

MTS-4A *Self-Powered Loudspeaker Systems*

OPERATING INSTRUCTIONS

INSTRUCTIONS

OPERATING



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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 indiquer 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 azares provengo de peligroso voltajes	Para indicar importante funcionar y mantenimiento instrucciones	Armadura o chassis	Tierra proteccionista

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

The Manufacturer:
MEYER SOUND LABORATORIES, INC.
 2832 San Pablo Avenue
 Berkeley, California 94702-2204, USA

ENVIRONMENTAL SPECIFICATIONS FOR MEYER SOUND ELECTRONICS PRODUCTS:

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

Declares that the product:

MTS-4A

Conforms to the following Product Specifications

- Safety: EN60065: 1994
- EMC: EN55103-1 emission¹
EN55103-2 immunity²

This device complies with the requirements of the Low Voltage Directive 73 / 23 / EEC and the EMC Directive 89 / 336 / EEC.

This device also 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.



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



N757 MTS-4A

Office of Quality Manager
 Berkeley, California USA Dec 22, 2000



SAFETY SUMMARY



ENGLISH

- To reduce the risk of electric shock, disconnect the unit from the AC mains before installing audio cable. Reconnect the power cord only after making all signal connections.
- Connect the unit 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 allow water or any foreign object to get inside the unit. Do not put objects containing liquid on, or near, the unit.
- To reduce the risk of overheating the unit, avoid exposing it to direct sunlight. Do not install the unit near heat-emitting appliances, such as a room heater or stove.
- This unit 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 appareil, 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 appareil 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 laisser de l'eau ou tout objet

pénétrer dans appareil. Ne pas placer de récipients contenant un liquide sur cet appareil, ni à proximité de celui-ci.

- Pour éviter une surchauffe de appareil, 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 appareil 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 Schlags auf ein Minimum zu reduzieren, den Gerät vom Stromnetz trennen, bevor ggf. ein Audio-Schnittstellensignalkabel angeschlossen wird. Das Netzkabel erst nach Herstellung aller Signalverbindungen wieder einstecken.
- Der Gerät 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.
- Darauf achten, daß weder Wasser noch Fremdkörper in das Innere den Gerät eindringen. Keine Objekte, die Flüssigkeit enthalten, auf oder neben die unterbrechungsfreie Stromversorgung stellen.
- Um ein Überhitzen dem Gerät 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 Gerät herrschen potentiell gefährliche Spannungen. Nicht versuchen, das Gerät zu öffnen. Es enthält keine vom Benutzer reparierbaren Teile. Reparaturen dürfen nur von ausgebildetem Kundendienstpersonal durchgeführt werden.

ESPAÑOL

- Para reducir el riesgo de descarga eléctrica, desconecte de la red el aparato antes de instalar el cable de señalización de interfaz de la segnale. Vuelva a conectar el conductor flexible de alimentación solamente una vez efectuadas todas las interconexiones de señalización.
- Conecte el aparato 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 deje que en el aparato 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 aparato contiene niveles de voltaje peligrosos en potencia. No intente desarmar la unidad, pues no contiene piezas que puedan ser reparadas por el usuario. Las reparaciones deben efectuarse únicamente por parte del personal de mantenimiento capacitado en la fábrica.

THE MTS-4A: INTRODUCTION

The Meyer MTS-4A self-powered loudspeaker is a compact, self-contained, full-range system suited for clubs and small theatres (throw distances less than 100 ft). Its trapezoidal shape facilitates array design that maximizes coverage and SPL for the size of the array. Since all frequencies are produced from one cabinet, the MTS-4A better approximates a point-source radiator, creating a smoother frequency image than separate mid-hi and subwoofer cabinets. The MTS-4A can be used as a PA, front-fill, bass, and keyboard speaker, and as a side-fill and drum monitor.

