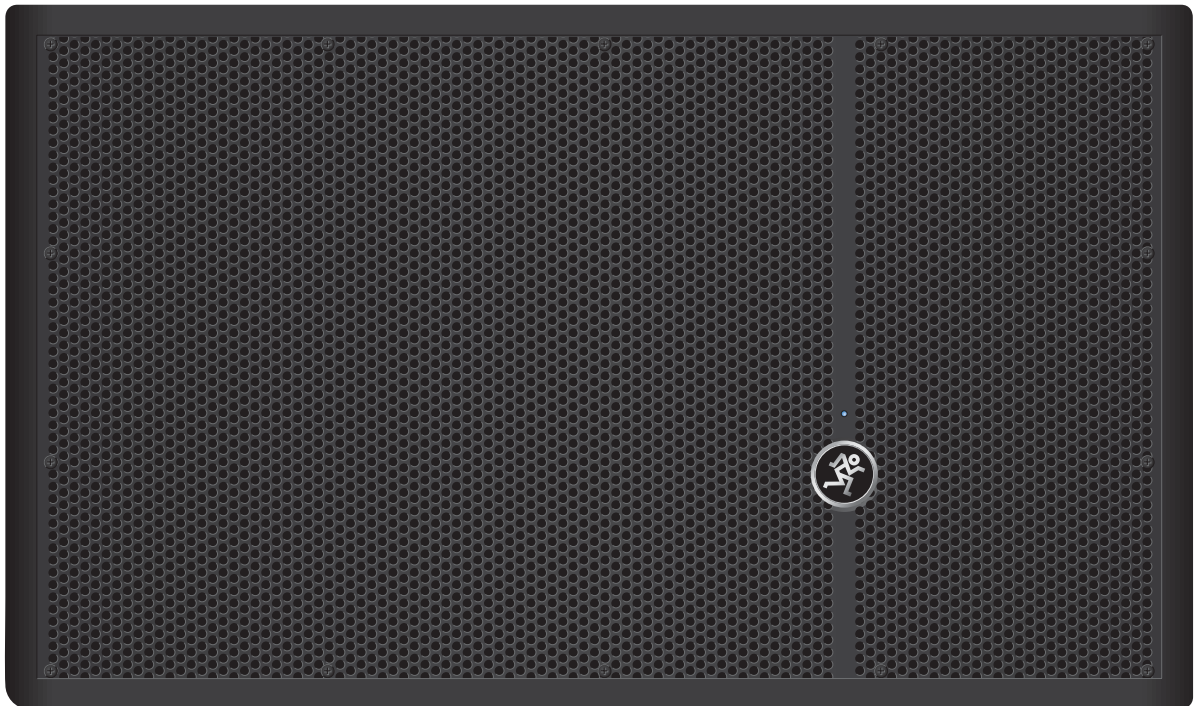


HDA

*2-Way High-Definition
Arrayable Loudspeaker*

OWNER'S MANUAL



MACKIE®

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Use only with a cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. This apparatus shall not be exposed to dripping or splashing, and no object filled with liquids, such as vases or beer glasses, shall be placed on the apparatus.
16. Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.
17. This apparatus has been designed with Class-I construction and must be connected to a mains socket outlet with a protective earthing connection (the third grounding prong).
18. The AC Mains PowerCon® connector (the appliance coupler) is used as the disconnect device. This connector shall remain readily accessible and operable.



19. NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

CAUTION: Changes or modifications to this device not expressly approved by LOUD Technologies Inc. could void the user's authority to operate the equipment under FCC rules.

20. This apparatus does not exceed the Class A/Class B (whichever is applicable) limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian Department of Communications.

ATTENTION — *Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques de class A/de class B (selon le cas) prescrites dans le règlement sur le brouillage radioélectrique édicté par les ministere des communications du Canada.*

21. Exposure to extremely high noise levels may cause permanent hearing loss. Individuals vary considerably in susceptibility to noise-induced hearing loss, but nearly everyone will lose some hearing if exposed to sufficiently intense noise for a period of time. The U.S. Government's Occupational Safety and Health Administration (OSHA) has specified the permissible noise level exposures shown in the following chart.

According to OSHA, any exposure in excess of these permissible limits could result in some hearing loss. To ensure against potentially dangerous exposure to high sound pressure levels, it is recommended that all persons exposed to equipment capable of producing high sound pressure levels use hearing protectors while the equipment is in operation. Ear plugs or protectors in the ear canals or over the ears must be worn when operating the equipment in order to prevent permanent hearing loss if exposure is in excess of the limits set forth here:

Duration, per day in hours	Sound Level dBA, Slow Response	Typical Example
8	90	Duo in small club
6	92	
4	95	Subway Train
3	97	
2	100	Very loud classical music
1.5	102	
1	105	Poonswang screaming at desTROyEr about deadlines
0.5	110	
0.25 or less	115	Loudest parts at a rock concert

CAUTION AVIS

RISK OF ELECTRIC SHOCK. DO NOT OPEN
RISQUE DE CHOC ELECTRIQUE. NE PAS OUVRIR

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK DO NOT REMOVE COVER (OR BACK) NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.
ATTENTION: POUR EVITER LES RISQUES DE CHOC ELECTRIQUE, NE PAS ENLEVER LE COUVERCLE. AUCUN ENTRETIEN DE PIECES INTERIEURES PAR L'USAGER. CONFIER L'ENTRETIEN AU PERSONNEL QUALIFIE.
AVIS: POUR EVITER LES RISQUES D'INCENDIE OU D'ELECTROCUTION, N'EXPOSEZ PAS CET ARTICLE A LA PLUIE OU A L'HUMIDITE

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure, that may be of sufficient magnitude to constitute a risk of electric shock to persons.
Le symbole éclair avec point de flèche à l'intérieur d'un triangle équilatéral est utilisé pour alerter l'utilisateur de la présence à l'intérieur du coffret de "voltage dangereux" non isolé d'ampleur suffisante pour constituer un risque d'électrocution.

The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.
Le point d'exclamation à l'intérieur d'un triangle équilatéral est employé pour alerter les utilisateurs de la présence d'instructions importantes pour le fonctionnement et l'entretien (service) dans le livret d'instruction accompagnant l'appareil.

WARNING — To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.



Correct disposal of this product. This symbol indicates that this product should not be disposed of with your household waste, according to the WEEE Directive (2002/96/EC) and your national law. This product should be handed over to an authorized collection site for recycling waste electrical and electronic equipment (EEE). Improper handling of this type of waste could have a possible negative impact on the environment and human health due to potentially hazardous substances that are generally associated with EEE. At the same time, your cooperation in the correct disposal of this product will contribute to the effective usage of natural resources. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, waste authority, or your household waste disposal service.

How To Use This Manual

The first few pages after the Overview and Features are the hookup diagrams. These show typical setups for deploying HDA loudspeakers. Next is a detailed tour of the entire loudspeaker. Throughout the manual are illustrations with each feature numbered and described in nearby paragraphs.

We cannot stress enough how important it is that you read this entire manual. There are specific instructions on rigging safety, power and signal connections, voicing and more. These notes are all extremely important in order to get the most out of your HDA loudspeaker(s), as well as necessary to maintain the utmost safety. The HDA Owner's Manual: Learn it. Know it. Live it.



This icon marks information that is critically important or unique to the HDA.



This icon leads to some explanations of features and practical tips.

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Introduction

While traditional point-and-shoot systems are great for venues such as coffee houses and small clubs, they do not have the output or throw to cover larger venues. In order to compensate, venues often combine loudspeakers to get more output and cover more ground. The problem is that the output of these traditional loudspeakers overlap and interfere. This interference is both constructive and destructive; it varies depending upon the listening position. For many, what they hear is less than desirable, and for no one it is exactly the same.

A line array solves this problem by effectively channeling these interferences, directing the sound where it is desired, and removing it from where it is not. Today, line arrays are the loudspeaker format of choice for high-profile tours and large installs worldwide. Unlike traditional point-and-shoot systems, line arrays excel at providing high output, long throw and directional coverage with good vertical pattern control – all in a package that is highly configurable and scalable.

But what is a line array system and how does it work? In its simplest form, a line array is a group of closely spaced loudspeakers arranged in a straight line. They are designed such that constructive interference occurs in front of the array of loudspeakers and destructive interference occurs at the top and bottom. This is the highly desirable vertical directivity for which line arrays are known.

However, one shouldn't place just any 'ol loudspeaker in a line and expect to get increased output and better pattern control. In order to get good vertical pattern control, a line array must be designed so the transducers are positioned as close together as possible. More specifically, the separation between the transducers must be less than the wavelengths emitted by them. This is easy to achieve for lower frequencies with long wavelengths (e.g. 1 kHz is equal to 13.56 inches), but much more difficult with higher frequencies (e.g. 10 kHz is equal to only 1.32 inches). Line arrays achieve this tight spacing by using multiple drivers and more complex mechanical designs. Even then, it isn't practical to place drivers only an inch apart. Therefore, additional acoustical magic is employed in the horn design to flatten the output of the high frequency wave fronts so they combine constructively. The result is high output and even coverage.

Well, if line arrays are so awesome, why even use traditional loudspeakers any more? Simply because line arrays aren't perfect for all situations. A line array is best-suited to applications where broad horizontal coverage is desired throughout a given space, combined with long-throw and higher output. Small venues don't always need the added size and output of a line array, and many meeting rooms, halls and restaurants are better served by distributed systems comprised of many small point-and-shoot loudspeakers. Plus, the added cost for the more complex acoustical and mechanical design of a line array puts them out of reach of many customers...until now.

The Mackie HDA brings this technology to you at a price point never seen before.

HDA is a constant curvature line array. This means that the physical angle of the loudspeaker matches the acoustical angle. There is only one way to rig together multiple HDAs, so it's easy to use. As more units are added, the array provides additional vertical coverage (plus more vertical directivity at lower frequencies) and, of course, it's louder. HDA's integrated rigging makes it perfect for use in large permanent installs, tours and festivals where the system is flown, or as a high-output pole-mounted portable PA. HDA is as versatile as your shows and will scale to fit your needs like no other system anywhere else.

There is a lot to digest, so grab a coffee, cozy up into your favorite chair and learn all there is to know about your new HDA system.

THE EVER-IMPORTANT INSTALLATION WARNING



WARNING: HDA loudspeakers are a wonderful tool when utilized in installed and portable PA systems. However, improper installation may result in damage to the equipment, injury or even death. Therefore, installation should only be done by experienced, licensed professionals to ensure that the loudspeakers are installed in a stable and secure way in order to avoid any conditions that may be dangerous for persons or structures.

Overview

The Mackie HDA High-Definition Arrayable Powered Loudspeaker is a 110° x 20° constant curvature line array ideal for installed and portable PA systems. The HDA 2-Way High-Definition Powered Loudspeaker delivers 1200W of peak system power via Class-D Fast Recovery™ amplification.

Mackie's patented HD audio processing provides unmatched sonic accuracy and clarity. Mackie Active technology includes a precision 2-way crossover, transducer time alignment, and phase correction. Acoustic correction algorithms, derived using proprietary measurement tools to identify and correct sonic anomalies, improve vocal intelligibility while removing high frequency discord.

EAW custom-designed HD Series transducers maximize efficiency and performance when matched with the system's internal amps. The 12-inch woofer uses a neodymium magnet for reduced weight, and the 3-inch voice coil dissipates heat extremely well. The dual Beyma® 1.7-inch compression drivers are mounted into a multi-cell horn.

