700-HP UltraHigh-Power Subwoofer

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DECLARATION OF CONFORMITY ACCORDING TO ISO/IEC GUIDE 22 AND EN 45014

Manufacturer's Name:
Meyer Sound Laboratories Inc.

Manufacturer's Address:
2832 San Pablo Avenue
Berkeley, CA 94702-2204, USA

Declares that the products
Product Name: 700-HP
Product Options: All

Conforms to the following Product Specifications
Safety: IEC 60065: 2002
BS EN 60065: 2002
CSA C22.2 60065: 2003
UL 813: 1999
EMC: EN 55103-1: 1997 emission(1)
EN 55103-2: 1997 immunity(2)

This device complies with EN 55103-1 & -2. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Supplementary Information

The product herewith complies with the requirements of the Low Voltage Directive 73/23/EEC and the EMC Directive 89/336/EEC.

Office of Quality Manager
Berkeley, California USA
December 6, 2004

European Contact: Your local Meyer Sound dealer or Meyer Sound Germany, GmbH. Carl Zeiss Strasse 13, 56751 Polch, Germany. Telephone: 49.2654.9600.58 Fax: 49.2654.9600.59

Environmental specifications for Meyer Sound Electronics products

Operating Temperature	0˚ C to +45˚ C
Non operating Temperature	<-40˚ C or > +75˚ C
Humidity	to 95% at 35˚ C
Operating Altitude	to 4600 m (15,000 ft)
Non operating Altitude	to 6300 m (25,000 ft)
Shock	30 g 11 msec half-sine on each of 6 sides
Vibration	10 Hz to 55 Hz (0.010 m peak-to-peak excursion)

Made by Meyer Sound Laboratories
Berkeley, California USA
European Office:
Meyer Sound Lab. GmbH
Carl Zeiss Strasse 13
56751 Polch, Germany
CE

3K59 COMMERCIAL AUDIO SYSTEM
c UL US LISTED

N775

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700-HP UltraHigh-Power Subwoofer Operating Instructions

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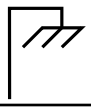
Printed in the U.S.A.

Part Number: 05.137.094.01 A

SYMBOLS USED

These symbols indicate important safety or operating features in this booklet and on the chassis:

			
Dangerous voltages: risk of electric shock	Important operating instructions	Frame or chassis	Protective earth ground
Pour indiquer les risques résultant de tensions dangereuses	Pour indequer important instructions	Masse, châssis	Terre de protection
Zu die gefahren von gefährliche spanning zeigen	Zu wichtige betriebs-anweisung und unter-haltsanweisung zeigen	Rahmen oder chassis	Die schutzerde
Para indicar voltajes peligrosos.	Instrucciones importantes de funcionamiento y/o manteniento	Armadura o chassis	Tierra proteccionista

IMPORTANT SAFETY INSTRUCTIONS

1 Read these instructions.

2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this loudspeaker near water.
6. Clean only with dry cloth.
7. Do not block any ventilation openings. Install in accordance with Meyer Sound's installation instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus that produce heat.
9. Do not defeat the safety purpose of the grounding-type plug. A grounding-type plug has two blades and a third grounding prong. The third prong is 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 loudspeaker. The AC mains plug or appliance coupler shall remain readily accessible for operation.
11. Only use attachments/accessories specified by Meyer Sound.
12. Use only with the caster rails or rigging specified by Meyer Sound, or sold with the loudspeaker. Handles are for carrying only.

CAUTION: Rigging should only be done by experienced professionals.

13. Unplug this loudspeaker during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the loudspeaker has been damaged in any way, such as when the power-supply cord or plug has been damaged; liquid has been spilled or objects have fallen into the loudspeaker; rain or moisture has entered the loudspeaker; the loudspeaker has been dropped; or when for undetermined reasons the loudspeaker does not operate normally.

SAFETY SUMMARY

English

- To reduce the risk of electric shock, disconnect the loudspeaker from the AC mains before installing audio cable. Reconnect the power cord only after making all signal connections.
- Connect the loudspeaker to a two-pole, three-wire grounding mains receptacle. The receptacle must be connected to a fuse or circuit breaker. Connection to any other type of receptacle poses a shock hazard and may violate local electrical codes.
- Do not install the loudspeaker in wet or humid locations without using weather protection equipment from Meyer Sound.
- Do not allow water or any foreign object to get inside the loudspeaker. Do not put objects containing liquid on or near the unit.
- To reduce the risk of overheating the loudspeaker, avoid exposing it to direct sunlight. Do not install the unit near heat-emitting appliances, such as a room heater or stove.
- This loudspeaker contains potentially hazardous voltages. Do not attempt to disassemble the unit. The unit contains no user-serviceable parts. Repairs should be performed only by factory-trained service personnel.

Français

- Pour réduire le risque d'électrocution, débrancher la prise principale de l'haut-parleur, avant d'installer le câble d'interface allant à l'audio. Ne rebrancher le bloc d'alimentation qu'après avoir effectué toutes les connections.
- Branchez l'haut-parleur dans une prise de courant à 3 dérivations (deux pôles et la terre). Cette prise doit être munie d'une protection adéquate (fusible ou coupe-circuit). Le branchement dans tout autre genre de prise pourrait entraîner un risque d'électrocution et peut constituer une infraction à la réglementation locale concernant les installations électriques.
- Ne pas installer l'haut-parleur dans un endroit où il y a de l'eau ou une humidité excessive.
- Ne pas laisser de l'eau ou tout objet pénétrer dans l'haut-parleur. Ne pas placer de r´cipients contenant un liquide sur cet appareil, ni à proximité de celui-ci.
- Pour éviter une surchauffe de l'haut-parleur, conserver-la à l'abri du soleil. Ne pas installer à proximité d'appareils dégageant de la chaleur tels que radiateurs ou appareils de chauffage.
- Ce haut-parleur contient des circuits haute tension présentant un danger. Ne jamais essayer de le démonter. Il n'y a aucun composant qui puisse être réparé par l'utilisateur. Toutes les réparations doivent être effectuées par du personnel qualifié et agréé par le constructeur.

Deutsch

- Um die Gefahr eines elektrischen Schlages auf ein Minimum zu reduzieren, den Lautsprecher vom Stromnetz trennen, bevor ggf. ein Audio-Schnittstellensign alkabel angeschlossen wird. Das Netzkabel erst nach Herstellung aller Signalverbindungen wieder einstecken.
- Der Lautsprecher an eine geerdete zweipolige Dreiphasen-Netzsteckdose anschließen. Die Steckdose muß mit einem geeigneten Abzweigschutz (Sicherung oder Leistungsschalter) verbunden sein. Der Anschluß der unterbrechungsfreien Stromversorgung an einen anderen Steckdosentyp kann zu Stromschlägen führen und gegen die örtlichen Vorschriften verstoßen.
- Der Lautsprecher nicht an einem Ort aufstellen, an dem sie mit Wasser oder übermäßig hoher Luftfeuchtigkeit in Berührung kommen könnte.
- Darauf achten, daß weder Wasser noch Fremdkörper in das Innere den Lautsprecher eindringen. Keine Objekte, die Flüssigkeit enthalten, auf oder neben die unterbrechungsfreie Stromversorgung stellen.
- Um ein Überhitzen dem Lautsprecher zu verhindern, das Gerät vor direkter Sonneneinstrahlung fernhalten und nicht in der Nähe von wärmeabstrahlenden Haushaltsgeräten (z.B. Heizgerät oder Herd) aufstellen.
- Im Inneren diesem Lautsprecher herr-schen potentiell gefährliche Spannungen. Nicht versuchen, das Gerät zu öffnen. Es enthält keine vom Benutzer reparierbaren Teile. Reparaturen dürfen nur von ausgebildetem Kundenienstpersonal durchgeführt werden.

Español

- Para reducir el riesgo de descarga eléctrica, desconecte de la red de voltaje el altoparlante antes de instalar el cable de señal de audio. Vuelva a conectar la alimentacion de voltaje una vez efectuadas todas las interconexiones de señalizacion de audio.
- Conecte el altoparlante a un tomacorriente bipolar y trifilar con neutro de puesta a tierra. El tomacorriente debe estar conectado a la protección de derivación apropiada (ya sea un fusible o un disyuntor). La conexión a cualquier otro tipo de tomacorriente puede constituir peligro de descarga eléctrica y violar los códigos eléctricos locales.
- No instale el altoparlante en lugares donde haya agua o humedad excesiva.
- No deje que en el altoparlante entre agua ni ningún objeto extraño. No ponga objetos con líquidos encima de la unidad ni cerca de ella.
- Para reducir el riesgo de sobrecalentamiento, no exponga la unidad a los rayos directos del sol ni la instale cerca de artefactos que emiten calor, como estufas o cocinas.
- Este altoparlante contiene niveles de voltaje peligrosos en potencia. No intente desarmar la unidad, pues no contiene piezas que puedan ser repardas por el usuario. Las reparaciones deben efectuarse únicamente por parte del personal de mantenimiento capacitado en la fábrica.

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INTRODUCTION TO THIS MANUAL

These operating instructions provide important information about the form, features, function and specifications of the 700-HP ultrahigh-power subwoofer. In addition to power requirements and audio characteristics, fundamental system design, useful software tools and rigging options for the 700-HP are discussed.

Chapter 1: Introduction provides a general description of the 700-HP and its capabilities and functionality.

Chapter 2: Power Requirements discusses power distribution, voltage and current requirements, as well as electrical safety issues.

Chapter 3: Amplification and Audio will help you understand and harness the power of the 700-HP amplifier and audio systems. Amplifier specifications, connectivity, limiting and cooling system components are all covered.

Chapter 4: RMS introduces you to the optional communication RMS module, which can be installed in the 700-HP's amplifier to make use of Meyer Sound's RMS™ remote monitoring system.

Chapter 5: System Integration will walk you through the integration of the 700-HP in mid-high or full-range systems.

Chapter 6: System Design and Integration Tools covers two comprehensive tools, Meyer Sound MAPP Online® and SIM®, for assisting you with the acoustical and functional requirements of system design and optimization.

Chapter 7: QuickFly® Rigging discusses the rigging options available for ground stacking and flying the 700-HP subwoofer.

Appendix A: Amplifier Replacement and Optional Rain Hood discusses the procedure for replacing the 700-HP amplifier and rain hood.

Appendix B: Specifications includes a full list of specifications for the 700-HP, along with dimensional drawings both with and without the optional rigging hardware.

HOW TO USE THIS MANUAL

As you read this manual, you'll find figures and diagrams to help you understand and visualize what you're reading. You'll also find numerous icons that serve as cues to flag important information or warn you against improper or potentially harmful activities. These icons include:

A **NOTE** identifies an important or useful piece of information relating to the topic under discussion.

A **TIP** offers a helpful tip relevant to the topic at hand.

A **CAUTION** gives notice that an action can have serious consequences and could cause harm to equipment or personnel, delays, or other problems.

Information and specifications are applicable as of the date of this printing. Updates and supplementary information are posted on the Meyer Sound Web site at:

http://www.meyersound.com

You may contact Meyer Sound Technical Support at:

Tel: +1 510 486.1166

Fax: +1 510 486.8356

Email: techsupport@meyersound.com

CHAPTER 1: INTRODUCING THE 700-HP ULTRAHIGH-POWER SUBWOOFER

The Meyer Sound 700-HP ultrahigh-power subwoofer (Figure 1.1) sets a new standard for the power-to-size equation. The 700-HP's power and bandwidth handle high continuous operating levels and extreme transient information with minimal distortion in its operating frequency range.