The MTS-4A contains independent amplifier and control electronics for three low frequency cone drivers (18", 15", 12"), and one high frequency horn driver (4" diaphragm, 2" throat). Each driver is contained in a separate vented

enclosure. This integrated design improves performance, durability, and reliability, eliminates amplifier racks, and simplifies setup and installation. The MTS-4A has the following acoustical specifications:

Frequency Response	±3 dB 30 Hz – 16 kHz
Phase Response	±70° 90 Hz – 17.2 kHz
Coverage	70° H x 60° V
Dynamic Range	>110 dB

See 12 for complete specifications.

The MTS-4A can be equipped to operate with the **Remote Monitoring System (RMS)**¹ interface network and software application.

AC POWER

When AC power is applied to the MTS-4A, the **Intelligent AC**[™] supply automatically selects the correct operating voltage, allowing the MTS-4A to be used in the US, Europe, or Japan without manually setting a voltage switch. The Intelligent AC power supply also performs surge suppression for high voltage transients (up to 275 V), minimizes inrush current, and filters EMI. Continuous voltages above 275 VAC may damage the unit! The MTS-4A uses a NEMA L6-20P or IEC 309 male power inlet and satisfies UL, CSA, and EC safety standards.

VOLTAGE REQUIREMENTS

The MTS-4A operates safely and without audio discontinuity if the AC voltage stays within the ranges 85–134 V or 165–264 V, at 50 or 60 Hz. Immediately after applying AC power, the green Active LED on the user panel illuminates and the proper operating voltage is automatically selected, but the system is muted. During the next three seconds, the primary fan turns on, the main power supply slowly ramps on, and the system is enabled to pass audio signals.

NOTE: If the Active LED does not illuminate or the system does not respond to audio input after ten seconds, remove AC power to avoid possible damage to the unit. Experienced electronics technicians with access to a test bench can verify proper operation for the power supply and amplifier system with The Meyer Sound Self-Powered Series MP-2 and MP-4 Field Verification Procedure (part # 17.022.066.01; contact Meyer Sound to receive this document). All other users should contact Meyer Sound or an authorized Meyer service center.

If the voltage decreases below the lower bound of either operating range (known as a brown-out period), the supply uses current from its storage circuits and continues to function briefly. The unit turns off if the voltage does not increase above the threshold before the storage circuits are depleted. The length of time that the MTS-4A continues to operate during brown-out depends on how low the voltage drops and the audio source level during this period.

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

If the MTS-4A shuts down due to either low or high voltage, the power supply automatically turns on after three seconds if the voltage has returned to either normal operating range. If the MTS-4A does not turn back on after ten seconds, remove AC power and refer to the Note above.

NOTE: We recommend that the power supply be operated at least a few volts away from the upper and lower bounds of the operating windows to avoid brown-out and possible shutdown.

CURRENT REQUIREMENTS

The MTS-4A presents a dynamic load to the AC mains which causes the amount of current to fluctuate between quiet and loud operating levels. Since different types of cables and

1. RMS displays signal and power levels, driver and cooling fan status, limiter activity, and amplifier temperature for all speakers in the network on a Windows-based PC. Contact Meyer Sound for more information about RMS.

circuit breakers heat up (and trip) 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 continuous RMS current is the maximum RMS current over a duration of at least 10 seconds. It is used to calculate the temperature increase in cables, which is used to select cables that conform to electrical code standards. It is also used to select the rating for slow-reacting thermal breakers.

The maximum burst RMS current is the maximum RMS current over a one second duration. It is used to select the rating for most magnetic breakers.

The maximum instantaneous peak current during burst is used to select the rating for fast-reacting magnetic breakers and to calculate the peak voltage drop in long AC cables according to the formula

$$V_{pkdrop} = I_{pk} \times R_{total\ cable}$$

Use the table below as a guide to select cables and circuit breakers with appropriate ratings for your operating voltage.

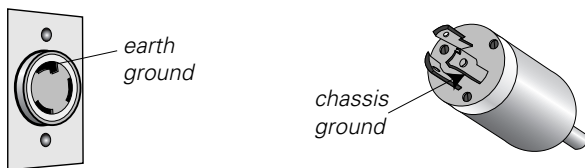
	115V	230V	100V
Max. Continuous RMS	14A	7A	16 A
Max. Burst RMS	26 A	13A	30 A
Max. Peak During Burst	38 A	18A	42A

The minimum electrical service amperage required by a system of Meyer speakers is the sum of their maximum continuous RMS currents. We recommend allowing an additional 30% above the minimum amperage to prevent peak voltage drops at the service entry.