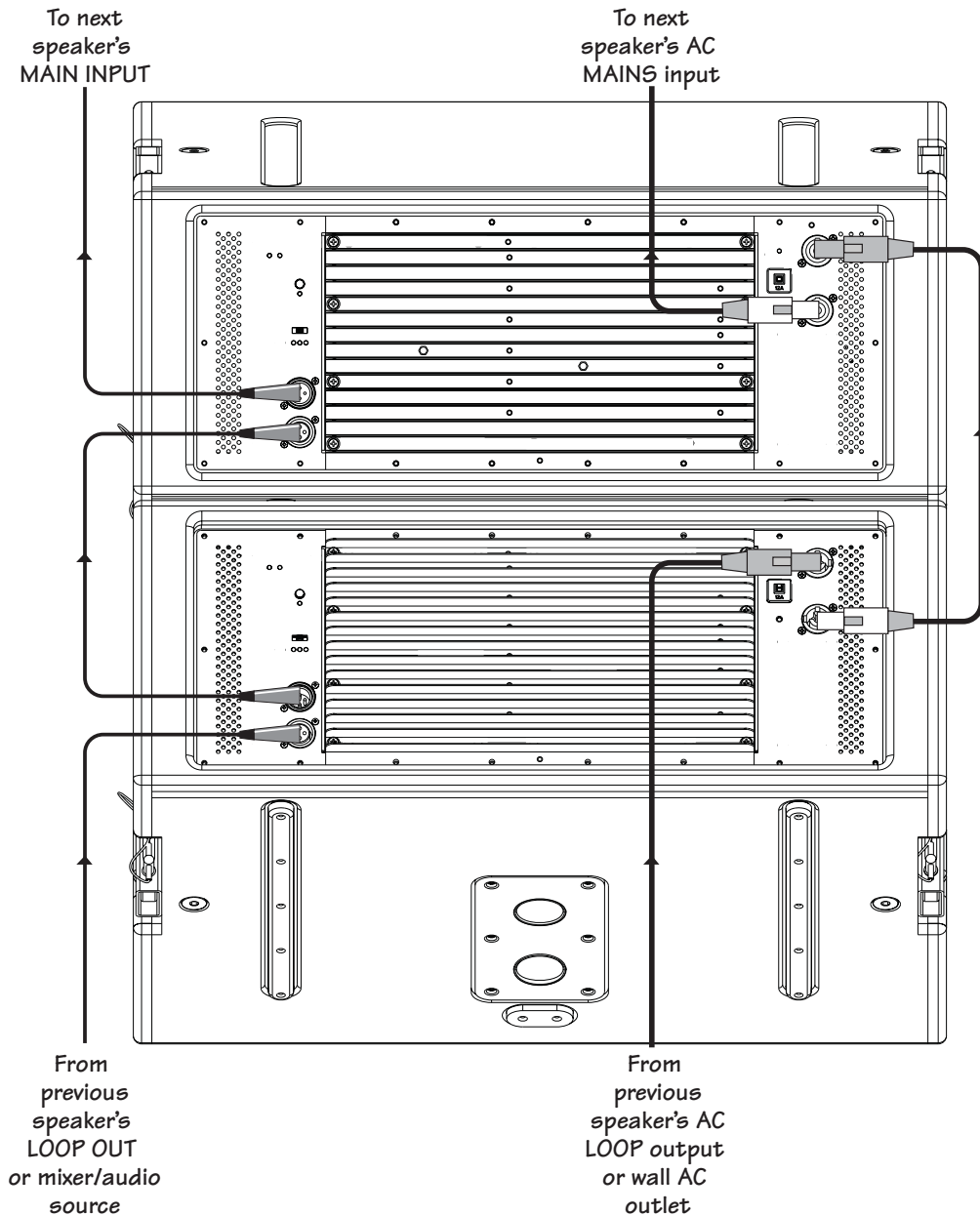
The integrated Array Voicing mode switch allows the user to custom-tailor the array for their application simply by selecting the number of HDAs in use per side. More advanced users may integrate EAW's Resolution software, which calculates array placement and flybar pickpoints, showing the resulting coverage for the venue. Full protection circuitry completes this ultra-portable, powerful and arrayable HD system.

The 15mm birch plywood enclosure is rugged and ready for install using the four integral fly points. The integrated rigging channels allow for quick setup and teardown of arrays. Use the flybar in conjunction with up to two Mackie HD1801 subwoofers and up to four HDAs. The lightweight design and the integrated dual angle pole cup allows up to two HDAs to be pole-mounted atop a subwoofer or on a tripod stand.

Features

- 110° x 20° constant curvature powered line array
- Scalable and arrayable with a multitude of configuration options
 - Fly up to 4 x HDA and 2 x HD1801 subwoofers
 - Ground stack up to 3 x HDA on 1 or 2 HD1801 subwoofer(s) or the optional flybar
 - Pole mount up to 2 x HDA on HD1801 subwoofer or tripod using dual angle pole cups
- 1200W of ultra-efficient Class-D Fast Recovery™ amplification
 - LF 500W RMS / 1000W peak
 - HF 100W RMS / 200W peak
- Custom designed transducers by EAW®
 - 12" neodymium woofer with 3" voice coil
 - Dual Beyma® 1.7" compression drivers with heat-treated titanium diaphragms
- High-definition audio processing includes:
 - Revolutionary patented acoustic correction
 - Transducer time alignment and phase correction
 - Precision 2-way crossover
- Three-position voicing switch for simple array voicing
- Integrated limiting and protection circuitry
- Proven rigging hardware:
 - Four M10 flypoints
 - Integrated flyware allows easy array setup
 - Optional Flybar and HD1801 subwoofer flyware kit
- Ultra-compact and lightweight (59 lb / 26.7 kg)
- Rugged all wood cabinet (15mm birch plywood)
- Supported by EAW Resolution prediction software

Hookup Diagrams



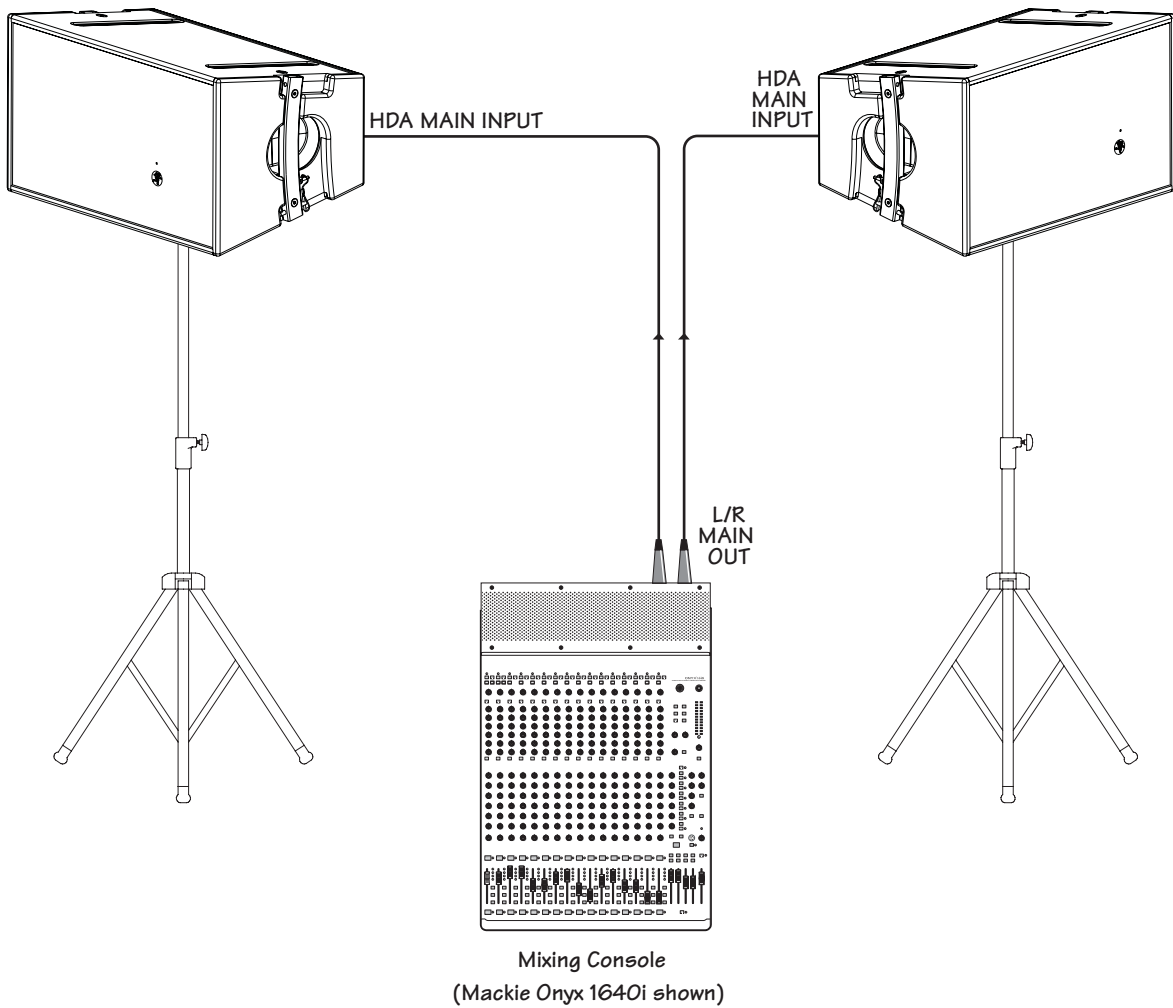
One convenient feature of the Mackie HDA loudspeaker system is the ability to connect multiple loudspeakers together easily, as shown in the illustration above.

If only one HDA is required, connect the mixer output to the HDA's XLR MAIN INPUT using a balanced XLR cable. The HDA is powered via the supplied Neutrik PowerCon® cable connected to the AC MAINS jack. See the following page for details on this type of setup.

If multiple HDAs will be connected, start with the instructions as listed above. Next, connect the first HDA's XLR LOOP OUT jack to the second HDA's XLR MAIN INPUT jack using a balanced XLR cable. A short 1-2 foot cable is all that is necessary. Hook up the supplied loop Neutrik PowerCon® cable from the first HDA's AC LOOP jack to the second HDA's AC MAINS jack. A maximum of four HDAs may be daisy-chained together in this fashion from a single 20A source.

See pages 8-12 for systems utilizing multiple HDAs in various setups. See page 15 for more information regarding powering the Mackie HDA loudspeaker.

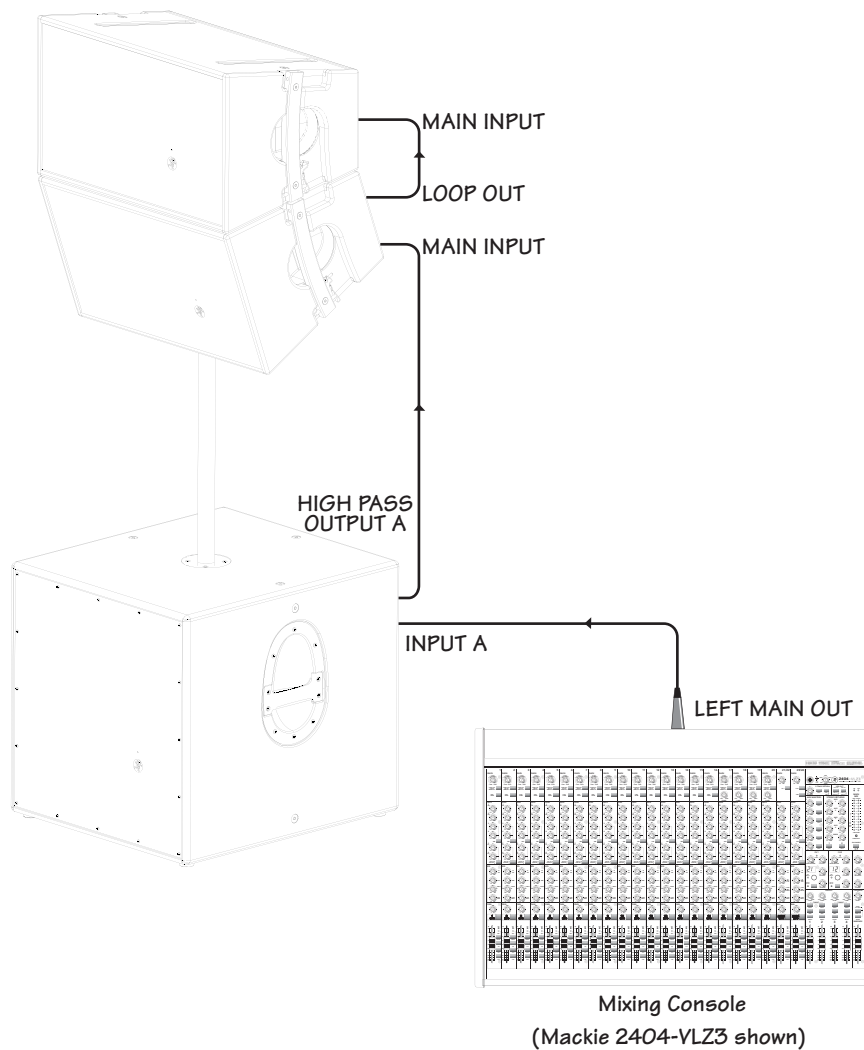
HDA: DAISY-CHAINING MULTIPLE LOUDSPEAKERS



This type of setup will typically be found at small indoor or outdoor gigs, weddings, parades, rental systems, and/or used as vocal reinforcement. Another possibility is to place HDAs on the stage as front or side fills. This helps provide sound to the fans near the stage where they may not be adequately covered by the PA.

