



QSC

Application Guide

Rev. B 10/2019



Application
Engineering
Team

K FAMILY FOR RENTAL AND PRODUCTION

© Copyright 2019 QSC, LLC. All rights reserved.

QSC, LLC

1675 MacArthur Boulevard
Costa Mesa, CA 92626-1468
USA

Tel: (800) 854-4079
Tel: +1 (714) 754-6175
Fax: +1 (714) 754-6174
E-mail: info@qsc.com

Application Engineering and Technical Services

Tel. (800) 772-2834
Tel. +1 (714) 957-7150
Fax: +1 (714) 754-6173
E-mail: tech_support@qsc.com

QSC EMEA

Kleines Feldlein 1
74889 Sinsheim
Germany

Phone: +49 7261 6595 300
Fax: +49 7261 6595 333

QSC LLC - India

EVOMA, #14 Bhattrahalli, Suite #187
Old Madras RD K.R. Puram
Bangaluru - 560 049 Karnataka, India

Phone: +91 80 306 13795
Fax: +91 80 419 03005

Section 1 : The K Family

P. 4	Introduction
P. 5	Directivity Matched Transition™ (DMT) for Rental Applications
P. 6	DMT Quick Guide
P. 7	Directivity Matched Transition — Throw This!
P. 9	K Family — Subwoofers
P. 13	K Family — Rigging and Suspension
P. 15	K Family — Power Efficiency
P. 18	K Family — Transportation

SECTION 2 : Application Suggestions

P. 19	Corporate AV: Function Room	50–100 people
P. 20	Live Sound Reinforcement: Live Bar	100–200 people
P. 21	Live Sound Reinforcement: Hall	200–400 people
P. 22	Corporate AV: Ballroom	200–400 people
P. 23	Live Sound Reinforcement: Theatre	400–800 people
P. 24	Live Sound Reinforcement: Outdoor Stage	800 plus people
P. 25	Monitor Rigs and Backline	

Contacts

P. 26	QSC Application Engineering Contacts
-------	--------------------------------------

Section 1: The K Family

Introduction

Providing quality sound reinforcement is your business. Whether your focus is large-scale productions or simple systems for the neighborhood block party, the fact remains that your business only makes money when its inventory is being rented. The QSC K Family of products is designed to offer users unparalleled performance in flexible, easy-to-use configurations. Ideal for a broad range of rental applications. K Family loudspeakers also feature long-term durability and a clean, professional appearance that is at home in any situation. With K Family loudspeakers in your rental inventory, the next time a customer asks, “Have you got something that will ...?” your answer will undoubtedly be YES!



K.2 Series

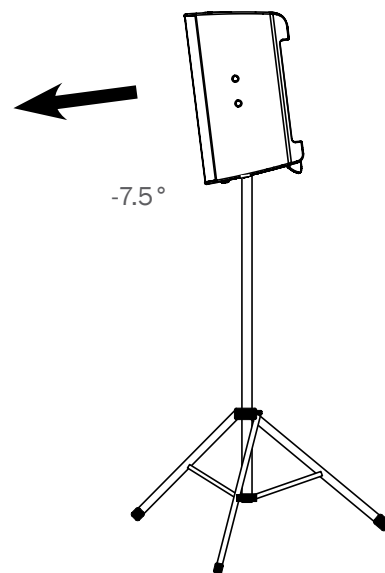
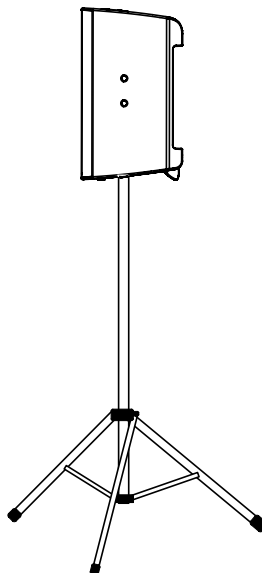


KLA Series



KW Series

QSC's K Family products offer several unique features. The three QSC K.2 Series™ models include a dual pole cup mount (standard and -7.5° down-tilt), while both the KW and KLA Series feature the QSC Tilt-Direct™ pole cup mount which tilts downward with a simple turn of the dial (-7.5° on KW and -9° on KLA12 models), focusing the acoustic energy on the audience and away from reflective surfaces. This is ideal for applications requiring maximum coverage from a high stand-mounted loudspeaker. Note that the model KW153 features only a standard pole cup.



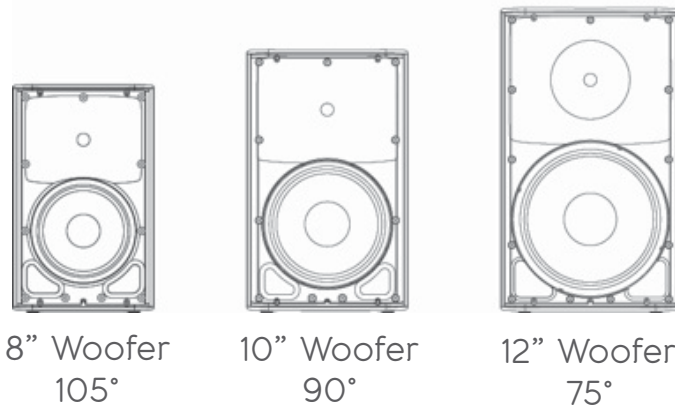
Directivity Matched Transition™ (DMT) For Rental Applications

In the history of professional audio, the birth of Directivity Matched Transition (DMT) has been one of those lightbulb innovations that makes us all wonder why nobody ever thought of it sooner.

It's all quite logical — here's a quick overview:

■ Smaller woofers beam less at the crossover frequency and therefore need to be matched with much wider waveguides (90°–105°). Conversely, larger woofers beam more at crossover, and therefore need to be matched with much narrower waveguides (60°–75°).

■ Smaller woofers have lower sensitivity, but guess what—their matching wider waveguides disperse energy over a wider area, and therefore their on-axis sensitivity is lower by the same order of magnitude. Larger woofers, though, have higher sensitivity and—you guessed it—their matching narrower waveguides also have higher on-axis sensitivity, by the same order of magnitude!



■ When you only match the width of the waveguide to the woofer, but not the height, the resulting vertical off-axis response will be gnarly. It will degrade the overall power response at the listening position as well (power response = sum of anechoic frequency response *plus* early reflections). However, matching *both* the width and height of the waveguide to the woofer will yield far smoother off-axis response, and therefore an optimized power response.

And here's the real kicker: for short-throw applications (front fill, delay fill, console monitors, vocal monitors, etc.) you'll actually want a small-woofer model for its small footprint and wider coverage waveguide, *but* you won't have to sacrifice power or headroom. This is why DMT has captured so much attention!

Section 1: The K Family

DMT Quick Guide

The following chart provides a quick guide to selecting the right K Family loudspeaker and subwoofer for the right application, based on the Directivity Matched Transition™ (DMT) concept:

DMT Application	120°	105°	90°	75°	60°	SUB
Small venue, corporate function, lounge-bar, distributed front-fill / delay-fill / balcony fill, dj monitor, console monitor		K8.2				
All purpose PA, mid-size venue, mid-throw, vocal wedge or keyboard wedge, backline acoustic amp			K10.2			
All purpose PA, mid-size venue, longer-throw, drum or keyboard wedge, backline acoustic amp				K12.2 KW122		
High SPL, large venue, long-throw, highly array-able and modular building block, centre-cluster, drum-fill or side-fill	2x KW152				KW152	
High SPL, large venue, long-throw, horn-loaded midrange for increased vocal clarity, or side-fill on large stage				KW153		
Bandpass enclosure design, high output in an ultra-compact form factor, highly transportable, for all entertainment applications						KS112
Dual bandpass enclosure design, cardioid radiation with 15 dB rejection at the rear, highly transportable, ideal for mobile entertainers and mid-sized venues						KS212C
Direct radiating subwoofer, impressive LF performance, omnidirectional or cardioid radiation (cardioid requires two or more units); ideal for live reinforcement.						KS118



Interesting Fact: Every K family full-range loudspeaker, from the smallest model to the largest, features Intrinsic Correction™ EQ employing FIR linear phase filters, which are more commonly found on high-end DSP processors.

Directivity Matched Transition - Throw This!

The term *throw* is perhaps the biggest misnomer in the professional audio industry, and is commonly used to describe the relative distance at which a loudspeaker can produce an intelligible signal at a volume level sufficient for the application.

The reality is that sound does not throw, but rather it propagates through the air and will simply attenuate at a rate of 6 decibels with every doubling of distance (inverse square law). Other phenomena such as air absorption may add progressive attenuation of the higher frequencies. But the longest distance over which the sound propagates while still remaining intelligible basically depends on the ratio of signal to noise at the listener's location.

Keeping that in mind, the audio industry has widely adopted the term *throw* so we will also use it in this guide.

Short-throw loudspeakers have very wide dispersion and are typically operated at low to medium SPL levels simply because they are usually in close proximity to the audience. Therefore, they tend to use smaller woofer cones. These transducers typically have very flat frequency response over a wide bandwidth, and their wide horizontal dispersion covers the audience seated within a close arc of the loudspeaker. With such short distances, air absorption is seldom a problem. Examples of QSC short-throw loudspeakers include the models K8.2 and K10.2.

