

User Manual

020-102170-02

Christie Vive Audio LS1/LS2 Line Source Speakers



NOTICES

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Every effort has been made to ensure accuracy, however in some cases changes in the products or availability could occur which may not be reflected in this document. Christie reserves the right to make changes to specifications at any time without notice. Performance specifications are typical, but may vary depending on conditions beyond Christie's control such as maintenance of the product in proper working conditions. Performance specifications are based on information available at the time of printing. Christie makes no warranty of any kind with regard to this material, including, but not limited to, implied warranties of fitness for a particular purpose. Christie will not be liable for errors contained herein or for incidental or consequential damages in connection with the performance or use of this material. Canadian manufacturing facility is ISO 9001 and 14001 certified.

WARRANTY

Products are warranted under Christie's standard limited warranty, the complete details of which are available by contacting your Christie dealer or Christie. In addition to the other limitations that may be specified in Christie's standard limited warranty and, to the extent relevant or applicable to your product, the warranty does not cover:

- a. Problems or damage occurring during shipment, in either direction.
- b. Projector lamps (See Christie's separate lamp program policy).
- c. Problems or damage caused by use of a projector lamp beyond the recommended lamp life, or use of a lamp other than a Christie lamp supplied by Christie or an authorized distributor of Christie lamps.
- d. Problems or damage caused by combination of a product with non-Christie equipment, such as distribution systems, cameras, DVD players, etc., or use of a product with any non-Christie interface device.
- e. Problems or damage caused by the use of any lamp, replacement part or component purchased or obtained from an unauthorized distributor of Christie lamps, replacement parts or components including, without limitation, any distributor offering Christie lamps, replacement parts or components through the internet (confirmation of authorized distributors may be obtained from Christie).
- f. Problems or damage caused by misuse, improper power source, accident, fire, flood, lightning, earthquake or other natural disaster.
- g. Problems or damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel or a Christie authorized repair service provider.
- h. Problems or damage caused by use of a product on a motion platform or other movable device where such product has not been designed, modified or approved by Christie for such use.
- i. Problems or damage caused by use of a projector in the presence of an oil-based fog machine or laser-based lighting that is unrelated to the projector.
- j. For LCD projectors, the warranty period specified in the warranty applies only where the LCD projector is in "normal use" which means the LCD projector is not used more than 8 hours a day, 5 days a week.
- k. Except where the product is designed for outdoor use, problems or damage caused by use of the product outdoors unless such product is protected from precipitation or other adverse weather or environmental conditions and the ambient temperature is within the recommended ambient temperature set forth in the specifications for such product.
- l. Defects caused by normal wear and tear or otherwise due to normal aging of a product.

The warranty does not apply to any product where the serial number has been removed or obliterated. The warranty also does not apply to any product sold by a reseller to an end user outside of the country where the reseller is located unless (i) Christie has an office in the country where the end user is located or (ii) the required international warranty fee has been paid.

The warranty does not obligate Christie to provide any on site warranty service at the product site location.

WARRANTY

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- a. Problems or damage occurring during shipment, in either direction.
- b. Problems or damage caused by combination of a product with non-Christie equipment, such as distribution systems, cameras, DVD players, etc., or use of a product with any non-Christie interface device.
- c. Problems or damage caused by misuse, improper power source, accident, fire, flood, lightning, earthquake, or other natural disaster.
- d. Problems or damage caused by improper installation/alignment, or by equipment modification, if by other than Christie service personnel or a Christie authorized repair service provider.
- e. Problems or damage caused by use of a product on a motion platform or other movable device where such product has not been designed, modified or approved by Christie for such use.
- f. Except where the product is designed for outdoor use, problems or damage caused by use of the product outdoors unless such product is protected from precipitation or other adverse weather or environmental conditions and the ambient temperature is within the recommended ambient temperature set forth in the specifications for such product.
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PREVENTATIVE MAINTENANCE

Preventative maintenance is an important part of the continued and proper operation of your product. Please see the Maintenance section for specific maintenance items as they relate to your product. Failure to perform maintenance as required, and in accordance with the maintenance schedule specified by Christie, will void the warranty.


REGULATORY

The product has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the product is operated in a commercial environment. The product generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of the product in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.

CAN ICES-3 (A) / NMB-3 (A)

이 기기는 업무용(A급)으로 전자파적합등록을 한 기기이오니 판매자 또는 사용자는 이점을 주의하시기 바라며, 가정 외의 지역에서 사용하는 것을 목적으로 합니다.

ENVIRONMENTAL

The product is designed and manufactured with high-quality materials and components that can be recycled and reused. This symbol  means that electrical and electronic equipment, at their end-of-life, should be disposed of separately from regular waste. Please dispose of the product appropriately and according to local regulations. In the European Union, there are separate collection systems for used electrical and electronic products. Please help us to conserve the environment we live in!