Figure 1.1. 700-HP ultrahigh-power subwoofer, shown here without optional rigging frame

Meyer Sound's rigorous design approach has been applied to extract the greatest efficiency from every part of the system, resulting in the 700-HP's effortless reproduction of low-frequency transient information. As a self-powered system, the transducers, amplification and control electronics of the 700-HP are created as a symbiotic system that optimizes performance and maximizes its tremendous power.

The operating frequency range of 28 Hz to 150 Hz complements other Meyer Sound loudspeakers and line and curvilinear arrays in sound reinforcement applications requiring maximum headroom at the low end of the frequency spectrum.

Features & Benefits

- Stackable
- Flyable using optional rigging kit
- Extremely low distortion for ultimate low-frequency clarity
- Very high peak power yields excellent transient reproduction
- Transportable in blocks using optional heavy duty caster frame
- Exceptionally reliable and durable

The 700-HP's efficiently tuned cabinet houses two Meyer Sound-designed and -manufactured back-vented, long-excursion, 18-inch cone drivers. Each driver features a 4-inch voice coil and is rated to handle 1200 AES watts. The drivers have also been engineered for extreme efficiency, using high-gauss neodymium magnets for the most powerful magnetic field strength. High magnetic field strength increases the driver's sensitivity, which yields greater output, while keeping heat dissipation requirements within operational tolerances.

An integral two-channel class AB/H amplifier with complementary MOSFET output stages supplies total peak power of 2250 watts (1125 watts per channel). With twice the amplifier power of the 650-P subwoofer, the 700-HP produces an average of 3 dB more overall SPL, with enormous headroom to accommodate the most extreme demands with ease. Recent tests conducted by Meyer Sound show the 700-HP producing significantly higher output than other "high-power" subwoofers.

The amplifier, control electronics and power supply are integrated into a single, field-replaceable module mounted in the rear of the cabinet. The cabinet is constructed of multi-ply hardwood and coated with a textured black finish. Integral metal grilles lined with acoustical black mesh protect the cone drivers. Designed mainly for stage or ground placement, the stackable 700-HP includes plastic skids on the bottom of the unit, preventing damage to the enclosure or the unit below. The skids align with slots on the cabinet's upper surfaces ensuring secure, aligned stacking. For maximum convenience in touring situations, the 700-HP can even travel in stacks on the MCF-700 caster frame.

Applications

- Stadiums, arenas and concert halls
- Medium-to-large theatres and clubs
- Theme parks
- Cinema

The 700-HP is truck-smart, with exterior cabinet dimensions suitable for both European and US truck widths. An optional QuickFly rigging kit is available, installed at the factory or as a field upgrade. Up to 11 cabinets can be suspended from the optional MTG-700 top grid in a straight hang at a 7:1 safety factor.

Options available for the 700-HP include weather protection and finishes in custom colors for fixed installations and other situations requiring specific cosmetics.

An optional RMS remote monitoring system module allows comprehensive monitoring of all key system parameters on any RMS-equipped host PC. In addition, Meyer Sound's MAPP Online multipurpose acoustical prediction program allows quick prediction of coverage, frequency response, impulse response and maximum output of the 700-HP and other Meyer Sound loudspeakers and loudspeaker systems.

CHAPTER 2: POWER REQUIREMENTS

Self-powered and highly mobile, the 700-HP subwoofer is advanced loudspeaker technology with equally advanced power capabilities. Understanding the 700-HP subwoofer's power distribution, voltage and current requirements, as well as electrical safety issues, is critical to the safe and correct operation and deployment of the 700-HP subwoofer.

AC POWER

When AC power is applied to the 700-HP subwoofer, the Intelligent AC power supply automatically selects the correct operating voltage, allowing the 700-HP subwoofer to be used internationally without manually setting voltage switches. The Intelligent AC power supply performs the following protective functions to compensate for hostile conditions on the AC mains:

- Suppresses high-voltage transients up to several kilovolts
- Filters common mode and differential mode radio frequencies (EMI)
- Sustains operation temporarily during low-voltage periods
- Provides soft-start power-up, eliminating high inrush current

VOLTAGE REQUIREMENTS

The 700-HP subwoofer operates safely and without audio discontinuity if the AC voltage stays within either of two operating windows at 50 or 60 Hz:

- 85 to 134 volts
- 165 to 264 volts

The 700-HP subwoofer can withstand continuous voltages up to 275 volts and allows any combination of voltage to GND (that is neutral-line-ground or line-line-ground).

CAUTION: Continuous voltages higher than 275 volts can damage the unit.

TIP: Since the 700-HP subwoofer does not require a dedicated Neutral, and it can tolerate elevated voltages from ground, it can be connected between Line-Line terminals in a 120 V 3-phase Wye system. This results in 208 V AC betweens lines (nominal) and will therefore draw less current for the same output power compared to operating the 700-HP subwoofer from 120 V AC (Line- Neutral). Make sure that the voltage remains within the 700-HP subwoofer's recommend operating window (180 V AC to 250 V AC). The Ground terminal must always be used for safety and the Line to Ground voltage should never exceed 250 V AC (typically there will be 120 V AC from Line to Ground in the above example).

The 700-HP subwoofer uses a NEMA L6-20P, an IEC 309 male power connector or a multipin VEAM connector and complies with worldwide product safety standards.

AC POWER DISTRIBUTION

All amplifier modules and directly associated audio equipment (mixing consoles, processors, etc.) must be properly connected to the AC power distribution, preserving AC line polarity and connecting earth ground such that all grounding points are connected to a single node or common point using the same cable gauge as the neutral and line(s) cable(s).

Improper grounding connections between loudspeakers and the rest of the audio system may produce noise, hum and/or serious damage to the input/output stages in the system's electronic equipment.

CAUTION: Before applying AC to any Meyer Sound self-powered loudspeaker, be sure that the voltage potential difference between neutral and earth ground is less than 5 V AC.

Figure 2.1 shows a sample three-phase AC distribution system, with the load between loudspeakers distributed among the three phases and all of the loudspeakers connected to common neutral and earth ground points.

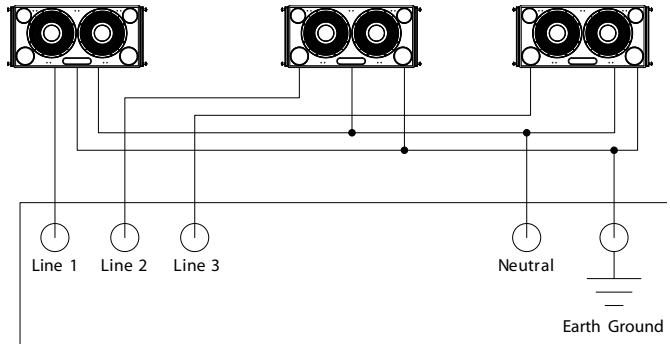


Figure 2.1. A sample AC power distribution block diagram.

NOTE: Refer to Appendix B for details on the 700-HP subwoofer's AC voltage requirements.

After applying AC power, the proper operating voltage is automatically selected, but the system is muted. During the next three seconds the following events occur:

1. The primary fans turn on.
2. The main power supply slowly ramps on.
3. The green Active LED on the user panel lights up, indicating that the system is enabled and ready to pass audio signals.

CAUTION: If the Active LED does not illuminate or the system does not respond to audio input after ten seconds, remove AC power immediately. Verify that the voltage is within the proper range. If the problem persists, please contact Meyer Sound or an authorized service center.

If voltage drops below the lower boundary of either safe operating range (brownout), the 700-HP subwoofer uses stored energy to continue functioning briefly, and shuts down only if voltage does not rise above the lower boundary before the 700-HP subwoofer's storage circuits are depleted. How long the 700-HP subwoofer will continue to function during brownout depends on the amount of voltage drop and the audio source level during the drop.

If the voltage increases above the upper boundary of either range, the power supply rapidly turns off, preventing damage to the unit.

NOTE: If voltage fluctuates within either operating range, automatic tap selection stabilizes the internal operating voltage. This tap selection is instantaneous, and there are no audible artifacts.

If the 700-HP subwoofer shuts down due to either low or high voltage, its power supply automatically turns on again after three seconds if the voltage has returned to either normal operating window. If the 700-HP subwoofer does not turn back on after ten seconds, remove AC power immediately (see previous Caution).

NOTE: It is recommended that the supply be operated in the rated voltage windows at least a few volts away from the turn on/off points. This ensures that AC voltage variations from the service entry – or peak voltage drops due to cable runs – do not cause the amplifier to cycle on and off.

CURRENT REQUIREMENTS

The 700-HP subwoofer presents a dynamic load to the AC mains, which causes the amount of current to fluctuate between quiet and loud operating levels. Since different cables and circuit breakers heat up at varying rates, it is essential to understand the types of current ratings and how they correspond to circuit breaker and cable specifications.

The *maximum long-term continuous current* is the maximum rms current during a period of at least ten seconds. It is used to calculate the temperature increase in cables, in order to select a cable size and gauge that conforms to electrical code standards. It is also used to select the rating for slow-reacting thermal breakers.

The *burst current* is the maximum rms current during a period of approximately one second, used to select the rating of most magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula:

V pk (drop) = I pk x R (cable total)

The *ultimate short-term peak current* is used to select the rating of fast-reacting magnetic breakers.

Use Table 2.1 below as a guide when selecting cable gauge size and circuit breaker ratings for your operating voltage.

Table 2.1. Current Ratings for the 700-HP Subwoofer

Current Draw	115 V AC	230 V AC	100 V AC
Idle current	0.640 A rms	0.320 A rms	0.850 A rms
Max. long-term continuous	8.8 A rms	4 A rms	10 A rms
Burst current	19 A rms	9.5 A rms	22 A rms
Ultimate short-term peak	39 A pk	20 A pk	45 A pk

NOTE: For best performance, the AC cable voltage drop should not exceed 10 volts, or 10 percent at 115 volts and 5 percent at 230 volts. Make sure that even with the AC voltage drop the AC voltage always stays in the operating windows.

NOTE: The minimum electrical service amperage required by the 700-HP subwoofer system is the sum of each loudspeaker's *maximum long-term continuous current*. An additional 30 percent above the minimum amperage is recommended to prevent peak voltage drops at the service entry.

CAUTION: In the unlikely event that the circuit breakers on the user panel trip (the white center buttons pop out), disconnect the AC power cable. Do not reset the breakers with the AC connected. Contact Meyer Sound for repair information.

POWER CONNECTOR WIRING CONVENTIONS

The 700-HP subwoofer requires a grounded outlet. It is very important that the system be properly grounded in order to operate safely and properly. Figures 2.2, 2.3, and 2.4 illustrate correct wiring for the creation of power cables and distribution systems.