Medium-throw loudspeakers are narrower in their horizontal and vertical dispersion. The greater coverage distance requires a higher maximum SPL, typically achieved by increasing the woofer cone size to 12" or 15", which increases the loudspeakers sensitivity. Examples of QSC medium-throw loudspeakers include the models K12.2 and KW122.

Long-throw loudspeakers have a very narrow dispersion (60 degrees or less) — the narrower horn pattern increases on-axis sensitivity and we match this with the higher sensitivity of a larger woofer cone — the net result is more acoustic output within the coverage pattern. When used on their own, they are great for covering large distances. However, another major benefit of these narrow dispersion loudspeakers is that they array extremely well, with minimal overlap and comb filtering. This makes them the perfect modular building block for creating arrays of varying sizes. Examples of QSC long-throw loudspeakers include the models KW152, KW153, and KLA12.



Section 1: The K Family

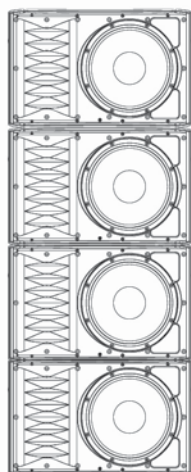


Figure 1. Vertical array of four KLA12s

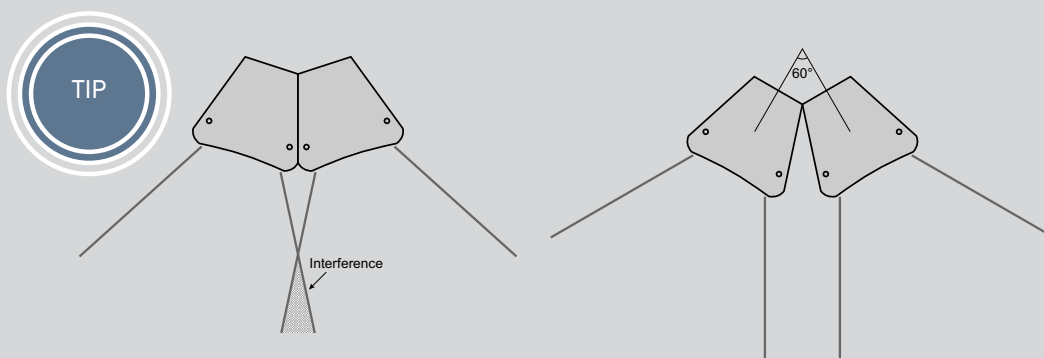


Figure 3: When arraying two KW152 60° boxes, don't hard pack the 18° sidewalls (left); this will yield only a 36° splay, and the overlapping energy will result in severe comb filtering within the listening area. Instead, use a wider 60° splay between boxes (right) to minimize overlap and broaden the total coverage angle to 120°.

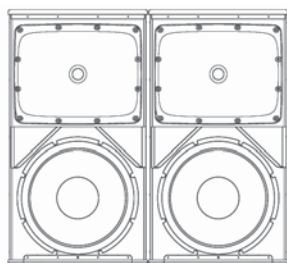


Figure 2. Horizontal array of two KW152s

The table below illustrates the nominal sound pressure level (C-weighted) at four arbitrary distances (4 m, 8 m, 16 m, and 32 m), calculated from the 1 m long-term or continuous maximum SPL for each K family loudspeaker or array. Please note this does not factor in any losses that may result from air absorption of upper high frequencies.

Model:	DMT	1 m (3 ft)	4 m (13 ft)	8 m (26 ft)	16 m (53 ft)	32 m (105 ft)
K8.2	110°	122 dB	110 dB	104 dB	98 dB	92 dB
K10.2	90°	124 dB	112 dB	106 dB	100 dB	94 dB
K12.2	75°	126 dB	114 dB	108 dB	102 dB	96 dB
K122	75°	125 dB	113 dB	107 dB	101 dB	95 dB
K153	75°	128 dB	116 dB	110 dB	104 dB	98 dB
KW152 × 1	60°	127 dB	115 dB	109 dB	103 dB	97 dB
KW152 × 2		130 dB	118 dB	112 dB	106 dB	100 dB
KW152 × 4		133 dB	121 dB	115 dB	109 dB	103 dB
KLA12 × 1	90 × 15°	125 dB	113 dB	107 dB	101 dB	95 dB
KLA12 × 2	90 × 30°	128 dB	116 dB	110 dB	104 dB	98 dB
KLA12 × 4	90 × 60°	131 dB	119 dB	113 dB	107 dB	101 dB

K Family: Subwoofers

Choosing the Appropriate Subwoofer

The QSC K Family catalog offers four subwoofer options that work well with any of the K Family full-range loudspeakers.

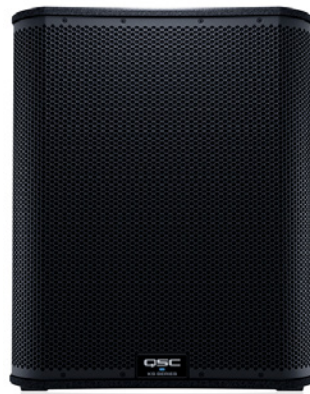
1. The KS112 is a single 12-inch bandpass subwoofer featuring an ultra-compact enclosure. It fits into some very tight spaces — especially when laid on its side to slide under a riser platform stage.
2. The KS212C is a dual 12-inch, dual bandpass enclosure design, featuring a cardioid radiation pattern with 15 dB rejection at the rear. Highly transportable, ideal for mobile entertainers and mid-sized venues, it can complement any K Family loudspeaker in either a vertical or horizontal deployment.
3. The KS118 features a single 18-inch front-loaded dual-ported enclosure. Its larger internal volume and bigger woofer provides a deep and powerful bass response. The size and weight of the enclosure are a stable base when pole-mounting loudspeakers on top of it, especially the larger, wooden-enclosure KW Series.
4. The KLA181 is also a single 18-inch front-loaded design, but with four reflex ports and a slightly larger enclosure. It contains integral rigging hardware for hanging at the top of a KLA12 line array.



KS212C



KS112



KS118



KLA181

Section 1: The K Family

Pole Extension Accessory

QSC offers threaded accessory poles SP-26 (26 in / 66 cm) and SP-36 (36 in / 91 cm; included with KS212C). Their lengths are optimized for safe use with 12" models or larger (see Figure 4). For smaller models (CP8 / CP12 or K8.2 / K10.2), though, the poles might not provide enough elevation, so QSC offers the optional SP-16X (16 in / 41 cm) Pole Extension Accessory (see Figure 5).

Warning: Use the Pole Extension *only* with the smaller CP8, CP12, K8.2, and K10.2 models.

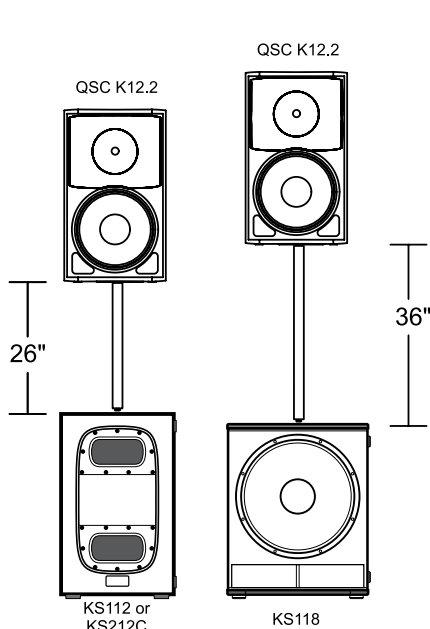


Figure 4: (K12.2 or larger)

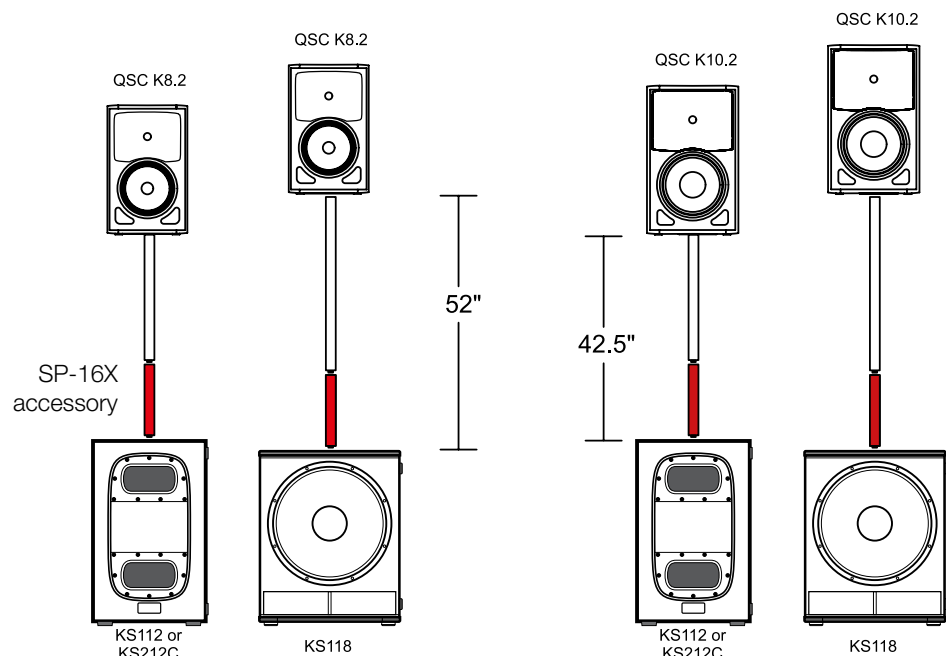


Figure 5: K8.2 and K10.2

So, How Many Subwoofers Will I Need?

