

### LA108 | LA112

#### Active Line Array Loudspeakers

**Q: Why do the LA108/LA112 feature only three adjustable vertical splay angles?**

**A:** Typical applications for L Class loudspeakers were defined to include deployment of arrays containing up to six (6) loudspeakers. Extensive calculations and simulations of array sizes and venues likely to be encountered by users of L Class loudspeakers were done. These simulations showed that L Class arrays could be optimized for Reach (sound projection over distance), Smoothness (minimum effect on frequency response for any splay angle) and Coverage (ability to direct sound energy) using three splay angles only, corresponding to a short, medium and long-throw deployment. With this insight, an additional level of simplicity allowed us to apply our single operator QSC RapidDeploy™ rigging system (patent-pending) as well as to create carefully tailored Ar-Q™ Array Equalization for any possible deployment scenario.

**Q: What is the coverage pattern of the LA108 and LA112?**

**A:** The LA108 has a coverage of 100° H x 15° V, while the LA112 features a 90° H x 15° V coverage, utilizing QSC Directivity Matched Transition® technology to match the horizontal coverage pattern at the crossover.

**Q: The LA108 has less specified amplifier Watts than a KLA12. Does that mean that the LA108 is not as loud as a KLA12?**

**A:** Specified amplifier power (Watts) alone is not an indication of the maximum sound pressure level a loudspeaker is capable of producing. The KLA12 has a maximum SPL of 131 dB, however the use of a very efficient Class D amplifier together with improved-sensitivity transducers gives the LA108 an increased output of 134 dB.

**Q: How many LA108/LA112 loudspeakers can be flown in an array?**

**A:** An array consisting of six (6) LA108/LA112 loudspeakers may be flown with a safety factor of 10:1 using QSC dedicated, product-specific array frame accessories.

**Q: How many LA108/LA112 loudspeakers can I deploy on a loudspeaker stand?**

**A:** A loudspeaker stand with a 45 kg (100 lb) safety rating can be used to deploy up to three (3) LA108 loudspeakers, or up to two (2) LA112 loudspeakers per stand. Always be sure to read and follow the safety recommendations provided by the manufacturer of the stand.

**Q: How many LA108/LA112 loudspeakers can I deploy on a pole over a subwoofer?**

**A:** Using QSC loudspeaker 26-inch or 36-inch poles (SP-26 or SP-36) with QSC LS118/KS118 subwoofers, up to three LA108, or two LA112 may be safely deployed.

Caution note: when using other pole types and/or subwoofer models, always make sure to follow the manufacturers' recommendations for loudspeaker stand deployment in the respective product User Manual.

To avoid toppling hazards:

- **Pole length:** a longer (higher) pole makes the system more subject to toppling due to wind or being bumped.
- **Subwoofer weight:** a lightweight subwoofer will make the system more susceptible to toppling.
- **Subwoofer footprint:** a subwoofer with a small footprint will also make the system more prone to toppling.
- **Base surface:** a level, solid floor under the subwoofer will reduce the potential for toppling. A soft, uneven surface such as a lawn will increase the potential.
- **Cable dress:** power, network and signal cables should all be laid out so as not to present a tripping hazard that could pull the system over.

**Q: What are the angles of the dual loudspeaker pole cup available on the bottom of the LA108/LA112?**

**A:** There are two pole cups on each loudspeaker. One will provide a 0° angle (baffle perpendicular to the ground). The other offers a (minus) -7.5° deployment for down-tilt firing.

**Q: Can the rigging hardware of the LA108 connect to the LA112?**

**A:** No. The width of the LA108 does not match the width of the LA112 enclosure. Therefore, they cannot be deployed or rigged in the same array.

**Q: What is Ar-Q™ Array Equalization?**

**A:** As the size and total vertical coverage of an array is altered, the resulting change in low frequency (LF) energy output is not the same as the change in high-frequency (HF) output. In order to maintain consistent balance between LF and HF, array equalization filters are used. These shelving filters display varying amplitude and frequency. QSC's AWARE™ (Automatic Wireless Array Recognition) technology provides the loudspeakers with the data that is required to select the appropriate equalization filter(s) for each specific deployment.