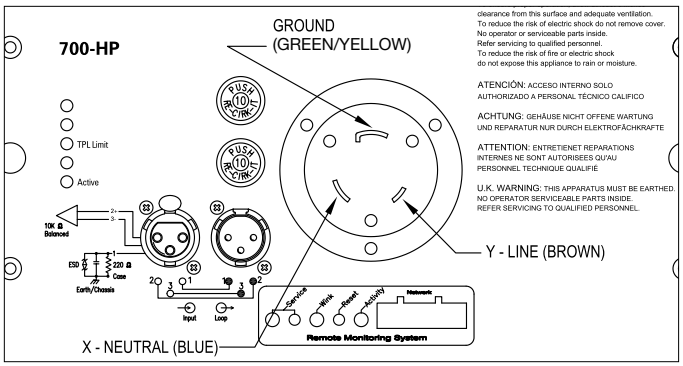


Figure 2.2. The 700-HP subwoofer user rear panel with L6-20 power connector

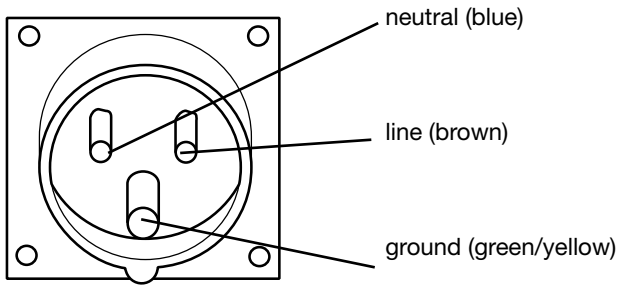


Figure 2.3. IEC 309 power connector pin-out

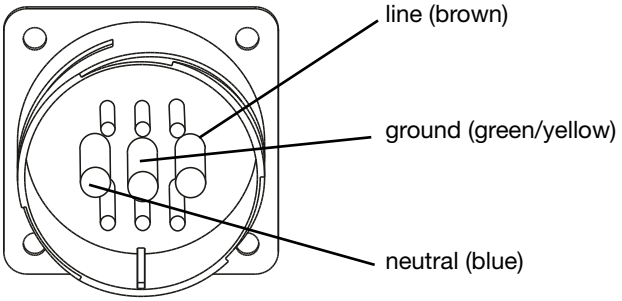


Figure 2.4. VEAM multipin connector power pin-out

If your 700-HP subwoofer is fitted with the VEAM multipin connector, see the Meyer Sound document VEAM Cable Wiring Reference (part number 06.033.113) for the wiring conventions and pin-outs for AC, audio, and RMS connections.

Meyer Sound offers the VIM-3 (VEAM interface module) to distribute power, audio, and RMS to 700-HP subwoofers fitted with VEAM connectors, as shown in Figure 2.5.

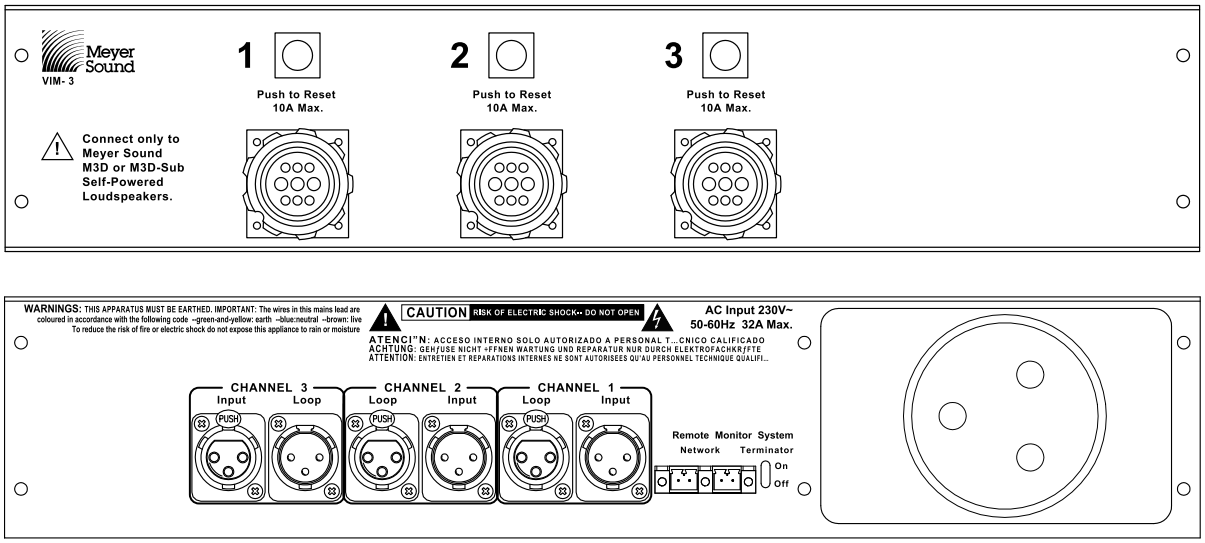
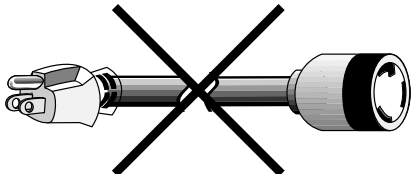


Figure 2.5. VIM-3 module, front (top) and rear (bottom)

ELECTRICAL SAFETY ISSUES

Pay close attention to these important electrical and safety issues.

CAUTION: Do not use a power cord adapter to drive the 700-HP subwoofer from a standard three-prong Edison outlet since that connector is rated for only 15 amps (NEMA 5-15R; 125 V AC max.).



CAUTION: The 700-HP subwoofer requires a ground connection. Always use a grounded outlet and plug.

TIP: Use the ring located in the rear to the side of the amplifier on the 700-HP subwoofer to provide strain relief for power and signal cables. Do not use this ring for any other purpose.

CHAPTER 3: AMPLIFICATION AND AUDIO

The 700-HP uses sophisticated amplification and protection circuitry to produce consistent and predictable results in any system design. This chapter will help you understand and harness the power of the 700-HP amplifier and audio systems.

The rear panel of the 700-HP (Figure 3.1) provides AC connection, audio input and loop out.

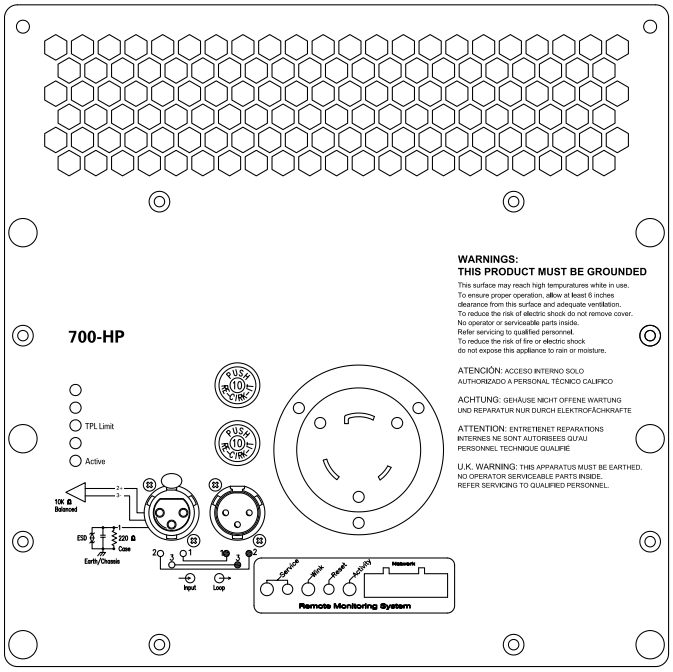


Figure 3.1. The rear panel of the 700-HP

AUDIO INPUT

The 700-HP presents a 10 kOhm balanced input impedance to a three-pin XLR connector with the following connectors:

- Pin 1 — 220 kOhm to chassis and earth ground (ESD clamped)
- Pin 2 — Signal (+)
- Pin 3 — Signal (-)
- Case — Earth (AC) ground and chassis

Pins 2 and 3 carry the input as a differential signal; pin 2 is hot relative to pin 3, resulting in a positive pressure wave when a positive signal is applied to pin 2. Pin 1 is connected to earth through 220 kOhm, 1000 pF, 15 V clamp network. This ingenious circuit provides virtual ground lift for audio frequencies, while allowing unwanted signals to bleed to ground.

CAUTION: Shorting an input connector pin to the case can form a ground loop and cause hum.

Use standard audio cables with XLR connectors for balanced signal sources. Make sure that pin 1 (shield) is always connected on both ends of the cable. Telescoping grounding schemes are not recommended.

CAUTION: Ensure that all cabling carrying signal to 700-HPs in a system is wired correctly: Pin 1 to Pin 1, Pin 2 to Pin 2, and so forth, to prevent the polarity from being reversed. Any number of loudspeakers – even one in the subwoofer system - with reversed polarity will result in severe performance degradation.

Audio signals can be daisy-chained using the loop output connector on the User Panel (Figure 3.2). A single source can drive multiple 700-HPs with a paralleled input loop, creating an unbuffered hard-wired loop connection.

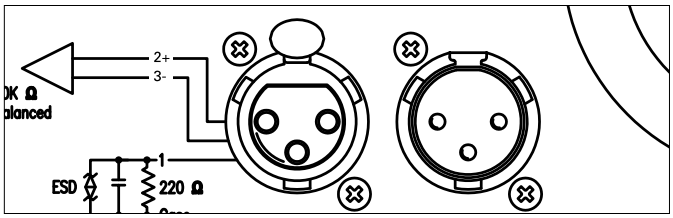


Figure 3.2. 700-HP rear panel audio input connectors

When driving multiple 700-HPs in a system, make certain that the source device can drive the total load impedance presented by the paralleled input circuit of the system. The audio source must be capable of producing a minimum of 20 dB volts (10 volts rms into 600 ohms) in order to produce the maximum peak SPL over the operating bandwidth of the subwoofer.

To avoid distortion from the source, make sure the source equipment provides an adequate drive circuit design for the total paralleled load impedance presented by the system. The input impedance for a single subwoofer is 10 kOhms: if *n* represents the number of 700-HPs in a system, paralleling the inputs of *n* subwoofers will produce a balanced input load of 10 kOhms divided by *n*.

NOTE: Most source equipment is safe for driving loads no smaller than 10 times the source's output impedance.

For example, cascading 10 700-HPs produces an input impedance of 1000 ohms (10 kOhms divided by 10). The source equipment should have an output impedance of 100 ohms or less. This is also true when connecting 700-HPs in parallel (loop out) with other self-powered Meyer Sound loudspeakers, for example, MILO, M3D, M2D or MSL-4.

TIP: If abnormal noises such as hiss and popping are produced by the subwoofer, disconnect the audio cable from the subwoofer. If the noise stops, then most likely the problem is not with the subwoofer. Check the audio cable, source, and AC power for the source of the problem.

Meyer Sound LD-1A, LD-2 and LD-3 line drivers are highly recommended when driving systems using multiple loudspeakers. These line drivers, in addition to maintaining signal integrity for long cable paths, offer independent outputs and filters to help you integrate 700-HP subwoofers into your system.

NOTE: For details on the 700-HP's audio input characteristics and amplification, see Appendix B: Specifications.

700-HP INTERCONNECTIONS

The 700-HP utilizes two 4-ohm, 18-inch cone drivers. These drivers feature lightweight neodymium magnet structures and are rated to handle 1200 AES watts. Each channel of the amplifier drives one low-frequency driver.

CAUTION: All Meyer Sound loudspeakers are shipped with the drivers in correct alignment. However, if a driver needs to be replaced, make sure the replacement is reinstalled with the correct polarity. Incorrect driver polarity impairs the system performance and may damage the drivers.

The 700-HP is powered by the Meyer Sound HP-2/700 amplifier, a high-power two-channel amplifier. The amplifier utilizes complementary MOSFET output stages (class AB/H) capable of delivering 2250 watts total (1125 watts per channel). All the specific functions for the 700-HP such as crossover points, frequency and phase response, and driver protection are determined by the control card installed inside the amplifier.

CABLING

The 700-HP is available with two different cabling/connection options. One is the Meyer Sound/VEAM cable system, which combines AC power, audio signal, and RMS network data into one heavy-duty cable with a single matching connector per 700-HP cabinet.

The other (standard) system uses three separate cables and connectors per cabinet for the AC line current, signal, and RMS data. However, the three can be consolidated to create a "multi-cable" by looming them together for quick connection to each cabinet. This ensures no patching errors and a minimum of discrete cables behind if the 700-HP cabinets are flown in an array.

