



Dolby Speaker System 128

Owner's Manual

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Notices

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Dolby Laboratories, Inc.

1275 Market Street
San Francisco, CA 94103-1410 USA
Telephone 415-558-0200
Fax 415-645-4000
<http://www.dolby.com>

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Product model

This documentation applies to: CS128MH (Model: CID1030), CS128LF (Model: CID1027).

Limited warranty and warranty exclusions

THE LIMITED WARRANTY AND WARRANTY EXCLUSIONS MAY BE FOUND AT THE FOLLOWING URL: <http://www.dolby.com/us/en/about/warranty-and-maintenance-policies.html>

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Important safety and regulatory information



Safety

INSTALLER ASSUMES ALL RESPONSIBILITY AND LIABILITY FOR THE INSTALLATION OF THIS PRODUCT.

No information contained in this guide is intended as a warranty on the part of Dolby. Anyone using this information assumes all liability arising from its use. Product abuse, use of the product not in accordance with Dolby instructions, or use in an application for which the product has not been designed is not covered under any Dolby warranty, nor is Dolby liable for any loss or damage.

Installation must be performed by qualified, licensed, and insured installers, and in accordance with all laws, rules, and regulations applicable to the installation site. Failure to do so could result in serious personal injury or even death. Prior to installing this product, read and completely understand the installation instructions. You must read these instructions to prevent personal injury and property damage. Keep the installation instructions in an easily accessible location for future reference.

A licensed professional engineer must approve the placement and method of attachment to the building structure prior to the installation of the system.

All information presented herein is based upon materials and practices common to North America and may not directly apply to other countries because of differing material dimensions, specifications, and/or local regulations. Installers in other countries should consult with appropriate engineering and regulatory authorities for specific guidelines.

Any supplied rigging hardware is intended only for use with the specified loudspeaker(s). The installer assumes all risk of loss and/or injury arising out of the use of the supplied rigging hardware with any other loudspeaker. All other rigging is considered part of the venue and/or installer-supplied equipment and is not addressed in this guide. This guide is not a comprehensive source for rigging in general. Installer assumes all responsibility for ensuring that accepted rigging and safety practices are employed. Installer assumes all responsibility for the appropriate use of Dolby supplied rigging hardware and follows at a minimum all applicable laws, rules, and regulations in force for each venue.

No open flame sources should be placed on or near the apparatus. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.

Storage temperature: -4 to +140°F (-20 to +60°C). The products covered by this manual are not intended for use in high-moisture environments. Moisture can damage the product and cause corrosion of electrical contacts and metal parts. Avoid exposing the speakers to direct moisture. Keep speakers out of extended or intense direct sunlight. Premature product failure or serious personal injury could occur if this product is used outdoors or in wet indoor environments.

Dolby is not responsible for the application of its products for any purpose or the misuse of this information for any purpose. Furthermore, Dolby is not responsible for the abuse of its products caused by avoiding compliance with inspection and maintenance procedures or any other abuse.



Caution: Hearing damage can occur by prolonged exposure to excessive sound pressure level (SPL); the loudspeaker is easily capable of generating SPL sufficient to cause permanent hearing damage to performers, production crew, or audience members. Caution should be taken to avoid prolonged exposure to SPL in excess of 90 dB.



Caution: Vibration from this type of speaker system is high and may cause cabinets to shift. Failure to secure the bottom speaker cabinet to the building structure may result in the speaker system tipping or falling, which may cause damage or injury.



Caution: Make sure that no water pipes, natural gas lines, electrical wire, or conduit are present where the speaker is to be installed. Cutting or drilling into water pipes, natural gas lines, electrical wire, or conduit could cause serious personal injury or property damage.



Caution: Use proper lifting techniques when working with heavy objects to avoid personal injury. **Always be careful when moving the CS128LF or the assembled Dolby Speaker System 128 and employ at least two people when attempting any relocation of the loudspeakers, as there is danger of tipping if the system is not secured to the building structure.**



High temperature warning: Loudspeaker system may reach elevated temperatures during operation. Always remove all drive signals and allow ample time for the system to cool down prior to handling.

EU Environmental regulations/ compliance and product disposal information

Restriction of Hazardous Substances Directive (RoHS): All Dolby products comply with the requirements of the EU RoHS Directive. This product is electronic equipment and should be disposed of in accordance with all applicable laws.

Do not dispose as household waste. Do not dispose of the product in a fire. Please dispose of this product by taking it to your local electronic waste collection point or recycling center. For information regarding where to recycle electronic equipment, contact your local dealer. For additional information regarding Waste Electrical and Electronic Equipment (WEEE) and product disposal go to <https://www.dolby.com/us/en/about/environmental-commitment.html>

Russian environmental regulations and compliance

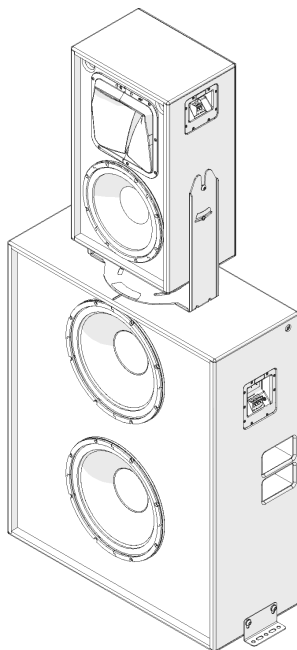
This product complies with Russia EAC RoHS requirements.



Introduction to Dolby Speaker System 128

The Dolby Speaker System 128 is designed to meet the needs of a high-performance screen speaker in a large Dolby Atmos or 7.1 Cinema, especially those rooms with minimal space behind the screen. The Dolby Speaker System 128 delivers consistent audio coverage and uniform volume shading for every seat in the venue up to approximately 66 feet (20 meters) in depth. The Dolby Speaker System 128 consists of a CS128MH loudspeaker for mid and high frequencies and a CS128LF loudspeaker for low-frequencies, providing greater intelligibility and enhanced low-frequency extension. These components are coupled together to create a screen speaker system that provides better audience coverage, lower distortion (discomfort), and increased low-frequency response. With intuitive ergonomic design and features, the Dolby Speaker System 128 enables quick, easy installation and service. Built on the foundation of Dolby's industry-leading system design and support philosophy, the Dolby Speaker System 128 provides elevated large-format auditorium performance and streamlines speaker integration.

Figure 1: Dolby Speaker System 128 full speaker stack



The list below is an outline of this chapter:

- [About this documentation](#)
- [CS128MH key features and benefits](#)
- [CS128LF key features and benefits](#)
- [Dolby Speaker System 128 wire selection](#)
- [Dolby Speaker System 128 installation information](#)
- [Additional information](#)
- [Contacting Dolby](#)

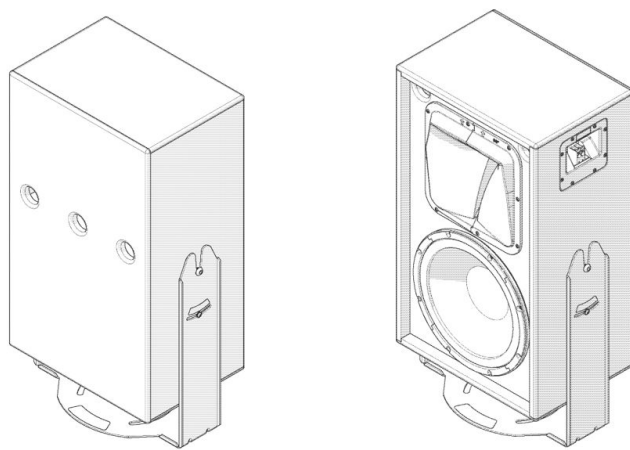
2.1 About this documentation

This documentation provides key features & benefits of the Dolby Speaker System 128 and how to install the system in a typical cinematic exhibition environment.

2.2 CS128MH key features and benefits

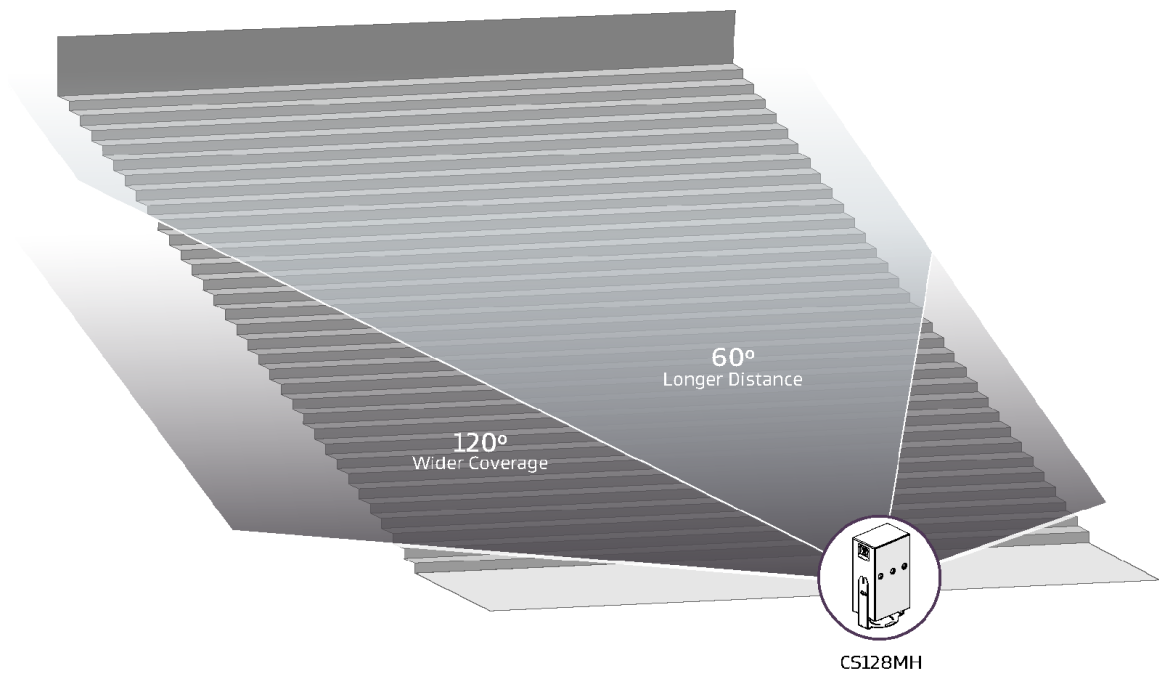
The Dolby Speaker System 128 utilizes one CS128MH unit, which consists of an asymmetrical high-frequency horn with a high-performance transducer, and a low distortion 12 inch midrange. This configuration yields improved pattern and amplitude control within the high-frequency operating range, yielding smoother response coverage to all seats in the auditorium.