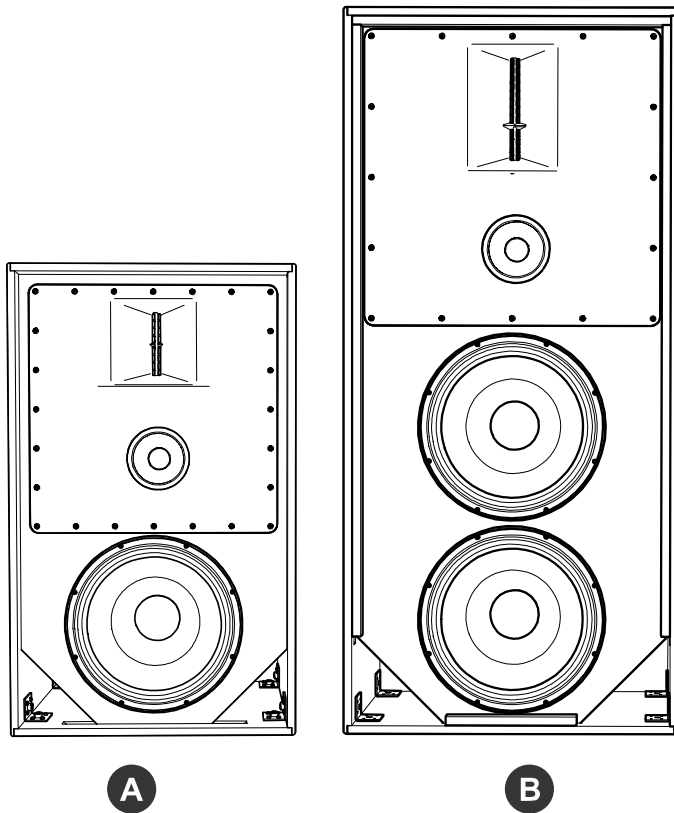
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Introduction

The Christie Vive Audio LS1/LS2 Line Source speakers are designed for screen channel or corner surround use in small to medium sized auditoriums.

Hardware attachment points on each speaker allow for multiple installation options. They are four-way, bi-amplified type, with separate inputs for low-frequency and mid-high frequency and require the use of an electronic crossover and two separate amplifier channels.



A	LS1 speaker
B	LS2 speaker

Safety and warning guidelines

Read all safety and warning guidelines before installing, operating, or maintaining the speakers.

Installation safety

The following guidelines apply when installing the speakers.



Warning! Failure to comply with the following could result in death or serious injury.

- Before installation, inspect all components for cracks, deformations, corrosion, and missing or damaged parts that could reduce their installation strength.
- A minimum of two people or appropriately rated lift equipment is required to safely lift, install, or move the product.
- The supporting structure must safely support the combined load of the product, all attached hardware, and components following all local safety standards and regulations.
- Always install all legally required safety straps or cables.
- Install the minimum number of rigging wires required to suspend the speaker.
- Observe load ratings and applicable local safety codes.
- FIRE AND SHOCK HAZARD! Use only the attachments, accessories, tools, and replacement parts specified by Christie.



Caution! Failure to comply with the following could result in minor or moderate injury.

- FIRE HAZARD! Do not install near any devices that produce heat such as amplifiers, radiators, heat registers, or stoves.
- Christie products must be installed and serviced by Christie qualified technicians.



Notice. Failure to comply with the following may result in property damage.

- Always turn off and disconnect the amplifiers from power before making audio connections or servicing a speaker.

Operation safety

The following guidelines apply when operating the speakers.



Caution! Failure to comply with the following could result in minor or moderate injury.

- To prevent permanent hearing loss, ear protection (ear plugs, canal protectors, or ear muffs) must be worn when operating the amplification system.
- Do not expose the product to moisture.
- Do not place objects containing liquids on the product.



Notice. Failure to comply with the following may result in property damage.

- Speakers exposed to extremely low temperatures must be allowed to warm for a minimum of one hour before playing them at typical application levels.

Maintenance safety

The following guidelines apply when maintaining the speakers.



Caution! Failure to comply with the following could result in minor or moderate injury.

- Only clean the components with Christie approved products.



Notice. Failure to comply with the following may result in property damage.

- Always turn off and disconnect the amplifiers from power before making audio connections or servicing a speaker.
- Any changes to the product not approved by Christie will void the warranty.

Permissible sound pressure level limits

Exposure to extremely high noise levels may cause permanent hearing loss.

Individuals vary considerably in their susceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to intense noise for a sufficient length of time.