The left and right main outputs from a mixer feed the MAIN INPUTS of the HDAs. Since only one HDA is used per side, the Array Mode switch should be in the '1-2' position on both speakers.

HDA: 2-WAY SYSTEM



This type of setup will typically be found at small indoor or outdoor gigs, festivals, weddings, or parades where a high output PA with wide coverage and throw is necessary. This is a great setup for local DIY bands, too.

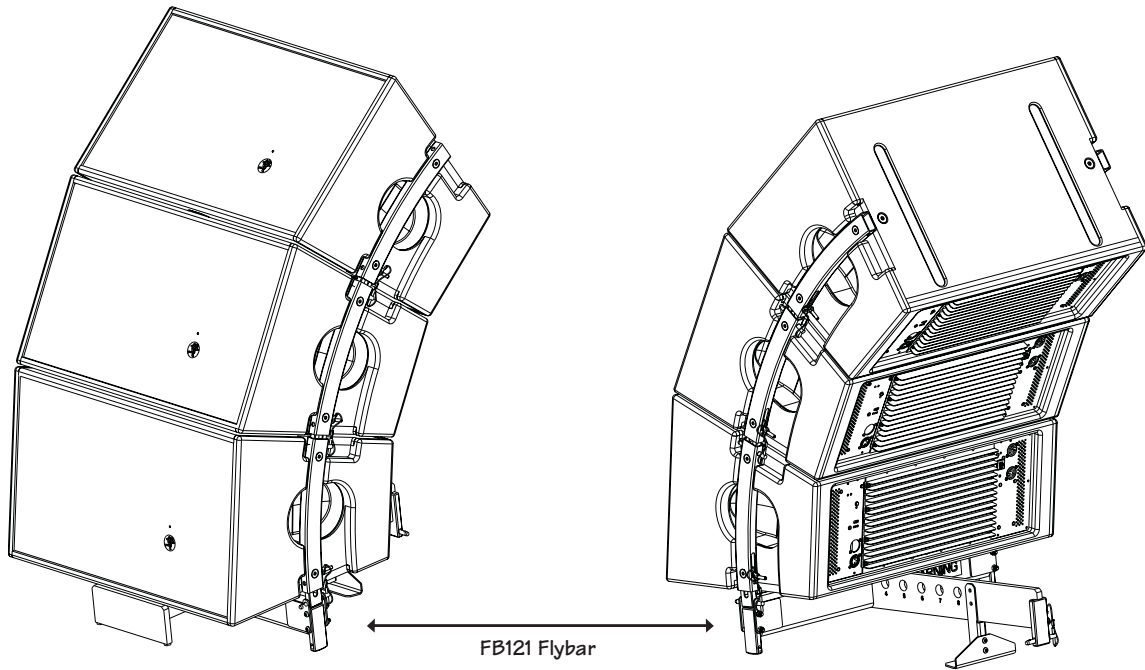
The left output from a mixer feeds INPUT A of a Mackie HD1801 powered subwoofer. The HIGH PASS OUTPUT A of the subwoofer feeds the MAIN INPUT of a Mackie HDA powered loudspeaker. The LOOP OUT of that Mackie HDA powered loudspeaker feeds the MAIN INPUT of the next Mackie HDA powered loudspeaker. The HDAs reproduce the mid-to-high frequencies in mono, and the subs provide the low frequencies in mono. The Array Mode switch should be in the '1-2' position on both units.

Since two HDAs are in the array, it is possible to reproduce this exact same hookup in stereo. Simply utilize the left and right main outputs from the mixer to feed the main inputs of each subwoofer and mirror the rest of the system as identified above.

Another important aspect to keep in mind is the rigging setup of loudspeakers. In this diagram, the HDAs are pole-mounted on a subwoofer, utilizing an SPM200 adjustable pole. Refer to page 17 to view a table listing other configuration possibilities and pages 18 and 19 for more information about rigging.

Note that the HDAs AC power may be linked via the AC LOOP. Refer to page 6 for details on daisy-chaining AC power.

HDA: POLE-MOUNTED WITH POWERED SUBWOOFER(S)



This is the perfect setup for any venue where the audience is level with and above the stage. For example, a bowl, a shed or a gym with bleachers.

The left output from a mixer feeds the MAIN INPUT of a Mackie HDA powered loudspeaker. The LOOP OUT of that Mackie HDA feeds the MAIN INPUT of the next Mackie HDA. This daisy-chained array is repeated once more to complete the tri-fecta.

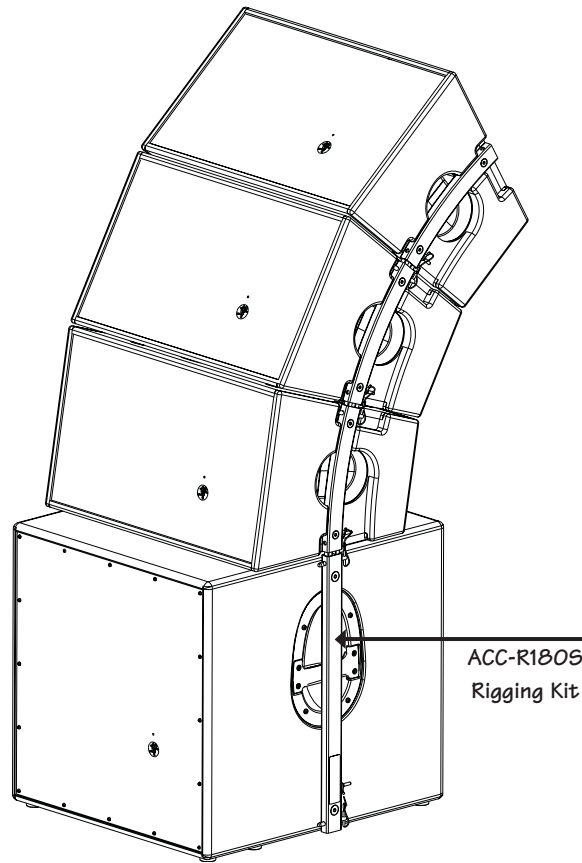
Since three units are used, the Array Mode switches should be in the '3-4' or '3-4 LONG THROW' position. See page 13 for more information about the Array Mode switch and the choices available.

It is possible to reproduce this exact same hookup in stereo. Simply utilize the left and right main outputs from the mixer to feed the main inputs of the first HDA on each side of the stage and mirror the rest of the system as described above.

Another important aspect to keep in mind is the rigging setup of loudspeakers. In this diagram, the HDAs are ground stacked on the FB121 Flybar and the kickstand is included for additional support. This may be a full-range system (as illustrated above) or add some subwoofers to the system for extra thump. You could even mount the HDAs on top of the sub as shown on the next page. Refer to page 17 to view a table listing other configuration possibilities and pages 18 and 19 for more information about rigging.

Note that the HDAs AC power may be linked via the AC LOOP. Refer to page 6 for details on daisy-chaining AC power.

HDA: GROUND STACKED WITH FLYBAR ACCESSORY



Similar to the hook-up diagram on the previous page, this is the perfect setup for any venue where the audience is level with and sloping upward from the stage and PA. For example, a bowl, a shed or a gym with bleachers. However, a subwoofer is introduced to this setup, adding a lot more thump to the system.

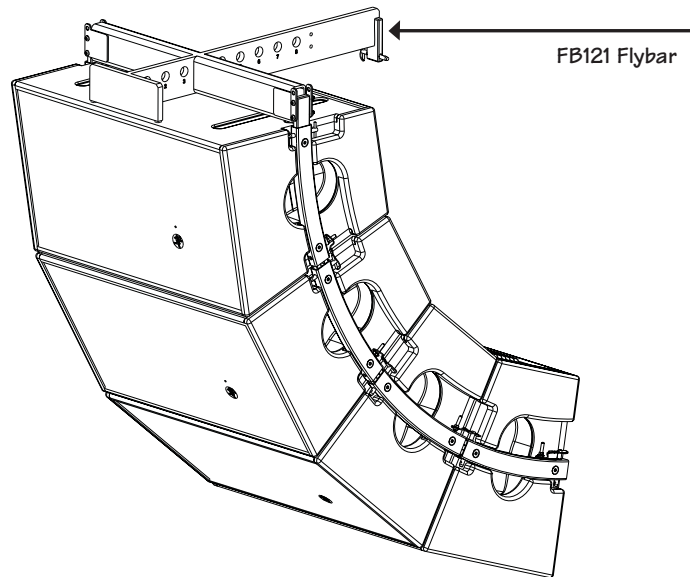
The left output from a mixer feeds INPUT A of a Mackie HD1801 powered subwoofer. The HIGH PASS OUTPUT A of the subwoofer feeds the MAIN INPUT of a Mackie HDA powered loudspeaker. The LOOP OUT of that Mackie HDA powered loudspeaker feeds the MAIN INPUT of the next Mackie HDA powered loudspeaker. The HDAs reproduce the mid-to-high frequencies in mono, and the sub provides the low frequencies in mono. Since three HDAs are used, the Array Mode switches should be in the '3-4' or '3-4 LONG THROW' position.

It is possible to reproduce this exact same hookup in stereo. Simply utilize the left and right main outputs from the mixer to feed INPUT A of each HD1801 and mirror the rest of the system as described above.

Another important aspect to keep in mind is the rigging setup of loudspeakers. In this diagram, the HDAs are ground stacked on a subwoofer utilizing the ACC-R180S rigging kit for the HD1801. This system may also be flown utilizing the FB121 Flybar, with the HD1801 powered subwoofer on top. See the next two pages for flying HDAs, page 17 to view a table listing other configuration possibilities and pages 18 and 19 for more information about rigging.

Note that the HDA's AC power may be linked via the AC LOOP. Refer to page 6 for details on daisy-chaining AC power.

HDA: GROUND STACKED ON SUBWOOFER(S)




This setup is perfect for installs, touring systems, festivals and/or small stages...any venue requiring high output with a 75–100 foot throw.

The left output from a mixer feeds the MAIN INPUT of the top HDA. The LOOP OUT of that HDA feeds the MAIN INPUT of the next HDA. This daisy-chained array is repeated twice more to complete the quad HDA setup. Here, the Array Mode switch should be in the '3-4' position because four HDAs are in the array. Alternatively, the top one or two HDAs may be set to the '3-4 Long Throw' position if they have to cover an audience at a substantially further distance than the bottom boxes. See the rear panel descriptions on page 13 for more information.