Note: In the unlikely case that the circuit breakers trip (the white center buttons pop out), do not reset the breakers! Contact Meyer Sound for repair information.

POWER CONNECTOR WIRING CONVENTIONS

Use the following AC cable wiring diagram to create international or special-purpose power connectors:



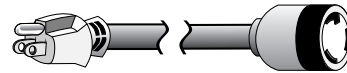
AC cable color code

If the colors referred to in the diagram don't correspond to the terminals in your plug, use the following guidelines:

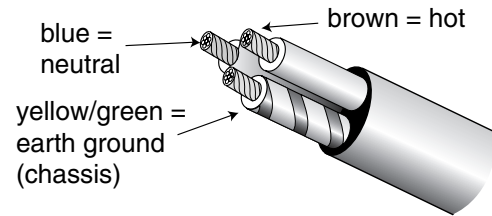
- Connect the blue wire to the terminal marked with an N or colored black.
- Connect the brown wire to the terminal marked with an L or colored red.
- Connect the green and yellow wire to the terminal marked with an E (or) or colored green (or green and yellow).

SAFETY ISSUES

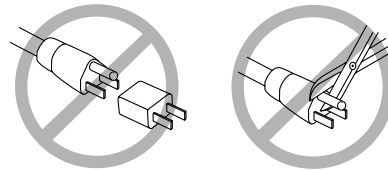
Pay close attention to these important electrical and safety issues.



Use a power cord adapter to drive the MTS-4A from a standard 3-prong outlet (NEMA 5-15R; 125 V max).



The MTS-4A requires a grounded outlet. Always use a grounding adapter when connecting to ungrounded outlets.



Do not use a ground-lifting adapter or cut the AC cable ground pin.

Keep all liquids away from the MTS-4A to avoid hazards from electrical shock.



Do not operate the unit if the power cables are frayed or broken.

Tie-wrap anchors on the amplifier chassis provide strain relief for the power and signal cables. Insert the plastic tie-wraps through the anchors and wrap them around the cables.

AUDIO INPUT

The MTS-4A presents a 10 k Ω balanced input impedance to a three-pin XLR connector wired with the following convention:

Pin 1	220 k Ω to chassis and earth ground (ESD clamped)
Pin 2	Signal
Pin 3	Signal
Case	Earth (AC) ground and chassis



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

Pins 2 and 3 carry the input as a differential signal; their polarity can be reversed with the input polarity switch on the user panel. If the switch is in the up position, pin 2 is hot relative to pin 3, resulting in a positive pressure wave when a positive signal is applied to pin 2. Use standard audio cables

AMPLIFICATION AND PROTECTION CIRCUITRY

Each driver in the MTS-4A is powered by one channel of the Meyer MP-4, a four-channel 2480 W amplifier (620 W/ch) utilizing complementary power MOSFET output stages (class AB/H). The following sections discuss the MP-4's limiting circuitry and the four-fan cooling system.

TRUPOWER™ LIMITING SYSTEM

Conventional limiters assume that the resistance of a speaker remains constant and set the limiting threshold by measuring voltage only. This method is inaccurate because the speaker's resistance changes in response to the frequency content of the source material and thermal variations in the speaker's voice coil and magnet. Conventional limiters begin limiting prematurely, which under-utilizes system headroom and deprives the speaker of its full dynamic range.

The TruPower limiting (TPL) system accounts for varying speaker impedance by measuring current, in addition to voltage, to compute the power dissipation and voice coil temperature. TPL improves performance before and during limiting by allowing the speaker to produce its maximum SPL across its entire frequency range. TPL also extends the lifetime of the drivers by controlling the temperature of the voice coil. Sub Limit, Lo Limit, Mid Limit, and Hi Limit LEDs on the user panel indicate TPL activity for each of the four amplifier channels. When any channel exceeds the safe continuous power level, that channel's limiter engages, ceasing operation when the power level returns to normal. The limiters for each channel function independently and do not affect the signal when the LEDs are inactive.