Earplugs or protectors to the ear canals or over the ears must be worn when operating this amplification system to prevent permanent hearing loss, if exposure is in excess of the following permissible limits provided by the United States Occupational Safety and Health Administration (OSHA):

Duration (consecutive)	Sound level (dBA), slow responses
8 hrs	90
6 hrs	92
4 hrs	95
3 hrs	97
2 hrs	100
1.5 hrs	102
1 hr	105
30 min	110
≤15 min	115

Cleaning products

Clean the speaker components with the following Christie approved products.

- Clean, dry, microfiber cloth

Included components

This table lists the components that are shipped with the Vive Audio LS1/LS2 speakers.

Quantity	Description	Part number
1	LS1 speaker, BKT-LSX tilt bracket	145-170109-XX

Quantity	Description	Part number
or		
1	LS2 speaker, BKT-LSX tilt bracket	145-172101-XX

Installation

Complete the following procedures to install the speaker.



All images shown in the installation instructions are of the LS1 speaker; however, these instructions are identical for the LS2 speaker.

Mounting the speakers on a platform

Use the BKT-LSX tilt bracket to install the speaker on a platform. The tilt bracket is included in the box with the speaker.

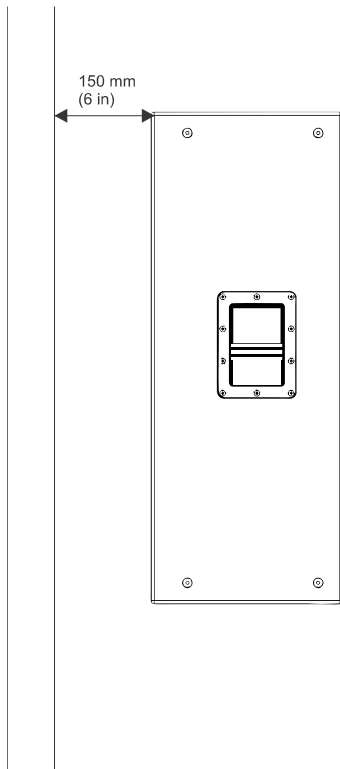


The instructions provided are for mounting the speaker to the platform in a vertical position. To mount the speaker horizontally, contact Christie Technical Support.

Positioning the speaker behind a perforated screen

When installing speakers behind a perforated projection screen, the optimal distance from the top-front of the speaker to rear of projection screen is 150 mm (6 inches) once the laser alignment procedure is complete. This distance provides the best possible speaker performance behind a perforated screen.

If this distance is not practical due to site conditions, maintain a distance of no less than 100 mm (4 inches) and no more than 300 mm (12 inches) between the top-front of the speaker and rear of the perforated screen, to avoid deterioration of audio performance.



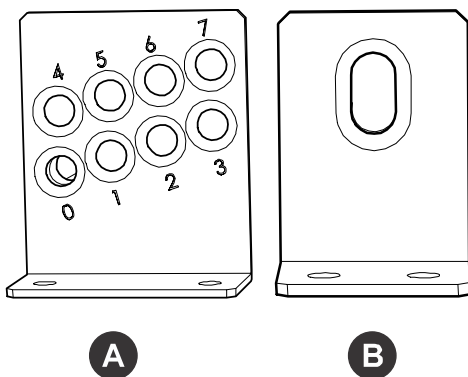
Securing the speaker to the platform with a forward tilt

If you have determined that the speaker should be platform mounted tilted forward, complete this procedure.

Laser alignment is required when installing this speaker.

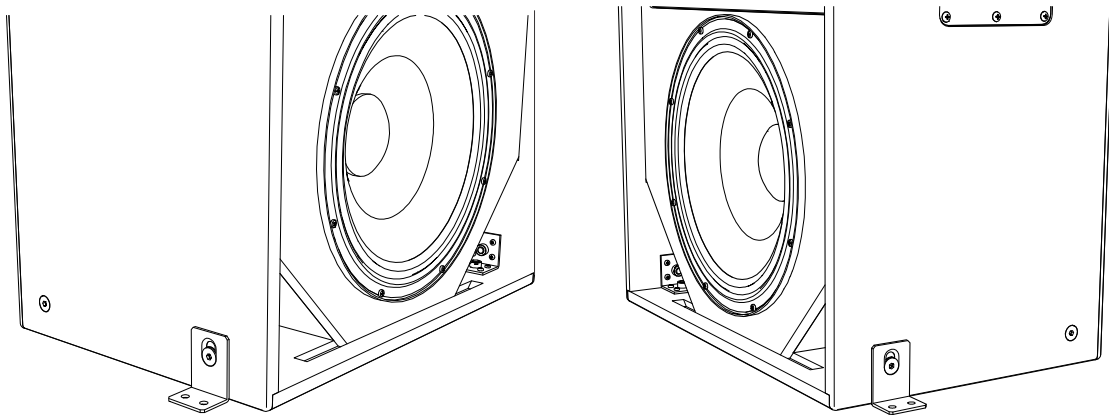
For detailed laser alignment instructions, refer to *Vive Audio Line Array and Line Source Laser Alignment Procedures (020-101406-XX)* (<https://www.christiedigital.com>).