Figure 2: CS128MH rear (left) and front (right)



- The high-frequency driver is a very low-distortion 75 mm titanium dome driver with a frequency response up to 20 kHz.
- The mid-frequency driver is a high sensitivity 12-inch transducer with optimized FEM (Finite Element Modeling) motor and suspension, optimized cooling for low power compression and an aluminum demodulation ring for decreased distortion.
- The cabinet depth is optimized for use in auditoriums with minimal spacing behind the screen.
- The advanced input plate features a high-current, spring-loaded terminal block that enables quick installation without the need for spade lugs or a crimping tool.
- The CS128MH assembly mounts directly to the top of a CS128LF unit and features independent horizontal and vertical aiming adjustments.
- The ports on front and back of unit are used for natural convection cooling.
- The unique asymmetrical high-frequency horn design provides long-distance coverage to the back of the auditorium from the top of the horn, while the bottom of the horn provides wider coverage and volume shading for the audience closer to the screen. This provides greatly improved coverage for the auditorium in comparison to conventional horn designs.

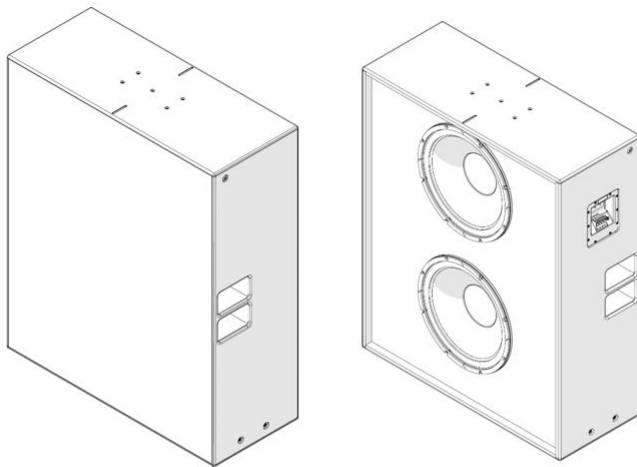
Figure 3: Dolby asymmetrical horn coverage



2.3 CS128LF key features and benefits

Dolby Speaker System 128 utilizes a single CS128LF to produce low frequencies.

Figure 4: CS128LF rear (left) and front (right)



- Each unit contains two 15-inch woofers that can be driven in parallel or driven individually to maximize available amplifier power.
- Each 15-inch driver is contained in an independent chamber within the cabinet that provides improved performance and reliability.
- On the CS128LF, a unique flip-card allows you to change the electrical routing for parallel wiring of the drivers powered from a single amplifier channel, or individual wiring to the amplifier channel on each driver. With the CS128LF flip-card, you can easily select either bi-amplifier mode or single-amplifier mode without the need of any additional tools.

- The close spacing of the woofers to each other combined with placing the pair toward the top of the cabinet improves system vertical dispersion.
- Rubber feet on the bottom of the cabinet help with stability and isolating the cabinet from transmitting vibration to the building structure.
- Dual side acoustical ports (one on each side of the cabinet) can be used as integrated handles to improve safety and comfort during handling and installation.
- BKT.FLR floor bracket kit, which is available from Dolby (sold separately), enables secure installation of the speaker system to the building structure. The kit includes two brackets and four M10 washers.
- The CS128LF attachment points are for connecting to the auditorium building structure only; they are not intended for hanging or flying the speaker. Always adhere to local building codes in your region.
- The advanced input plate features a high-current, spring-loaded terminal block, which enables quick installation with no crimp tools or spade lugs needed, vastly simplifying installation.

2.4 Dolby Speaker System 128 wire selection

This section can assist you in selecting the correct wire gauge.

Typically, no more than 0.5 dB (or 11%) of power should be lost in the cabling. The Dolby Speaker System 128 connectors accept an American Wire Gauge (AWG) of 18 AWG to 6 AWG (1 mm² – 16 mm²). Typically, a wire gauge of 16 AWG to 12 AWG (1.5 mm² – 4 mm²) is recommended. The following sections provide basic information regarding the Dolby Speaker System 128 input plates, choosing between the two modes of operation, installing the wiring, and detailed information regarding speaker operating modes.



Note: The input terminals are marked with indicators to show the polarity. Per International Electrotechnical Commission (IEC) standards, a positive voltage on the positive marked input results in the transducers moving outward. You must verify the positive and negative markings for each respective product. Always tie the cable down to the available hardware to minimize any buzzing or pullouts. If possible, after wiring is completed, play sound through the speaker to identify any connection issues, buzzing, or rattling.

2.5 Dolby Speaker System 128 installation information

In a typical auditorium, Dolby Speaker System 128 is installed behind the screen, with the acoustic center of the speaker located two-thirds of the distance from the bottom of the screen.

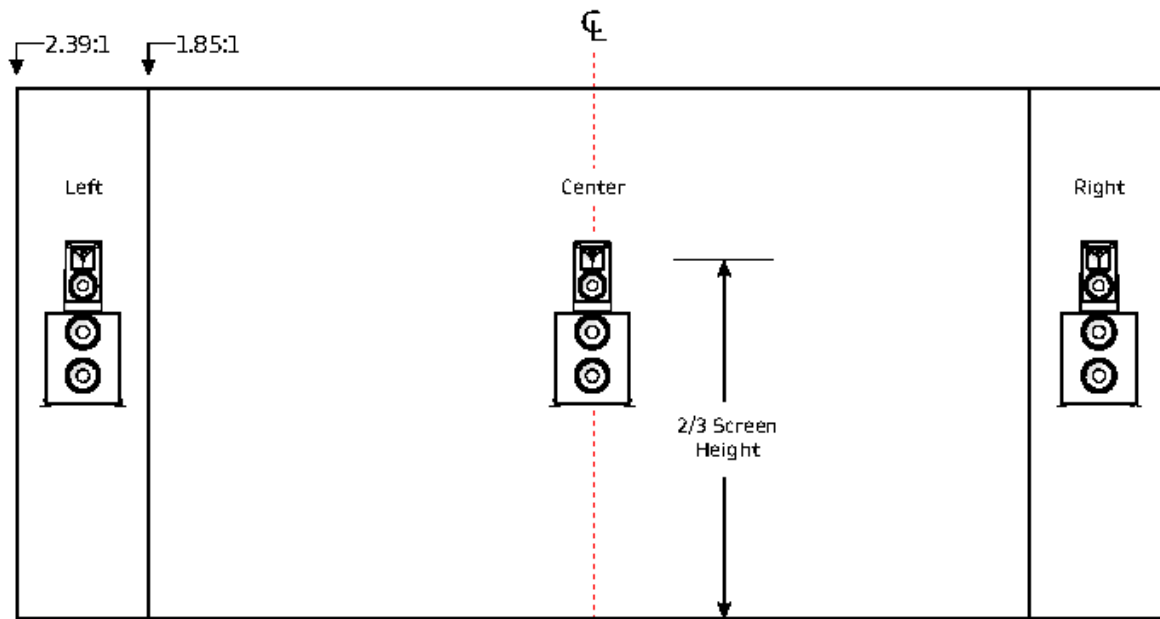
The placement of the speakers behind the screen should follow guidance found in Dolby Atmos Specifications for cinema, or industry standard guidance in the case of a 7.1 screen. To improve localization and smooth pan-throughs, larger cinemas can benefit by adding left-center and right-center screen speakers.

You may need to build a screen platform to position the speaker system to the correct height. A screen platform must be secured to the building structure. You must consult a licensed professional engineer regarding design and construction of a screen platform.



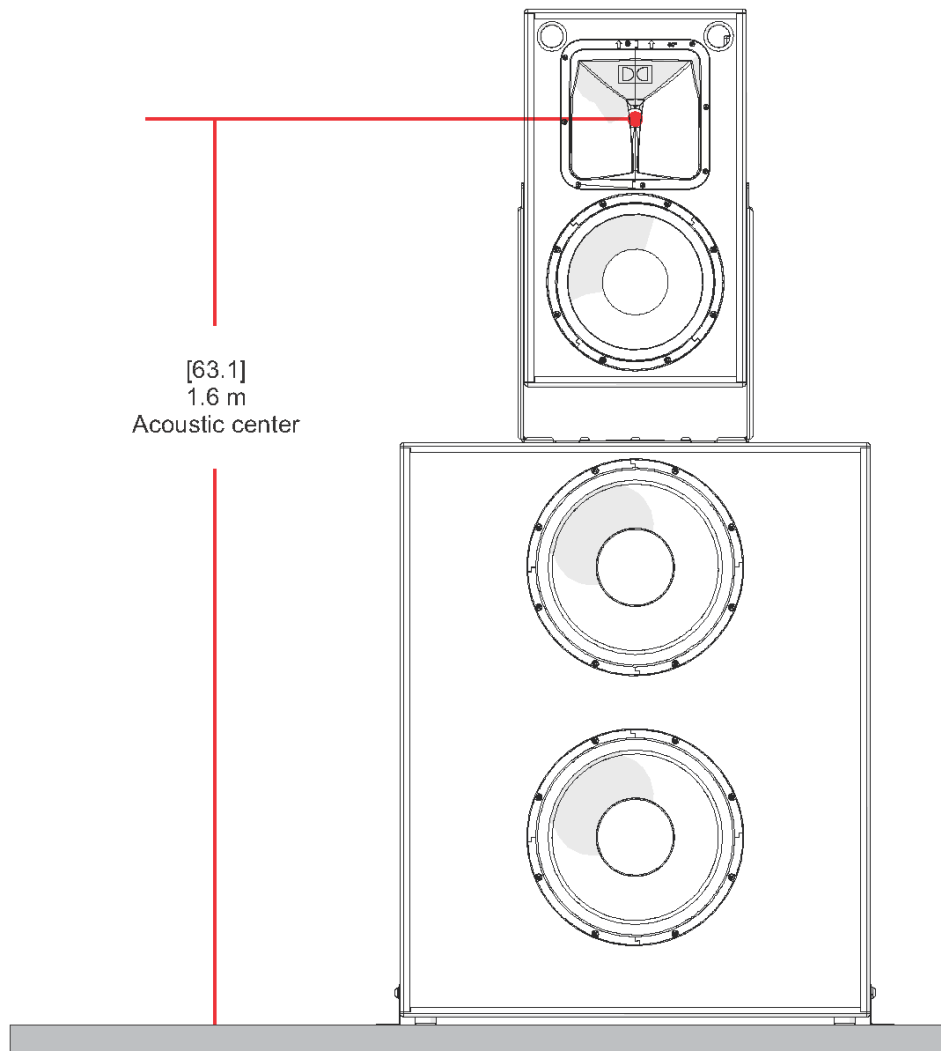
Caution: Design and construction of a screen platform must be performed by a qualified, licensed, and insured professional in accordance with all laws, rules, and regulations applicable to the installation site. Failure to do so could result in serious personal injury or even death.