The MTS-4A performs within its acoustical specifications and operates at a normal temperature if a given TPL LED is on for no longer than two seconds, and off for at least one second. If an LED remains on for longer than three seconds, that channel

with XLR connectors for balanced signal sources.

NOTE: If abnormal noise (hum, hiss, popping) is produced from the loudspeaker, disconnect the audio source from the speaker. If the noise stops, then the problem is not within the loudspeaker; check the audio input and AC power.

A single source can drive multiple MTS-4As with a paralleled input loop, creating an unbuffered hardwired loop connection. Make certain that the source equipment can drive the total load impedance presented by the paralleled input circuit. For example, since the input impedance of a single MTS-4A is 10 k Ω , cascading 20 MTS-4As produces a balanced input impedance of 500 Ω . If a 150 Ω source is used, the 500 Ω load results in a 2.28 dB loss.

is hard limiting with these negative consequences:

- Increasing the input level will not increase the volume.
- The system distorts due to clipping and nonlinear driver operation.
- Unequal limiting between the drivers alters the frequency response.
- Driver and amplifier components are subjected to maximum heat, which shortens their life-span.

The TPL LEDs can indicate an imbalance in a system of speakers by functioning like a spectrum analyzer. If speakers in a subwoofer, mid-bass, or mid-hi subsystem begin to limit before reaching the required operating level for the entire system, then that subsystem needs to be supplemented with additional speakers.

NOTE: Although the TPL limiters exhibit smooth sonic characteristics, we do not recommend using them for intentional compression effects. Use an outboard compressor/limiter to compress a mixed signal.

FANS AND COOLING SYSTEM

The MTS-4A uses a forced-air cooling system with four fans to prevent the amplifiers from overheating. The fans draw air in through ducts on the front of the cabinet, over the heatsinks, and out the rear of the cabinet. Since dust does not accumulate in the amplifier circuitry, its life-span is increased significantly.

A foam insert filter, in combination with the entire front grill surface, acts as an air filter for the cooling system. Despite the filtering, extensive use or a dusty operating environment can allow dust to accumulate along the path of the airflow, preventing normal cooling. We recommend periodically removing the grill, filter, and amplifier module and using

compressed air to clear dust from the grill, filter, fans, and heatsinks. Make sure that the air ducts are clear and that there is at least six inches clearance for exhaust behind the cabinet.

Two variable-speed primary fans run continuously with an inaudible operating noise of 22 dBA at 1 m at their slowest speed. When the temperature of the heatsinks reaches 42°C, the primary fans begin increasing their speed, reaching full speed at 62°C. At full speed, they are barely audible near the cabinet, even without an audio signal.

In the unusual event that the heatsink temperature reaches 74°C, the secondary fans turn on; they turn off when the temperature decreases to 68°C. The secondary fans are audible

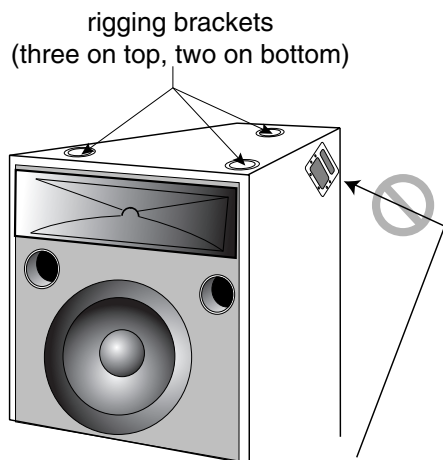
at close proximity without an audio signal and turn on in response to

- primary fan failure (check its status immediately);
- accumulation of dust in the cooling system path;
- a prolonged period of high source levels in hot temperatures or direct sunlight;
- driver failure.

Troubleshooting Note: In the highly unlikely event that the secondary fans do not keep the temperature below 85°C, the MTS-4A automatically shuts down until AC power is removed and reapplied. If the MTS-4A shuts down again after cooling and reapplying AC power, contact Meyer Sound for repair information.