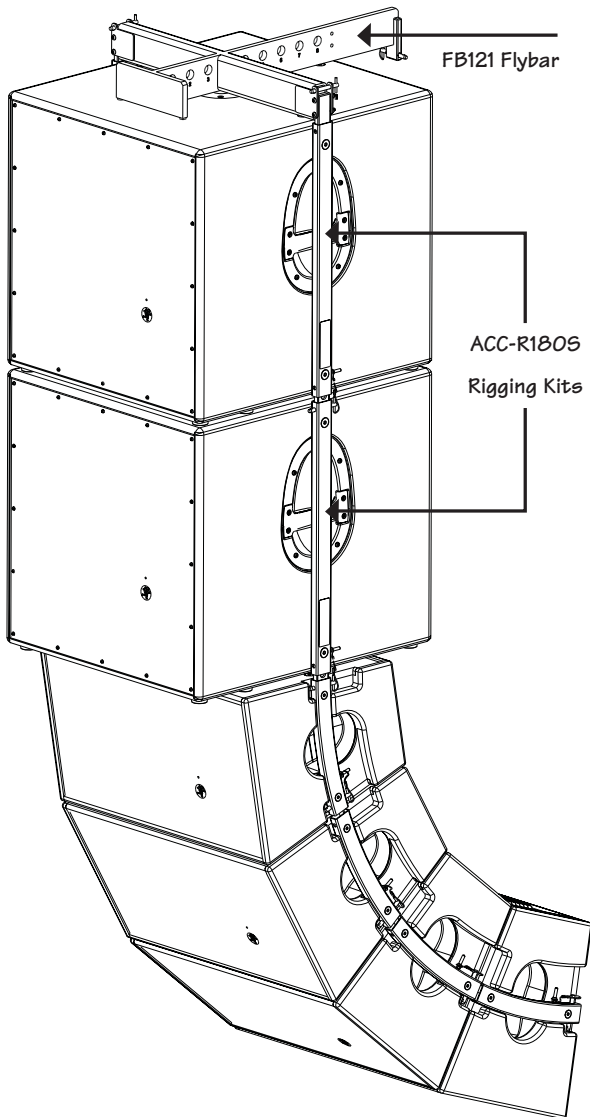
It is possible to reproduce this exact same hookup in stereo. Simply utilize the left and right main outputs from the mixer to feed the main inputs of the top boxes and mirror the rest of the system as identified above.

Another important aspect to keep in mind is the rigging setup of loudspeakers. In this diagram, the HDAs are flown utilizing an FB121 Flybar. In this array, subs may be on the stage to add more thump to the overall sound system. Be sure to visit the next page if you are interested in flying subs. Refer to page 17 to view a table listing other configuration possibilities and pages 18 and 19 for more information about rigging (and eyebolts).

Note that the HDAs AC power may be linked via the AC LOOP. Refer to page 6 for details on daisy-chaining AC power.

VERY IMPORTANT  *Last, but not least, a VERY important warning: when the FB121 Flybar is used to suspend a system, it cannot retain a 10:1 design factor at certain pick points for the largest systems. Please refer to the array usage and rigging sections, starting on page 17 and Appendix A on page 22 to review and run the Resolution software. This predictive software is an invaluable tool in determining safety issues, weights and angles involved, coverage and much more.*

HDA: 4 FLOWN HDA LOUDSPEAKERS



Similar to the hook-up diagram on the previous page, this setup is perfect for installs, touring systems, festivals and/or small stages...any venue requiring a 75–100 foot throw. However, two subwoofers are introduced to this setup, providing even low frequency coverage for the flown subs.

As in the previous hook-up diagram, the Array Mode switch should be in the '3-4' position because four HDAs are in the array. Again, the top one or two HDAs may be set to the '3-4 Long Throw' position if they have to cover an audience at a substantially further distance than the bottom boxes. See the rear panel descriptions on page 13 for more information.

It is possible to reproduce this exact same hookup in stereo. Simply utilize the left and right main outputs from the mixer to feed the main inputs of the top subwoofers to mirror the rest of the system as identified above.

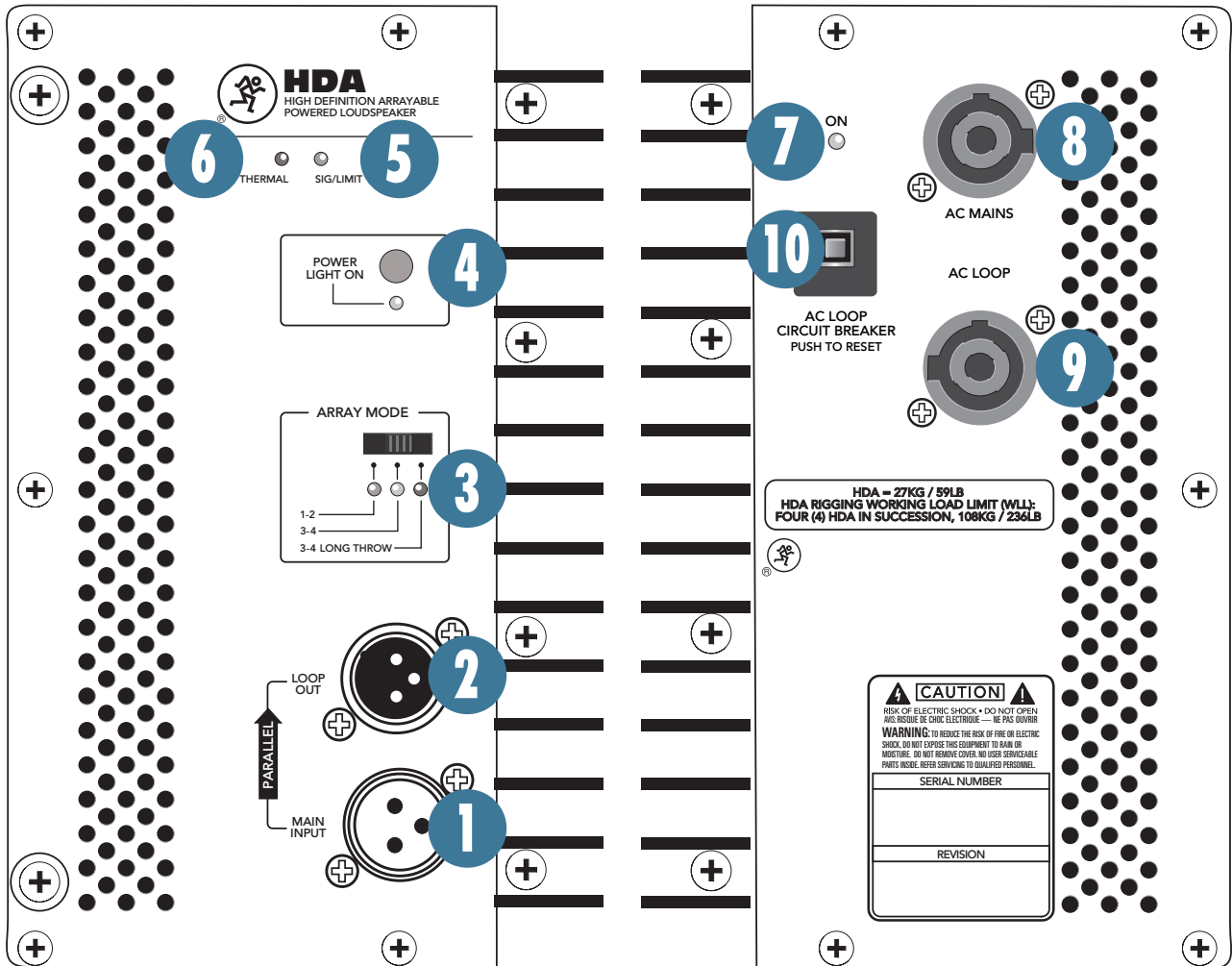
Another important aspect to keep in mind is the rigging setup of loudspeakers. In this diagram, the HDAs and HD1801 subwoofers are flown utilizing an FB121 Flybar. Note that each subwoofer requires its own ACC-R180S rigging kit, as well. Refer to page 17 to view a table listing other configuration possibilities and pages 18 and 19 for more information about rigging (and eyebolts).

Note that the HDAs AC power may be linked via the AC LOOP. Refer to page 6 for details on daisy-chaining AC power.

VERY IMPORTANT Last, but not least, a VERY important warning: when the FB121 Flybar is used to suspend a system, it can not retain a 10:1 design factor at certain pick points for the largest systems. Please refer to the array usage and rigging sections, starting on page 17 and Appendix A on page 22 to review and run the Resolution software. This predictive software is an invaluable tool in determining safety issues, weights and angles involved, coverage and much more.

HDA: 2 HD1801 SUBWOOFERS AND 4 HDA LOUDSPEAKERS FLOWN

Rear Panel Features



1. MAIN INPUT

This is a female XLR-type connector that accepts a balanced line-level signal from a mixing console or other signal source. See Appendix C for more information about this connector.

2. LOOP OUT

This is a male XLR-type connector that produces exactly the same balanced line-level signal that is connected to the main input jack. Use it to daisy-chain several HDAs together off the same signal source. See Appendix C for more information about this connector and page 6 for instructions on how to daisy-chain multiple loudspeakers.

3. ARRAY MODE

This 3-position voicing mode switch allows the HDA to be tailored for any sound application. It voices the array for a flat response depending on the number of HDAs in use.

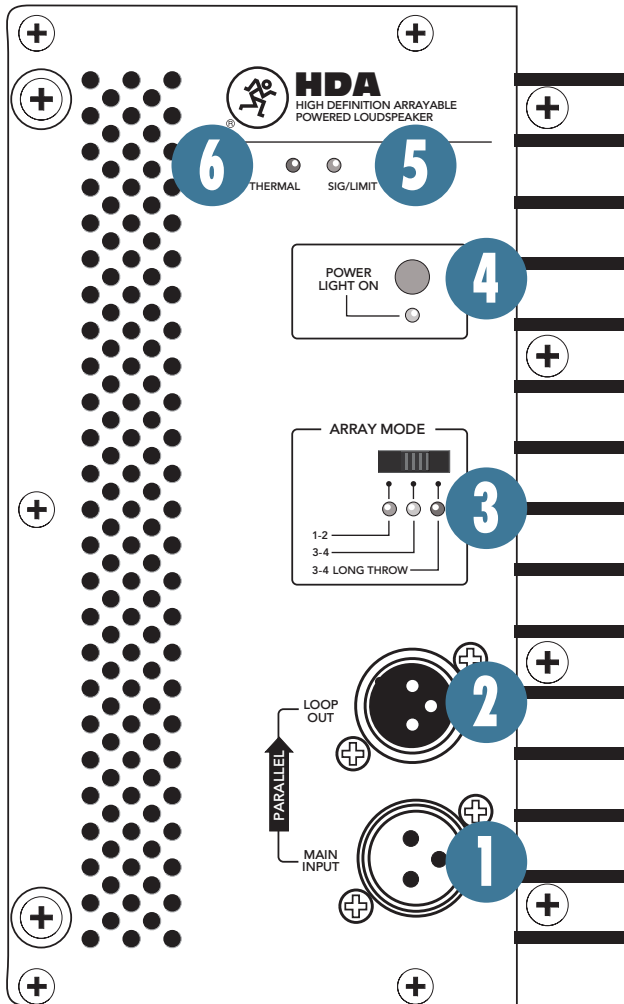
As more HDAs are arrayed together, the boxes couple and the low frequency energy increases. The array mode EQ voices each box so the array, as a whole, is flat and even sounding. [See the Frequency Response graph on page 28 to view the different voicing for each setting.]

1-2

When configuring an array with one or two HDAs per side, set the Array Mode Switch on each unit to the '1-2' position. The LED below the switch will illuminate yellow when '1-2' is the chosen array mode.

3-4

When configuring an array with three or four HDAs per side, set the Array Mode Switch on each unit to the '3-4' position. The LED below the switch will illuminate green when '3-4' is the chosen array mode.



3-4 LONG THROW

When configuring an array with three or four HDAs per side, set the Array Mode Switch on the top one or two boxes to the '3-4 LONG THROW' position. The LED below the switch will illuminate red when '3-4 LONG THROW' is the chosen array mode.

The top box in a flown three or four box array typically has to reach an audience that is much further away than those covered by the bottom boxes. Since high frequency energy decreases as it travels, audience members positioned towards the rear of the venue will commonly perceive less high end than those located closer. '3-4 LONG THROW' compensates for this by boosting the top end so the audio sounds smooth and even when it reaches those audience members.

Therefore, set the voicing mode switch to '3-4 LONG THROW' on the top one or two boxes in the array. In doing so, the high frequency energy will reach the back of the venue, as intended. Setting the bottom boxes to '3-4' will cover the audience converged more towards the front.

Be sure to utilize the EAW Resolution software, too, as it helps visualize the high frequency energy in the venue's coverage. Finally, listen for consistency by using your ears while walking around the room.

4. POWER LIGHT ON

Press this switch in to turn on the front panel power LED if a visual indicator is preferred. The LED below the switch will light as a reminder.