A ring/stud fitting is provided on the rear of the 700-HP loudspeaker to act as a strain relief for cabling. Using this fitting will minimize the chance of cables being damaged during installation. To utilize the strain relief fitting, insert the signal, data, and AC connections into each loudspeaker as the array is being rigged (swag all cables under the rain hood's side flaps if installed), and tie the cables off to the ring/stud fitting (Figure 3.3).

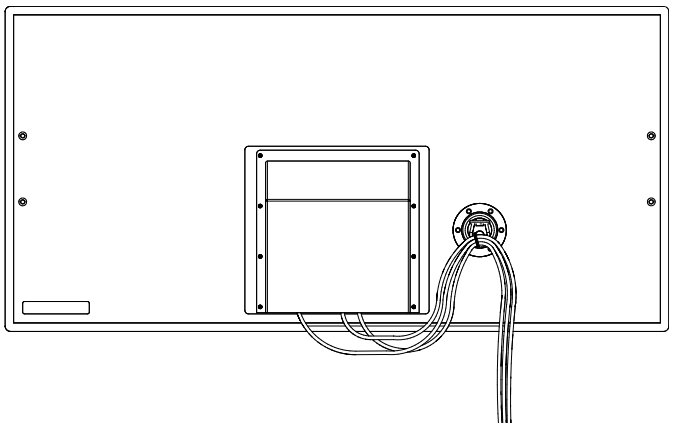


Figure 3.3. Tie cables off using the ring/stud fitting.

700-HP LIMITING

The 700-HP uses Meyer Sound's advanced TruPower® limiting. Conventional limiters assume a constant loudspeaker impedance and therefore set the limiting threshold by measuring voltage only. However, this method is inaccurate, because the speaker's impedance changes in response to the frequency content of the source material and thermal variations in the speaker's voice coil and magnet. Consequently, conventional limiters begin limiting prematurely, which under-utilizes system headroom and lessens the speaker's dynamic range.

In contrast, TruPower accounts for varying loudspeaker impedance by measuring current, in addition to voltage, to compute the actual power dissipation in the voice coil. TruPower improves performance before and during limiting by allowing each driver to produce maximum SPL across its entire frequency range.

NOTE: TruPower limiting only reduces the signal level to keep the voice coil below 180° Celsius, hence peaks are unaffected.

In addition, TruPower limiting eliminates power compression when the system is operated at high levels for extended periods, and also extends the driver life cycle by controlling voice coil temperatures.

The 700-HP's left and right 18-inch cone drivers are powered by separate amplifier channels, each with a power detector but routed to one limiter; the limiter tracks both channels and uses the higher of the two values to engage. When the safe continuous power level is exceeded in any channel, the TruPower limiter controlling both amplifier channels engages. TruPower limiting activity is indicated by the LED on the amplifier's user panel.

In addition to TPL limiting the 700-HP also includes a peak limiter. When engaged, the peak limiter prevents signal peaks from causing excessive distortion in the amplifier channel, preserving headroom and maintaining smooth frequency response at high levels.

The TPL LED is used to indicate any limiting activity. When the LED turns on and off in rapid succession, it indicates peak limiting; when it turns on and off slowly, it indicates TPL activity that indicates when the safe power level is exceeded (Figure 3.4).

Limiters cease operation when the power level and voltage for the channel returns to normal – below the limiter's threshold. The limiting circuitry utilizes optical limiters that add no noise and have no effect on the signal when the limiter is not engaged and the LED is inactive.

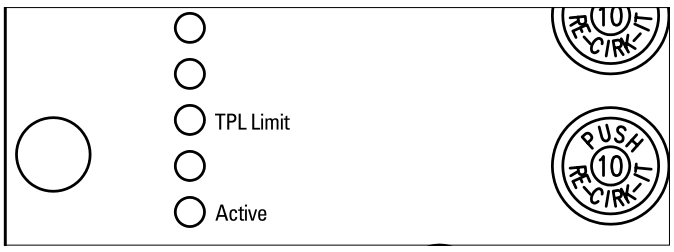


Figure 3.4. The 700-HP subwoofer's limit LED indicators

The 700-HP performs within its acoustical specifications and operates at a normal temperature if the limit LED is lit for no longer than two seconds, and then goes off for at least one second. If the limit LED remains on for longer than three seconds, the 700-HP enters **hard limiting** with the following negative consequences:

- Increasing the input level will not increase the volume.
- The system distorts due to clipping and nonlinear driver operation.
- The lifespan of the drivers is reduced because they are subjected to excessive heat.

CAUTION: While the limiters protect the system under overload conditions and exhibit smooth sonic characteristics, we recommend that you do not drive the 700-HP into continuous limiting. If an entire system of 700-HPs begins to limit before reaching the required sound pressure level (SPL), you should consider adding more 700-HP subwoofers to the system.

700-HP AMPLIFIER COOLING SYSTEM

The 700-HP uses a forced-air cooling system with two fans (one primary and one reserve) to prevent the amplifier module from overheating. The primary fan draws air in through ducts on the front of the cabinet, over the heatsink, and out the rear of the cabinet. Because dust does not accumulate in the amplifier circuitry, its lifespan is increased significantly. The front grille surface acts as an air filter for the cooling system and should always be in place during operation (Figure 3.5).

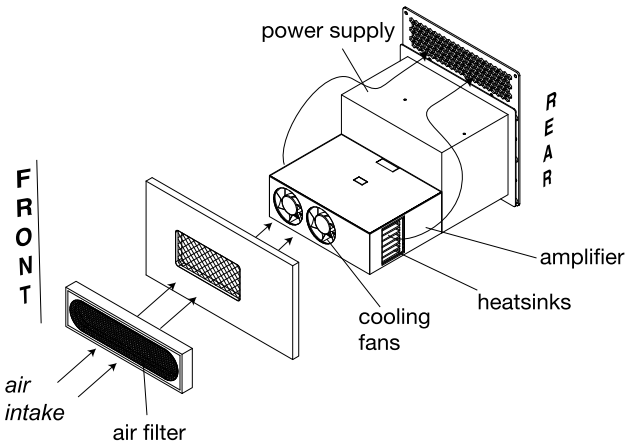


Figure 3.5. Airflow through the 700-HP

CAUTION: When operating a weather-protected 700-HP with the collapsible rain hood installed, always be sure the rain hood is fully open. Leaving the hood closed or partially open will limit the airflow through the amplifier, which could cause it to overheat and shut down.

The variable-speed primary fan runs continuously with an inaudible operating noise at its slowest speed. The primary fan begins increasing speed when the heatsink reaches 42˚ C. The fan reaches full speed at 62˚ C and is barely audible near the cabinet, even without an audio signal. In the event that the heatsink temperature reaches 74˚ C, the secondary fan turns on and is clearly audible without an audio signal. The secondary fan turns on in response to:

- Primary fan failure (check status immediately)
- High source levels for a prolonged period
- Accumulation of dust along the cooling path

The secondary fan turns off when the temperature decreases to 68˚ C.

NOTE: In the highly unlikely event that the secondary fan does not keep the temperature below 85˚ C, the 700-HP automatically shuts down until AC power is removed and reapplied. If the 700-HP shuts down again after cooling and reapplying AC power, contact Meyer Sound for repair information.

Despite the 700-HP's filtering, extensive use or a dusty operating environment can allow dust to accumulate along the path of the airflow, preventing normal cooling. To prevent this, you should periodically remove the grille frame, air-intake foam and amplifier module and use compressed air to clear dust from the grille, foam, fans, and heatsinks. Make sure that the air ducts are clear.

CAUTION: Be sure to unplug power to the unit before cleaning the amplifier.

CHAPTER 4: RMS REMOTE MONITORING SYSTEM (OPTIONAL)

An optional communication module can be installed in the 700-HP's amplifier to make use of Meyer Sound's RMS remote monitoring system. RMS is a real-time networked monitoring system that connects Meyer Sound self-powered loudspeakers with a Windows-based PC at the sound mix position or other desired location. Optional RMS software delivers extensive status and system performance data directly to you from every installed loudspeaker.

RMS allows you to monitor amplifier voltages, limiting activity, power output, temperature, fan and driver status, warning alerts, and other key data for up to 62 loudspeakers without a network repeater; data is updated two to five times per second.

NOTE: Optional Loudspeaker Mute and Solo functions, helpful for acoustic setup or troubleshooting, are also available. A jumper must be installed in the RMS communication module in order to enable Mute and/or Solo functionality; the software also needs to be enabled for these functions.

If your 700-HP is shipped fitted with an RMS communication module, Loudspeaker Mute and Solo functions are disabled by default. Once enabled, the jumper(s) can still be removed to eliminate any chance of an operator error (a muting error, for example) during a performance, and both functions can be controlled by software commands in any case. Also note that RMS does not control loudspeaker volume or AC power.

Loudspeakers are identified on the network by Node Names assigned during a one-time "commission" (Figure 4.1) into the RMS database that resides on your computer (as a part of the software).

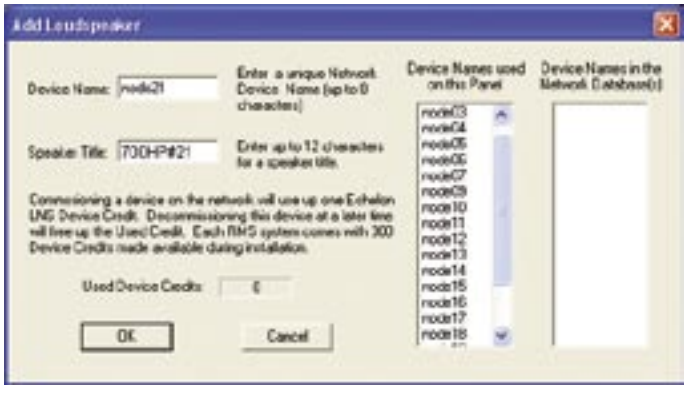


Figure 4.1. Commissioning a loudspeaker using RMS

This information is permanently retained on each RMS communication module and in the computer RMS database unless you modify it. Speaker View labels can be modified at any time, allowing you to customize how you view the data. In addition, any 700-HP can be physically identified from RMS software by activating the Wink function – a Wink LED will turn on the RMS communication board that corresponds to its Node Name.

A 700-HP is identified using the RMS software by activating the "service" function; an icon will show up on the RMS screen corresponding to its Node Name (Figure 4.2). This makes verifying Speaker View titles and speaker field labels easy, using the Wink or Service Button commands.

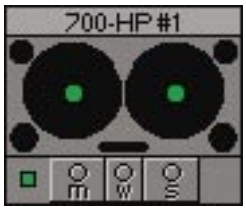


Figure 4.2. RMS loudspeaker icons

UNDERSTANDING THE RMS COMMUNICATION MODULE'S USER PANEL

The RMS communication module's user panel, shown in Figure 4.3, has three LEDs and two buttons. The following sections describe their functions.

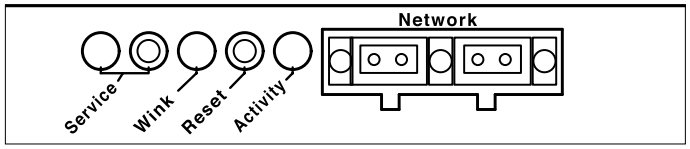


Figure 4.3. The RMS user panel

Service LED (Red)

When blinking once every two seconds, the Service LED indicates that the network hardware is operational, but the loudspeaker is not installed (commissioned) on the network. When a loudspeaker has been installed on the network, the Service LED will be unlit and the Activity LED will flash continuously.