1. Remove the four flat head M10 bolts from the bottom corners of the speaker and keep the bolts for use later.
2. Remove the two fixed and two adjustable bracket plates from the speaker packaging.



A	Adjustable plate
B	Fixed plate

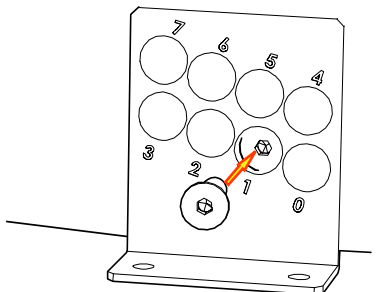
- Loosely attach the fixed bracket plates to the bottom of the speaker, placing the bolts removed in step 1 into the left-front and right-front holes.



- Position an adjustable plate along the bottom edge of the speaker, in front of the right-rear hole.
- Using two people and a laser alignment tool, determine the appropriate tilt required.
- Line up the hole in the speaker with the nearest numbered hole in the adjustable plate. Each numbered hole represents the angle (in degrees) that the speaker is tilted when secured in that position.



- Loosely attach the adjustable bracket plate to the bottom of the speaker, placing the bolt removed in step 1 into the hole.



- Repeat steps 5 and 6 on the left-rear side of the speaker. Ensure that when you attach the left-rear adjustable bracket plate, you are using the same tilt angle and numbered hole as the right-rear adjustable bracket plate.

9. Ensuring that the bottom of the brackets are parallel to the platform, tighten the bolts on both adjustable bracket plates to the torque of 2.1 N*m (19 in*lb), securing them to the speaker.
10. Using a laser alignment tool and the document referred to in step 5, adjust the horizontal aim of the speaker.
11. Tighten the bolts on both fixed bracket plates to the torque of 2.1 N*m (19 in*lb), securing them to the speaker.
Ensure that the bottom of the brackets are parallel to the platform.
12. Secure the adjustable bracket plates to the platform using appropriately sized lag bolts (not provided in the box) according to laws and regulations applicable to the venue.
13. Secure the fixed bracket plates to the platform using appropriately sized lag bolts (not provided in the box) according to laws and regulations applicable to the venue.

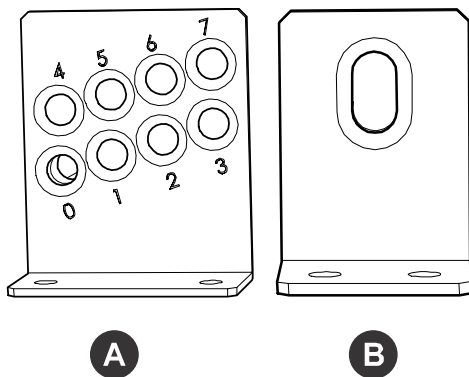
Securing the speaker to the platform with a backwards tilt

If you have determined that the speaker should be platform mounted tilted backwards, complete this procedure.

Laser alignment is required when installing this speaker.

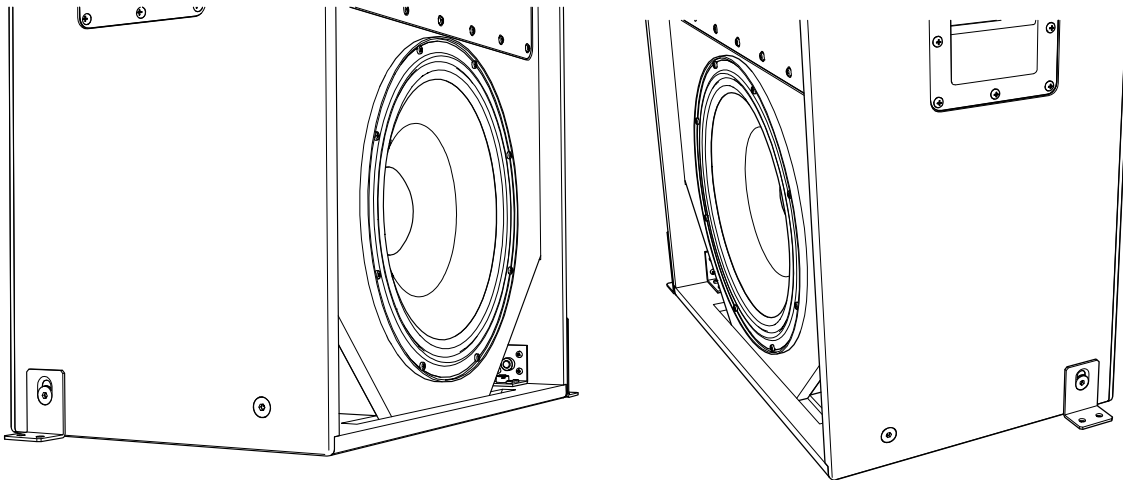
For detailed laser alignment instructions, refer to *Vive Audio Line Array and Line Source Laser Alignment Procedures (020-101406-XX)* (<https://www.christiedigital.com>).