To anyone in the industry, this is like asking, "How big is a fish?"

Determining the number of subwoofers required for a system deployment has many parallels with choosing which DMT main loudspeaker to use for it. For example:

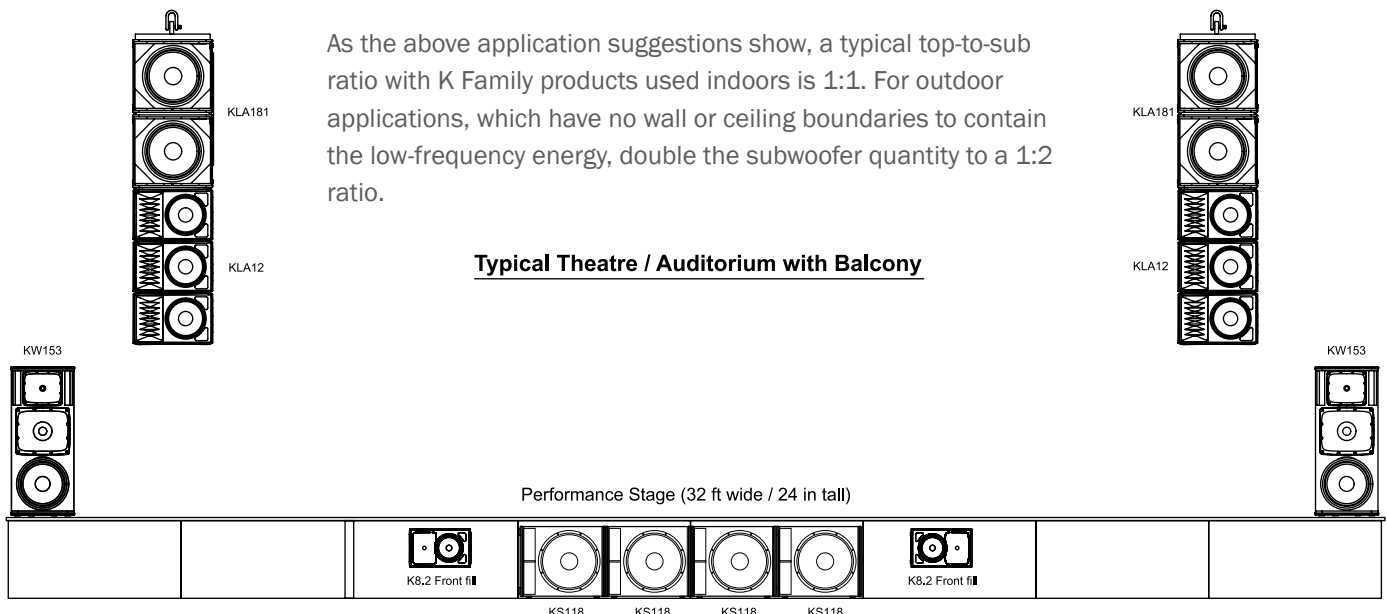
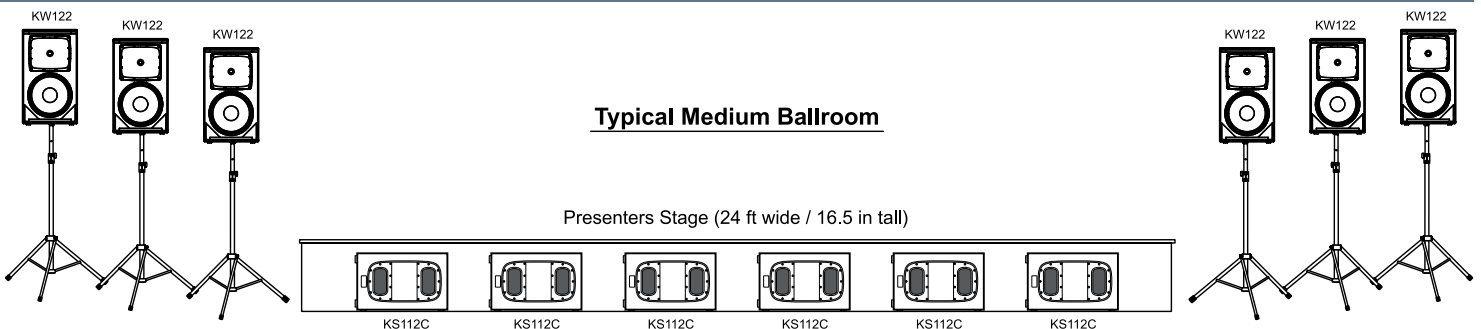
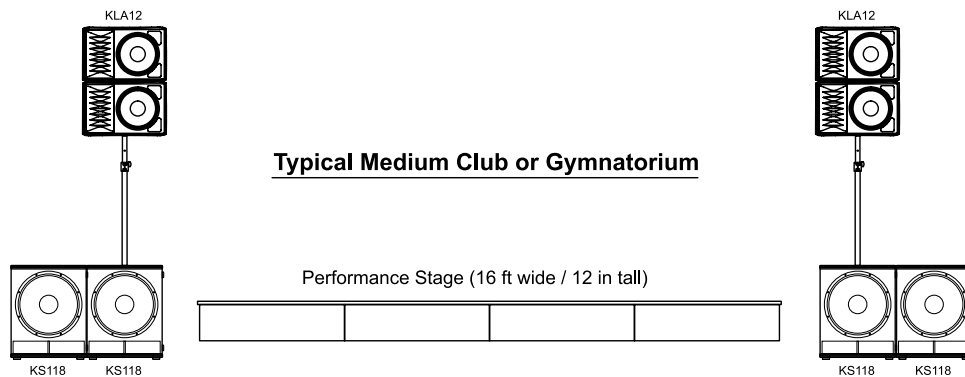
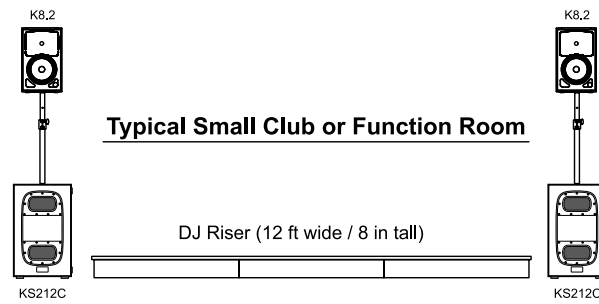
- Content – Live sound reinforcement or playback (recorded) music?
- Space constraints – limited room for deployment?
- Desired bass extension and SPL (sound pressure level)?
- Budget constraints?

Other considerations include (but are not limited to):

- Will the subwoofers be flown, ground stacked, or a combination of both?
- The type of content – rock, jazz, rap, reggae, etc?
- Stereo left-right deployment, or mono block in center?
- Indoors or outdoors?

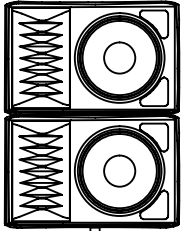
Section 1: The K Family

Answering these questions helps us figure a suitable top-to-subwoofer ratio, which a “one size fits all” formula cannot give us. Let’s start with some basic rule-of-thumb combinations as a baseline for planning a system that requires full-range performance to 40 Hz and below.

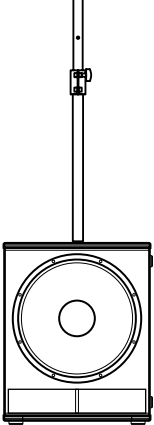


As the above application suggestions show, a typical top-to-sub ratio with K Family products used indoors is 1:1. For outdoor applications, which have no wall or ceiling boundaries to contain the low-frequency energy, double the subwoofer quantity to a 1:2 ratio.

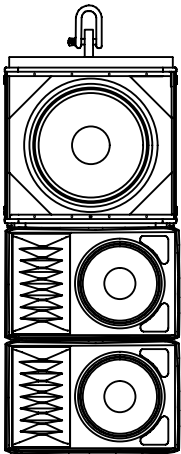
Section 1: The K Family



QSC KLA12



QSC KS118



QSC KLA181

QSC KLA12

Subwoofers: Ground-Stacked vs. Flown

QSC offers a choice of ground-stacked (KS112, KS212C, KS118) or flown subwoofers (KLA181 only). The KLA181 can be ground stacked but features additional built-in hardware for flying as part of a KLA12 array.

Here are some reasons why you might choose one configuration over the other for certain applications.

Ground-Stacked Subwoofers (KS112, KS212C, KS118, KLA181): This is the simpler configuration to set up, deploy, and load out. The obvious sonic benefit of ground stacking is the additional 3 dB of “free” bass, the result of ground-plane coupling. Ground stacking also simplifies wiring – loop the audio through the subwoofers to the tops and adjust to suit.

The only real downside to ground stacking is the greater drop-off in SPL from the front of the audience to the rear of the audience, but sound engineers have been living with this compromise for decades.