NOTE: When continuously lit, the Service LED indicates that the loudspeaker has had a local RMS hardware failure. In this case, the RMS communication module may be damaged and you should contact Meyer Sound Technical support.

Service Button

Pressing the Service button will notify the corresponding loudspeaker display icon on the RMS screen. When used in combination with the Reset button, the card will be decommissioned from the network and the red Service LED will blink.

Wink LED (green)

When lit, the Wink LED indicates that an ID signal has been sent from the host station computer to the loudspeaker. This is accomplished using the Wink button on the loudspeaker Icon, Meter or Text views in the RMS monitoring program.

Reset Button

Pressing the Reset button will cause the firmware code within the RMS card to reboot. However, the commissioning state of the card will not change (this is stored in flash memory). When used in combination with the Service Button, the card will be decommissioned from the network and the red Service LED will blink.

Activity LED (Green)

When the loudspeaker has been commissioned, the Activity LED will flash continuously. When the Activity LED is unlit the loudspeaker has not been installed on the network.

NOTE: The LEDs and buttons on the user panel of the RMS communication board shown back in Figure 4.3 are used exclusively by RMS, and have no effect on the acoustical and/or electrical activity of the 700-HP itself – unless MUTE or SOLO is enabled at the board and from the RMS software.

USER INTERFACE

The RMS software features an intuitive, graphical Windows user interface. As mentioned earlier, each loudspeaker appears on the computer's color monitor as a "view" in the form of a status icon, bar graph meter, or text meter (numerical values), depending on your preferences.

Each view contains loudspeaker identification and data from the unit's amplifier, controller, drivers and power supply. System status conditions cause changes in icon and bar graph indicators, alerting the operator to faults or excessive levels. The views are moveable and are typically arranged on the screen to reflect the physical layout of the loudspeakers. You can design a screen "panel" of icons or meters, as shown in Figure 4.4, and save it on the computer's hard disk, with the panel conveniently named for a unique arrangement or performer.

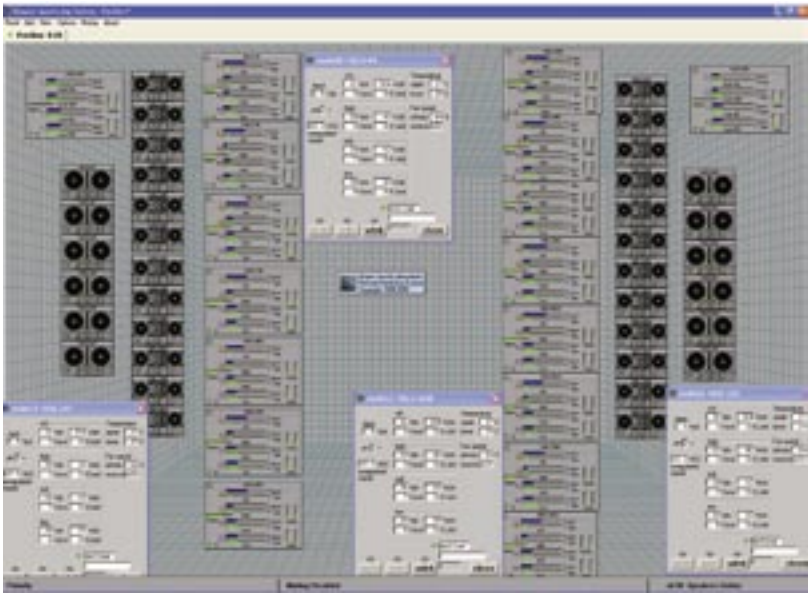


Figure 4.4. The RMS application's user interface

If the installation pattern changes completely, a new screen panel can be built. If a subset of installed loudspeakers will be used for a subsequent event, only selected loudspeakers need to appear on screen for that performance.

NOTE: For more information on RMS, please visit www.meyersound.com, or refer to the RMS User Guide included with the software.

CHAPTER 5: SYSTEM INTEGRATION

USING 700-HP SUBWOOFERS WITH OTHER MEYER SOUND LOUDSPEAKERS

It's often necessary to augment mid-high or full-range systems with subwoofers when higher SPL is needed, or the program content requires additional low-frequency energy (e.g., the reinforcement of popular music).

The 700-HP subwoofer can achieve frequencies down in the 28 Hz range, extending the system response appreciably and increasing the acoustic power of the system in the lowest frequencies. In addition, the use of high-pass and/or low-pass filters to drive a system with subwoofers can improve the interaction between the subwoofers and the system in the crossover area as well as increase the system's headroom.

The ideal ratio of 700-HP subwoofers with respect to other loudspeakers in the system depends on:

- The loudspeaker type being used in conjunction with the 700-HP (MILO, MSL-4, M2D, CQ-1, etc.)
- The configuration of the system, whether flown or ground stacked
- The frequency content of the signal being reproduced by the system, e.g., classical music, rock or speech

When considering the ratio of loudspeakers to subwoofers in a system, it's important to consider not only the frequency response for the system, but also the required headroom.

Common applications for the 700-HP involve using the subwoofer with M Series and Concert Series loudspeakers. In most circumstances, two loudspeakers for each subwoofer yields good results in frequency response and headroom. In demanding low-frequency applications, using higher ratios (for example, three loudspeakers for one subwoofer) can have negative consequences — decreasing the headroom at the low end of the spectrum and exposing the 700-HP drivers to excessive power levels.

CAUTION: The 700-HP's limit LEDs indicate when the safe power level is exceeded. If the subwoofers used in the system begin to limit before reaching the required SPL at low frequencies, consider adding more subwoofers to satisfy the SPL requirements without exposing the drivers to excessive heat and/or excursion.

700-HP USED WITH CONCERT AND ULTRASERIES

All Meyer Sound products have been optimized with internal crossover networks. When Meyer Sound loudspeakers are used in close proximity and are coplanar, these networks provide maximum power addition through their respective overlapping frequency ranges.

Several basic connection options are available when using the 700-HP subwoofer with other Meyer Sound Concert or UltraSeries loudspeakers, as discussed in the following sections.

Daisy-Chained

If 700-HP subwoofers and other Meyer Sound loudspeakers are daisy-chained using the loop feature on the user panel, the result is a smooth frequency response through the "overlap range." When the 700-HP and the other Meyer Sound loudspeakers are coplanar, this usually occurs at a ratio of two loudspeakers to each 700-HP. This is the configuration commonly used in small systems.

NOTE: Full-range signals may be applied to Meyer Sound's self-powered loudspeakers and subwoofers because they have built-in active crossovers.

The 700-HP subwoofers should be placed as close as possible to the other loudspeakers so that the relative distances between them are the same at all listening positions.

NOTE: There is no polarity switch on the 700-HP and it is wired pin 2 "hot" (positive acoustic pressure when a positive pulse is applied to pin 2).

NOTE: When 700-HP subwoofers are used with Concert Series or UltraSeries loudspeakers in their full-range configuration (e.g., looped audio or the same audio feed), their polarities should be kept the same (set the switch on the rear of the loudspeaker to Pin 2+) if they are coplanar or near each other. If they are separated by a greater distance — or delay must be used between them — a measurement system such as the SIM audio analyzer should be used to determine the correct delay and polarity.

CAUTION: When daisy-chaining, make sure that the source equipment can drive the total load of the paralleled array. (See “Chapter 3: Amplification and Audio” on page 9.)

Adding an LD-1A/LD-2 Line Driver

Driving 700-HP subwoofers and Meyer Sound loudspeakers with the same signal from different outputs using a line driver allows adjustments to the gain of each sub-system, and could be used effectively to compensate for the ratio of loudspeakers or acoustical conditions. If the gains are adjusted to the same level, the combined response is identical to a daisy-chained configuration.

Using the LD-1A/LD-2’s Lo-Cut Filter

Using the Lo-Cut filter of the LD-1A or LD-2 (Figures 5.1 and 5.2, respectively) optimizes the full-range loudspeaker headroom and reduces the area of overlap; the full-range loudspeakers in the system receive their signal following a Lo-Cut (high-pass) filter, while the 700-HP subwoofers apply their normal internal crossover frequencies to a full-range signal. This configuration results in a smooth frequency response through crossover and reduces the overlap frequency range between the speakers. However, the use of external filters – like the Lo-Cut in the LD-1A/LD-2 – is optional, and should be used very carefully to minimize phase shifts that can cause cancellations in the overlap area.

NOTE: When driving Concert or UltraSeries loudspeakers from the Mid-Hi output of the LD-1A or LD-2 line driver, with the Lo-Cut filter engaged and the 700-HP subwoofers in their full-range configuration, a change of polarity on the Sub Output might be needed due to the phase shift caused by the high-pass filter at overlapping frequencies. Placing the subwoofers more than 4 feet apart may require reversing the polarities once again to compensate for the delay propagation. If they are separated by a greater distance — or delay must be used between them — a measurement system such as the SIM audio analyzer should be used to determine the correct delay and polarity.

Figure 5.1. The LD-1A line driver

Figure 5.2. The LD-2 line driver

USING THE 700-HP WITH M SERIES LOUDSPEAKERS

The 700-HP integrates easily with M Series linear and curvilinear arrays. The 700-HP can be flown using the optional MRK-700 rigging kit and MTG-700 top grid in a straight array next to an M Series array, or ground stacked.

NOTE: There is no polarity switch on the 700-HP and it is wired pin 2 “hot” (positive acoustic pressure when a positive pulse is applied to pin 2), making its integration when coplanar — and in close-proximity — easier when flown or ground stacked with M Series arrays.

700-HP subwoofers should be kept as close as possible to M Series loudspeakers to avoid phase errors and cancellation in some seating locations. Ideally, the arrays should not be separated by more than 3 feet.

NOTE: If the 700-HP subwoofers are placed more than 4 feet away from the M Series array, you may need to set the 700-HP and the M Series loudspeakers to opposite polarities.

Adding an LD-3 Compensating Line Driver

Full-range signals may be applied to Meyer Sound’s self-powered loudspeakers and subwoofers because they have built-in active crossovers. However, the use of external filters — like the ones in the LD-3 compensating line driver (Figure 5.3) — is highly recommended, especially in medium-to-large systems.

Figure 5.3. The LD-3 compensating line driver

Using the LD-3's filters helps to easily integrate and optimize your M Series array with 700-HP subwoofers. The use of high-pass filters (HPF) augment array headroom by removing lower frequencies near the array loudspeaker's lower operating range, while low-pass filters (LPF) can remove unwanted mid-low frequencies reproduced by the array or stack of subwoofers. The use of these filters reduces the area of overlap and minimizes the interaction and possible cancellations between subsystems, usually resulting in highly desirable behavior, such as very flat frequency response.

As shown in Tables 5.1 through 5.3, the LD-3's filtering capabilities can go a long way toward fine-tuning your system, when using the 700-HP subwoofer with M Series loudspeakers. All data in these tables are based on designs in a close-proximity, coplanar orientation, at a 2:1 ratio of loudspeakers to subwoofers. Out of all possible combinations, these yield the flattest frequency response.

Table 5.1. MILO Models and 700-HP

HPF	LPF	ø Reverse Switch	Result
Off	Off	Engaged	Boost in the 100 Hz region
160	Off	Engaged	Very flat response
80	80	Off	Very flat response
160	80	Off	Flat response

Table 5.2. M3D and 700-HP

HPF	LPF	ø Reverse Switch	Result
Off	Off	Engaged	Flat response
Off	55	Engaged	Flat response
80	55	Off	Very flat response, +6 dB sub gain recommended
160	80	Off	Very flat response, +6 dB sub gain recommended

Table 5.3. M2D and 700-HP

HPF	LPF	ø Reverse Switch	Result
Off	55	Off	Flat response, -6 dB sub gain recommended*
80	80	Engaged	Very flat response, -6 dB sub gain recommended*

** Unlike the matched sensitivity of the M2D and M2D-Sub, the 700-HP is +6 dB more sensitive than the M2D/M2D-Sub.*

NOTE: The use of external filters — like the ones in the LD-3 — should be used very carefully to minimize phase shifts that can cause cancellations.