RIGGING

The MTS-4A weighs 280 lb (127 kg). The maximum recommended load for a single cabinet with aircraft pan fittings is 600 lb (273 kg). This working load is based on a 5:1 safety factor. The MTS-4A has five rigging brackets (three on top, two on bottom). Each bracket is capable of supporting the full working load of the cabinet.



Handles are for carrying only.
Do not use them for rigging!

Rigging load ratings assume a straight tensile pull and that the cabinet is in new condition with aircraft pan fittings. If these conditions are not met, the load ratings can be reduced significantly. Load ratings can also be reduced by age, wear, and damage. It is important to inspect the rigging hardware regularly and replace worn or damaged components immediately.

The cabinet, exposed electronic circuitry, and drivers can receive protective treatment that permits safe use in wet conditions. Additionally, a rain hood can be fitted to shield cables and electronics. Do not install a unit outdoors without weather protection! Contact Meyer Sound for more information.

Note: 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 done only by experienced professionals.

There are four types of interchangeable rigging brackets, each fastened by six Phillips screws:

- aircraft pan fittings (ring and stud)
- 3/8"-16 nut plates
- M-10 x 1.5 metric nut plates
- blank plates (if no rigging brackets are requested)

Note: Units with nut plates are rated for the weight of one cabinet only.

MEASUREMENT AND SYSTEM INTEGRATION TOOLS

It is essential that even the most carefully assembled sound systems be analyzed with precise measurement tools. We recommend using the **Meyer Sound SIM® System II Sound Analyzer¹** and **CP-10 Parametric Equalizer²** to

- assist the process of choosing and configuring speakers;
- measure propagation delays between subsystems to set the correct polarity and delay times;
- measure and equalize variations in frequency response caused by the acoustical environment and the placement and interaction of speakers.

Contact Meyer Sound for assistance with your application. We recommend using one of the Meyer Sound line drivers to integrate different types of Meyer self-powered speakers into a complete system. The LD-1A and LD-2 have two channels equipped to control a full-range main system, and the LD-1A has six auxiliary channels for down-fill, front-fill, and delay systems. The LD-1A maintains signal integrity for long cable paths and provides the following useful functions:

- The Lo Cut switch activates a high-pass filter (160 Hz, -12

dB/oct, $Q = 0.8$) that performs a crossover function for the Mid-Hi output.

- The DS-2 & Sub Crossover switch (channels 1 and 2 only) activates a crossover network optimized for the DS-2P or DS-4P when used with the 650-P. With the switch in, frequencies below 80 Hz are sent to the Sub output (for the 650-P), and above 80 Hz to the DS-2 output. When the 650-P is used without the DS-2P or DS-2P, the switch should be out, which sends a full-range signal to both the DS-2 and Sub outputs.
- The DS-2 f and Sub f switches (channels 1 and 2 only) toggle the polarity for the DS-2 and Sub outputs.
- The Mid-Hi, DS-2, and Sub outputs (channels 1 and 2 only) each have their own gain control and mute switch.

POLARITY NOTE: The polarity for Meyer Sound self-powered speakers may be reversed using the input polarity switch on the user panel. The line drivers also allows polarity reversal with the DS-2 f and Sub f switches for speakers connected to the DS-2 and Sub outputs. When making polarity decisions in applications that include the LD-1A or the LD-2, check the state of all polarity switches.

COMPLETE SYSTEMS

MEYER SPEAKER TYPES

The following Meyer speakers are mentioned in the example applications.