Flown Subwoofers: (KLA181 only). Flown subwoofers are obviously more complex to set up and deploy than ground-stacked ones, but the benefits can certainly make for a worthwhile experience, both to you and your client. A flown subwoofer array offers a more uniform SPL front-to-back across the audience area (because the distance between subwoofer and audience is more uniform). In addition, flown subwoofers often just seem to integrate better acoustically with the rest of the system.

A possible disadvantage with flown subwoofers is the lack of a substantial surface (floor or wall) on which to plane couple, although the ceiling can serve as a boundary in some instances.



In some applications (e.g., balcony auditoriums or theatres) it is common to employ both flown and stacked subwoofer configurations, but doing so requires careful DSP alignment.

K Family – Rigging and Suspension

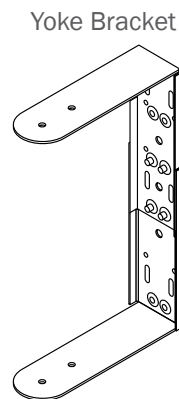
K.2 Series

The K.2, KW and KLA series offer several methods for permanent or temporary rigging, also known as flying.

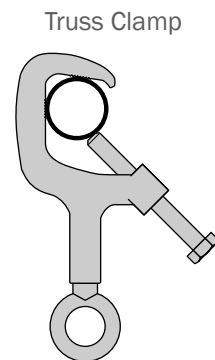
K.2 series - Each full-range model (K8.2, K10.2 and K12.2) can be suspended by the integrated M10-threaded pick points on the top, back, and/or side in either vertical (HF on top) or horizontal orientation. Use only rated forged shoulder eyebolts.



The loudspeakers can also be mounted on yoke brackets bolted directly to a wall or ceiling in permanent installations. The yoke mounts are available as accessories specific to each loudspeaker model. A yoke can also be mounted to a lighting claw or truss clamp for temporary suspension from a truss or rigging pipe.



Yoke Bracket

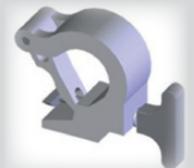


Truss Clamp



Truss clamps are available from a number of rigging supply companies, such as ATM Flyware.

<http://adapttechgroup.com/index.html>



Section 1: The K Family

KW Series

The KW122 has seven M10-threaded pick points:

- Two on the top
- Two on each side
- One on the rear

The KW122 can be hung vertically via the top pick points, with coverage angle adjusted by pulling back on the rear pick point. It can also be hung horizontally using the KW122 Suspension Kit, which includes two M10 forged eyebolts and a pull-back bar. The M10 eyebolts may be installed on either side so the enclosure can be flown with the horn to the left or the right.

The KW152 and KW153 have seven M10-threaded pick points:

- Two on the top
- Two on the bottom
- Three on the rear (one in the center)



KW152 flown horn-up



KW153 flown horn-down

As with the K.2 Series, truss clamps offer a quick, easy, and safe method for hanging KW loudspeakers from a truss or fixed rigging pipe.

KLA Series

The KLA series line array modules are one of the industry's fastest and simplest systems to rig together and suspend. KLA's unique self-contained SOLO™ (Single-Operator Logistics) rigging system enables a user to quickly assemble (and disassemble) the line array quickly, with no need for special tools or external hardware.

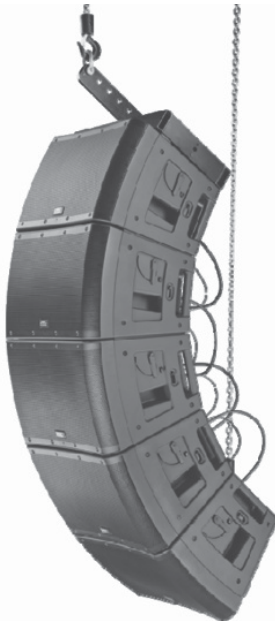


KLA offers solutions for both permanent and temporary suspension. For permanent installations each element has four M10-threaded points on the top of the cabinet, and one in the bottom center of the rear of the cabinet for aiming.

For portable or touring applications, the [KLA AF12](#) array frame brings speed and flexibility to the rigging process. The array frame can either mount to the top of a [KLA12](#) full-range cabinet or, to hang subwoofers at the upper end of the array, to the top of a [KLA181](#). The array frame can be used with its pick bar facing forward or aft to maximize flexibility of vertical focus and the use of center of gravity.



5 × KLA12 Array



3 × KLA12 under
2 × KLA181



Warning

THE SUSPENSION AND MOUNTING OF LOUDSPEAKERS PRESENT POTENTIAL SAFETY HAZARDS. QSC HAS NO KNOWLEDGE OF THE ACTUAL STRUCTURAL INTEGRITY OF THE FACILITY IN WHICH THESE PRODUCTS ARE USED. THEREFORE, THE SYSTEM USER AND/OR INSTALLER BEAR SOLE RESPONSIBILITY FOR PROPERLY INSTALLING THE EQUIPMENT AND COMPLYING WITH ALL APPLICABLE STANDARDS AND REGULATORY REQUIREMENTS. RIGGING OR SUSPENSION OF EQUIPMENT SHOULD BE PERFORMED ONLY BY CERTIFIED AND LICENSED RIGGING TECHNICIANS.

Section 1: The K Family

K Family — Power Efficiency

All of the KW and KLA loudspeaker models share the same 1000-watt class D power amp module. The K.2 Series models feature an updated 2000-watt class D module with user-selectable DSP presets, user-definable DSP settings, and user-definable and recallable scenes.



KW Series



KLA Series



K.2 Series

These power amp designs are very efficient at AC draw or consumption. For example, one KW or KLA Series loudspeaker operating at 1/8 of full power (which is fairly loud, to the point of causing occasional clipping), only draws 2.1 amps at 120 VAC. That means you can run up to five K Family loudspeakers (any combination, including sub-woofers) off a single 15-amp AC circuit, and as many as eight off a 20-amp circuit! That means, for example, that you can actually power a full sound system of as many as four KW153 three-way top enclosures plus four KS118 subwoofers *per side* off of a single 20-amp outlet. No need for a special (and expensive) AC power distribution to run the PA.

KW and KLA Series				
Voltage	One loudspeaker	Two loudspeakers	Four loudspeakers	Six loudspeakers
100 VAC	2.3 A*	4.6 A*	9.2 A *	13.8 A*
120 VAC	2.01 A*	4.02 A*	8.04 A*	12.06 A*
230 VAC	1.13 A*	2.26 A*	4.52 A*	6.78 A*
* Average output 1/8 of full power				

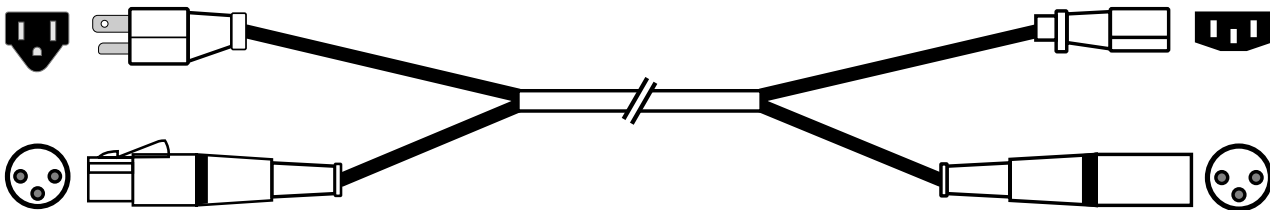
K.2 Series				
Voltage	One loudspeaker	Two loudspeakers	Four loudspeakers	Six loudspeakers
100 VAC	2.1 A*	4.2 A*	8.4 A *	12.6 A*
120 VAC	1.9 A*	3.8 A*	7.6 A*	11.4 A*
230 VAC	1.1 A*	2.2 A*	4.4 A*	6.6 A*
* Average output 1/8 of full power				

Green Power

Not only are the K power modules efficient during use, but also when not in use. When the power module's DSP sits idle (no signal) for more than five minutes, it automatically enters standby mode, effectively shutting down the amplifier. This saves energy but also saves money in installations where remote controlled on/off AC relays would otherwise be required. Once an audio signal is restored at the input, the DSP senses it immediately and turns the amplifier back on without any noticeable delay.

Wiring

The **K.2** and **KW** series loudspeakers each come with a 10-foot (3 meter) detachable locking IEC power cable. Each **KLA** series cabinet has both an input and output Neutrik powerCON AC connector, so each **KLA12** cabinet comes with a 12-foot (3.6 meter) main power cable as well as a 2-foot (0.6 meter) AC jumper while each **KLA181** subwoofer comes with a 12-foot (3.6 meter) main power cable and a 3-foot (1 meter) AC jumper. For daisy-chaining audio, each **KLA12** comes with a 2-foot XLR to XLR jumper, and each **KLA181** comes with a 3-foot XLR to XLR.



Combination cables in custom lengths are available from third party suppliers. They combine AC power (IEC or powerCON) with a separate XLR to XLR audio channel into one jacketed cable. Hum does not couple from the power wires into the audio line because of the tightly twisted conductor pair in the audio cable, along with the high-performance CMR (Common Mode Rejection) balanced circuit in each K amplifier input.

Section 1: The K Family

K Family – Transportation Totes and Covers

K.2 Series — for each K.2 Series fullrange model (K8.2, K10.2, and K12.2) there is an optional soft, padded tote available, made with weather resistant and heavy-duty Nylon/Cordura® material. Side-flap access to the aluminum top handle allows for convenient vertical transport.