NOTE: When driving the system using the LD-3 with the filters engaged, a change of polarity on the Sub Output might be needed due to the phase shift caused by the filters at overlapping frequencies. Placing the subwoofers more than 4 feet apart may require reversing the polarities once again to compensate for the delay propagation. If they are separated by a greater distance — or delay must be used between them — a measurement system such as the SIM audio analyzer should be used to determine the correct delay and polarity.

700-HP USED IN COMBINATION WITH THE 650-P SUBWOOFER

With its different low-frequency drivers, amplification and cabinet tuning, output capabilities and extended low-end headroom, the 700-HP is not the same subwoofer as Meyer Sound's 650-P. However, the phase response of both models is identical, making it possible to deploy 700-HP/650-P combinations.

For this situation, three 650-P subwoofers should be used for every two 700-HP subwoofers to avoid over-working the 650-Ps while fully utilizing the 700-HP's output power. Although both models will, in general, limit in approximately the same way, their exact limiting behavior will vary with the frequency content of the signal fed to the subwoofers.

NOTE: There is no polarity switch on the 700-HP and it is wired pin 2 "hot" (positive acoustic pressure when a positive pulse is applied to pin 2). When 700-HP subwoofers are used with 650-P subwoofers, their polarities must be kept the same (set the switch on the rear of the 650-P to Pin 2+).

Digital Signal Processors

Full-range signals may be applied to Meyer Sound's self-powered loudspeakers because they have built-in active crossover circuits; external crossovers and digital signal processors (DSP) are optional and should be used very carefully due to phase shifts that can cause cancellations.

If DSP is used, both Meyer Sound loudspeakers and 700-HP subwoofers should be fed from the DSP in order to keep their delay time the same. Otherwise, you may experience phase shift differences between the loudspeakers and the subwoofers. In addition, you should verify the delay time between channels. Some DSPs may develop channel-to-channel delay errors when the DSP is near maximum throughput, which becomes more likely as the number of filters the DSP is using increases.

In no case should a filter higher than 2nd order be used. The additional phase shift introduced deteriorates the impulse response and higher roll-off does not improve crossover interaction. In fact, it is highly recommended that the crossover/filter be set to emulate the low-cut LD-1A/LD-2 characteristics themselves, as shown in Table 5.4.

Table 5.4. LD-1 / LD-2 "Lo-Cut Filter" Parameters (160 Hz HPF in the LD-3)

Type	Order	Pole Frequency	Q
High Pass	2nd (-12 dB/oct)	162 Hz	0.82*

** If the DSP does not have variable Q for high-pass filters, the filter should be set to "Butterworth" (Q ≈ 0.7).*

TIP: All other filters on the LD-3 are parabolic filters with minimal phase shift; most commercially available DSP devices have no presets to emulate the LD-3's parabolic filters.

CAUTION: If the loudspeakers are going to be driven directly from the DSP, verify that the outputs of the processor have the driving capabilities to drive the total load presented by the loudspeakers connected to it. Please refer to the Audio Input section of "Chapter 3: Amplification and Audio."

NOTE: When precise array design, subwoofer integration, DSP and delay systems, and compensation for acoustical conditions all come into play, measurement and correction tools are a must. Meyer's SIM audio analyzer system; LD-1A/LD-2, LD-3 line drivers; CP-10 parametric equalizer; and the VX-1 program equalizer are highly recommended.

CHAPTER 6: SYSTEM DESIGN AND INTEGRATION TOOLS

Meyer Sound offers two comprehensive tools to assist you with the acoustical and functional requirements of system design and optimization. The chapter introduces you to Meyer Sound MAPP Online, a powerful online acoustical prediction tool, and SIM, a robust instrumentation package for system measurement, analysis, and more.

MEYER SOUND MAPP ONLINE

MAPP Online is a powerful, cross-platform, Java-based application for accurately predicting the coverage pattern, frequency response, impulse response, and maximum SPL output of single or arrayed Meyer Sound loudspeakers.

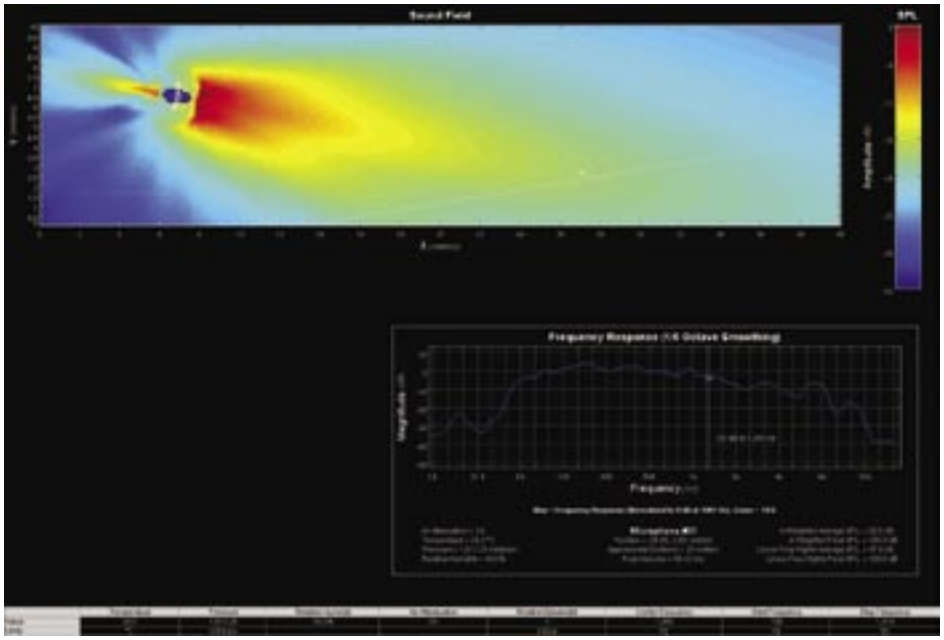


Figure 6.1. MAPP Online is an intuitive, powerful system design tool.

Residing on your computer, MAPP Online facilitates configuring arrays of a wide variety of Meyer Sound products and, optionally, defines the environment in which they will operate, including air temperature, pressure, and humidity, as well as the location and composition of walls. You can find MAPP Online at:

www.meyersound.com/mapponline

NOTE: To use MAPP Online, you will need to register by clicking "Apply for MAPP Online" on the Web site listed above. After registration and upon approval, an email will be sent to you with a username and password along with the address for the Web site where you can download MAPP Online. Online instructions will guide you through the download and setup process.

As its name indicates, MAPP Online is an online application: when a prediction is requested, data is sent over the Internet to a high-powered server at Meyer Sound that runs a sophisticated acoustical prediction algorithm using high-resolution, complex (magnitude and phase) polar data. Predicted responses are returned over the Internet and displayed on your computer in color.

With MAPP Online, you can:

- Plan an entire portable or fixed loudspeaker system and determine delay settings for fill loudspeakers.
- Clearly see interactions among loudspeakers and minimize destructive interference.
- Place microphones anywhere in the sound field and predict the frequency response, impulse response, and sound pressure level at the microphone position using MAPP Online's Virtual SIM feature.
- Refine your system design to provide the best coverage of the intended audience area.
- Use a virtual VX-1 program equalizer to predetermine the correct control settings for best system response.
- Gain valuable load information about the array to determine rigging capacities.

MAPP Online enables you to come to an installation prepared with a wealth of information that ensures the system will satisfy your requirements "out of the box" – including basic system delay and equalization settings. Its accurate, high-resolution predictions eliminate unexpected onsite adjustments and coverage problems. With MAPP Online, every sound system installation has a maximum chance of success.

MAPP Online is compatible with Windows, Linux, Unix, and Apple® Macintosh® computers running Mac OS® X version 10.1.2 or higher. The MAPP Online Web page above lists additional system requirements and recommendations.

SIM MEASUREMENT SYSTEM

The SIM audio analyzer system includes a selection of hardware and software options, microphones and accessory cables.

The SIM audio analyzer system is optimized for making audio frequency measurements of an acoustical system with a resolution of up to 1/48th of an octave; the high resolution enables you to apply precise electronic corrections to adjust system response using frequency and phase (time) domain information.

Source Independent Measurement Technique

The SIM audio analyzer implements the Meyer Sound source independent measurement technique, a dual-channel method that accommodates statistically unpredictable excitation signals. Any excitation signal that encompasses the frequency range of interest (even intermittently) may be used to obtain highly accurate measurements of acoustical or electronic systems. For example, concert halls and loudspeaker systems may be characterized during a musical performance using the program as the test signal, allowing you to:

- View measurement data as amplitude versus time (impulse response) or amplitude and phase versus frequency (frequency response)
- Utilize a single-channel spectrum mode
- View frequency domain data with a logarithmic frequency axis
- Determine and internally compensate for propagation delays using SIM 3 Delay Finder function

Applications

The main application of the SIM audio analyzer is loudspeaker system testing and alignment. This includes:

- Measuring propagation delay between the subsystems to set correct polarities and set very precise delay times
- Measuring variations in frequency response caused by the acoustical environment and the placement and interaction of the loudspeakers to set corrective equalization
- Optimizing subwoofer integration
- Optimizing loudspeaker arrays

The SIM audio analyzer can also be used in the following applications:

- Microphone calibration and equalization
- Architectural acoustics
- Transducer evaluation and correction
- Echo detection and analysis
- Vibration analysis
- Underwater acoustics

CHAPTER 7: QUICKFLY RIGGING

The 700-HP features Meyer Sound's QuickFly® rigging system with rugged, reliable and simple components that remain captive in transit. QuickFly rigging facilitates constructing rigid ground-stacked or flown 700-HP arrays, and eases integration of 700-HP subwoofers with full-range line or curvilinear arrays.

CAUTION: All Meyer Sound products must be used in accordance with local, state, federal and industry regulations. It is the owner's and/or user's responsibility to evaluate the reliability of any rigging method for their application. Rigging should be carried out only by experienced professionals.

CAUTION: Always use properly rated rigging hardware.

CAUTION: It is important to inspect rigging hardware regularly and replace worn or damaged components immediately.

MRK-700 RIGGING KIT

The MRK-700 rigging kit is required to attach the 700-HP ultrahigh-power subwoofer to the MTG-700 top grid. This optional rigging kit is available installed at the factory or as a field upgrade, and includes:

- 4 MRB-700 rigging bars
- 4 MAL-700 straight rigging links
- 8 3/8" x 1.125" quick release pins (QRP)

The MRK-700 rigging kit utilizes the rugged, straight rigging links and QRPs to connect adjacent subwoofers in ground-stacked or flown array configurations (Figure 7.1).