**Q: After setting up my loudspeaker array, how do I apply the correct Ar-Q™ Array Equalization settings for my deployment?**

**A:** The user may apply Ar-Q™ Array Equalization filters by selecting "Optimize Array" via the Rear User Interface (RUI) located on the rear panel of the LA108/LA112 loudspeakers. Simply press and hold the Rear User Interface (RUI) rotating encoder on any loudspeaker in the array for approximately 3 seconds. The QSC AWARE™ technology will sense the location and the relative angle of each loudspeaker within the array via on-board IR sensors (located at the top and bottom of each loudspeaker's grille), which will then apply the optimal Ar-Q™ Array Equalization for the physical deployment of your array.

**Q: What is the purpose of the infrared (IR) transmitter/receiver on the top/bottom of each LA108/LA112 loudspeaker's grille?**

**A:** The IR transmitter/receiver provides a communication link between members of an array whether or not an Ethernet connection is used. This enables QSC AWARE™ to determine the number of loudspeakers in the array, as well as the location of each array member and its splay angle. It is from this data that AWARE can determine what Ar-Q™ Array Equalization to apply. In addition, the IR communication link allows settings for the entire array to be controlled from the Rear User Interface (RUI) of a single array member loudspeaker.

**Q: What are the Dante®/Network EtherCON ports for?**

**A:** The dual EtherCON ports can be connected to a local area network (LAN), over which remote control and monitoring of the loudspeaker(s) is available via the local area network using the QSC SysNav™ (System Navigator) app. Additionally, uncompressed digital audio can be received using the Dante audio-over-IP protocol.

**Q: Is the second EtherCON port for network redundancy (primary vs secondary)?**

**A:** No. The second EtherCON port is a parallel switched port that allows for daisy-chaining boxes.

**Q: If there is no Dante® network redundancy on the LA108/LA112, what other fail over is supported?**

**A:** For mission-critical events (live broadcasts, etc.) it is possible to connect both Analog and Dante signals simultaneously where Dante audio is the primary source and the analog audio is the secondary source or "backup". In this scenario, the analog source must remain muted, but can be manually unmuted in the event of a network failure.

**Q: The KLA12 loudspeaker had an 18° vertical coverage angle, while the LA108/LA112 feature a 15° vertical coverage angle. Does that mean the KLA12 covers more audience area than the LA108/LA112?**

**A:** Yes. However, maximum vertical coverage is not always the most desirable attribute of a line array system. The decreased vertical coverage of the LA108/LA112 loudspeakers combined with more splay-angle options than the KLA12 allows an array to be better tailored to meet the needs of varying coverage requirements.

**Q: Can I use KLA12 and LA112 loudspeakers together in the same array?**

**A:** No. The rigging hardware is incompatible.

**Q: Does QSC offer any recommendations regarding a ratio of LS118 subwoofers to LA108/LA112 loudspeakers?**

**A:** QSC strongly encourages you to use LS118, KS118 or KS212C subwoofer(s) together with LA108/LA112 loudspeakers. The determination of the subwoofer count depends on a number of factors including acoustics of the performance venue, whether it is indoors or outdoors, program content and sound pressure level expectations. A recommended starting point would be to use one subwoofer unit for every four (4) loudspeakers (two per side) you are using in your PA system.

**Q: Can I connect to my L Class loudspeaker array with Dante® and then pass the signal through the rest of the array with analog XLR cables?**

**A:** No. The XLR output connector featured on L Class models is an analog pass-through wired directly to the XLR input. The signal is not post-DSP.

**Q: Can I connect to my L Class loudspeaker array with an analog cable and then pass the signal through the rest of the array using RJ45 network cables?**

**A:** No. The ethernet ports on L Class models do not include a Dante® transmitter.

**Q: Can I use the LA108/LA112 in vertical orientation (enclosure placed on its side) for stage side-fills, for example?**

**A:** Yes, the LA108/LA112 enclosures can also be deployed as a horizontal ground-stacked array when flipped onto their sides. Rubber feet located on the enclosure's side ensure the endcaps are not scuffed up when the enclosure is deployed in an horizontal array configuration. The rear panel features also an arrow indicating the location of the high frequency (HF) waveguide, which should always be positioned at the top. Warning: the loudspeakers' coverage angles also rotate, with the LA108 being 15 degrees horizontal and 100 degrees vertical and the LA112 being 15 degrees horizontal and 90 degrees vertical. Particular attention should be paid to possible strong floor/stage reflections which may compromise the sound reproduction quality. Note that in this orientation, loudspeakers cannot be flown, but only ground-stacked.