1. Remove the four flat head M10 bolts from the bottom corners of the speaker.
2. Remove the two fixed and two adjustable bracket plates from the speaker packaging.



A	Adjustable plate
B	Fixed plate

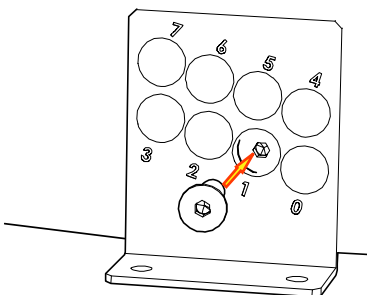
3. Loosely attach the fixed plates to the bottom of the speaker, placing the bolts removed in step 1 into the left-rear and right-rear holes.



4. Position an adjustable plate along the bottom edge of the speaker, in front of the right-front hole.
5. Using two people and a laser alignment tool, determine the appropriate tilt required.
6. Line up the hole in the speaker with the nearest numbered hole in the adjustable plate. Each numbered hole represents the angle (in degrees) that the speaker is tilted when secured in that position.



7. Loosely attach the adjustable bracket plate to the bottom of the speaker, placing the bolt removed in step 1 into the hole.



8. Repeat steps 5 and 6 on the left-front side of the speaker. Ensure that when you attach the left-front adjustable plate, you are using the same tilt angle as the right-front adjustable plate.
9. Ensuring that the bottom of the brackets are parallel to the platform, tighten the bolts on both adjustable bracket plates to the torque of 2.1 N*m (19 in*lb), securing them to the speaker.

10. Using a laser alignment tool and the document referred to in step 5, adjust the horizontal aim of the speaker.
11. Tighten the bolts on both fixed plates to the torque of 2.1 N*m (19 in*lb), securing them to the speaker.
Ensure that the bottom of the brackets are parallel to the platform.
12. Secure the adjustable bracket plates to the platform using appropriately sized lag bolts (not provided in the box) according to laws and regulations applicable to the venue.
13. Secure the fixed bracket plates to the platform using appropriately sized lag bolts (not provided in the box) according to laws and regulations applicable to the venue.

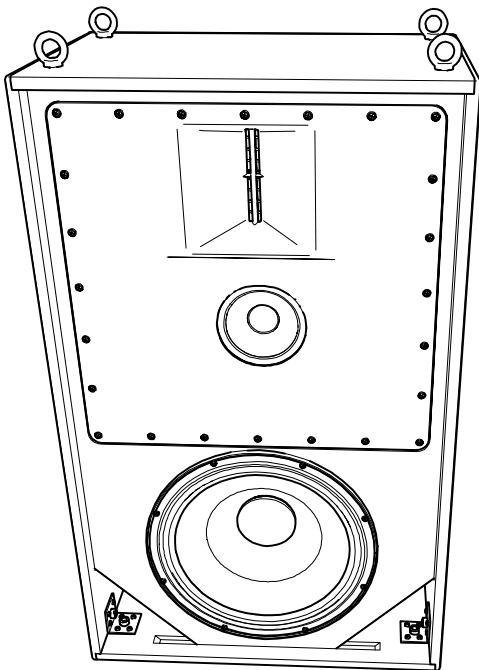
Flying the speaker vertically

The speaker is flown, according to installer best practices, using four rigging cables and any legally required redundant safety cables.



Flying a speaker should only be done by qualified rigging professionals in accordance with local requirements and regulations.

1. Place the speaker on a flat stable surface in a vertical position.
2. Remove the four pre-installed M10 x 60 mm flat head bolts from the top of the speaker.
3. Insert and screw in the four eye-bolts.



If more downward tilt of the speaker is required, remove two flat head bolts from the top-front of the speaker, and two from the bottom-rear of the speaker, and insert the eye-bolts into these holes.

4. Attach the rigging cables to the eye-bolts.
5. Hang the speaker.

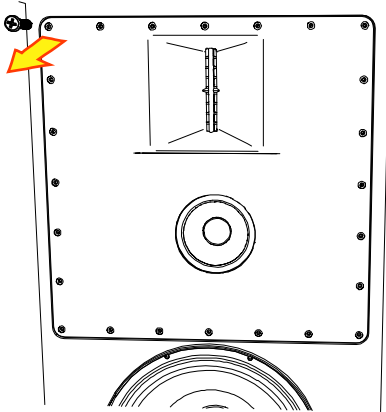
Flying the speaker horizontally

The speaker is flown, according to installer best practices, using four rigging cables and any legally required redundant safety cables.