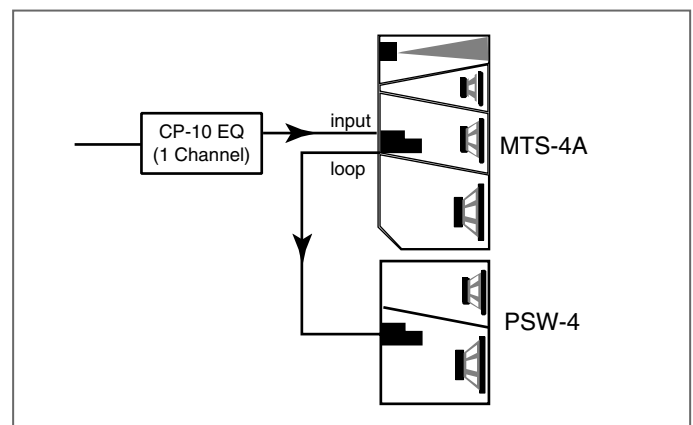
CQ	Self-powered mid-hi speaker
PSW-4	Self-powered subwoofer
650-P	Self-powered subwoofer

The Meyer self-powered speakers listed above have a loop connection to send the input signal to another speaker. Full-range signals can be applied to all Meyer self-powered subwoofers because they have built-in active crossovers that filter mid-hi frequencies.

MTS-4A AND PSW-4

Combining the PSW-4 with the MTS-4A doubles the low frequency power of the system because both loudspeakers contain the same sub and low drivers. Due to the summation between the PSW-4 and the MTS-4A, the system frequency

response exhibits a rise in the range 30–160 Hz. It is important to emphasize that the speakers are in phase in this region. This rise can be corrected using the Meyer CP-10 Parametric Equalizer, if desired.



The LD-1A/2 with an MTS-4A and PSW-4

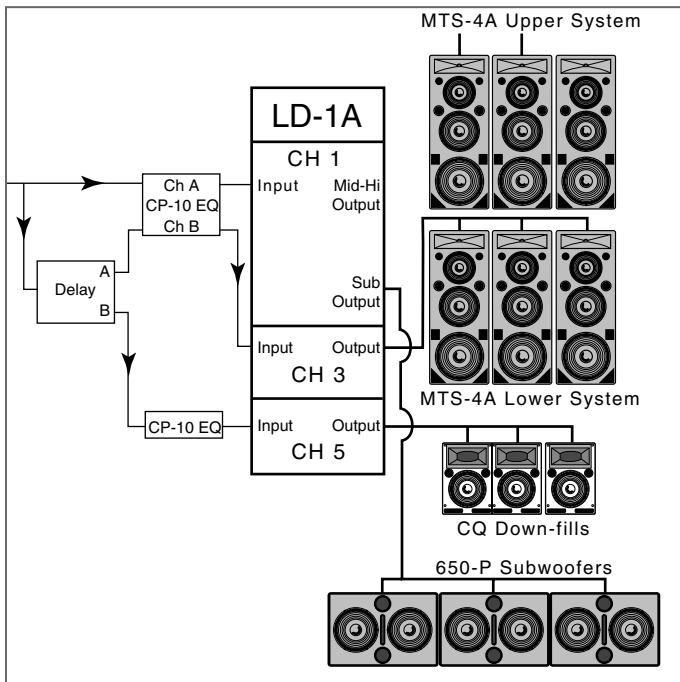
Set the MTS-4A and PSW-4 to the same polarity.

1. The Meyer Sound SIM II is a computer-based dual channel FFT analysis system optimized for electroacoustic measurement.

2. The CP-10 is a dual-channel, complimentary phase, precision analog equalizer with five bands of parametric equalization and two bands of shelving filters.

LD-1A WITH FLOWN MTS-4A AND CQ; 650-P ON THE FLOOR

This example shows the LD-1A integrating a complete system of self-powered speakers for a large venue. Although channels 1, 3, and 5 constitute half of the system, channels 2, 4, and 6 can be used with identical connections to create the other half. The upper and lower MTS-4A arrays and CQ down-fills are flown; the 650-P subwoofers are on the floor.



The LD-1A with MTS-4As, CQs, and 650-P Subwoofers

Set the MTS-4A and CQ to the same polarity. The polarity for the 650-P depends on the distance of the measurement position from the flown and subwoofer systems.

The CH 1 Mid-Hi and CH 3 outputs drive the upper and lower MTS-4A arrays, respectively, applying appropriate levels for speakers directed at different distances. CH 3 is delayed to phase align the upper and lower systems in the intersecting coverage area.