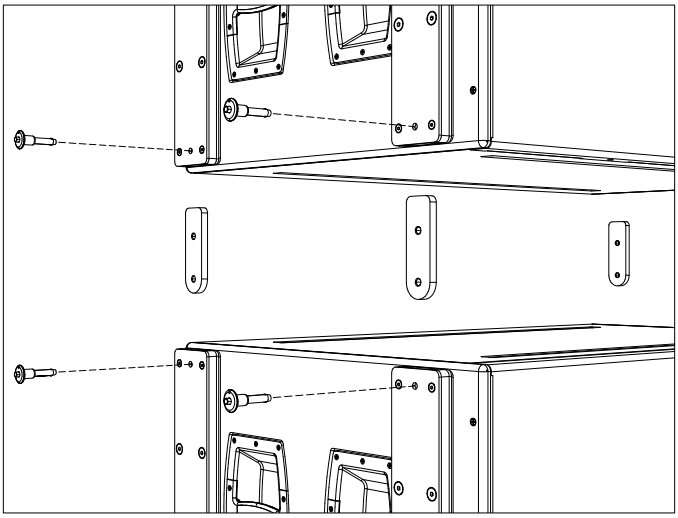


Figure 7.1. Two cabinets rigged using the MRK-700 rigging kit

CAUTION: Use only MAL-700 straight rigging links when connecting two 700-HP subwoofers. Never use MTG-700 rigging links to connect 700-HP subwoofers.

CAUTION: To upgrade your 700-HP with the MRK-700 rigging kit, please refer to the document 700-HP Rigging Grid and Accessories Assembly Guide available at www.meyersound.com

The MAL-700 straight rigging links can be securely stowed for transport links in the bottom cavities of the MRB-700 rigging bars attached to the 700-HP subwoofer (Figure 7.2). By leaving the top pins in place and keeping the links captive, the links and pins are always ready for use.

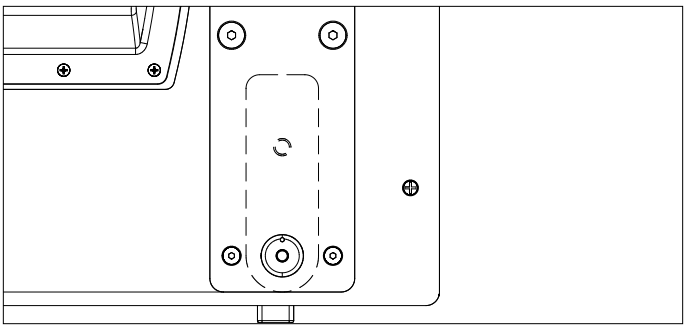


Figure 7.2. The MAL-700 rigging links can be stowed for transport inside the MRB-700 rigging bars.

MTG-700 MULTIPURPOSE GRID

The MTG-700 top grid is a very straightforward solution for rigging 700-HP subwoofers, allowing multiple cabinets to be flown in a straight array. The MTG-700 top grid can accommodate a variety of pickup configurations using its six pick-up points, three on each side of the frame (Figure 7.3).

NOTE: For more information on load ratings and how to set up the MTG-700, please use the 700-HP Rigging Grid and Accessories Assembly Guide available at www.meyersound.com.

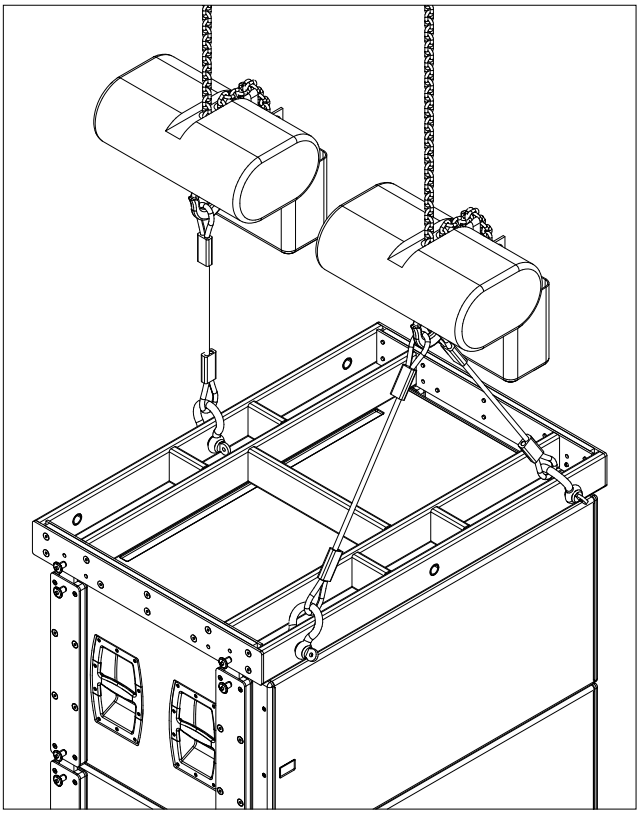


Figure 7.3. Flying a 700-HP array is easily achieved with the MTG-700 top grid (3 to 2 corner/center point pickup configuration shown).

The MTG-700 top grid is supplied with:

- 1 MTG-700 top grid assembly
- 4 MTG-700 rigging link
- 8 3/8" x 1.125" QRPs

The four MTG-700 rigging links are used to connect the grid to the top subwoofers in the array (Figure 7.4).

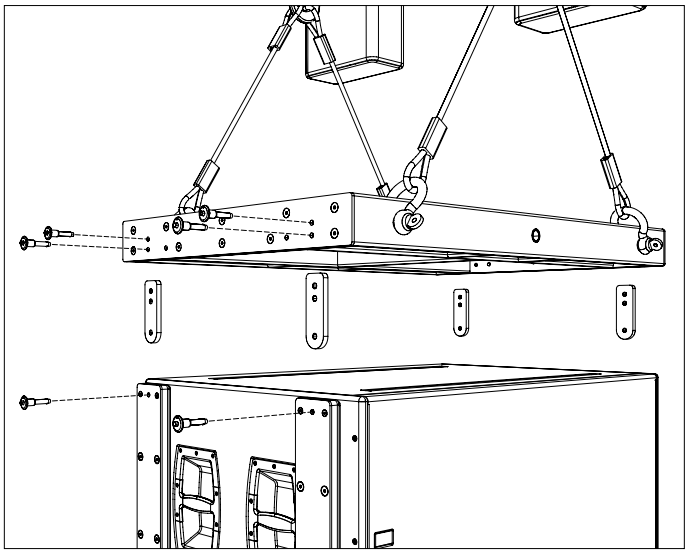


Figure 7.4. Multiple 700-HP subwoofers can be supported by the MTG-700 multipurpose grid.

CAUTION: Use only MTG-700 rigging links with the MTG-700 top grid. Never use the standard MAL-700 straight rigging links when connecting a 700-HP subwoofer to the MTG-700 top grid.

For convenient storage, each of the four MTG-700 rigging links can be stowed in the MTG-700 top grid, and secured with the 3/8" x 1.125" QRPs (Figure 7.5).

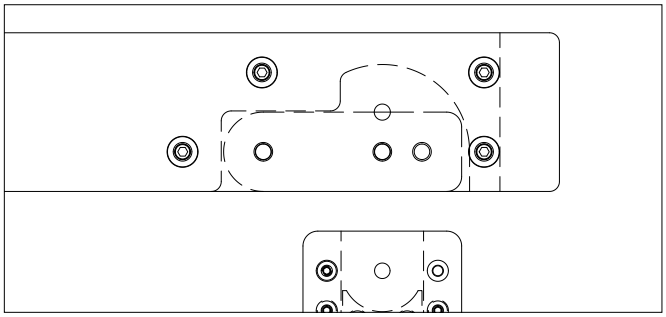


Figure 7.5. The MTG-700 rigging links are stowed in the MTG-700 top grid during transport.

MCF-700 CASTER FRAME

The heavy-duty MCF-700 caster frame (Figure 7.6) is highly durable and easy to attach to a 700-HP ultrahigh-power subwoofer.

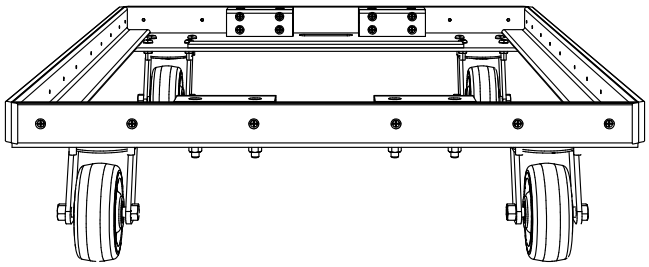


Figure 7.6. The MCF-700 caster frame

NOTE: The MCF-700 caster frame can be used with 700-HP subwoofers regardless if they are fitted with the MRK-700 rigging kit.

Whether you're deploying or striking a 700-HP array, the MCF-700 can support the weight of the array, making it easy to assemble or disassemble by using blocks of up to three 700-HP subwoofers.

CAUTION: Do not exceed **three** 700-HP subwoofers high on a block to avoid tipping over the stack.

TIP: You can also transport the MTG-700 attached to the top 700-HP on a stack.

The MCF-700's rugged steel frame allows the use of a forklift.

CAUTION: When lifting a block with a forklift, always keep the forks wide – close to the MCF-700 caster frame's wheels. Doing otherwise (for example, moving the forks together in the center) may bend the frame.

For safety reasons and to avoid any damage to the enclosures, use straps when transporting a stack (Figure 7.7), especially if the cabinets are not fitted with the MRK-700 rigging kit. The MCF-700 caster frame includes slots on the sides for this purpose.

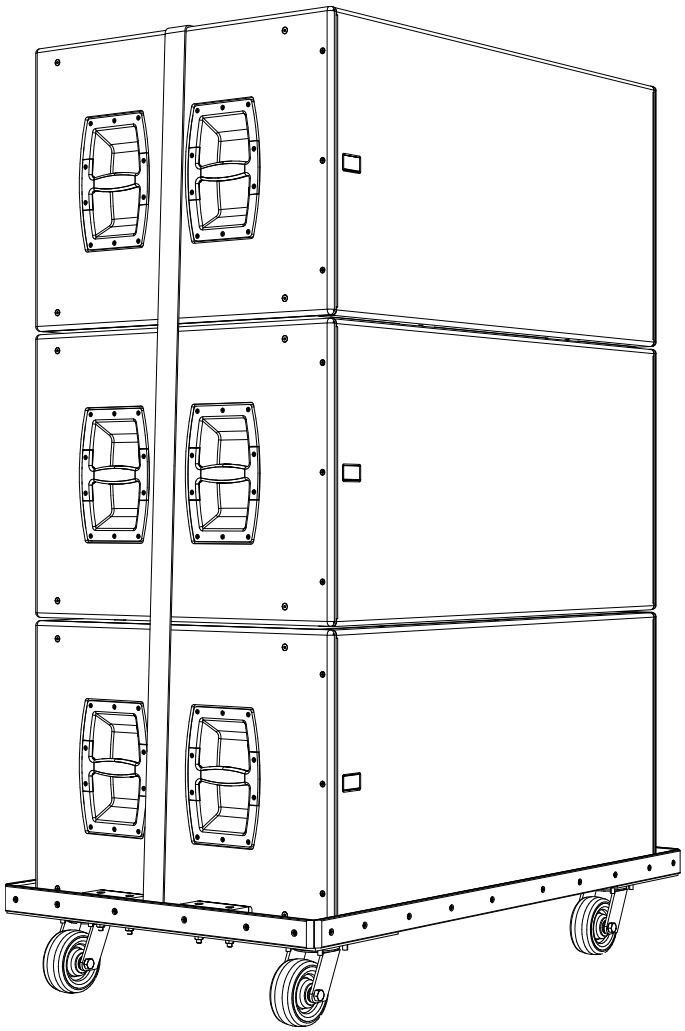


Figure 7.7. MCF-700 caster frame supporting 3 700-HP subwoofers in a ground-stack

A range of protective covers is available.

In addition to transport, the MCF-700 also allows 700-HP subwoofers to be supported in a ground-stacked configuration.

CAUTION: When using the MCF-700 caster frame to ground-stack 700-HP subwoofers, make sure all four caster wheels are blocked to prevent the stack from rolling away.