The K Family subwoofers — the KS112, KS212C, KS118, and KLA181 — also each have a cover available.



K8.2 Tote



K10.2 Tote



K12.2 Tote



KS112 Cover



Pictured: K10.2 Outdoor Cover

We also offer an optional nylon fabric and mesh cover for temporary outdoor use of the K8.2, K10.2, or K12.2 in adverse weather. A removable amplifier panel allows access to connectors and controls, and a vented panel allows airflow for proper heat management. NOTE: These weather covers are not intended for permanent outdoor installation or sustained severe weather conditions.

KW Series — for each KW Series fullrange model (KW122, KW152, and KW153) there is also an optional soft, padded cover available (no straps), made with weather resistant and heavy-duty Nylon/Cordura® material. A similar side-flap access to the aluminum top handle allows for convenient vertical transport.



KW122 Cover Tote



KW152 Cover



KW153 Cover



KS118 Cover

Section 2: Application Suggestions

Corporate AV: Function Room

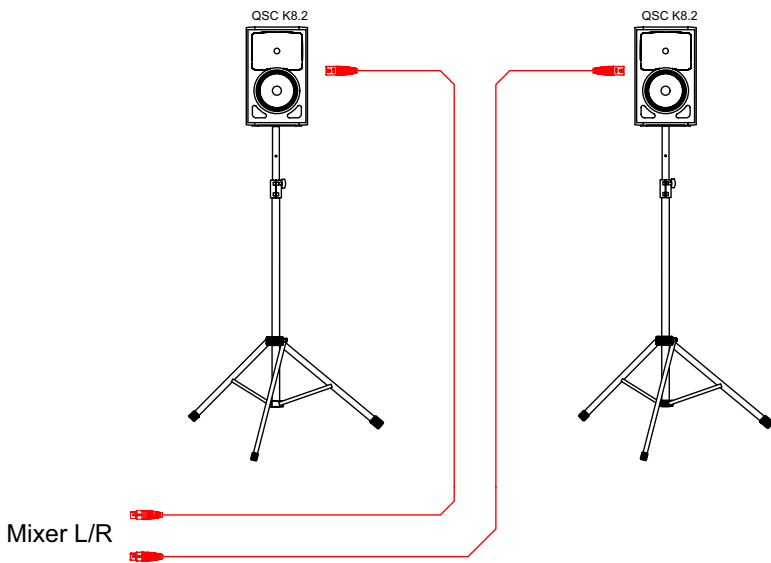
Approx. 30 × 50 ft (1500 ft²) : 50–100 people

This is a typical hotel or conference center function room, often with moveable airwalls or concertina doors. Most commonly used for smaller corporate presentations, seminars, or training events during the day, but can also be used for small scale ceremonies or events during the evening, requiring some level of music reinforcement.

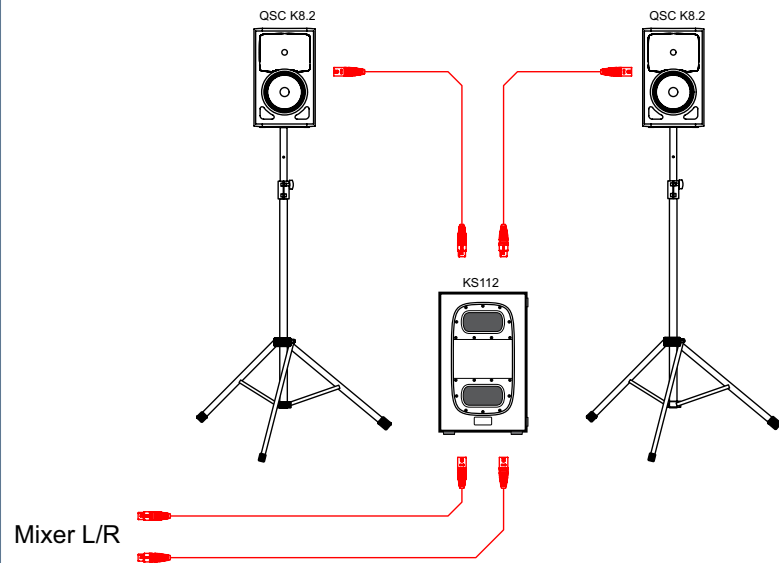


Option 1 – Basic Speech and music playback reinforcement system

■ Recommend K8.2 with 105 degree DMT coverage

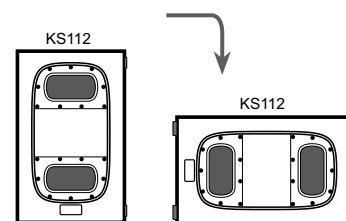


Option 2 – Add a K112 for greater impact of music playback



TIP

Rotate KS112 for even lower footprint or to fit under riser



Section 2: Application Suggestions

Live Sound Reinforcement: Live Bar

Approx. 40 × 60 ft (2400 ft²) : 100–200 people

This would be a live music bar or club, with the stage oriented against a back wall or corner.

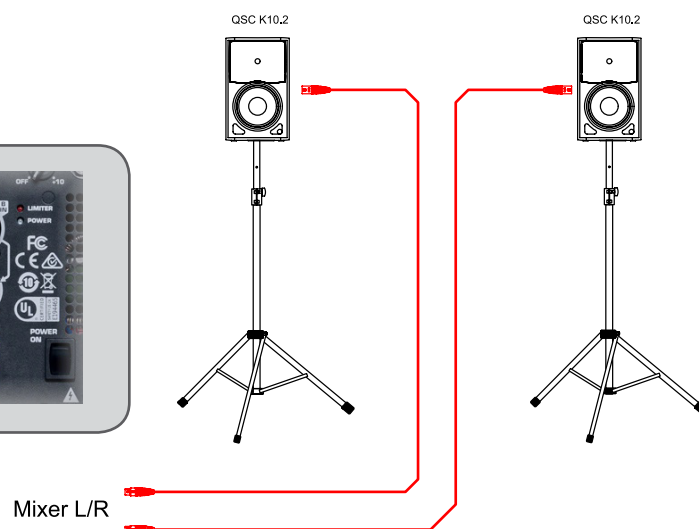
Music levels would gradually increase during the course of the evening as the venue switches from dining mode to nightlife entertainment mode.



Option 1 – Light Acoustic instrument reinforcement system; recommend K10.2 with short-throw 90 degree DMT coverage.

TIP

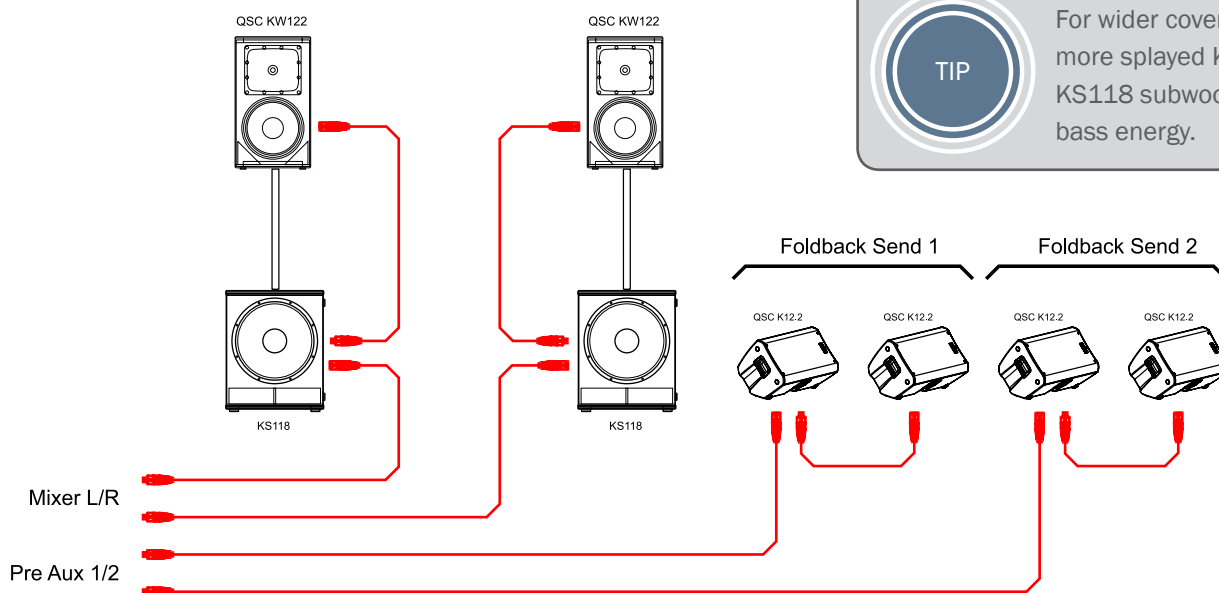
For backline applications, the K10.2 works extremely well for acoustic guitar and keyboards. The MIX OUT also doubles as a DI output to feed any FOH mixer.



Option 2 – High-impact music reinforcement system; recommend KW122 for more punch.

TIP

For wider coverage, simply add more splayed KW122s. Add more KS118 subwoofers to increase bass energy.



Section 2: Application Suggestions

Live Sound Reinforcement: Hall

Approx. 50 × 70 ft (3500 ft²) : 200–400 people

This is your typical multi-purpose venue: the school assembly hall, the community hall, the gymnasium, or the church hall—usually with a hard flat floor and temporary stackable seating or retractable stadium seating.