Figure 5: Typical auditorium installation



The elevation of the speaker system should be located with the acoustic center of the horn positioned exactly two-thirds the distance from the bottom of the screen. The acoustic center of the speaker system is 1.6 m (63 inches) above the building structure from which it is secured. See Figure 6.

Figure 6: Dolby Speaker System 128 acoustic center

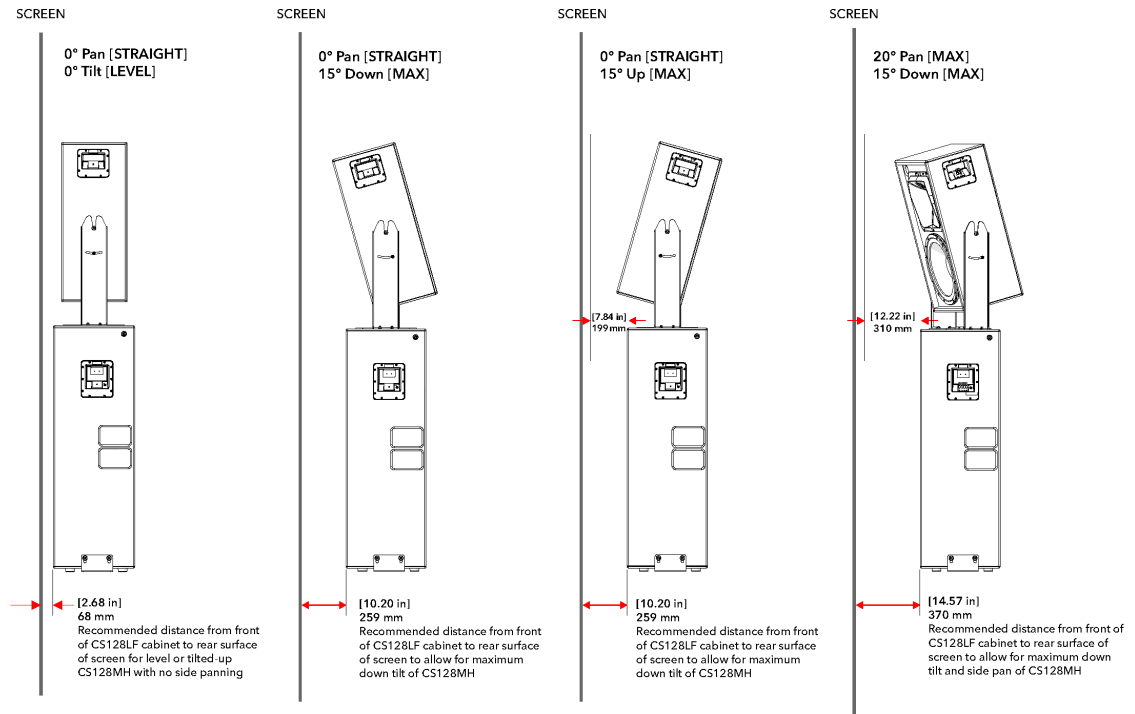


The Dolby Speaker System 128 is designed to be placed as close to the screen surface as possible with a minimum distance of 5-7 cm. This minimizes high-frequency reflections (screen loss) but does not locate the speaker too close to the screen. When aiming the system, angling of the CS128MH may require that the speaker system be set back from the screen to accommodate proper tilting and aiming.



Caution: Always be careful when moving the CS128LF or the assembled Dolby Speaker System 128, and employ at least two people when attempting any relocation of the loudspeakers, as there is danger of tipping if the system is not secured to the building structure.

Figure 7: Dolby Speaker System 128 screen planes



GLL format files for software simulation modeling

There are .GLL files that you can use to simulate the Dolby Speaker System 128 in acoustical simulation software. You can download the .GLL files at <https://www.dolby.com/us/en/professional/cinema/products/sys128.html>. To run the .GLL files, use EASE or EASE Focus software. EASE Focus software is free, and can be downloaded from <https://focus.afmg.eu/index.php/fc-downloads-en.html>.

Dolby Speaker System 128 .GLL file descriptions

- **CS128LF GLL**
 - The file-name to create the Dolby Speaker System 128 screen channel is Do**l**by_CS128LF.
 - For correct simulation, place the LF entry point (z axis) at the height of the CS128LF speaker cabinet base in the auditorium.
- **CS128MH GLL**
 - To finish the Dolby Speaker System 128 screen channel, use the Do**l**by_CS128MH file. The loudspeaker entry point into the simulation is at the acoustic center of the system.
 - Place the CS128MH height entry point (z axis) at 1.6 m (5.25 ft) above the height entry point of the CS128LF.GLL. The x and y axes should match the companion CS128LF.
 - The CS128MH.GLL file can then pan +/-20 degrees horizontally, and tilt +/-15 degrees, independent of the CS128LF, as it would in a typical configuration.

2.6 Additional information

Additional information about weight, blockage, and wire gauge selection is provided here:

- System weight is approximately 84.3 kg (186 lb).
- Please allow at least 11 inches (30cm) between the side port exits and any obstruction (including side wall or baffle wall construction). Blockage of the side port(s) will result in reduced low-frequency extension and a decreased life span of the product.
- Wire gauge selection should always use industry-standard practice based on the loudspeaker rated ohms and cable length. Typical maximum acceptable power loss is 0.5 dB, or less than 11%.

2.7 Contacting Dolby

You can contact Dolby Cinema Solutions and Support using email or regional telephone numbers. You can also access documentation by visiting the Dolby customer portal.

Contact Dolby Cinema Solutions and Support

- Send an email to cinemasupport@dolby.com.
- Call:
 - Americas: +1-415-645-4900
 - Europe/Middle East/Africa (EMEA): +44-33-0808-7700
 - Asia-Pacific (APAC): +86-400-692-6780
 - Japan: +81-3-4520-9798

Access documentation

Visit <https://customer.dolby.com>.

Submit feedback about this documentation

Send an email to documentation@dolby.com.

3

Assembling the Dolby Speaker System 128

You will need to secure the CS128LF to the building structure, and then install the CS128MH onto the CS128LF.



Note: BKT.FLR floor brackets are available from Dolby (sold separately) to secure the speaker system to the building structure. When using the BKT.FLR brackets, installer must supply the mounting hardware necessary to secure the speaker system to the building structure. The holes in the bracket are sized for M10 or 3/8- inch bolts.



Caution: Vibration from this type of speaker system is high and may cause cabinets to shift. Failure to secure the bottom speaker cabinet to the building structure may result in the system tipping or falling, which may cause damage or injury.



Caution: Dolby disclaims any liability, including damage or injury, for the use of non-Dolby supplied mounting hardware, supports, and brackets. Any modification to the speaker system (for example, mounting by drilling holes into the speaker system) will render the product warranty null and void.

The list below is an outline of this chapter:

- [Securing the CS128LF](#)
- [Installing the CS128MH onto the CS128LF](#)
- [Aiming the Dolby Speaker System 128](#)
- [Working with electrical components](#)
- [Connecting and configuring the CS128MH](#)
- [Connecting and configuring the CS128LF](#)

3.1 Securing the CS128LF

It is required that the speaker system is secured to the building structure.

About this task

The following tools are needed to secure the Dolby CS128LF:

- 6 mm hex driver or wrench
- BKT.FLR brackets
- Installer-provided serviceable thread-locking compound (recommended)
- Installer-provided acoustic or non-hardening caulking (recommended)

Procedure

1. Determine the proper placement of the system.



Note: Check with local building codes, and always refer the installation to a qualified professional.

2. Remove the four M10 bolts from the bottom sides of the CS128LF speaker cabinet, as shown in the following figure. These bolts are pre-installed in the CS128LF cabinet.
3. Reinstall the M10 bolts with the M10 washers, included with the BKT.FLR kit, securing the BKT.FLR brackets, and then tighten the M10 bolts to 12 Nm (8.9 ft-lb, 106 in-lb).
4. Secure the CS128LF to the building structure with installer provided mounting hardware.



Note: Proper selection and installation of mounting hardware is the exclusive responsibility of the installer. We recommend using M10 bolts and a serviceable thread-locking compound (for example, Loctite 243). We also recommend applying acoustic or other non-hardening caulking to the bottom side of the bracket to isolate speaker vibration from the building structure.