APPENDIX A: AMPLIFIER REPLACEMENT AND OPTIONAL RAIN HOOD

USING THE RAIN HOOD (WEATHER-PROTECTED LOUDSPEAKERS)

If your 700-HP loudspeaker was ordered with optional weather protection, a rain hood is installed. It is provided to protect the loudspeaker's electronics from direct exposure to rainfall. Before using the 700-HP loudspeaker, open the rain hood as described in the following procedure.

1. Pull the exterior Velcro straps off the hood to allow it to open.
2. Lift the flap fully outward, and unfold the fabric of the rain hood.
3. With your other hand, reach into the hood and free the two PVC supports from their corner pockets in the outer flap.
4. Fold both supports out and re-insert them into the two pockets, shown in Figure A.1, in the lower corners of the soft side flaps. This will hold the rain hood fully open for use, which is necessary for proper cooling of the 700-HP loudspeaker's electronics.

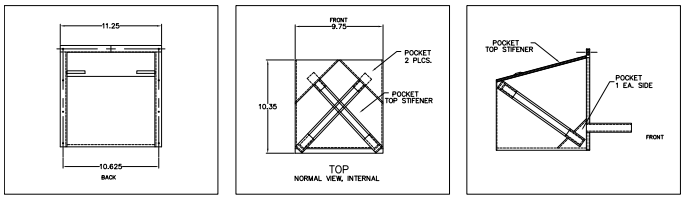


Figure A.1. Rain hood stiffener pockets

Figure A.2 shows an example of an installed rain hood.

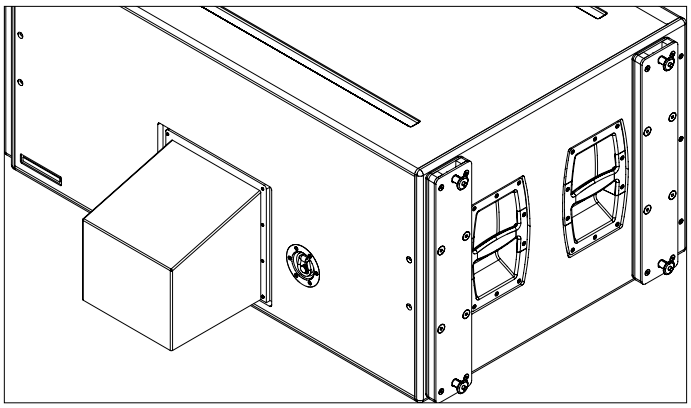


Figure A.2. A fully opened rain hood installed on a 700-HP

CAUTION: When operating a weather-protected 700-HP loudspeaker be sure the rain hood is fully open. Leaving the hood closed or partially open will limit the airflow through the amplifier, which could cause it to overheat and shut down.

REMOVING THE HP-2/700 AMPLIFIER

If you need to remove the amplifier from a 700-HP loudspeaker, perform the following steps:

1. Using a #2 Phillips screwdriver, remove all eight screws from the amplifier module. This will free the HP-2/700 electronics module from the cabinet (Figure A.3).

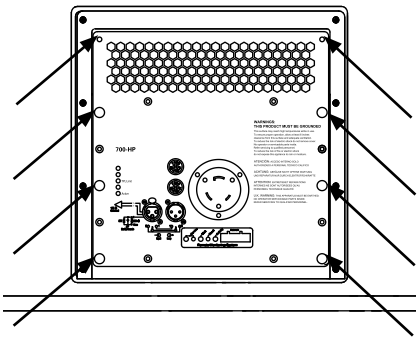


Figure A.3. Location of the eight screws securing the HP-2/700 amplifier module

2. Carefully slide the amplifier module out of the cabinet using care not to stress the cables.
3. Disconnect the 4-pin loudspeaker connector.

Replacing the HP-2/700 Amplifier

To replace the amplifier, do the following:

1. Gently slide the amplifier partially back into 700-HP and connect the loudspeaker connector.

TIP: Avoid pinching wires behind the fans; if necessary, reach in and guide the wire(s) toward you as you slide the amplifier into place.

2. Start all eight screws into the holes before tightening them.
3. Once all eight screws are started, tighten them using a #2 Phillips screwdriver.
4. Tighten the inner four screws first, then tighten the remaining four corners.

CAUTION: Never use power tools in high torque settings to remove or replace the stainless steel amplifier and/or rain hood screws on the 700-HP loudspeaker.

REMOVING THE HP-2/700 AMPLIFIER (WITH RAIN HOOD)

If you need to remove and replace the amplifier from a weather-protected loudspeaker, first remove the rain hood, then remove the amplifier following the steps described in the previous section. Note that the rain hood is attached to the amplifier using the same screws that attach the amplifier to the cabinet.

Replacing the HP-2/700 Amplifier and Rain Hood

Perform the following steps to replace amplifier and rain hood:

1. Gently slide the amplifier partially back into 700-HP and connect the loudspeaker connector.
2. With the wires properly connected, slide the amplifier all the way into its cabinet.

TIP: Avoid pinching wires behind the fans; if necessary, reach in and guide the wire(s) toward you as you slide the amplifier into place.

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3. Check to be sure that all three steel bars are correctly inserted in the three fabric pockets of the hood.

NOTE: The bars must be inside the fabric pockets to achieve proper water protection.

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4. Carefully install the fabric rain hood, using the stainless steel screws and washers.
5. Align all eight screws and make sure that the washers are over the fabric.
6. Start all eight screws into the holes before tightening them.
7. Use the screws to sandwich the fabric and its gasket reinforcement bar over the external gasket.
8. Once all eight screws are started, tighten them using a #2 Phillips screwdriver.
9. Tighten the inner four screws first, then tighten the remaining four corners.

CAUTION: Never use power tools in high torque settings to remove or replace the stainless steel amplifier and/or rain hood screws on the 700-HP loudspeaker.

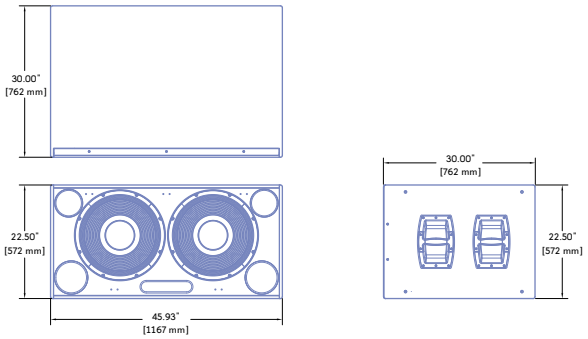
APPENDIX B

700-HP SPECIFICATIONS

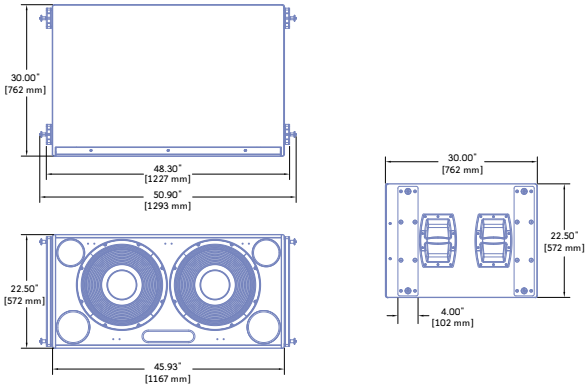
ACOUSTICAL	
Operating frequency range	28 Hz - 150 Hz
	Note: Recommended maximum operating frequency range. Response depends upon loading conditions and room acoustics.
Frequency response	30 Hz - 125 Hz ±4 dB
	Note: Free field, measured with 1/3 octave frequency resolution at 4 meters.
Phase response	45 Hz - 145 Hz ±30°
Maximum peak SPL	139 dB
	Note: Measured with music at 1 meter.
Dynamic range	>110 dB
Coverage	360° (single unit); varies with number of units and configuration
TRANSDUCERS	
Low frequency	Two 18" cone drivers Nominal impedance: 4 Ω Voice coil size: 4" Power-handling capability: 1200 W (AES)
	Note: Power handling is measured under AES standard conditions: transducer driven continuously for two hours with band limited noise signal having a 6 dB peak-average ratio.
AUDIO INPUT	
Type	Differential, electronically balanced
Max. common mode range	±15 V DC, clamped to earth for voltage transient protection
Connectors	Female XLR input with male XLR loop output or VEAM all-in-one (integrates AC, audio & network)
Input impedance	10 kΩ differential between pins 2 and 3
Wiring	Pin 1: Chassis/earth through 220 kΩ, 1000 pF, 15 V clamp network to provide virtual ground lift at audio frequencies Pin 2: Signal + Pin 3: Signal - Case: Earth ground and chassis
DC Blocking	None on input, DC blocked through signal processing
CMRR	>50 dB, typically 80 dB (50 Hz – 500 Hz)
RF filter	Common mode: 425 kHz; Differential mode: 142 kHz
TIM filter	Integral to signal processing (<80 kHz)
Nominal input sensitivity	0 dBV (1 V rms, 1.4 V pk) continuous is typically the onset of limiting for noise and music.
Input level	Audio source must be capable of producing a minimum of +20 dBV (10 V rms, 14 V pk) into 600 ohms in order to produce maximum peak SPL over the operating bandwidth of the loudspeaker.
AMPLIFIER	
Amplifier type	Two-channel complementary power MOSFET output stages (class AB/H)
Output power	2250 W (1125 W/channel)
	Note: Amplifier wattage rating is based on the maximum unclipped burst sine-wave rms voltage the amplifier will produce into the nominal load impedance. Both channels 67 V rms (95 V pk) into 4 ohms.
THD, IM TIM	< .02%
Load capacity	4 Ω each channel
Cooling	Forced air cooling, two fans (one ultrahigh-speed reserve fan)

AC POWER	
AC power connector	250 V NEMA L6-20 (twist lock), IEC 309 male inlet or VEAM
Voltage selection	Automatic, two ranges, each with high-low voltage tap
Safety agency rated operating voltage	95 V AC - 125 V AC; 208 V AC - 235 V AC; 50/60 Hz
Turn on/turn off points	85 V AC - 134 V AC; 165 V AC - 264 V AC; 50/60 Hz
Current Draw	
Idle current	0.640 A rms (115 V AC); 0.320 A rms (230 V AC); 0.850 A rms (100 V AC)
Max. long-term continuous current (>10 sec)	8.8 A rms (115 V AC); 4 A rms (230 V AC); 10 A rms (100 V AC)
Burst Current (<1 sec)	19 A rms (115 V AC); 9.5 A rms (230 V AC); 22 A rms (100 V AC)
Ultimate Short-Term Peak Current Draw	39 A pk (115 V AC); 20 A pk (230 V AC); 45 A pk (100 V AC)
Inrush Current	7 A pk (115 V AC); 7 A pk (230 V AC); 10 A pk (100 V AC)
RMS NETWORK (Optional)	
	Equipped for two-conductor twisted-pair network, reporting all operating parameters of amplifiers to system operator's host computer.
PHYSICAL	
Enclosure	Premium birch plywood
Finish	Black textured
Protective grille	Perforated metal grille lined with acoustical black mesh
Rigging	Optional QuickFly rigging kit available, with aluminum and steel side-rigging bars, AlignaLinks and quick release pins
Dimensions Dimensions with rigging	45.93" w x 22.50" h x 30.00" d (1167 mm x 572 mm x 762 mm) 50.90" w x 22.50" h x 30.00" d (1293 mm x 572 mm x 762 mm)
Weight Weight with rigging	204 lbs (92.53 kg) 259 lbs (117.48 kg)

700-HP



700-HP with rigging



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