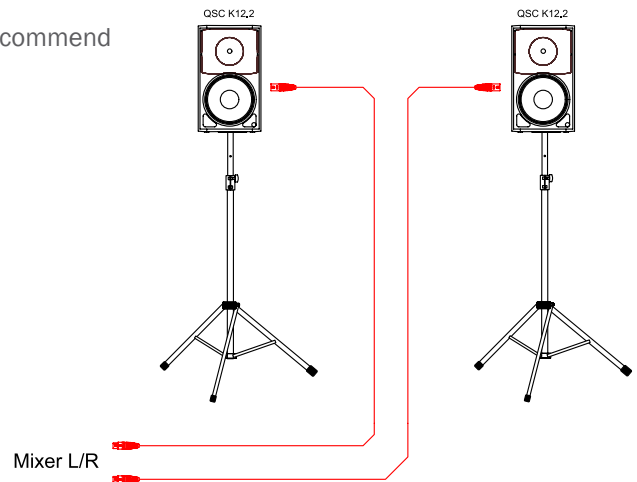
The permanent stage runs a narrow end of the hall, requiring loudspeakers with narrower coverage and longer throw.



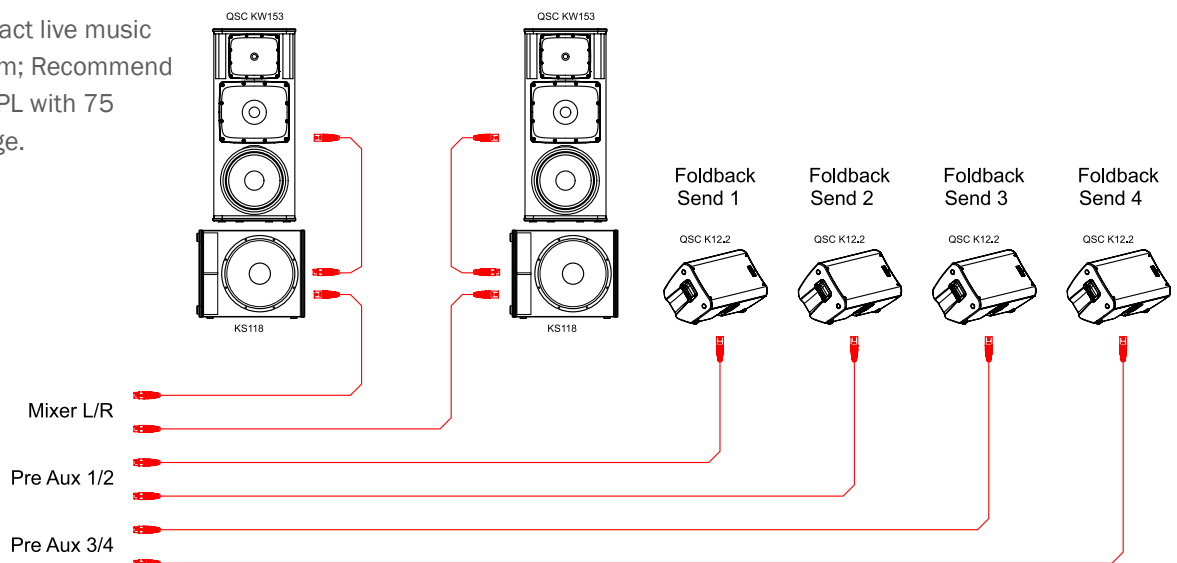
Option 1 – Basic speech and playback music reinforcement system; recommend K12.2 with 75 degree DMT coverage

NOTE

For a quick and easy public address deployment, simply connect the announcer's microphone directly into one K Family full-range loudspeaker and loop the signal through to the next one(s).



Option 2 – High-impact live music reinforcement system; Recommend KW153 for higher SPL with 75 degree DMT coverage.



Section 2: Application Suggestions

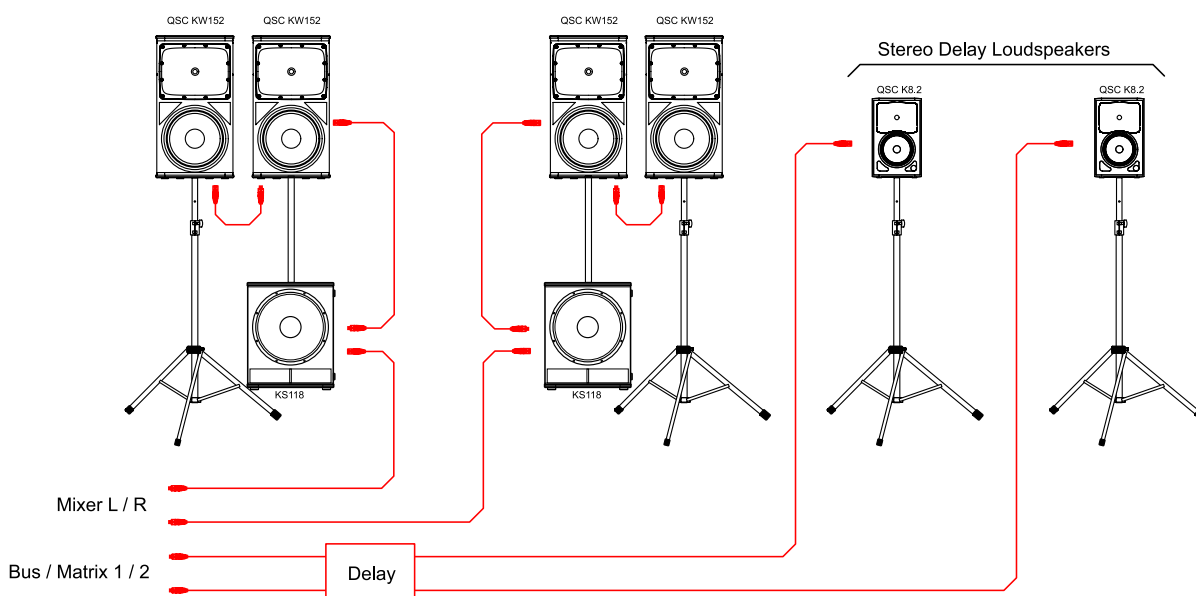
Corporate AV: Ballroom

Approx. 50 × 70 ft (3500 ft²): 200–400 people

This is a typical hotel or conference centre ballroom with moveable airwalls or concertina doors. Mostly used for larger corporate presentations, seminars, and training events during the day, but can also be used for major ceremonies or events during the evening that may require a DJ or band. A temporary stage is typically erected across a long wall of the room, requiring wider coverage loudspeakers.



Option 1 – Ground-stacked speech and playback music reinforcement system



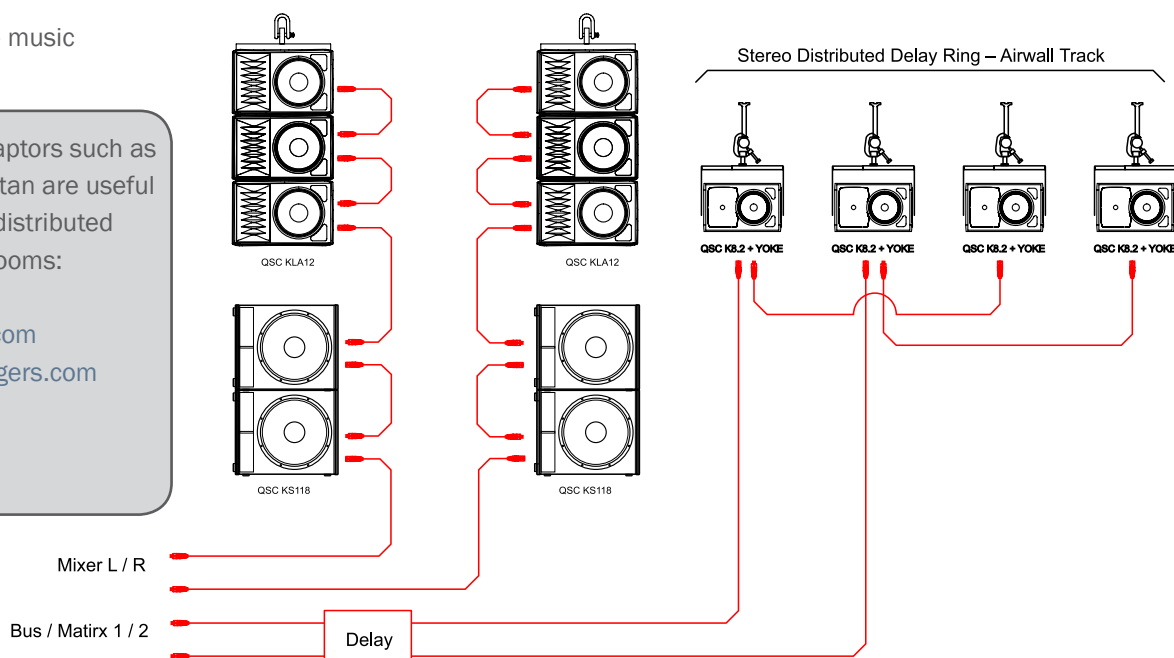
TIP

When arraying two KW152 boxes, apply a high shelf filter to compensate for the resulting LF and MF summing. Set it with a 3 dB boost at 1.5 kHz and a 12 dB/oct slope. This is similar to the Ar-Q compensation built into each KLA module.

