4.0	-5.5	-7.0
4x Reverse	4.0	6.0	7.5	9.0	10.5	12.0	13.5	15.5	17.0	19.0	20.5	22.5
4x Shed Stand.	4.5	3.0	1.5	0.5	-1.0	-2.5	-4.0	-5.0	-6.5	-7.5	-9.0	-10.5
4x Shed Rev.	0.0	1.0	2.5	4.0	5.5	7.0	8.0	9.5	11.0	12.5	14.0	15.5
6x Standard	8.0	7.0	6.0	5.0	4.0	2.5	1.5	0.5	-0.5	-1.5	-2.5	-3.5
6x Reverse	4.0	5.5	6.5	7.5	8.5	10.0	11.0	12.0	13.0	14.0	15.5	17.0
6x Fest. Stand.	3.5	2.5	1.5	0.5	-0.5	-1.5	-2.5	-3.5	-4.5	-5.5	-6.5	-7.5
6x Fest. Rev.	0.0	1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	9.0	10.0	11.0

All angles are rounded to the nearest 1/2 degree

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