If this switch is disengaged [out], and the HDA is powered on, the LED on the front of the cabinet will not light, nor will the LED below the switch.

5. SIG/LIMIT LED

This bi-color LED illuminates green whenever there is signal present at the MAIN INPUT connector.

The HDA has a built-in limiter that helps to prevent the amplifier outputs from clipping or overdriving the transducers. The SIG/LIMIT indicator lights in yellow when the limiter is activated. It's okay for it to blink yellow occasionally, but if it blinks frequently or lights continuously, turn down the mixer's main level until it only blinks occasionally.



Excessive limiting may lead to overheating, which in turn trips the thermal protect circuitry and interrupts the performance. Pushing it too hard may also damage the amplifier and/or transducers. See 'Thermal Considerations' on page 21 for more information.

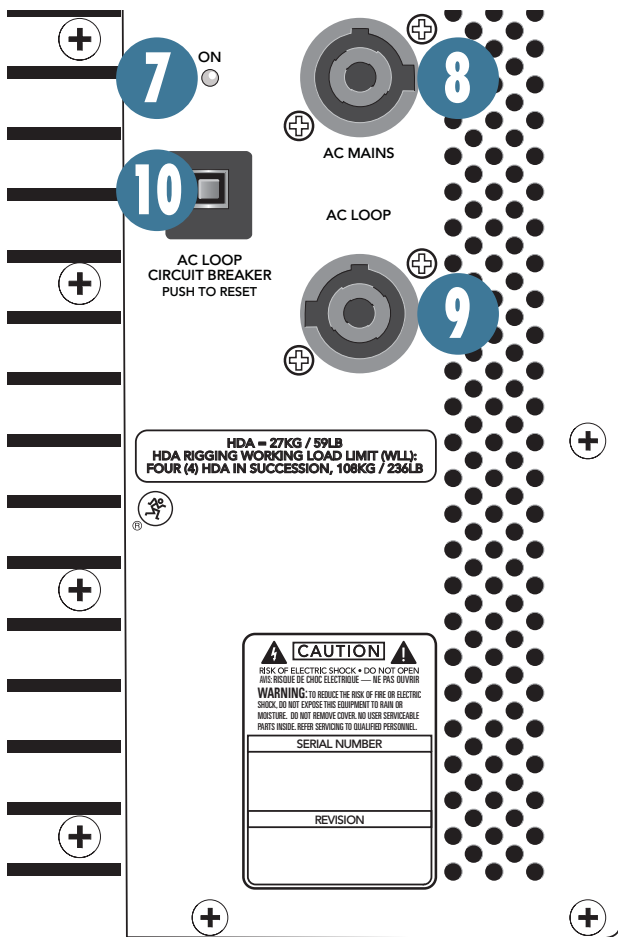
6. THERMAL LED

The HDA is equipped with a thermal protection circuit that monitors the internal temperature of the amplifiers and heatsink. If the temperature exceeds a safe operating level, this indicator lights red and the input signal is muted to allow the amplifiers to cool. When the temperature cools to a safe level once again, the thermal protection circuit deactivates, the THERMAL LED turns off and the HDA returns to normal operation.

When the HDA is in thermal protect mode, the unit is still powered on despite the lack of output. If POWER LIGHT ON [4] is engaged, the front panel power LED will go out when in thermal protect mode.



Activation of the thermal protection circuit is an indication that steps need to be taken to avoid continued thermal problems. See 'Thermal Considerations' on page 21 for more information.



7. ON LED


This LED will illuminate when the HDA is connected to a live AC mains outlet. The front panel LED will also turn on, but only if the POWER LIGHT ON switch [4] is engaged.


8. AC MAINS


There is no power switch on the HDA. When connected to the AC mains, the loudspeaker will be fully operational, with the output level controlled by the signal source feeding it.


Connect the supplied AC mains cord to the AC MAINS Neutrik PowerCon® jack on the rear of the HDA. The PowerCon® system utilizes a locking connector. To lock, twist 1/4 turn clockwise after fully inserting it into the AC MAINS receptacle. Then connect the other end of the cable to the AC mains supply receptacle.


The ON LED [7] will light when powered up. The front panel LED will also illuminate, but only if the POWER LIGHT ON switch [4] is engaged.

 Ensure that the AC mains voltage matches the voltage rating listed on the HDA below the AC MAINS connector. Do not apply 230V mains power if the voltage rating on the loudspeaker is 115V. Immediate and catastrophic damage to the HDA will result and may cause a fire hazard, serious personal injury, or even death.

 Ensure that the AC power supply has a properly grounded safety ground. Failure to follow this warning could cause equipment damage, serious personal injury, or even death.

 The supplied 9.5 foot (2,896 mm) AC mains plug may not be appropriate for local AC mains receptacles. If not, have a qualified electrician remove the existing AC mains plug and install a plug appropriate for the AC mains supply receptacle and following all local codes.


 If an extension cord is used for the AC mains, use only a cord with the appropriate wire size and current rating for the required current draw and extension cord length.

 As a general guide, powered speakers should be powered up last, after the mixer and other sources. They should also be the first things turned off. This will reduce the possibility of any turn-on, or turn-off thumps in the loudspeakers.

9. AC LOOP


The Neutrik PowerCon® AC MAINS and AC LOOP connectors are wired in parallel to provide an AC MAINS inlet and outlet on each HDA.


A 1.5 foot (457 mm) AC LOOP cable is included with the HDA. The white connector mates with the AC LOOP outlet, while the blue connector mates with the AC MAINS inlet. Therefore, to loop the AC MAINS from enclosure to enclosure, connect the included AC MAINS jumper cable from the AC LOOP output of one HDA to the AC MAINS input of the next HDA as shown on page 6. Up to four HDAs may be looped in this fashion from a single 20A service.

 The maximum, continuous load from the first HDA Loop output must not exceed 6A at 100–120V and 3A at 220–240V.

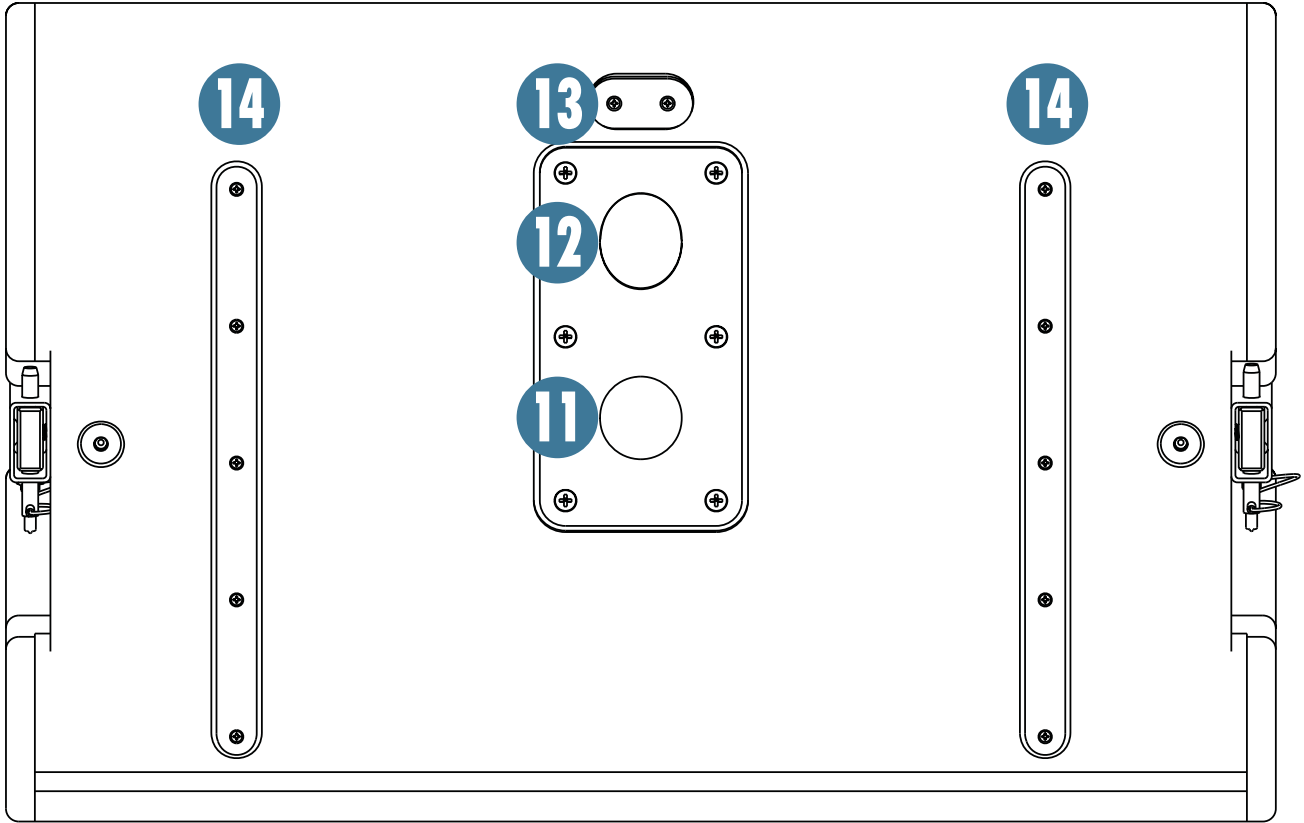
10. AC LOOP CIRCUIT BREAKER

The AC LOOP circuit breaker protects the AC LOOP outlet. If the continuous load connected to the AC LOOP outlet exceeds the rated load, the circuit breaker will trip. For this situation, reduce the connected load and then manually reset the circuit breaker.

 As is the case with the AC LOOP, the maximum, continuous load from the first HDA Loop output must not exceed 6A at 100–120V and 3A at 220–240V.

 Yes, there are quite a few 'Very Important' hand symbol remarks on this page. Please review them carefully, because they are indeed 'Very Important'! Ok, let's move on to the bottom surface features.

Bottom Surface Features



The HDA has three features on the bottom side of each cabinet:

11 & 12. DUAL-ANGLE POLE CUP

The rear pole cup [11] is for use with a single unit on a pole. It orients the HDA for output parallel to the floor.

The front pole cup [12] serves two purposes. It angles the HDA downward 20° to aim at the audience below the loudspeaker. It may also be utilized for use with two HDAs arrayed on one pole as seen in the hook-up diagram on page 8.

13. COMPRESSION PAD

The compression pad supports the weight of multiple units in a flown array. It helps protect the wood cabinet from damage.

14. RUBBER RUNNERS

The rubber runners provide traction when the HDA is used as a front or side fill. They are also used as mating grooves when arraying multiple HDAs.

IMPORTANT INSTALLATION WARNING

Installation should only be done by experienced, licensed professionals. Improper installation may result in damage to the equipment, injury or death. As described throughout this manual, make sure the loudspeakers are installed in a stable and secure way in order to avoid any conditions that may be dangerous for persons or structures.

Array Usage

Having memorized the rear panel features, fully grasped the multiple hookup possibilities, and reviewed the practices on proper rigging, you are nearly an expert on the Mackie HDA. However, we need to discuss array usage. In other words, where should the Mackie HDA be placed and how do you do it safely?

Every possible HDA combination is listed in the table below. It details the configuration, the number of HDA loudspeakers and HD1801 subwoofers used in the system and what position the Array Mode switch should be in. Please refer to the table below when trying to decipher your system setup. It's gold!

Floor Mounting

The HDA loudspeaker is appropriate for multiple purposes. Typically, line arrays are designed to be flown. However, the HDA may also sit on the floor or stage as the main PA or as a front (or side) fill. Additionally, it may be pole-mounted via one of the two built-in sockets on the bottom of the cabinet. Be sure the pole is capable of supporting the weight of one or two HDA(s). The Mackie SPM200 is a great option for this application.

Check to make sure that the support surface (e.g., floor, etc.) has the necessary mechanical characteristics to support the weight of the loudspeaker(s).

When pole-mounting loudspeakers, be sure that they are stabilized and secured from falling over or being accidentally pushed over. Failure to follow these precautions may result in damage to the equipment, personal injury, or death.