Option 2 – Flown high-impact live music reinforcement system

Airwall track adaptors such as Alupalok and Titan are useful for suspending distributed systems in ballrooms:

www.alupalok.com
www.airwallhangers.com



Section 2: Application Suggestions

Live Sound Reinforcement: Theatre

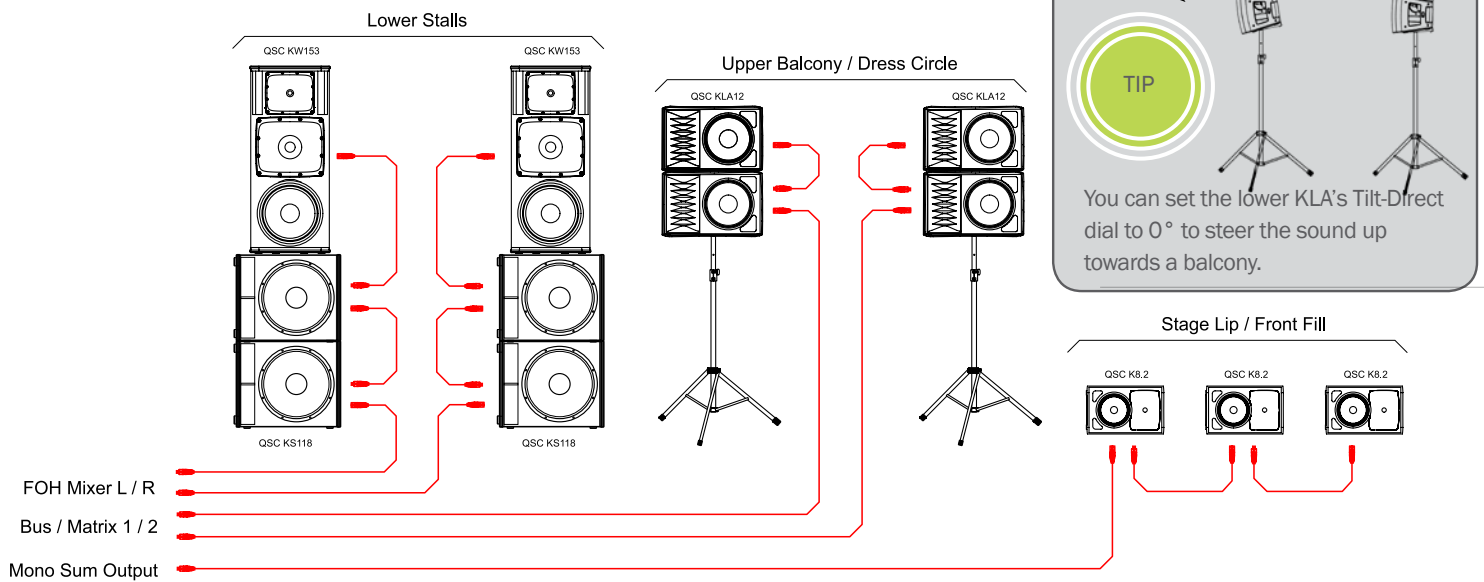
Approx. 80 × 100 ft (8000 ft²) : 400–800 people

This could be a modern community theatre with stadium seating or a traditional proscenium arch theatre with slow raking lower stalls and a steep raking dress-circle or balcony. Seats are typically upholstered permanent fixtures.

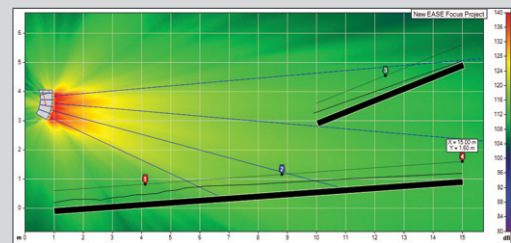
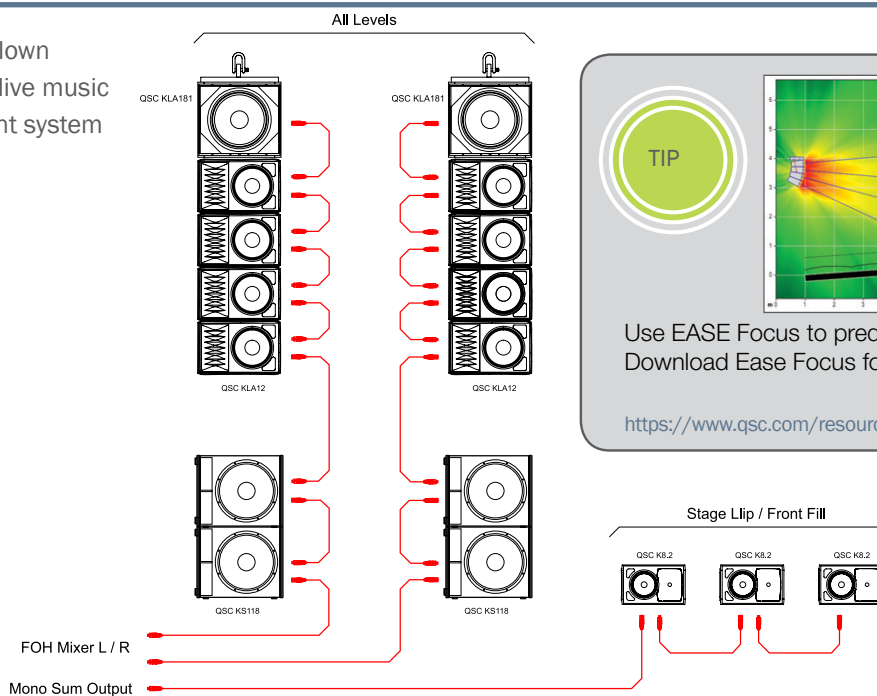
An ideal deployment would include a flown line array with enough vertical coverage to cover all levels. In older heritage buildings that have no structural provision for chain-motor pick points the loudspeakers would be ground stacked.



Option 1 – Ground-stacked speech and playback music reinforcement system



Option 2 – Flown high-impact live music reinforcement system



Use EASE Focus to predict vertical coverage of each KLA array. Download EASE Focus for free from:

<https://www.qsc.com/resources/software-and-firmware/loudspeakers/>

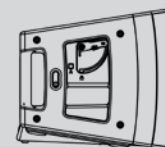
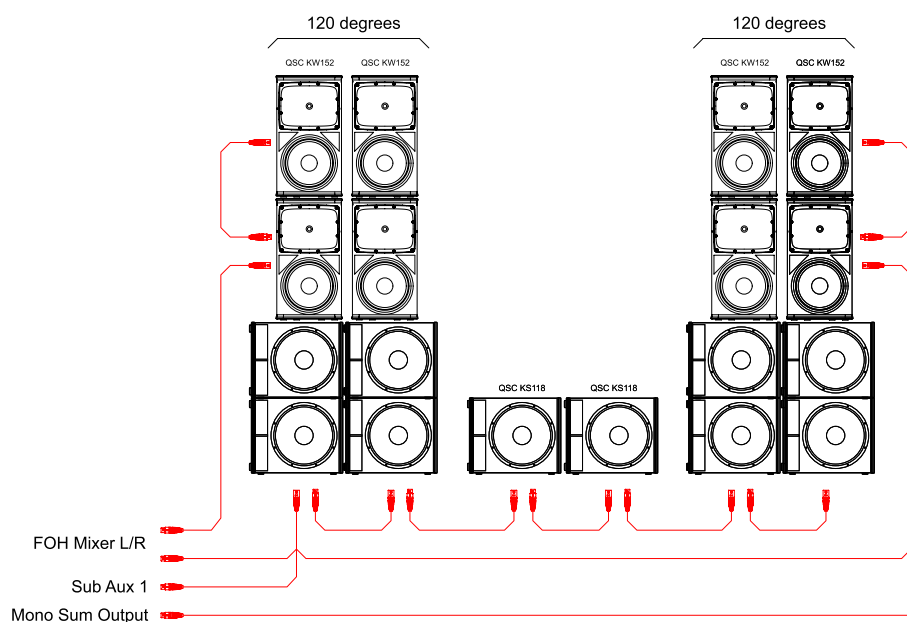
Section 2: Application Suggestions

Live Sound Reinforcement: Outdoor Stage

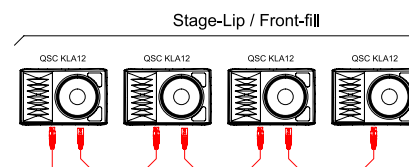
Up to approx. 100 ft (12,000 ft²): 800+ people

This is a small outdoor stage – either an existing band shell or a temporary scaffold or trailer stage. Most commonly used for community events such as fairs, race days, or music festivals.