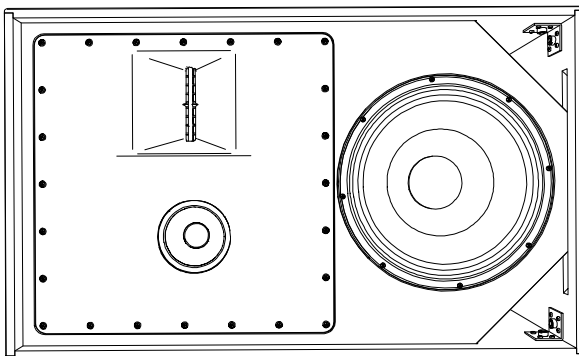


Flying a speaker should only be done by qualified rigging professionals in accordance with local requirements and regulations.

1. Place the speaker on a flat stable surface on its back.
2. Remove the 24 M5 screws and lock washers from the waveguide.

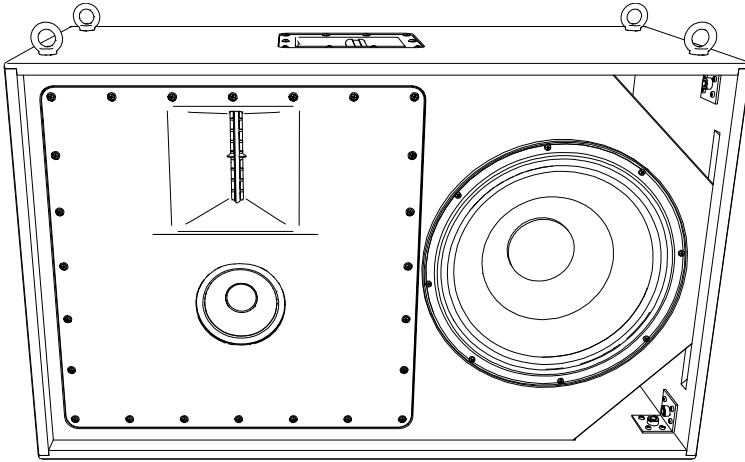


3. Carefully pull the waveguide away from the cabinet, making sure to not strain the connecting wires.
4. Rotate the waveguide 90 degrees clockwise.
5. Insert the waveguide into the cabinet.



6. Secure the waveguide with the 24 screws and lock washers removed in step 1.
7. Turn the cabinet horizontally.

8. Remove the four pre-installed M10 flat head bolts from the top of the speaker.
9. Insert and secure the four eye-bolts.



If more downward tilt of the speaker is required, remove two flat head bolts from the top-front of the speaker, and two from the bottom-rear of the speaker, and insert the eye-bolts into these holes.

10. Attach the rigging cables to the eye-bolts.
11. Hang the speaker.

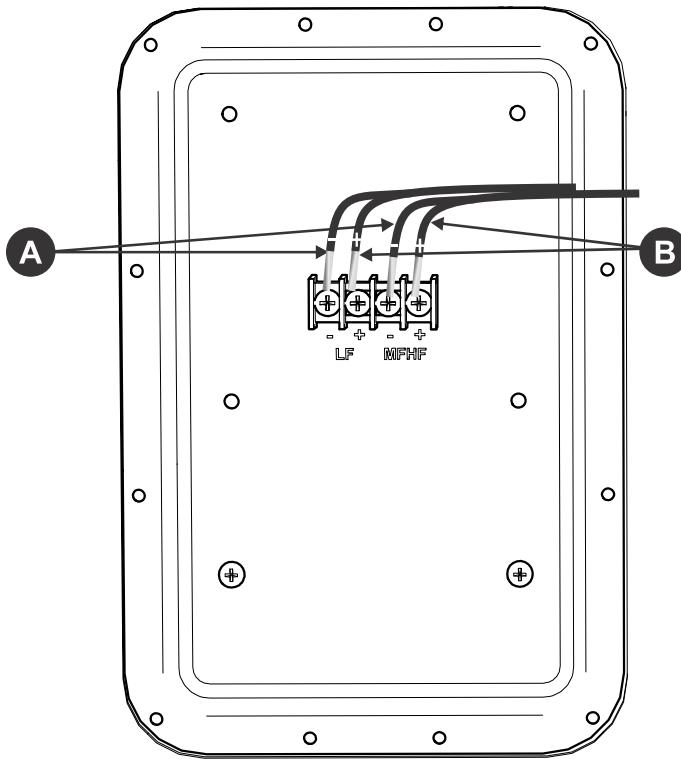
Connecting the speaker wires

Once the speaker is installed, connect the speaker wires to the amplifier.