Note that the Mackie HDA comes standard with two pole-cups at different angles. The desired pole-cup angle depends on many factors such as the height of the stage, if one or two HDAs will be used, etc. We suggest using a combination of the EAW Resolution software (see Appendix A) and your ears to help determine which pole cup to utilize.

Configuration	Number of Mackie HDA Loudspeakers per side	Number of Mackie HD1801 Subwoofers per side	HDA Array Mode Switch
Pole Mount	1 or 2	0 or 1 (use SPM200 loudspeaker pole with HD1801)	1-2
Ground stack on FB121 Flybar	1 or 2	0	1-2
	3	0	3-4*
Ground stack on HD1801 subwoofer	1 or 2	1 or 2 (each HD1801 requires its own ACC-R180S Rigging Kit)	1-2
	3		3-4*
Flown with FB121 Flybar or PA-A2 Eyebolt Kit	1 or 2	0 to 2 (each HD1801 requires its own ACC-R180S Rigging Kit)	1-2
	3 or 4		3-4*

*Selection of '3-4' and '3-4 LONG THROW' will depend upon the distance each box is required to cover. For more information refer to Array Mode [3] starting on page 13 and be sure to utilize the prediction capabilities of EAW Resolution software as described on page 22.

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Rigging

HDAs may only be flown horizontally. Use M10 x 1.5 x 37 mm forged shoulder eyebolts or the optional FB121 Flybar.



WARNING: The cabinet is suitable for rigging via its fly points or the integrated flyware only. NEVER attempt to suspend the HDA by its handles.

Rigging Design Practices

Rigging a loudspeaker requires determining:

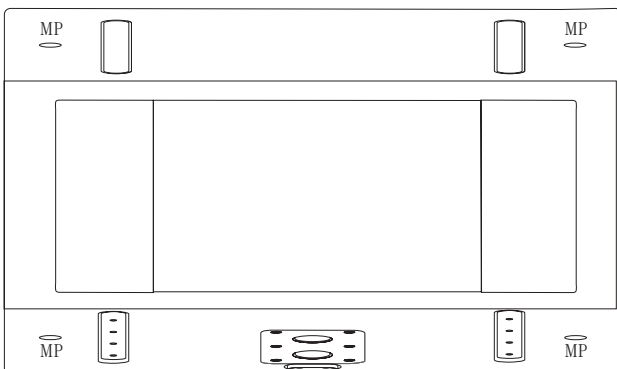
1. The rigging methods and hardware that meet static, shock, dynamic, and any other load requirements for supporting the loudspeaker from structure.
2. The design factor for and the required WLL (Working Load Limit) for this support.

Mackie strongly recommends the following rigging practices:

1. Documentation: Thoroughly document the design with detailed drawings and parts lists.
2. Analysis: Have a qualified professional, such as a licensed Professional Engineer, review and approve the design before its implementation.
3. Installation: Have a qualified professional rigger do the installation and inspection.
4. Safety: Use adequate safety precautions and back-up systems.

4 Fly Points

MP=Mounting Point



Rigging Hardware and Accessories

Rigging Mackie loudspeakers will invariably require hardware not supplied by Mackie. Various types of load-rated hardware are available from a variety of third-party sources. There are a number of such companies specializing in manufacturing hardware for, designing, and installing rigging systems. Each one of these tasks is a discipline in its own right. Because of the hazardous nature of rigging work and the potential liability, engage companies that specialize in these disciplines to do the work required.

Mackie does offer certain accessory rigging items, primarily for attachment to the hardware integral with the loudspeaker. Some items, such as eyebolts and flybars, may be used with a variety of products. While these accessories are intended to facilitate installation, the wide variety of possible installation conditions and array configurations do not permit Mackie to determine their suitability or load rating for any particular application.

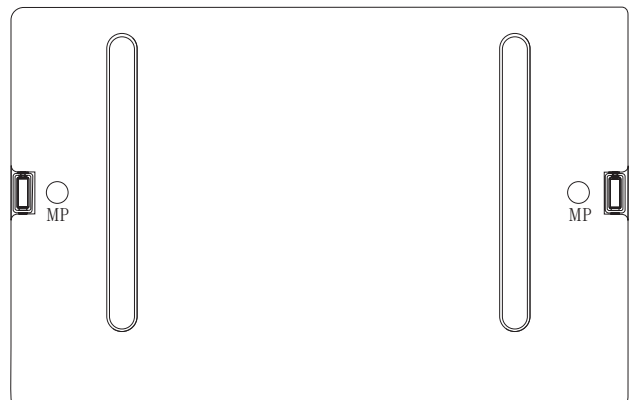
Mackie is not in the business of providing complete rigging systems, either as designers, manufacturers, or installers. It is the responsibility of the installer to provide a properly engineered, load-certified rigging system for supporting the loudspeaker from structure.

A note on eyebolts

Eyebolt working load limits are significantly de-rated when angular lifts are applied. If an application requires an angular lift greater than 45°, a swivel hoist ring or similar fitting must be used – see Figure A, for example. These fittings have full swivel and pivot action which helps avoid side loads.



Figure A



IMPORTANT INSTALLATION WARNING

Installation should only be done by experienced, licensed professionals. Improper installation may result in damage to the equipment, injury or death. As described throughout this manual, make sure the loudspeakers are installed in a stable and secure way in order to avoid any conditions that may be dangerous for persons or structures.

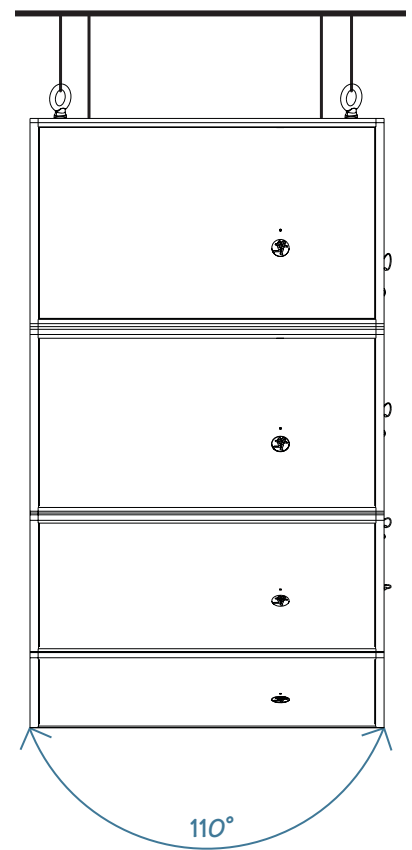
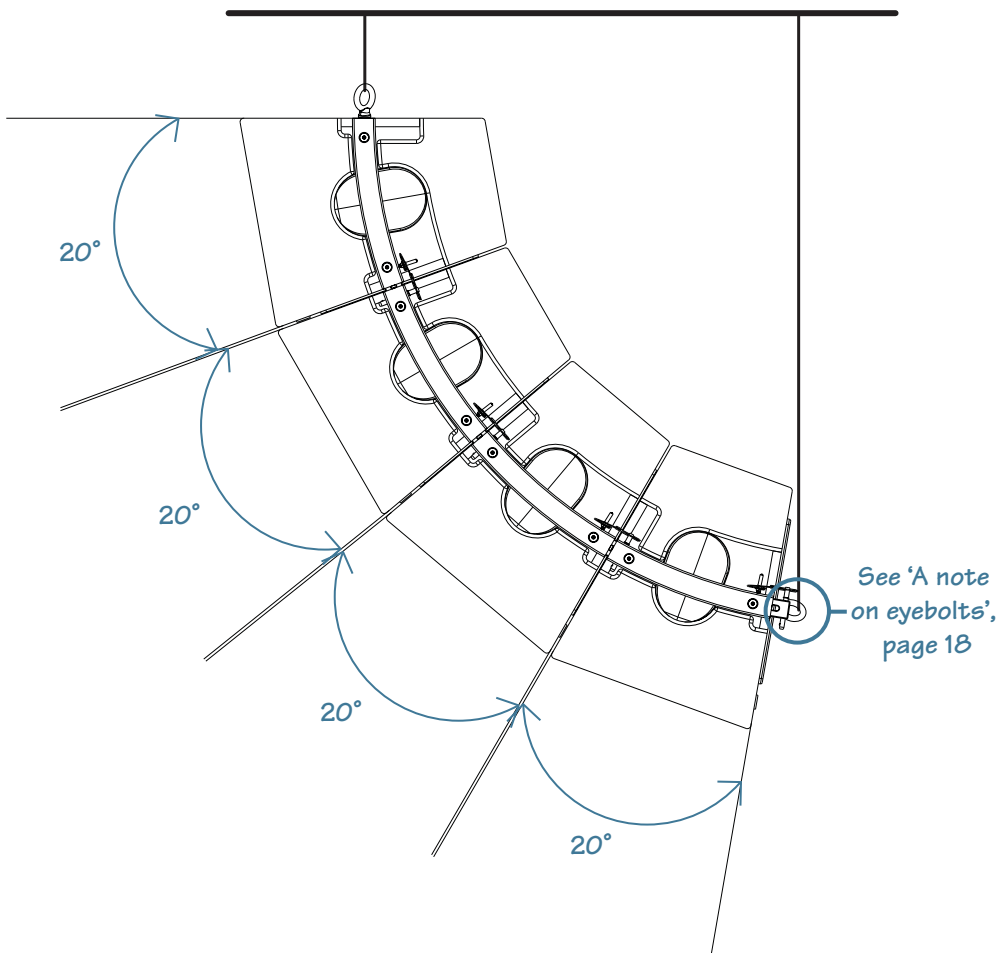
Rigging Notes

A minimum of two rigging points must be used to hang an HDA. More may be used for creating the desired hanging angle as shown in the illustrations below.

The illustrations provided below is just one rigging possibility. Refer to the hookup diagrams to view additional rigging suggestions.



WARNING: When the FB121 Flybar is used to suspend a system, it cannot retain a 10:1 design factor at certain pick points. In some situations, suspended and installed arrays may be configured with other design factors (e.g. 8:1 or 5:1), Loud Technologies Inc only recommends using the desired 10:1 design factor. Please refer to the table on page 17 for the recommended setup for your system and Appendix A on page 22 to review and run the Resolution software. This predictive software is an invaluable tool in determining safety issues, weights and angles involved, coverage and much more.



IMPORTANT INSTALLATION WARNING

Installation should only be done by experienced, licensed professionals. Improper installation may result in damage to the equipment, injury or death. As described throughout this manual, make sure the loudspeakers are installed in a stable and secure way in order to avoid any conditions that may be dangerous for persons or structures.

Room Acoustics

The HDA loudspeakers are designed to sound neutral; that is, to reproduce the input signal as accurately as possible.

Room acoustics play a crucial role in the overall performance of a sound system. Here are some additional placement tips to help overcome some typical room problems that might arise:

- Avoid placing loudspeakers in the corners of a room. Doing so increases the low frequency output and can cause the sound to be muddy and indistinct.
- Avoid placing loudspeakers against a wall. This, too, increases the low frequency output, though not as much as corner placement. However, this is a good way to reinforce the low frequencies, if so desired.
- Avoid placing the speakers directly on a hollow stage floor. A hollow stage can resonate at certain frequencies, causing peaks and dips in the frequency response of the room. It is better to place the loudspeakers on a sturdy table or stand designed to handle the weight of the HDA.
- Position the loudspeakers so the high-frequency drivers are 2 to 4 feet above ear level for the audience (make allowances for a standing/dancing in the aisles audience). High frequencies are highly directional and tend to be absorbed much easier than lower frequencies. By providing direct line-of-sight from the loudspeakers to the audience, the overall brightness and intelligibility of the sound system increase.
- Highly reverberant rooms, like many gymnasiums and auditoriums, are a nightmare for sound system intelligibility. Multiple reflections off the hard walls, ceiling, and floor play havoc with the sound. Depending on the situation, it is possible to take some steps to minimize the reflections, such as putting carpeting on the floors, closing draperies to cover large glass windows, or hanging tapestries or other materials on the walls to absorb some of the sound.

However, in most cases, these remedies are not possible or practical. What to do? Making the sound system louder generally doesn't work because the reflections become louder, too. The best approach is to provide as much direct sound coverage to the audience as possible. The farther away you are from the speaker, the more prominent will be the reflected sound.