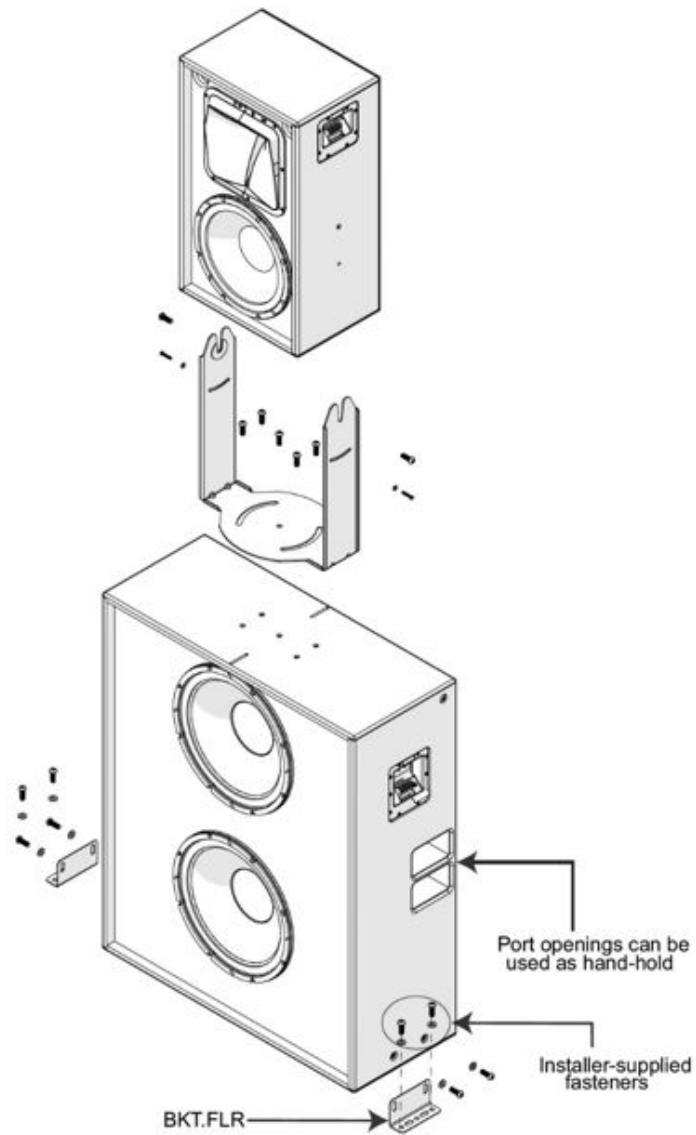
Caution: Vibration from this type of speaker system is high and may cause cabinets to shift. Failure to secure the bottom speaker cabinet to the building structure may result in the speaker system tipping or falling, which may cause damage or injury.



Caution: Dolby disclaims any liability, including damage or injury, for the use of non-Dolby supplied mounting hardware, supports, and brackets. Any modification to the speaker system (for example, mounting by drilling holes into the speaker system) will render the product warranty null and void.



Attention: The Dolby Speaker System 128 was designed to be placed as close to the screen as possible, within 5-7 cm. When aiming the system, angling of the CS128MH may require that the speaker system be set back from the screen to accommodate proper tilting and aiming

Figure 8: Securing the CS128LF

3.2 Installing the CS128MH onto the CS128LF

Use the information provided in this section to install the CS128MH onto the CS128LF.

About this task

The following tools are needed to secure the Dolby CS128LF:

- 6 mm hex driver or wrench

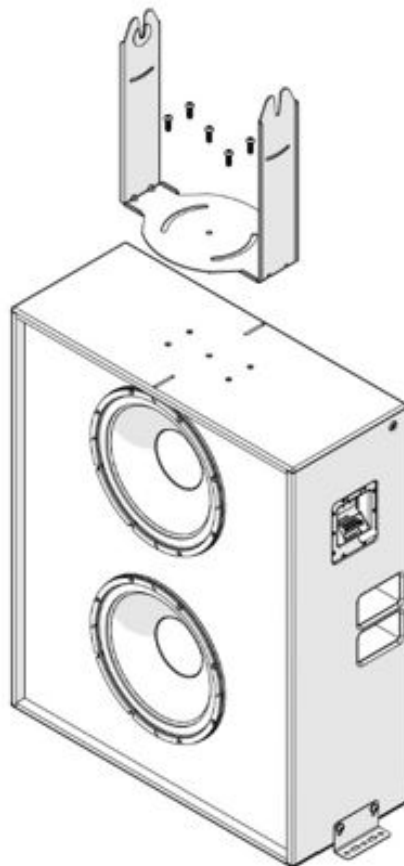
Procedure

1. Remove the five M10 bolts from the top of CS128LF low-frequency cabinet.
2. Place the provided yoke onto the top of the CS128LF, and then reinstall the five M10 bolts (see Figure 9).
3. It is recommended to perform the horizontal aiming process at this point.
4. Fully tighten the M10 bolts.

Optionally, the M10 bolts can be loosely installed and tightened later as discussed in [Aiming the Dolby Speaker System 128](#) on page 18.

Figure 9: Mount yoke to top of CS128LF low-frequency cabinet

Remove five M10 bolts from
CS128LF top panel

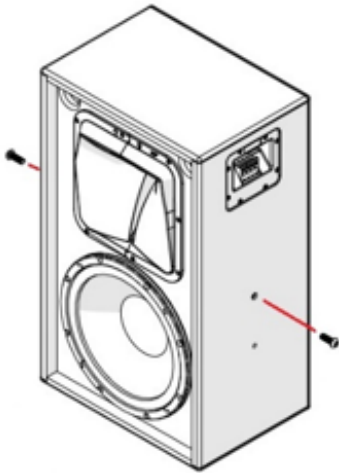


Place yoke on cabinet and reinstall five M10 bolts
through yoke

5. Install the two M10 bolts supplied with the CS128MH mounting hardware bag into the two side mounting locations on the CS128MH cabinet.

The bolts must remain loose enough to allow the cabinet to slide into the yoke as described in step 6 (see the following figure for M10 yoke mounting locations).

Figure 10: Installing M10 Bolts to side locations on CS128MH



6. Carefully lift the CS128MH, and then insert into the mounting yoke such that the M10 bolts (inserted in step 5) seat into the left and right cradles located at the top of the yoke attached to the CS128LF.
7. Install and tighten the two M5 set screws and washers supplied with the CS128MH mounting hardware bag into the two side mounting locations on the CS128MH cabinet.



Caution: Always be careful when moving the CS128LF or the assembled Dolby Speaker System 128, and employ at least two people when attempting any relocation of the loudspeakers, as there is danger of tipping if the system is not secured to the building structure.

3.3 Aiming the Dolby Speaker System 128

Use the information provided in this section to aim the Dolby Speaker System 128 for precise sound distribution.

About this task

The following tools are needed to secure the Dolby CS128LF:

- 6 mm hex driver or wrench
- 3mm hex driver or wrench



Note: If a laser pointer will be used for aiming, the laser pointer must be provided by the installer.

Procedure

1. After assembling the Dolby Speaker System 128, adjust the speaker horizontal axis by rotating the CS128MH on the cabinet.

The angle adjustment range is +/- 20 degrees from the center, as shown on the provided decal stickers.

Figure 11: Adjust CS128MH horizontal axis

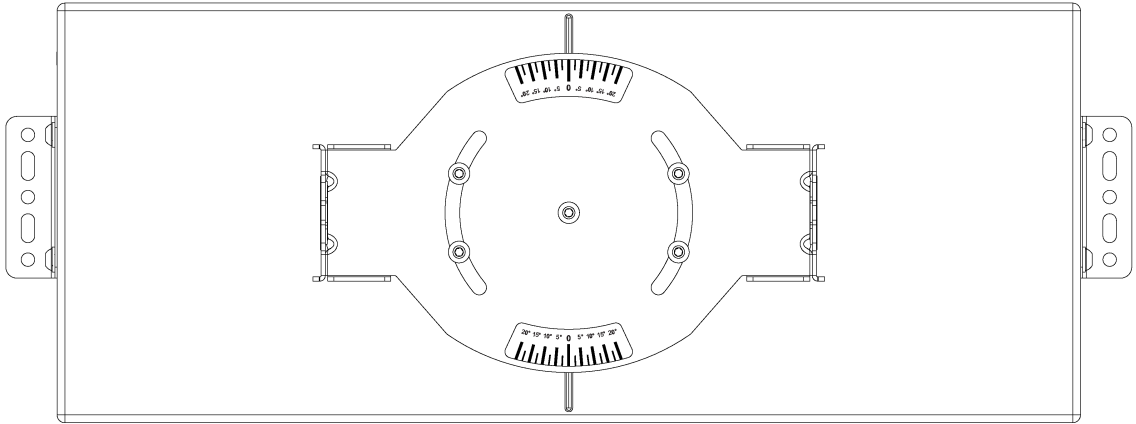
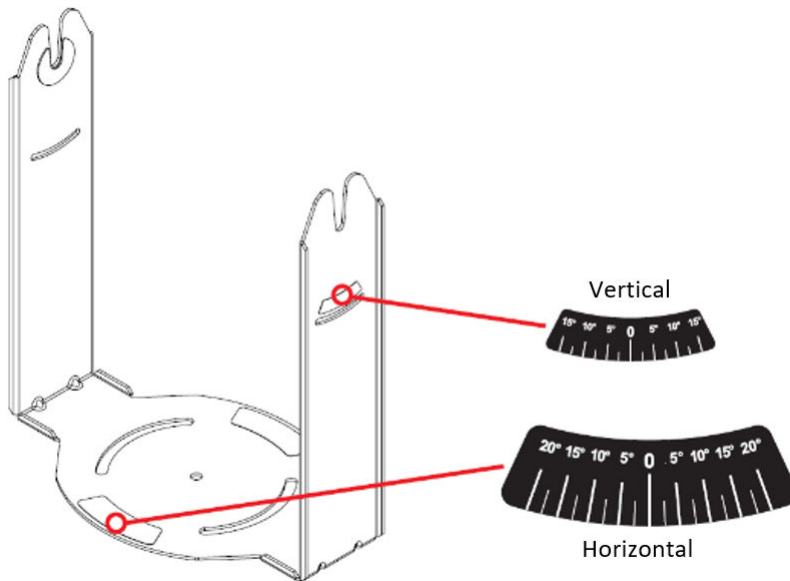


Figure 12: Vertical and horizontal aiming guide

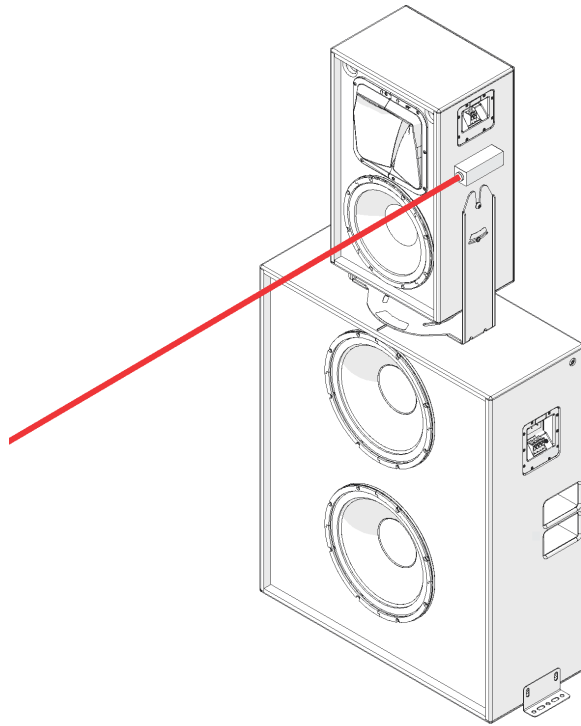


2. Aim the CS128MH toward the theater Reference Listening Position (RLP).

If a laser pointer is used to assist in the horizontal aiming process:

- a. Place the laser pointer on the outside left or right side of the CS128MH enclosure.
- b. Align the laser with the vertical plane of the enclosure.
- c. Adjust the horizontal angle of the CS128MH until the laser is directed at the RLP horizontal plane.