**Q: Can I use L Class models in applications where they may be exposed to rain or other sources of moisture?**

**A:** When LA108/LA112 loudspeakers are used in a temporary application, where rain or exposure to moisture is a possibility, the TWS-IO (Temporary Weather Shield) is recommended, which protects the unit's In/Out connectors. For the LS118 subwoofer, used in the same conditions, a different accessory is available and recommended, the TWS-AMP (Temporary Weather Shield), which protects the entire subwoofer's amplifier module.

Be sure to read and understand the instructions that come with the TWS-IO and TWS-AMP accessories. In any circumstances, do not allow water to enter the amplifier module or the loudspeaker/subwoofer enclosure.

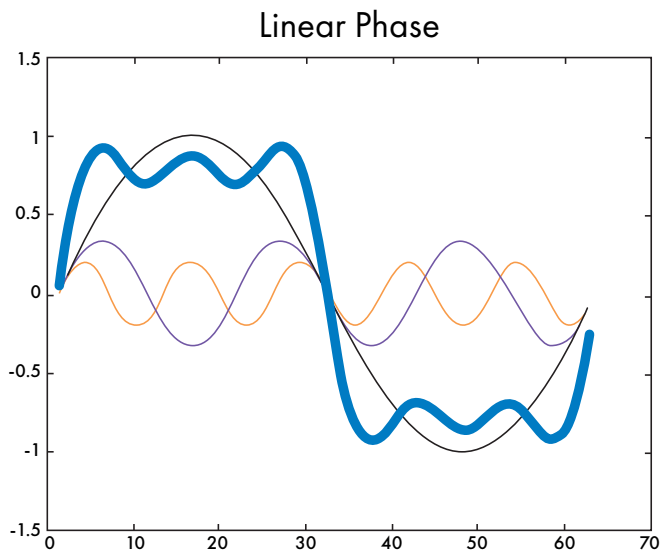
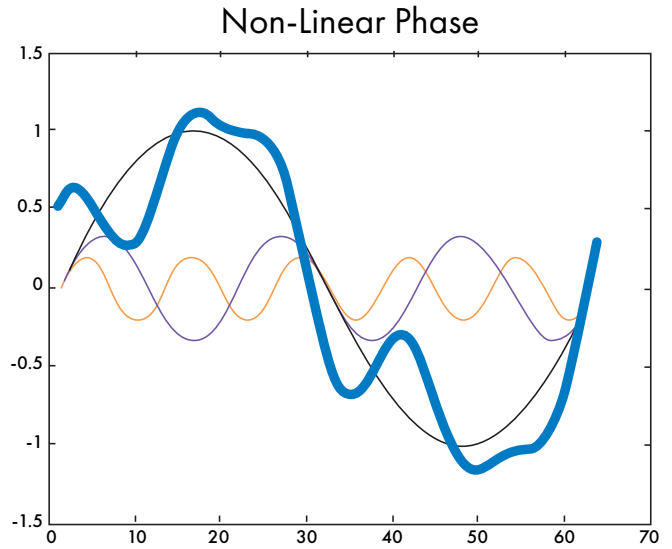
In fixed installations, the L Class models are not designed or intended for permanent or long-term deployment where they are exposed to the elements. Longer-term exposure to extreme humidity, salt-spray and water can result in cosmetic damage or compromised functionality and safety.

**Q: What is the operating ambient temperature range at which LA108/LA112 will perform according to their specifications?**

**A:** The operating ambient temperature range of L Class models is between 0° - 50°C (32° - 122°F). However at the upper end of the operating range, thermal limiting may engage resulting in reduced sound output.

**Q: What is linear phase and why should anyone care about it?**

**A:** Linear phase means that all frequencies are delayed by the same amount when passing from the input to the output of a system. The image below depicts a square wave, a waveform that consists of a fundamental and odd harmonics (only two of which are shown). When the square wave passes through a linear phase system, the time relationship between fundamental and harmonics is preserved and the waveform that emerges maintains its square wave character.



In a system with non-linear phase, the time relationship between fundamental and harmonics is altered and something other than a square wave emerges at the output. Another term for altered waveform is distortion.

Phase non-linearity can be introduced by the electronics as well as by the transducers, waveguides, and other elements of a loudspeaker system. So linear-phase processing and amplification won't deliver linear-phase acoustic output from the loudspeaker.