Option 1 – Ground-stacked speech and playback music reinforcement system



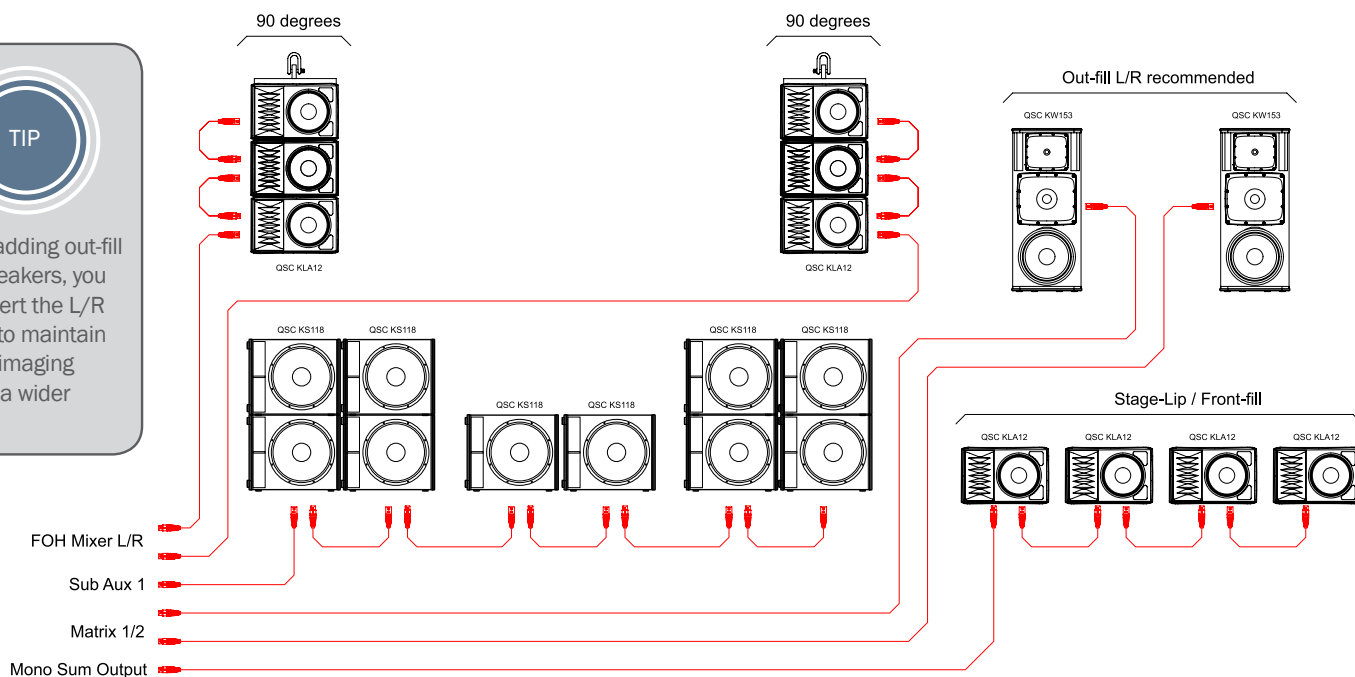
The KLA also makes a great stage lip front-fill loudspeaker for wider stage applications. QSC engineers have even included a useful foot on each KLA for this application.



Option 2 – Flown high-impact live music reinforcement system

TIP

When adding out-fill loudspeakers, you can invert the L/R to R/L to maintain stereo imaging across a wider area.



Section 2: Application Suggestions

Monitor Rigs and Backline

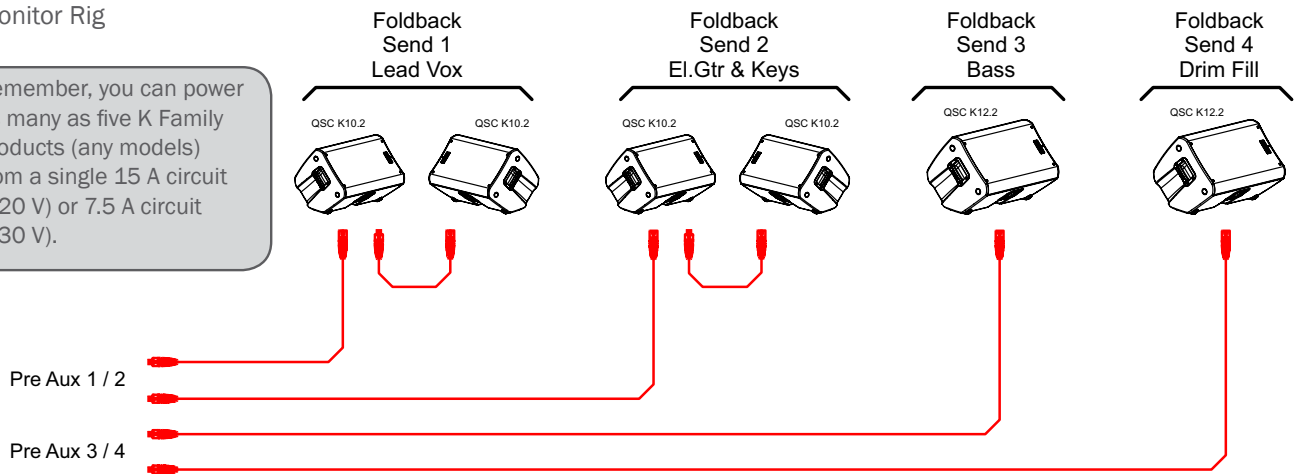


Small Monitor Rig

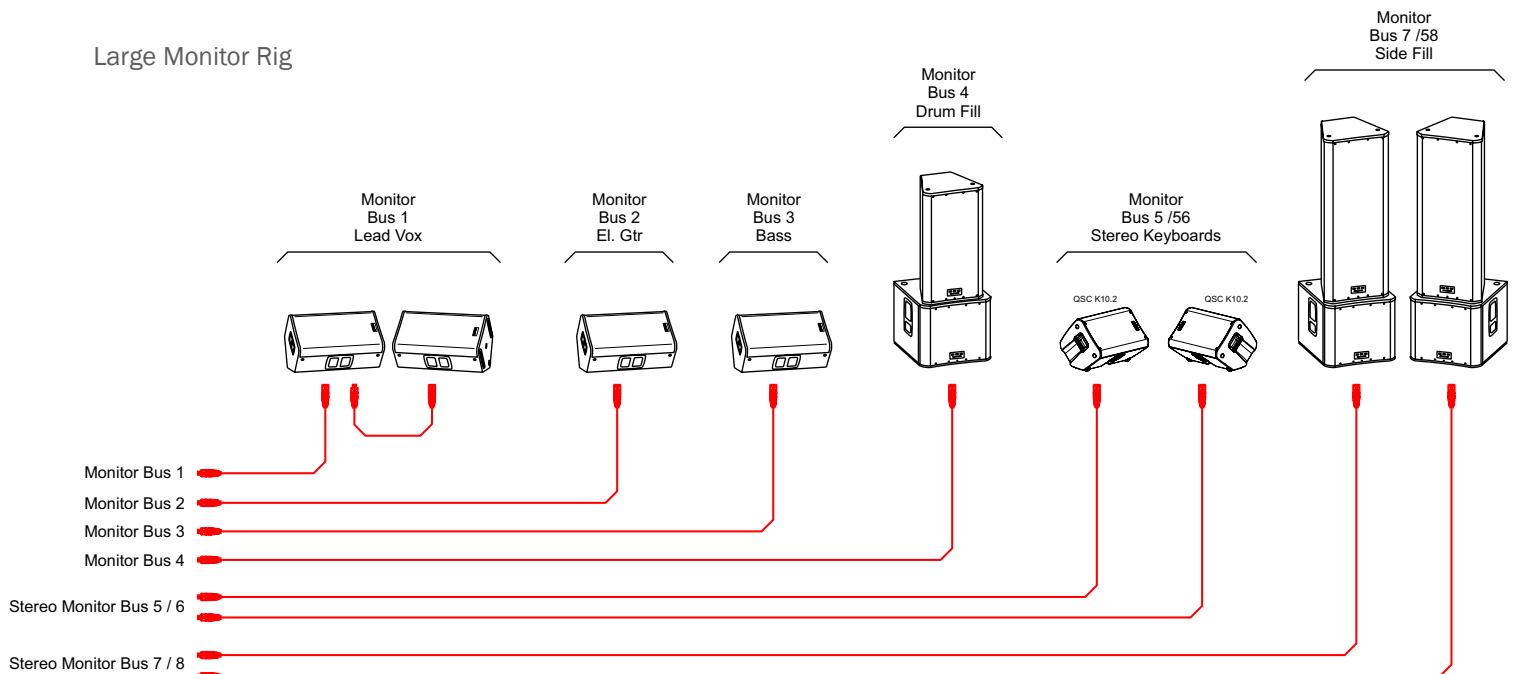


TIP

Remember, you can power as many as five K Family products (any models) from a single 15 A circuit (120 V) or 7.5 A circuit (230 V).



Large Monitor Rig



QSC Application Engineering Contacts

QSC, LLC

1675 MacArthur Boulevard
Costa Mesa, CA 92626-1468
USA

Tel: (800) 854-4079
Tel: +1 (714) 754-6175
Fax: +1 (714) 754-6174
E-mail: info@qsc.com

Application Engineering and Technical Services

Tel. (800) 772-2834
Tel. +1 (714) 957-7150
Fax: +1 (714) 754-6173
E-mail: tech_support@qsc.com

QSC EMEA

Kleines Feldlein 1
74889 Sinsheim
Germany

Phone: +49 7261 6595 300
Fax: +49 7261 6595 333

QSC LLC - India

EVOMA, #14 BhattraHalli, Suite #187
Old Madras RD K.R. Puram
Bangaluru - 560 049 Karnataka, India

Phone: +91 80 306 13795
Fax: +91 80 419 03005