Figure 13: Laser Pointer Positioning During Horizontal Aiming



3. Tighten the M10 bolts to 4 Nm (2.95 ft-lb, 35.4 in-lb), so the horizontal adjustment is locked in place.
4. Loosen the M10 vertical angle adjustment points on the side of the CS128MH and tilt the cabinet to aim the CS128MH toward the theater RLP. The angle adjustment range is +15/-15 degrees.

If a laser pointer is used to assist in the vertical aiming process:

- a. Place the laser pointer on the top of the CS128MH enclosure.
- b. Align the laser with the vertical plane of the enclosure.
- c. Adjust the vertical angle of the CS128MH until the laser is directed at the RLP vertical plane.

Figure 14: Laser pointer positioning during vertical aiming

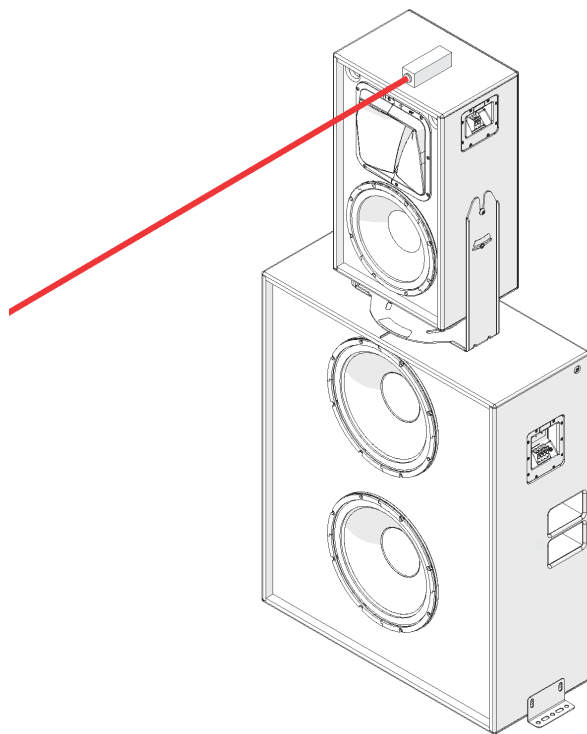
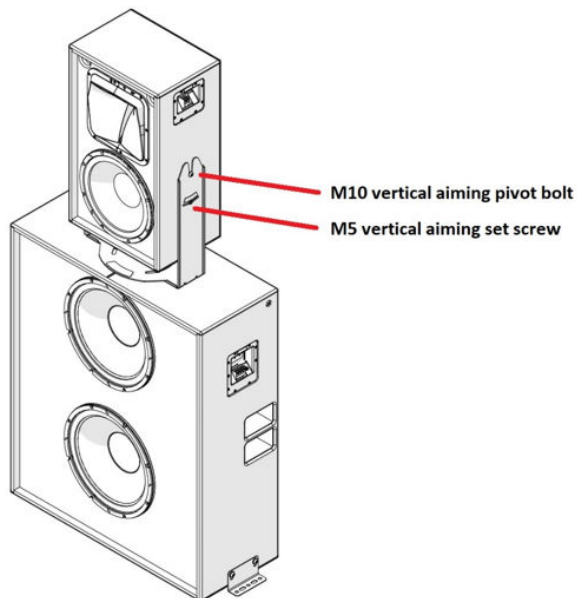
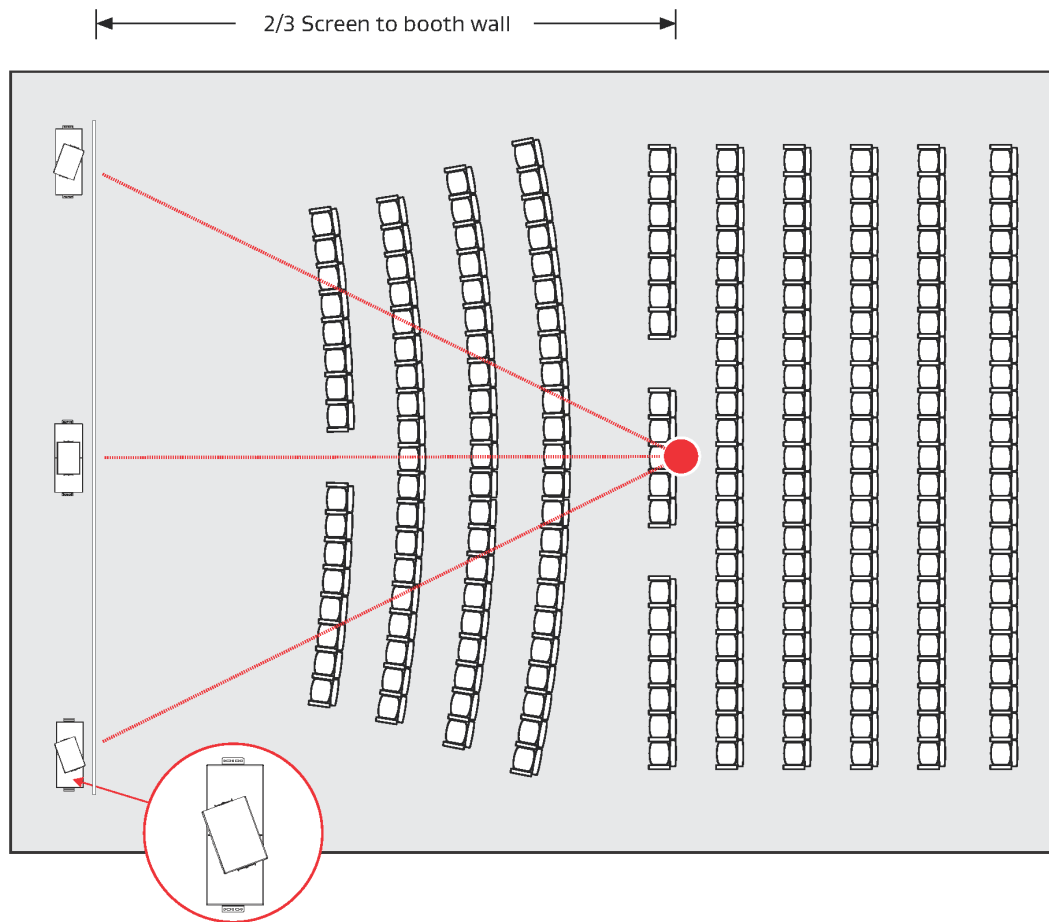


Figure 15: M10 vertical adjustment pivot bolt and M5 set screw



5. Tighten the M10 bolts and M5 vertical aiming set screws to 4 Nm (2.95 ft-lb, 35.4 in-lb) so the vertical angle adjustment is locked in place.

Figure 16: Aiming for the reference listening position (RLP) overhead view



3.4 Working with electrical components

To be sure that the speakers work correctly, you must connect all electrical components properly.

You will need a wire stripper to complete some tasks here.

Caution: Turn off all amplifiers when connecting loudspeaker wiring.

The Dolby Speaker System 128 connectors accept an American Wire Gauge (AWG) of 18 AWG to 6 AWG (1 mm² – 16 mm²). Typically, a wire gauge of 16 AWG to 12 AWG (1.5 mm² – 4 mm²) is recommended. The following sections provide basic information regarding Dolby Speaker System 128 input plates, choosing between the two modes of operation, installing the wiring, and detailed information regarding speaker operating modes.

3.5 Connecting and configuring the CS128MH

This section provides information on how to connect and configure the CS128MH.

About this task

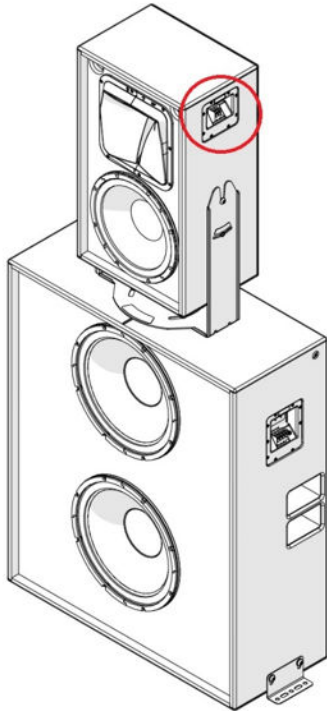
To be sure speakers work correctly, you must connect all electrical components properly. You will need a wire stripper to complete some tasks in this section.

Caution: Turn off all amplifiers when connecting loudspeaker wiring.

Procedure

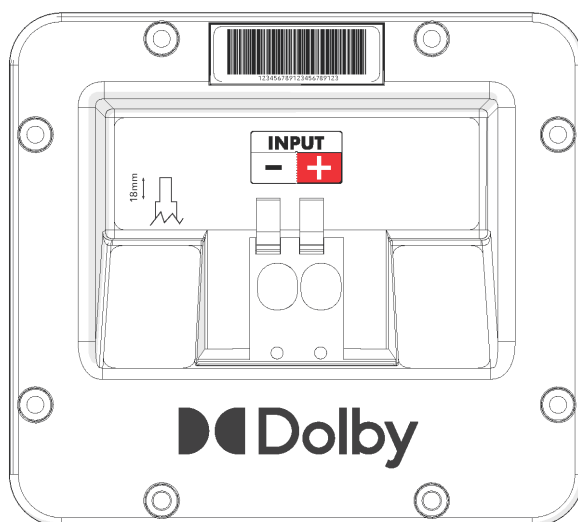
1. Locate the input plate on the side of the CS128MH.