Use more speakers strategically placed so they are closer to the back of the audience. If the distance between the front and back speakers is more than about 100 feet, use a delay processor to time-align the sound. (Since sound travels about 1 foot per millisecond, it takes about 1/10 of a second to travel 100 feet.)

Keep in mind that the Array Mode (see pages 13-14) is a great way to compensate for some of these issues.

Thermal Considerations

The HDA has two powerful built-in amplifiers capable of producing a combined 600 watts of rms power. As an amplifier works, it produces heat. The higher the signal level, the louder and hotter it gets. It is important to dissipate the heat as quickly as possible. This results in increased reliability and longevity for the amplifier.

The amplifier module is mounted on a large heatsink, which is cooled by convection where cool air is drawn through its fins, carrying the heat away. In order for this convection cooling to work efficiently, it is important to provide adequate airspace behind the loudspeaker. Additionally, a thermally-controlled fan resides inside of the HDA which helps to reduce the chance of it overheating. When positioning the HDA, we recommend leaving at least six inches of air space behind it.

In the unlikely event of the amplifier overheating, a built-in thermal switch will activate, muting the signal, lighting the thermal LED, and ramping the fan up to top speed. When the amplifier has cooled down to a safe operating temperature, the thermal switch resets itself, and the HDA resumes normal operation.

If the thermal switch activates, try turning down the level control a notch or two on the mixing console to avoid overheating the amplifier. Be aware that direct sunlight and/or hot stage lights may be the culprit of an amplifier overheating.

AC Power

Be sure the HDA is plugged into an outlet that is able to supply the correct voltage specified for your model. It will continue to operate at lower voltages, but will not reach full power.

Be sure the electrical service can supply enough current for all the components connected to it.

We recommend that a stiff (robust) supply of AC power be used because the amplifiers place high current demands on the AC line. The more power that is available on the line, the louder the speakers will play and the more peak output power will be available for cleaner, punchier bass. A suspected problem of “poor bass performance” is often caused by a weak AC supply to the amplifiers.



Refer back to page 15 for additional details regarding the AC power section of the Mackie HDA loudspeaker.

Care and Maintenance

Mackie loudspeakers will provide many years of reliable service if these guidelines are followed:

- Avoid exposing the loudspeakers to moisture. If they are set up outdoors, be sure they are under cover if rain is expected.
- Avoid exposure to extreme cold (below freezing temperatures). If the loudspeakers must be operated in a cold environment, warm up the voice coils slowly by sending a low-level signal through them for about 15 minutes prior to high-power operation.
- Use a dry cloth to clean the cabinets. Only do this when the power is turned off. Avoid getting moisture into any of the openings of the cabinet, particularly where the drivers are located.

Keep in mind that temperature and humidity contribute to air loss for high frequencies. They do not, however, affect the low frequencies.

Gig O'Clock

The next few pages are the appendices. They describe in detail how to utilize the EAW Resolution software, offer troubleshooting suggestions and showcase HDA connections. Here you will also find technical information, such as the HDA's specifications, block diagram, graphs and dimensions.

Other than these few things, you are finished! You are now well-versed in the ways of the Mackie HDA loudspeaker. Time to grab a frosty one and kick back.

Appendix A: EAW Resolution Software

IMPORTANT INSTALLATION WARNING

Installation should only be done by experienced, licensed professionals. Improper installation may result in damage to the equipment, injury or death. As described throughout this manual, make sure the loudspeakers are installed in a stable and secure way in order to avoid any conditions that may be dangerous for persons or structures.

What is Resolution Software?

EAW Resolution software allows one to virtually model, predict and evaluate a loudspeaker system's performance for any user-defined venue. Resolution will also predict direct SPL levels and frequency response throughout this virtual venue. Most importantly, it allows you to model a design that is safe for your application.

EAW Resolution software may be found and downloaded at the EAW website here:
<http://www.eaw.com/products/Resolution>

Why use Resolution Software?

EAW Resolution software should be installed and utilized for a multitude of reasons.

First, it is predictive software that helps predetermine any issues that may arise, including safety, weight, angle, flybar, and more.

EAW Resolution software also determines coverage. Are the SPL and frequency response as desired everywhere in the venue? Should three or four HDAs be used? How many subwoofers should be employed in this particular system? Should the subwoofer(s) be flown or placed on the floor? What voicing mode is best for this system? Find out the answers to these questions, and more, using this software.

It is a great tool for pre-sales, as well. Customers will be able to see the final setup prior to any purchase. Therefore, realistic expectations have been set for all interested parties which results in a better relationship between the buyer and seller.

Finally, it is a great educational tool with a great price...free! Just download the software and you, too, will now be cool. Impress friends with your acoustic knowledge.

For complete instructions about operating the EAW Resolution software, click on the Help menu when running the software.



EAW Resolution software should ALWAYS be used to model any new installation to ensure that the design is safe.

Computer Requirements

The EAW Resolution software requires a PC running one of the following operating systems:

- Windows® 7 32 / 64
- Windows® Vista 32 / 64
- Windows® XP 32 SP 2

Macintosh operating systems and earlier Windows operating systems are not supported at this time.

Appendix B: Service Information

If you think there is a problem with your Mackie HDA, please check out the following troubleshooting tips and do your best to confirm the problem. Visit the Support section of our website (www.mackie.com/support) where lots of useful information such as FAQs and other documentation reside. You may find the answer without having to send the HDA away.

Troubleshooting

No power

- Is it plugged in? Make sure the AC outlet is live (check with a tester or lamp).
- Is the ON LED on the rear panel glowing green? If not, make sure the AC outlet is live. If so, refer to “No sound” below.
- The internal AC line fuse may be blown. This is not a user serviceable part. If a blown AC line fuse is the suspect, please see the "Repair" section next.

No sound

- Is the signal source working? Make sure the connecting cables are in working order and securely connected at both ends. Make sure the output volume (gain) control on the mixing console is turned up sufficiently to drive the inputs of the speaker.
- Make sure the mixer does not have a Mute on or a Processor loop engaged. If so, make sure the volume/gain is turned down before disengaging the offending switch.
- Is the thermal indicator lit red on the rear panel? Make sure there is at least six inches of free space behind the HDA.

Poor bass performance

- Check the polarity of the connections between the mixer and the loudspeakers. The positive and negative connections may be reversed at one end of one cable, causing one or more loudspeakers to be out-of-phase.
- Poor bass performance may be the result of bad AC power. See the section titled ‘AC Power’ on page 21 for further details.

Poor sound

- Is it loud and distorted? Make sure that a stage in the signal chain is not being overdriven. Verify that all level controls are set properly.
- Is the input connector plugged completely into the jack? Be sure all connections are secure.

Noise

- Make sure all connections to the active loudspeakers are good.
- Make sure none of the signal cables are routed near AC cables, power transformers, or other EMI-inducing devices.
- Is there a light dimmer or other SCR-based device on the same AC circuit as the HDA? Use an AC line filter or plug the HDA into a different AC circuit.

Hum

- Try disconnecting the cable connected to the main input jack. If the noise disappears, it could be a “ground loop,” rather than a problem with the HDA. Try some of the following troubleshooting ideas:
 - Use balanced connections throughout the system for the best noise rejection.
 - Whenever possible, plug all the audio equipment’s line cords into outlets which share a common ground. The distance between the outlets and the common ground should be as short as possible.

Repair

For warranty service, refer to the warranty information on page 29.

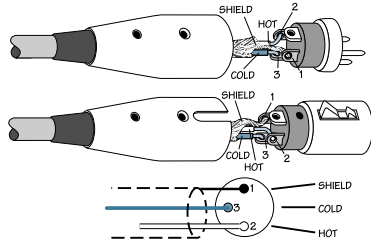
Non-warranty service for Mackie products is available at a factory-authorized service center. To locate the nearest service center, visit www.mackie.com, click “Support” and select “Locate a Service Center.” Service for Mackie products outside the United States can be obtained through local dealers or distributors.

If you do not have access to our website, you may call the Tech Support department at 1-800-898-3211, Monday-Friday, during normal business hours, Pacific Time, to explain the problem. Tech Support will tell you where the nearest factory-authorized service center is located in your area.

Appendix C: Connections

XLR Connectors

The HDA has one female XLR input that accepts a balanced line-level signal. When connecting a balanced signal, be sure it's wired per AES (Audio Engineering Society) standards:



Balanced XLR Connectors

XLR

Pin 1 – Shield (Ground)

Pin 2 – Hot (+)

Pin 3 – Cold (–)

There is also a male XLR connector on the HDA labeled LOOP OUT. This is also wired according to the AES standards listed above.

The LOOP OUT connector allows several HDAs to be connected in parallel. Simply plug the signal source (i.e., mixer output) into the main input jack, and patch that speaker's LOOP OUT jack to the next speaker's main input jack, and so on, daisy-chaining multiple speakers. See page 6 for a visual example of daisy-chaining.

The LOOP OUT jack is wired straight from the main input connector — there is no electronic circuitry between — so the signal coming out of the LOOP OUT jack is exactly the same as the signal going in.

Appendix D: Technical Information

HDA Specifications

Acoustic Performance:

Frequency Response (-10 dB)	57 Hz – 20 kHz
Frequency Response (-3 dB)	65 Hz – 18 kHz
Max peak SPL (calculated) ¹	134 dB
Max peak SPL (measured) ²	124 dB
Crossover Point	2.0 kHz

Array Coverage

Horizontal Coverage (-6 dB)	110° averaged 2 kHz to 10 kHz
Vertical Coverage (-6 dB)	
1x HDA	20° averaged 2 kHz to 10 kHz
2x HDA	40° averaged 2 kHz to 10 kHz
3x HDA	60° averaged 2 kHz to 10 kHz
4x HDA	80° averaged 2 kHz to 10 kHz

Input / Output

Input Type	Female XLR balanced
Input Impedance	11 kΩ balanced
Loop Out	Male XLR balanced

Voicing Mode

1-2	Voicing for an array with 1 or 2 HDAs
3-4	Voicing for an array with 3 or 4 HDAs
3-4 Long Throw	Long Throw Voicing for an array with 3 or 4 HDAs

*See pages 13-14 and the Frequency Response graph on page 28 for more information.

¹ Calculated from driver sensitivity and amplifier power.

² Measured with pink noise, free field at 1 meter, before limiting.

Low-Frequency Power Amplifier

Rated Power	500 watts rms 1000 watts peak
Rated THD	< 0.03%
Cooling	Convection Extrusion
Design	Class D

High-Frequency Power Amplifier

Rated Power	100 watts rms 200 watts peak
Rated THD	< 0.03%
Cooling	Convection Extrusion
Design	Class D

Low-Frequency Transducer

Diameter	12.0 in / 305 mm
Voice Coil Diameter	3.0 in / 76 mm
Diaphragm Material	Paper
Magnet Material	Neodymium

High-Frequency Transducer x2

Voice Coil Diameter	1.7 in / 43 mm
Horn Entry Diameter	0.75 in / 18 mm
Diaphragm Material	Mylar
Magnet Material	Neodymium

Line Input Power

US	100 – 120 VAC, 50 – 60 Hz, 200W
EU, CN	200 – 240 VAC, 50 – 60 Hz, 200W
AC Mains Connector	Locking Neutrik PowerCon® A 20 amp, 250 VAC Max input 800W
AC Mains Cable (included)	9.5 ft / 2,896 mm
AC Loop Connector	Locking Neutrik PowerCon® B 20 amp, 250 VAC Max output 600W
AC Loop Cable (included)	1.5 ft / 457 mm

HDA Specifications Continued...

Safety Features

Input Protection:	RMS limiting, power supply and amplifier thermal protection
Display LEDs:	Power ON, Voicing Mode selection, Sig/Limit, Thermal protection, Front Power ON

Construction Features

Basic Design	Trapezoidal, 20° included angle
Cabinet	15 mm exterior grade premium birch plywood
Finish	High durability black paint
Handles	One on each side
Grille	Powder-coated galvanized steel
Fly Points	Four M10 x 1.5 mm
Pole Mount Diameter	1.42 in / 36 mm
Pole Mount Angle	10° and 30°
FB121 Hole Diameter	0.81 in / 21 mm

Physical Properties

Height	14.7 in / 373 mm
Width	24.7 in / 628 mm
Depth	15.9 in / 405 mm
Weight	59 lb / 26.7 kg

Mounting Methods

Pole mount, integral rigging flybar, stack on top or fly underneath subwoofer(s), or fly via 4 integrated M10 mounting points (using M10 x 1.5 x 37 mm forged shoulder eyebolts). See page 18 for more information.