Notice. Failure to comply with the following may result in property damage.

- Always turn off and disconnect the amplifiers from power before making audio connections or servicing a speaker.
1. These speakers are bi-amped, with distinct negative and positive input terminals for the low frequency and mid/high frequency sections. Connect the separate low frequency and mid/high frequency speaker wires to the negative (A) and positive (B) terminals on the back of the speaker.
if creating crimped spade lug terminations, use a #8 spade lug (P/N: 145-159106-XX).



A	Negative (-) connections
B	Positive (+) connections

2. Connect the speaker wires to the corresponding terminals on the amplifier for both the low frequency and mid/high frequency sections.
3. Turn on the amplifier and verify that the speaker is receiving an input signal by playing a test signal through the system.
Ensure that the amplifier attenuators or gain controls are at nominal settings.

Troubleshooting

For assistance with common issues, refer to the following troubleshooting topics.
If you cannot resolve your issue with the information provided, contact Christie Technical Support.

The speaker does not function

The speaker is connected to the amplifier, but is not producing any sound.

Resolution

- Verify that the speaker is receiving an input signal from the amplifier.
- Verify that the circuit breaker for the main circuit to the amplifier is closed.
- Verify that amplifier is powered on and attenuators or gain controls are at nominal settings.
- If open, reset the circuit breaker. If the AC mains breaker continues to open, check the voltage and amperage of the circuit.
- Verify that the speaker wires are correctly connected to the input terminals on the speaker and the terminals on the amplifier.

The speaker sound is degraded

The speaker is receiving a signal and sound is being output, but it is distorted.

Resolution

- Visually inspect the speaker for deterioration or holes.
- Ensure that the input signal to the amplifier is clean.
- Verify that attenuators or gain controls on amplifiers and any audio processors are at nominal settings.
- Verify that the speaker wires from the speaker are securely connected to the terminals on the amplifier.
- Verify that the speaker wires are correctly connected to the input terminals on the speaker.
- Verify there are no loose or missing screws. Replace all screws you removed during installation.
- Have an authorized dealer complete an audio test (for example, pink noise, frequency sweeps, and content and program material).

There is audible noise from speaker

The speaker is producing audible noise when the amplifier driving it is powered on.

Resolution

- Mute channels, one at a time, to isolate the problem.
- Verify that all line-level cables in the signal chain are in good condition.
- Ensure that the input signal to the amplifier is clean.
- Reroute audio cables away from AC power and lighting cables.
- Verify the correct gain structuring of B chain, input levels, and output levels of source devices and amplifiers.

Specifications

Learn about the product specifications. Due to continuing research, specifications are subject to change without notice.

Audio

Learn about the audio specifications.

Specification	LS1 description	LS2 description
System type	Four-way, bi-amp, vented enclosure.	
Driver components	<p>High-frequency: 2 x 3 in. planar ribbon driver with Kapton diaphragms and Neodymium magnets.</p> <p>Mid-frequency: 6.5 in. cone driver with 38 mm voice coil.</p> <p>Low-frequency: 15 in. paper composite cone driver with 100 mm diameter voice coil.</p>	<p>High-frequency: 6 in. and 3 in. planar ribbon drivers with Kapton diaphragms and Neodymium magnets.</p> <p>Mid-frequency: 6.5 in. paper/Kevlar cone high efficiency Neodymium magnet driver with 51 mm voice coil.</p> <p>Low-frequency: 2 x 15 in. paper composite cone drivers with 100 mm diameter voice coils.</p>
Crossover ¹	<p>Low-frequency and mid-frequency: 350 Hz, active via processor.</p> <p>Mid-frequency and high-frequency: passive at 2.0 kHz. Two-way high-frequency section with frequency shading network.</p>	<p>Low-frequency: 350 Hz active via processor.</p> <p>Mid-frequency and high-frequency: Passive in mid- and high-frequency section with 2 kHz and 7 kHz crossover points. Two-way high-frequency section with frequency shading network.</p>
Frequency response ²	30 Hz-20 kHz at -6dB	
Maximum SPL ³	<p>Low-frequency: 122.8 dB continuous, 125.0 dB IEC maximum long term, 126.8 dB IEC maximum short term.</p> <p>Mid-frequency and high-frequency: 123.1 dB continuous, 124.4 dB IEC maximum long term, 126.1 dB IEC maximum short term.</p> <p>LS1 system: 126.0 dB continuous, 127.7 dB IEC maximum long term, 129.5 dB IEC maximum short term.</p>	<p>Low-frequency: 128.8 dB continuous, 131.1 dB IEC maximum long term, 132.8 dB IEC maximum short term.</p> <p>Mid-frequency and high-frequency: 124.3 dB continuous, 126.5 dB IEC maximum long term, 128.0 dB IEC maximum short term.</p> <p>LS2 system: 130.0 dB continuous, 132.4 dB IEC maximum long term, 134.0 dB IEC maximum short term.</p>
System coverage ⁴	100° horizontal dispersion , 40° vertical dispersion.	
Sensitivity ¹ , 1 W/1 m	Low-frequency: 95.0 dB.	Low-frequency: 98.0 dB.