Figure 17: CS128MH input plate location



2. Strip back the wire insulation/sheath to 18mm.
3. Locate the orange terminal tab, and then push it inward.
This terminal tab is spring loaded, and pushing it inward opens the gap in the hole directly below the tab.
4. Insert the wire fully into the hole.
5. Release the terminal tab, and the spring mount clamp will secure the wire.

Figure 18: CS128MH input plate



6. Inspect the terminal for any stray wire strands, and then remove if any are found.



Note: The input terminals are marked with indicators to show their polarity. Per IEC standards, a positive voltage on the positive marked input results in the transducers moving outward. Always tie the cable down to the available hardware to minimize any buzzing or pullouts. If possible, after wiring is completed, play sound through the speaker to identify any connection issues, buzzing, or rattling. Refer to the figures in the wiring sections that follow.

3.6 Connecting and configuring the CS128LF

This section provides information on how to connect and configure the CS128LF.

About this task

To be sure speakers work correctly, you must connect all electrical components properly. You will need a wire stripper to complete some tasks in this section.

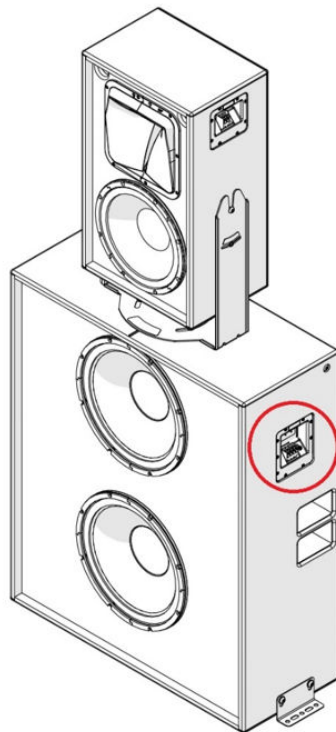


Caution: Turn off all amplifiers when connecting loudspeaker wiring.

Procedure

1. Locate the input plate on the side of the CS128LF.

Figure 19: CS128LF input plate location



The input plate contains a flip-card that you can use to select the operational mode. To remove the flip-card, pull it straight out (rocking it a little if needed). The flip-card orientation determines whether the drivers are operated in parallel or individually. If you turn the flip-card so the arrow points to the left, the wiring connection to **terminal pair 1** drives both of the 15-inch speaker drivers in parallel. If you turn the flip card so the arrow points to the right, each of the drivers is independent and must be powered individually by separate amplifier channels. This requires connections to both wiring **terminal pair 1** and wiring **terminal pair 2**. (See the following two figures.)

Note: The input plate displays two LF connections, and their icons are the same size because the drivers are the same size. Icon 1 represents the top driver in the cabinet, and icon 2 represents the bottom driver in the cabinet. There is no crossover in the CS128LF.

2. Strip back the wire insulation/sheath to 18mm.
3. Locate the orange terminal tab, and then push it inward.
The terminal tab is spring loaded, and pushing it inward opens the gap in the hole directly below the tab.
4. Insert the wire fully into the hole.
5. Release the terminal tab, and the spring mount clamp will secure the wire.

Figure 20: CS128LF parallel operating mode

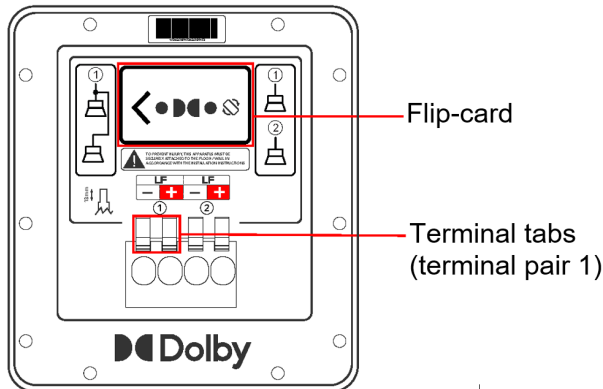
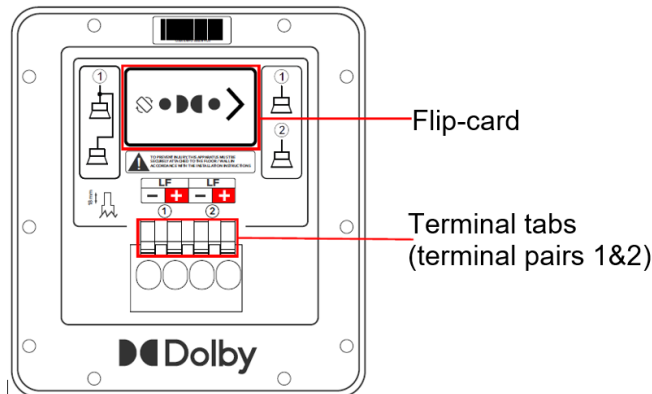


Figure 21: Independent operating mode

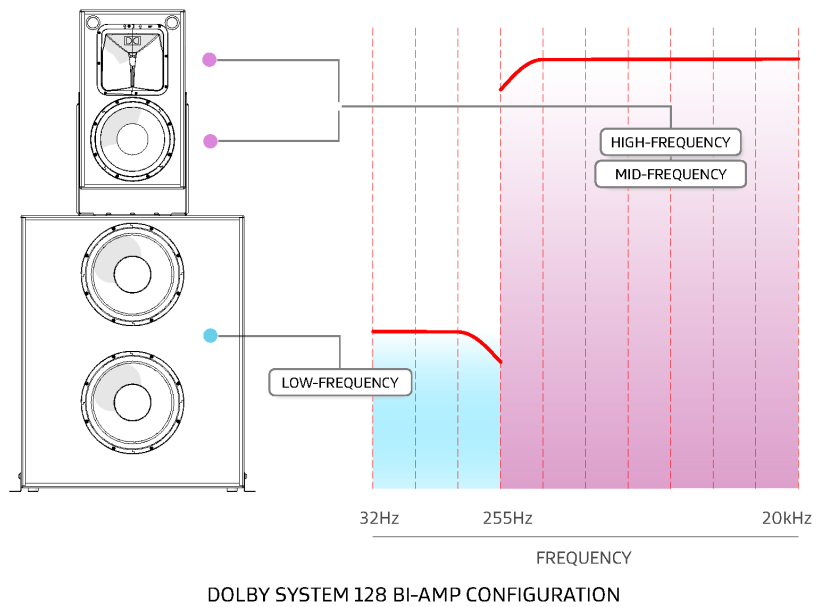


6. Inspect the terminal for any stray wire strands, and then remove if any are found.

Note: The input terminals are marked with indicators to show their polarity. Per IEC standards, a positive voltage on the positive marked input results in the transducers moving outward. Always tie the cable down to the available hardware to minimize any buzzing or pullouts. If possible, after wiring is completed, play sound through the speaker to identify any connection issues, buzzing, or rattling. Refer to the figures in the wiring sections that follow.

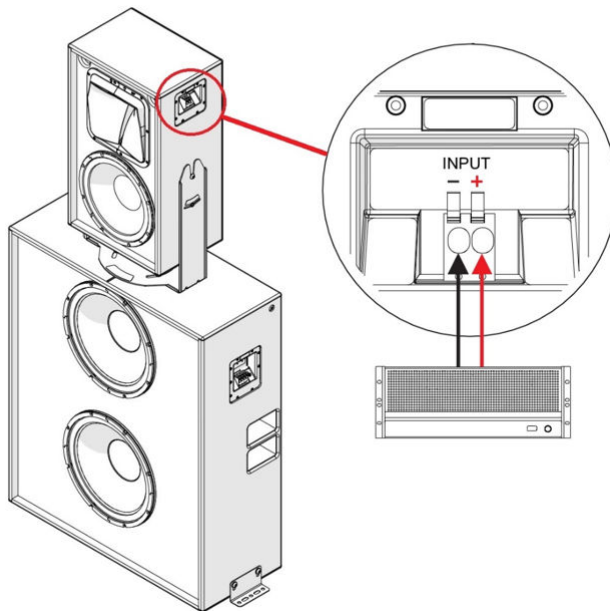
The Dolby Speaker System 128 always runs in bi-amplifier mode with the CS128MH and CS128LF requiring external amplifier processing for crossovers and gain settings. The CS128LF ships in parallel mode (single amplifier channel for both drivers) but can be changed such that an individual amplifier channel can be used for each 15 inch woofer.

Figure 22: Dolby Speaker System 128 bi-amp configuration



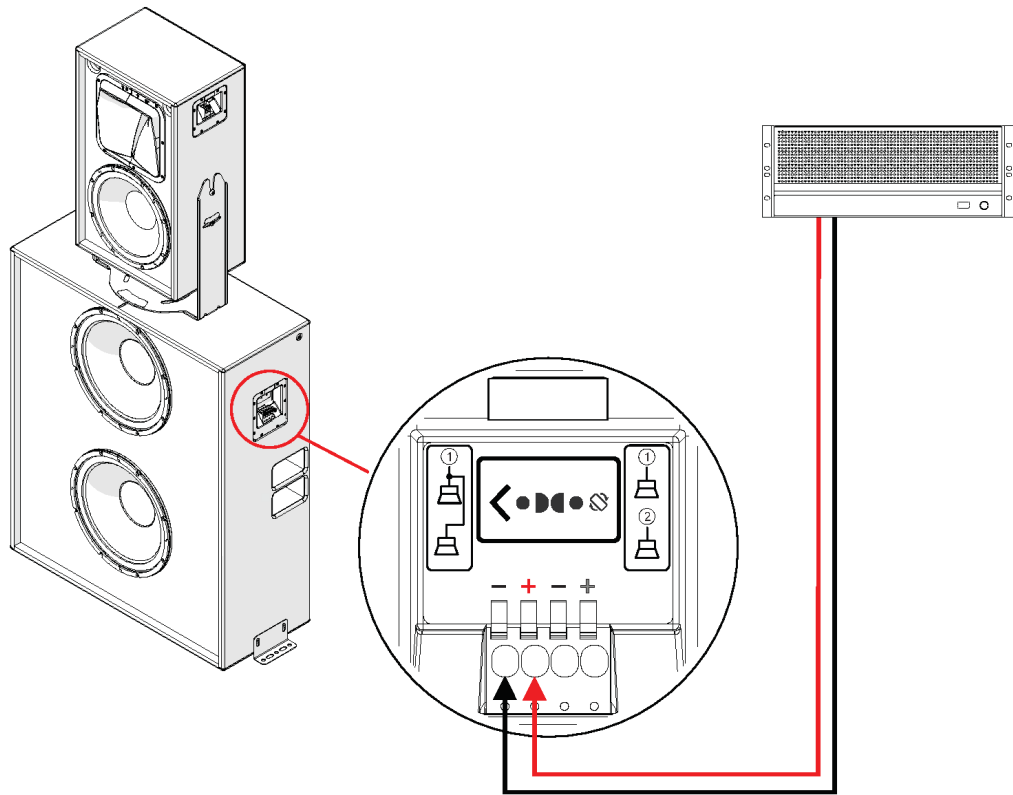
The mid/high is an 8 ohm load to a single amplifier channel.