**Q: What is QSC Acoustic Linear Phase (ALP) design?**

**A:** QSC ALP design employs a combination of FIR, IIR and all-pass filters to address a number of phase-related shortcomings found in many loudspeakers.

Used across a range of QSC loudspeakers, ALP design provides consistent phase response allowing easy combination and coherent deployment of loudspeakers within the same sound system. It eliminates typical phase issues occurring when crossing over from subwoofer to top box as well as comb filtering problems when mixing top boxes that do not share the same phase response.

**Q: Which QSC loudspeakers feature Acoustic Linear Phase (ALP) design?**

**A:** QSC has applied the concept of Acoustic Linear Phase (ALP) design to loudspeaker systems including QSC K.2 Series™ KS and CP Series as well as L Class family of products. With consistent phase response across a range of loudspeakers, it is possible to deploy systems in which various types of loudspeakers can be more coherently combined. As an example, a K.2 Series loudspeaker may be used in a front-fill role and will blend coherently with LA108 or LA112 main line arrays loudspeakers.

**Q: How many L Class models can I connect via switch hops on a single network run from my router or switch?**

**A:** In the AV industry, there are two common methods of connecting network devices. The first method is a star topology where each device has its own port on an Ethernet switch. This is the most robust method but it requires a cable home run from each device back to the Ethernet switch, which is fine for permanent installations but challenging for temporary deployments.

The second method is daisy-chaining, which requires dual switched ports on each device, as found on the L Class models. While daisy-chaining is much easier to deploy, it should be noted that each “hop” incurs a latency penalty, measured in micro-seconds, but quickly adding up. Therefore, a pre-determined latency is applied to each Dante receiving device to account for switch hops, eliminating the risk of dropped packets and resulting audio glitches.

The Dante latency settings are based on worst-case latency assumptions and are therefore quite conservative. The L Class models default to 1 ms, which will accommodate up to 10 switch hops. As a reference point, a Dante mixer connected through an Ethernet switch to a 6-box daisy-chained array of LA108 or LA112, is the equivalent of 6 switch hops. If you are using 5 switch hops or less, there is the potential to adjust the latency and decrease it from 1 ms to 0.5 ms using the Dante Controller software. Please refer to Audinate for more information on Dante Controllers.

**Q: How is Dante® audio distributed to an array?**

**A:** When a LA108/LA112 loudspeaker array is created, all of the parameters are linked, such as EQ, Delay, Gain etc. Additionally, the Dante Transmitter (TX) subscriptions are also linked, which means that all loudspeakers receive the same Dante audio from its assigned transmitter. Because Dante uses multi-cast traffic, one transmitter (such as a digital mixer) can stream to multiple receivers (such as a line array system). Please consult [www.audinate.com](http://www.audinate.com) for more information on how to connect your Dante-capable PA system.

**Q: Can you enlist remote monitoring and management for fixed installations if you integrate L Class line array with the Q-SYS Platform and Q-SYS Reflect Enterprise Manager?**

**A:** Yes. In upcoming Q-SYS Designer Software select the L Class component from your Inventory and add it to the Schematic. This allows you to control and monitor each device. However, firmware updates will still be managed in QSC SysNav™ App and Dante subscriptions will need to be managed in SysNav or via Dante Controllers.

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## LS118

### Active Subwoofer

**Q: Can the LS118 run in cardioid mode?**

**A:** Yes, using two or more LS118 side by side, stacked, or back-to-back and engaging the appropriate cardioid setting (Forward/Rear) on each subwoofer will provide a cardioid coverage.

**Q: Is the LS118 flyable?**

**A:** The LS118 has fittings that accommodate M10 Eyebolts. Flying an array consisting of multiple subwoofers is not supported. Always be sure to observe safe rigging practices and local regulations when suspending loudspeakers and subwoofers.

**Q: Can I fly an array of LA108/LA112 underneath the LS118?**

**A:** No, the LS118 subwoofer does not have matching rigging hardware that could be directly attached to LA108/LA112 enclosures. However, a single LS118 can safely be flown behind or next to an LA108/LA112 array.

**Q: Is the performance of the LS118 altered/modified when used on its side?**

**A:** The LS118 can be used in either vertical or horizontal orientation, while providing identical performance and sound radiation no matter the direction of the deployment.