Specification	LS1 description	LS2 description
	Mid-frequency and high-frequency: 101.3 dB.	Mid-frequency and high-frequency: 102.5 dB.
Recommended amplifier power	Low-frequency: 600-1000 W at 8 ohms. Mid-frequency and high-frequency: 200-300 W at 6 ohms.	Low-frequency: 850-1500 W at 4 ohms. Mid-frequency and high-frequency: 350-450 W at 8 ohms.
Rated impedance	Low-frequency: 8 ohms. Mid-frequency and high-frequency: 6 ohms.	Low-frequency: 4 ohms. Mid-frequency and high-frequency: 8 ohms.

¹For more detailed crossover information, see *Recommended Crossover Settings (P/N 020-101405-01)* (<https://www.christiedigital.com>).

²Measured at 2 m on tweeter axis in simulated free field conditions. Sensitivity is calculated based on measured SPL response averaged in 200 Hz-5 kHz range.

³IEC refers to IEC 60268-5 standard. Maximum SPL values calculated based on sensitivity and IEC power ratings. Continuous power handling tested using IEC60268-1 noise signal for duration of two hours.

⁴Averaged in the 500 Hz-12 kHz range, at -6 dB.

Power requirements

Learn about the power specifications.

Specification	LS1 description	LS2 description
Power handling capacity ¹	Low frequency: 600 W continuous, 1000 W IEC long term, 1500 W IEC short term. Mid-frequency and high-frequency: 150 W continuous, 200 W IEC long term, 300 W IEC short term.	Low frequency: 1200 W continuous, 2000 W IEC long term, 3000 W IEC short term. Mid-frequency and high-frequency: 150 W continuous, 250 W IEC long term, 350 W IEC short term.

¹IEC refers to IEC 60268-5 standard. Maximum SPL values calculated based on sensitivity and IEC power ratings. Continuous power handling tested using IEC60268-1 noise signal for duration of two hours.

Physical

Learn about the physical specifications.

Specification	LS1 description	LS2 description
Input connectors	Four position terminal barrier strip with separate low-frequency and mid/high-frequency inputs.	
Enclosure	<ul style="list-style-type: none"> Vented enclosure with a tuning frequency of 32 Hz (LS1) or 28 Hz (LS2) 18 mm marine plywood, heavily braced for maximum structural strength and minimum panel resonance Rotatable mid/high-frequency section in acoustically isolated enclosure 	

Specification	LS1 description	LS2 description
	<ul style="list-style-type: none"> • Multiple M10 integrated fly points • Rated for overhead installation with 5:1 safety ratio 	
Dimensions (H x W x D)	1018 mm x 618 mm x 400 mm (40.0 in. x 24.3 in. x 15.8 in.)	1505 mm x 692 mm x 400 mm (59.3 in. x 27.2 in. x 15.8 in.)
Net weight	47.17 kg (104 lbs)	69.9 kg (154 lbs)

Accessories

The following optional accessories are available to be used with the speakers.

Accessory	Part number
Allen Products RK-4C rigging kit 4 x cables for flying.	111-685201-XX
BKT-LSX tilt bracket if extra or replacement brackets are required	145-178107-XX
#8 Spade Lug (for speaker input from amplifier)	145-159106-XX

Approvals

This product is designed and built to comply with all relevant directives, standards, safety, health and environmental rules and regulations required for the product to be sold in: USA/Canada, EU, Australia/New Zealand, Kuwait, China, Korea, Japan, Mexico, Ukraine, Russia, India, Argentina, Brazil, Singapore, South Africa, and Saudi Arabia.

Environmental

EU Directive (2011/65/EU) on the restriction of the uses of certain hazardous substances (RoHS) in electrical and electronic equipment and the applicable official amendment(s).

EU Regulation (EC) No. 1907/2006 on the registration, evaluation, authorization and restriction of chemicals (REACH) and the applicable official amendment(s).

EU Directive (2012/19/EU) on waste and electrical and electronic equipment (WEEE) and the applicable official amendment(s).

China Ministry of Information Industry Order No. 32 (01/2016) on Management Methods for the Control of Pollution from Electrical and Electronic Products.

International packaging recycling mark requirements.

- EU Directive (94/62/EC) on packaging and packaging waste;
- China packaging recycling mark standard (GB18455-2001).

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