Figure 23: Mid/high configuration



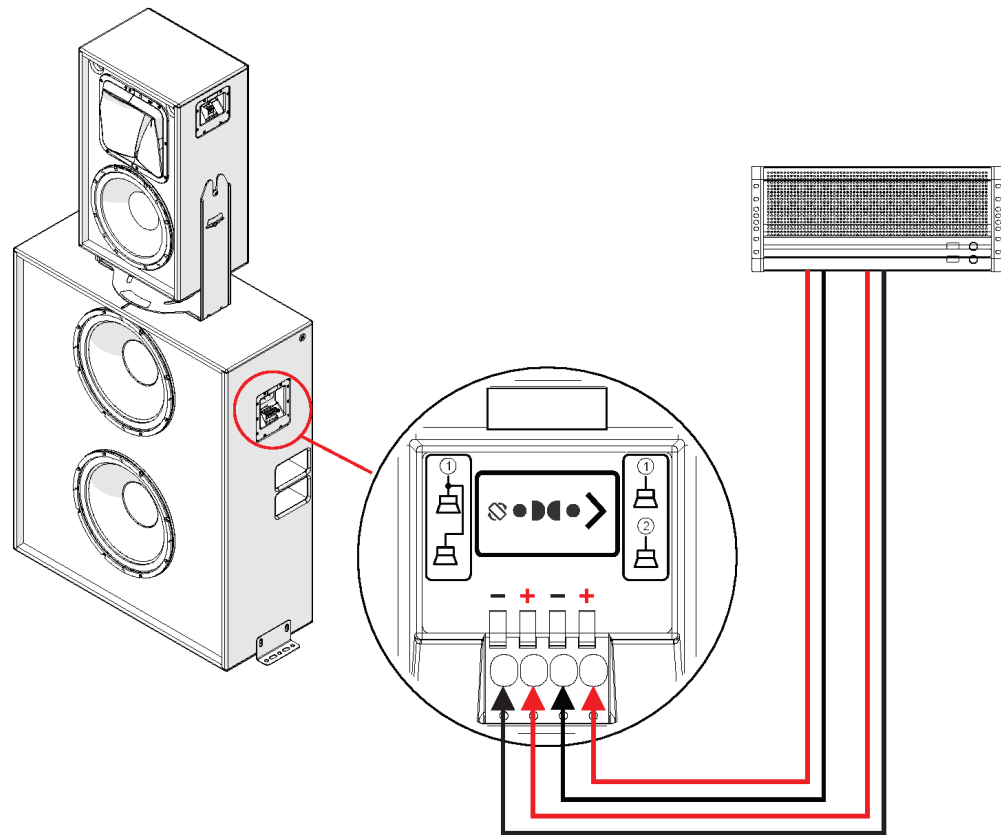
The low-frequency parallel configuration is a 4 ohm load to a single amplifier channel.

Figure 24: Low-frequency parallel wiring configuration



The low-frequency independent configuration provides 8 ohm loads to two amplifier channels. It is required to use the same signal processing for both channels. RMS voltage limiting remains the same as in parallel mode, as only the amplifier power requirement decreases by 50 percent for the respective amplifier channel.

In this configuration, the flip card should be oriented with the arrows pointing to the right.

Figure 25: Low-frequency independent wiring

4

Dolby Speaker System 128 and system components specifications

The specifications for the Dolby Speaker System 128 and for the system components are available.

The list below is an outline of this chapter:

- [Dolby Speaker System 128 specifications](#)
- [CS128MH specifications](#)
- [CS128LF specifications](#)
- [Dolby Speaker System 128 and system components dimensions](#)

4.1 Dolby Speaker System 128 specifications

The specifications for the Dolby Speaker System 128 are shown here:

Table 1: Dolby Speaker System 128 specifications

Specification	Technical data	Notes
Frequency range	39 Hz - 20 kHz	+3 dB/-6 dB in half-space conditions using required processing.
Usable LF response	32 Hz	-10 dB in half space conditions.
Coverage window (asymmetrical)	60 degrees top horizontal, 120 degrees bottom horizontal, 60 degrees vertical	Horizontal top and vertical -6 dB averaged to on-axis response. Horizontal bottom -9 dB averaged to on-axis response for near-field proximity compensation.
CS128MH rated impedance	8 ohms	
CS128LF rated impedance	4 ohms in parallel, 8 ohms independent drive	
CS128MH sensitivity @ 1 W	101 dB	Measured with 12 dB crest pink noise @ 2.83Vrms in whole-space conditions with required high-pass filter (HPF) and 48 dB bandwidth (BW) low-pass filter (LPF) @ the rated system frequency range.
CS128LF sensitivity @ 1 W	101 dB	Measured with 12 dB crest pink noise @ 2 Vrms in half-space conditions with required processing.
C128MH power handling	300 W @ 49Vrms	12 dB crest pink noise for two hours with required HPF and 48 dB bandwidth (BW) low-pass filter (LPF) @ the rated system frequency range, calculated power based on rated impedance.
C128LF power handling	600 W @ 49 Vrms	12 dB crest pink noise for two hours with required HPF and LPF based on AES2-2012 standard; calculated power based on rated impedance.
CS128MH maximum continuous SPL @1 meter	126 dB	Calculated from rated sensitivity and power.
C128LF maximum continuous SPL @ 1 meter	129 dB	Calculated from rated sensitivity and power.
Dolby Speaker System 128 maximum summed continuous SPL @ 1 meter	131 dB	Total SPL is a non-coherent summation.
Dolby Speaker System 128 weight	174 lb. (79 kg)	

4.2 CS128MH specifications

The CS128MH specifications are shown here.

Table 2: CS128MH specifications

Specification	Technical data	Notes
Frequency range	255 Hz - 20 kHz	+3 dB/-6 dB in whole- space conditions using required processing.
Coverage window (asymmetrical)	60 degrees top horizontal, 120 degrees bottom horizontal, 60 degrees vertical	Horizontal top and vertical -6 dB averaged to on-axis response. Horizontal bottom -9 dB averaged to on-axis response for near-field proximity compensation.
Rated impedance	8 ohms	
Sensitivity @ 1 W	101 dB	Measured with 12 dB crest pink noise @ 2.83 Vrms in whole- space conditions with required HPF and a 48 dB BW LPF at the rated frequency range of the system.
Power handling	300 W @ 49 Vrms	12 dB crest pink noise for 2 hours with required HPF and 48 dB bandwidth (BW) low-pass filter (LPF) @ the rated system frequency range, calculated power based on rated impedance.
Power draw	300 W	Measured average power over 5 seconds at the rated Vrms using 12 dB crest pink noise with required HPF and LPF. This measured power draw from the amplifier is useful for estimating amplifier sizing in overall system design.
Maximum voltage peak	100 Vpk	Measured Vpk over 100 hours using a Hann shaped sine-wave burst at the maximum excursion frequency of the system. This data is useful for setting peak stop limiters and amplifier selection.
Maximum continuous SPL @ 1 meter	126 dB	Calculated from rated sensitivity and power.
Measured acoustic peak SPL @ 1 meter	138 dB	Measured peak SPL over five seconds at rated Vrms using 12 dB crest pink noise with required HPF.
Dolby CS128MH weight	54 lb. (24.5 kg)	

4.3 CS128LF specifications

The CS128LF specifications are shown here:

Table 3: CS128LF specifications

Specification	Technical data	Notes
Frequency range	39 Hz - 255 Hz	-6 dB in half-space conditions, high frequency determined by required processing.
Usable LF response	32 Hz	-10 dB in half-space conditions
Coverage window	160 degrees horizontal, 100 degrees vertical	Horizontal and vertical 6 dB relative to on-axis response within rated frequency range.
Rated impedance	4 ohms in parallel, 8 ohms in direct drive	
Sensitivity @ 1 W	101 dB	Measured with 12 dB crest pink noise @ 2 Vrms in half-space conditions with required processing.
Power handling	600 W @ 49 Vrms	12 dB crest pink noise for two hours with required processing, based on AES2-2012 standard, calculated power based on rated impedance.
Power draw	420 W	Measured average power over five seconds at the rated Vrms using 12 dB crest pink-noise with required HPF and LPF. This measured power draw from the amplifier is useful for estimating amplifier sizing in overall system design.
Maximum voltage peak	138 Vpk	Measured Vpk over 100 hours using a Hann shaped sine-wave burst at the maximum excursion frequency of the system. This data is useful for setting peak stop limiters and amplifier selection.
Maximum continuous SPL @ 1 meter	129 dB	Calculated from rated sensitivity and power.
Measured acoustic peak SPL @ 1 meter	139 dB	Measured half space peak SPL over five seconds at rated Vrms using 12 dB crest pink noise with required processing.
Dolby CS128LF weight	120 lb (54.4 kg)	



Note: These specifications provide typical values and do not represent absolute limits.

4.4 Dolby Speaker System 128 and system components dimensions

The dimensions of the Dolby Speaker System 128 and its components are described here.