Options

PA-A2 Forged Shoulder Eyebolt Kit (4 x M10 x 1.5mm x 37mm)
SPM200 Loudspeaker Pole Mount
FB121 HDA Flybar

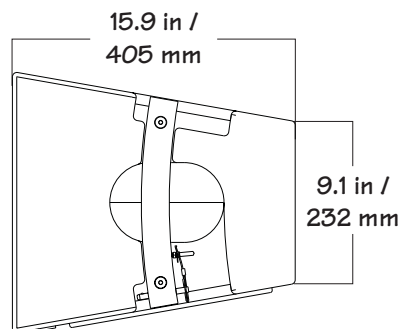
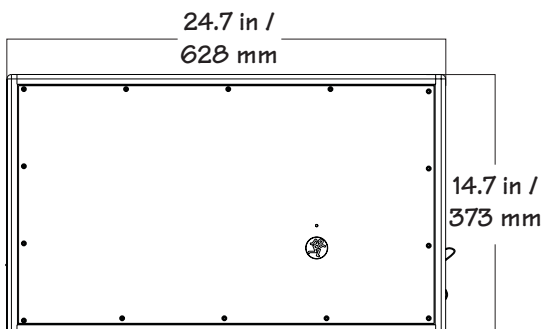
Disclaimer

Since we are always striving to make our products better by incorporating new and improved materials, components, and manufacturing methods, we reserve the right to change these specifications at any time without notice.

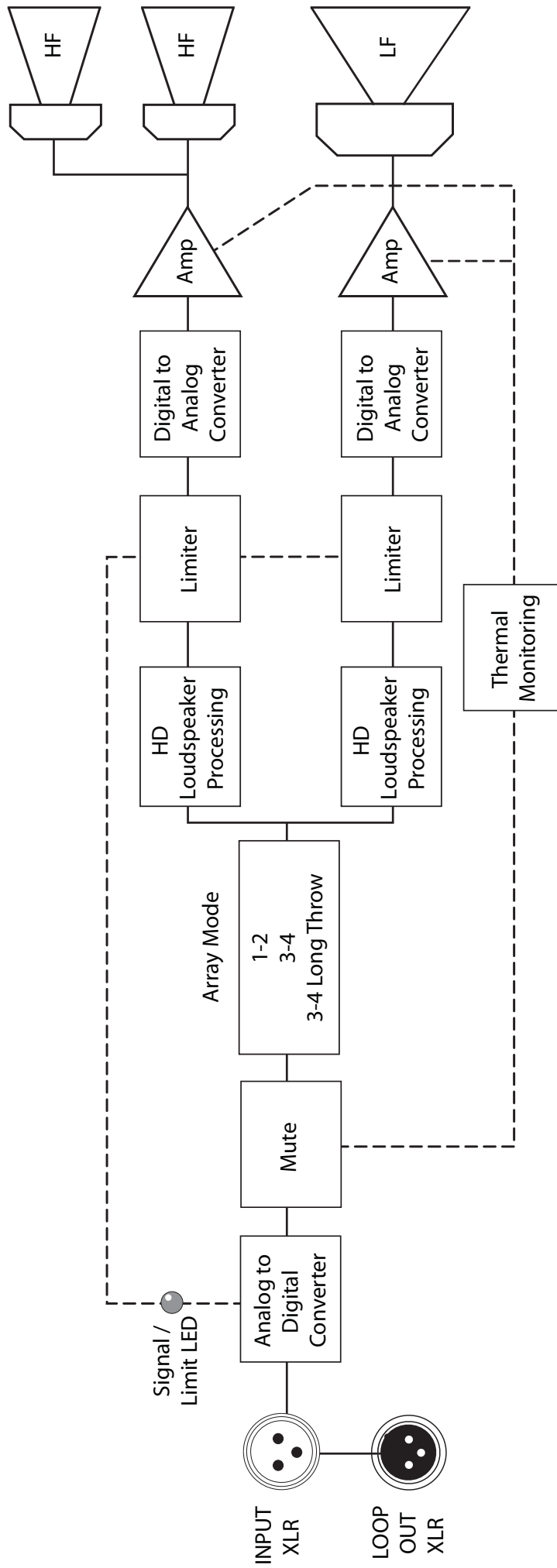
“Mackie” and the “Running Man” figure are registered trademarks of LOUD Technologies Inc.

All other brand names mentioned are trademarks or registered trademarks of their respective holders, and are hereby acknowledged.

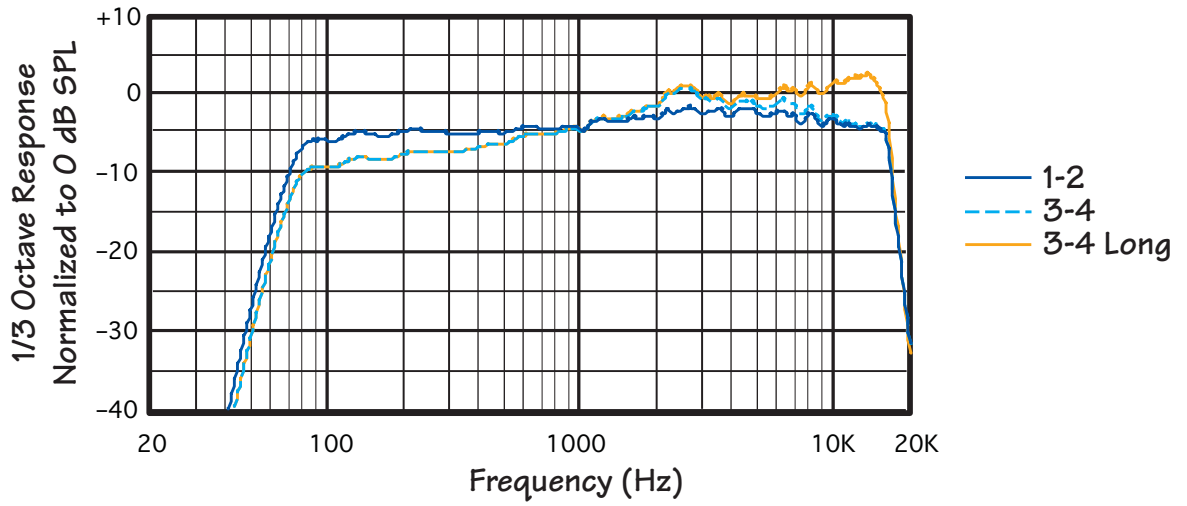
HDA Dimensions



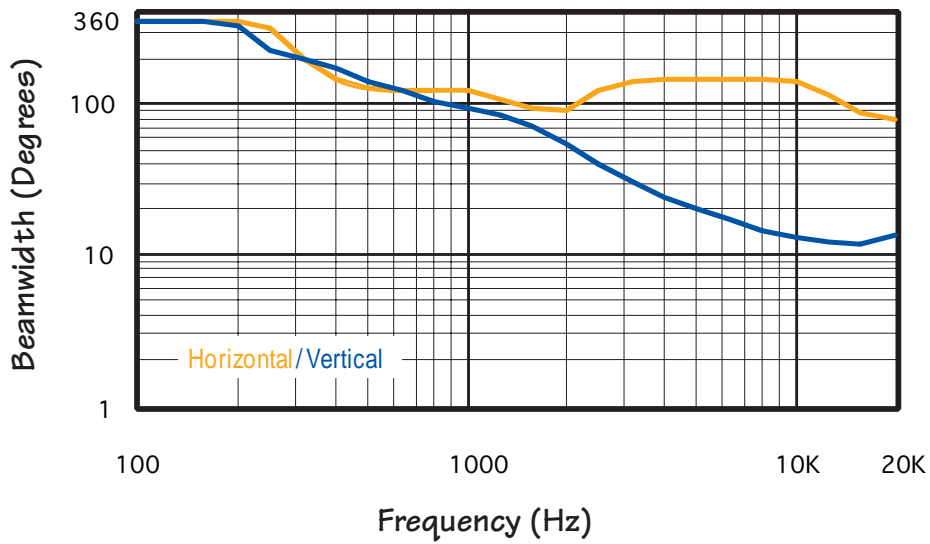
HDA Block Diagram



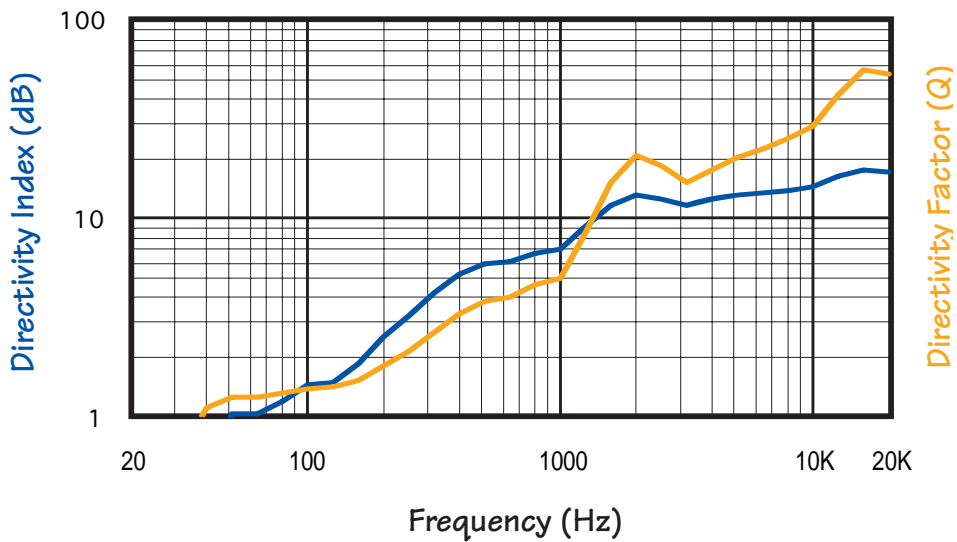
HDA Frequency Response On-Axis



HDA Beamwidth vs. Frequency



HDA Directivity vs. Frequency



HDA Limited Warranty

Please keep your sales receipt in a safe place.

This Limited Product Warranty (“Product Warranty”) is provided by LOUD Technologies Inc. (“LOUD”) and is applicable to products purchased in the United States or Canada through a LOUD-authorized reseller or dealer. The Product Warranty will not extend to anyone other than the original purchaser of the product (hereinafter, “Customer,” “you” or “your”).

For products purchased outside the U.S. or Canada, please visit www.mackie.com/warranty to find contact information for your local distributor, and information on any warranty coverage provided by the distributor in your local market.

LOUD warrants to Customer that the product will be free from defects in materials and workmanship under normal use during the Warranty Period. If the product fails to conform to the warranty then LOUD or its authorized service representative will at its option, either repair or replace any such nonconforming product, provided that Customer gives notice of the noncompliance within the Warranty Period to the Company at: www.mackie.com/support or by calling LOUD technical support at 1.800.898.3211 (toll-free in the U.S. and Canada) during normal business hours Pacific Time, excluding weekends or LOUD holidays. Please retain the original dated sales receipt as evidence of the date of purchase. You will need it to obtain any warranty service.

For full terms and conditions, as well as the specific duration of the Warranty for this product, please visit www.mackie.com/warranty.

The Product Warranty, together with your invoice or receipt, and the terms and conditions located at www.mackie.com/warranty constitutes the entire agreement, and supersedes any and all prior agreements between LOUD and Customer related to the subject matter hereof. No amendment, modification or waiver of any of the provisions of this Product Warranty will be valid unless set forth in a written instrument signed by the party to be bound thereby.

Need help with your new powered loudspeaker?

- Visit www.mackie.com and click Support to find: FAQs, manuals, and addendums.
- Email us at: techmail@mackie.com.
- Telephone 1-800-898-3211 to speak with one of our splendid technical support chaps (Monday through Friday, normal business hours, PST).

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