Dolby Speaker System 128 and components dimensions:

Figure 26: Dolby Speaker System 128 and system components dimensions

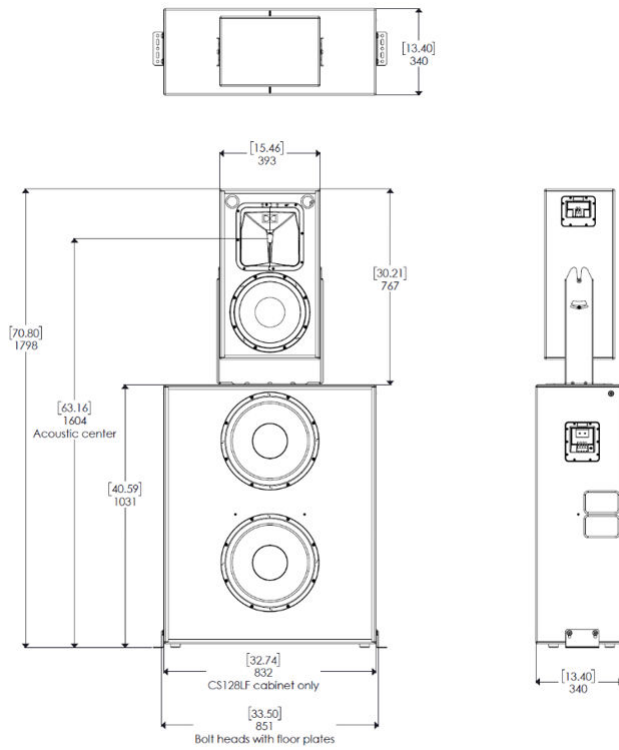
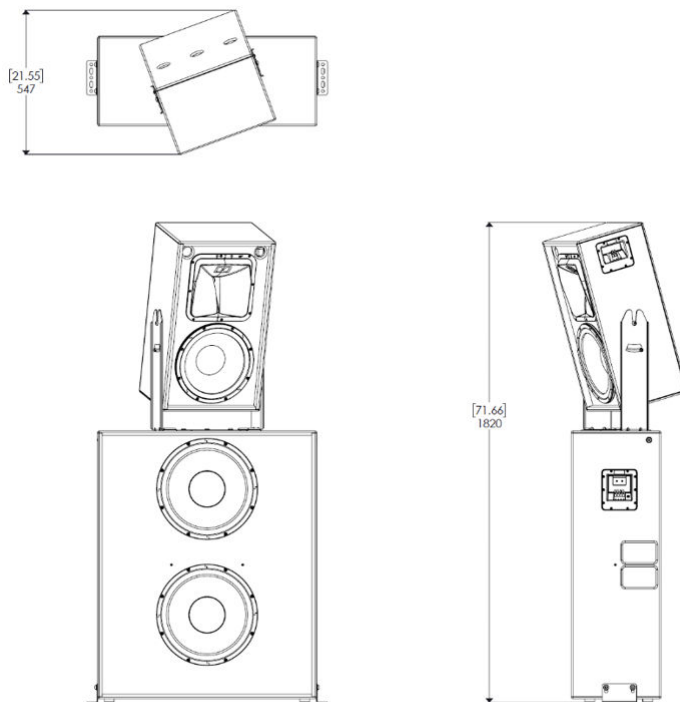


Figure 27: Dolby Speaker System 128 and system components dimensions



Dolby Speaker System 128 digital signal processing requirements

The Dolby Speaker System 128 digital signal processing is subject to a variety of requirements. The values in the requirements apply to both parallel and direct drives.

The list below is an outline of this chapter:

- [CS128MH digital signal processing requirements](#)
- [CS128LF signal processing requirements](#)

5.1 CS128MH digital signal processing requirements

The CS128MH digital signal processing requirements are listed here:

Table 4: CS128MH general filtration, gain, and delay requirements

High-pass filter	Low-pass filter	Overall gain in dB	Polarity	Delay in ms
255Hz, 24 dB (4th order L-R)	None	-4	Positive	If the CS128MH vertical angle in yoke is $< +10$ degrees, use a 0.5 msec delay. If the CS128MH vertical angle in yoke is $\geq +10$ degrees, use 0.5 msec delay

Table 5: CS128MH parametric equalization requirements

EQ frequency	Constant Q*	Constant bandwidth*	EQ gain in dB
450Hz	4 Q	0.36 BW	+4



Note: There are two principal implementations for parametric EQ filters in DSP processors. You need to select either the Constant Q or Constant Bandwidth mode in your DSP user interface (UI). The DSP UI may provide both Q or BW settings, or it may show only BW with no option to input or show Q. To correctly match the intended performance of this Dolby product, confirm with your DSP manufacturer as to which implementation is used. The Dolby CP850 and Dolby CP950 cinema processors use constant-bandwidth parametric EQ filters.

Table 6: CS128MH limiter requirements

RMS limiting in Vrms	Attack time in ms	Release time in ms	Peak stop in Vpk
49	2	32	100Vpk

5.2 CS128LF signal processing requirements

The CS128LF digital signal processing requirements are listed here:

Table 7: CS128LF general filtration, gain, and delay requirements

High-pass filter	Low-pass filter	Overall gain in dB	Polarity	Delay in ms
35Hz, 24 dB (4th order Butterworth)	255Hz, 24 dB (4th order Linkwitz-Riley)	0	Positive	If the CS128MH vertical angle in yoke is $< +10$ degrees, use a 0.5 msec delay. If the CS128MH vertical angle in yoke is $\geq +10$ degrees, no delay is required.

Table 8: CS128LF parametric equalization requirements

EQ frequency	Constant Q*		Constant bandwidth	EQ gain in dB
50Hz	2.87 Q	0.5 BW	0.67	2.5
120Hz	1.41 Q	1 BW	1.43	-4
215Hz	2 Q	0.71 BW	1.06	-4.5



Note: There are two principal implementations for parametric EQ filters in DSP processors. You need to select either the Constant Q or Constant Bandwidth mode in your DSP user interface (UI). The DSP UI may provide both Q or BW settings, or it may show only BW with no option to input or show Q. To correctly match the intended performance of this Dolby product, confirm with your DSP manufacturer as to which implementation is used. The Dolby CP850 and CP950 cinema processors use constant-bandwidth parametric EQ filters.

Table 9: CS128LF limiter requirements

RMS limiting in Vrms	Attack time in ms	Release time in ms	Peak stop in Vpk
49	45	720	138Vpk



System limiters

You can run the system limiters process with the required digital signal processing engaged.

The list below is an outline of this chapter:

- [Setting system limiters](#)

6.1 Setting system limiters

You can use the RMS limiter in the DSP to set the system limiters.

About this task

We recommend that you set up the system gain structure with the amplifier channel volumes turned all the way up if the volume setting is easily accessible by any user, such as via a front-panel knob that is not behind a security panel. Disconnecting the loudspeakers from the amplifier during this process will most likely result in conservative settings. You can connect the loudspeakers to the amplifier during this process if caution is observed when increasing the stimulus level and confidence in the measuring setup is secured. In addition, we recommend wearing hearing protection when setting up system limiters via the following procedure.



Caution: Loudspeaker damage as a result of exceeding the power handling specifications defined in *Dolby Speaker System 128 and system components specifications* is not covered under the warranty.



Caution: Hearing damage can occur by prolonged exposure to excessive sound pressure level (SPL); the loudspeaker is easily capable of generating SPL sufficient to cause permanent hearing damage to performers, production crew, or audience members. Caution should be taken to avoid prolonged exposure to SPL in excess of 90 dB.

It is recommended to set the system limiter for each amplifier channel individually. However, you may copy the limiter settings to other channels if those channels share identical loudspeaker models, identical amplifier models, and identical gain structure in the signal path (including any amplifier front-panel volume controls).

Procedure

1. Connect a wide-bandwidth multimeter with averaging to the amplifier output.
A wide-bandwidth meter has a rated measuring bandwidth of at least 20 kHz with an averaging function that is more than five seconds (very important for low-frequency outputs).
2. Access the RMS limiter setting in the DSP and set it to the maximum value, such that no limiting should occur.
3. Set the attack and release times based on the high-pass filter (HPF), according to the recommended digital signal processing settings for the respective loudspeaker being measured. If that data is not available, we recommend these settings:
 - HPF <30 Hz: attack 45 ms, release 720 ms
 - HPF 30 Hz to 59 Hz: Attack 16 ms, release 256 ms
 - HPF 60 Hz to 99 Hz: Attack 8 ms, release 128 ms
 - HPF 100 Hz to 224 Hz: Attack 4 ms, release 65 ms
 - HPF 225 Hz to 449 Hz: Attack 2 ms, release 32 ms
 - HPF 450 Hz to 999 Hz: Attack 1 ms, release 16 ms
 - HPF 1 kHz to 1.99 kHz: Attack 0.5 ms, release 8 ms
 - HPF >2 kHz: attack 0.3 ms, release 4.8 ms
4. Mute all outputs into the system, except for the output you are setting.
5. Play low-level pink noise into the amplifier channel, and then confirm that the expected loudspeaker is playing (if the loudspeaker is connected to the amplifier) and the multimeter is reading the voltage.
6. While monitoring the meter, slowly turn up the pink noise until the V_{rms} is at the published rating.
For low-frequency outputs, an average of at least five seconds at the same pink-noise level is required for the reading to stabilize. Typically, some amplifier clipping will occur. However, if the amplifier clipping light is almost solid, stop increasing the pink noise and leave it at a V_{rms} level below the published rating.
7. While pink noise is playing at the rated V_{rms} (or there is heavy amplifier clipping), turn down the threshold on the root mean square (RMS) limiter block until the measured V_{rms} goes down slightly.
8. Turn up the stimulus gain, and then confirm that the V_{rms} does not increase beyond the rated V_{rms} . If it does, turn down the limiter threshold again until the V_{rms} is not above the loudspeaker rating when the stimulus is driven heavily.



Documentation revision history

The documentation revision history lists the date, issue number, and description of all publications of the *Dolby Speaker System 128 Owner's Manual*.

Date	Issue	Description
31 August 2021	Issue 1	Initial release
27 October 2021	Issue 2	Updated Chapter 5



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