Since the MTS-4A arrays are driven by full-range signals, the Lo Cut switches for the CH 1 Mid-Hi and CH 3 outputs should be **out**. The Array EQ switches should also be **out** because the Array EQ filter is designed for the MSL-4, not the MTS-4A. Since the DS-P Series is not included in this system, the DS-2 & Sub Crossover switch should be **out**.

CH 5 controls the CQ down-fill system. Since the main system is more powerful than the down-fill system to project farther into the venue, the main system is audible in the down-fill's coverage area. To insure that the systems combine properly in this area:

- Set the CQ to the opposite polarity to the MTS-4A to phase align the mid-hi frequencies and minimize the MTS-4A's low frequency down-lobe.
- Use the CH 5 Lo Cut filter to eliminate the low frequency rise caused by the overlap with the 650-P/MTS-4A systems.
- Delay the down-fill to align with the MTS-4A system in their intersecting coverage area.

The polarity of the 650-P depends on the height and distance of the measurement position from the flown and subwoofer systems. The entire system should be measured, phase-aligned, and equalized using the SIM System II Sound Analyzer and CP-10 Parametric Equalizer.

DRIVER TROUBLESHOOTING

TROUBLESHOOTING WITH TPL

The TPL LED can indicate serious driver problems, if interpreted correctly. If one MTS-4A in a system exhibits substantially more TPL activity than others receiving the same audio signal, then one or both drivers in that unit may have a short circuit. This is a potentially dangerous condition for the electronics; shut the MTS-4A down immediately.

The TPL circuit does not activate if there is no power dissipation in the driver, regardless of the input signal level. Therefore, if all MTS-4As in a system receiving the same audio signal exhibit TPL activity except one, then that unit may have an open voice coil; disconnect it and contact Meyer Sound for repair information.

NOTE: The Remote Monitoring System (RMS) provides precise information about peak power, peak voltage, and average voltage (VU) for each amplifier channel, enabling a more complete driver diagnostic than the

TPL LEDs. Contact Meyer Sound for more information about RMS.

DRIVER REPLACEMENT

To determine whether the high or low drivers are functioning properly, or replace a damaged driver, contact Meyer Sound to obtain **The Low Driver Inspection and Evaluation Procedure for Self-Powered Series Products** (part # 17.010.120.01) or **The High Driver Inspection and Evaluation Procedure for Self-Powered Series Products** (part # 17.010.120.02).

VERIFYING DRIVER POLARITY

Incorrect driver polarity impairs system performance and may damage the drivers. All Meyer loudspeakers are shipped with the drivers in correct alignment. However, if the driver or circuit wiring has been removed or disassembled in any loudspeaker in a system for any reason, it is essential to check the polarity between drivers in the same cabinet and between adjacent loudspeakers.

We do not recommend using phase poppers to analyze driver polarity. The phase response for all drivers varies, to some degree, over the frequency range in which it operates. Since the phase popper, a popular but inaccurate tool, does not discern variations in phase response with respect to frequency, it provides no useful information about the phase response through the crossover, the most important consideration for determining correct driver polarity.

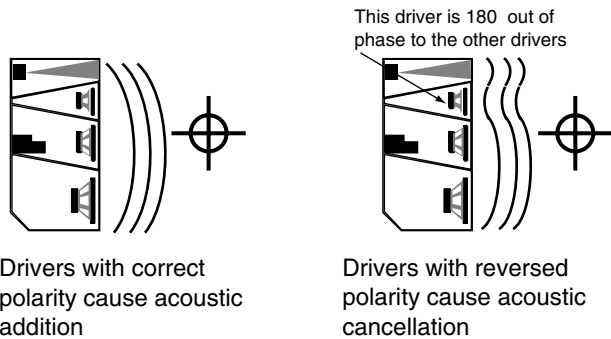
Phase poppers are, therefore, not useful for performing phase measurements on an individual loudspeaker or a full-range sound system containing one or more crossovers. If necessary, apply a phase popper only to loudspeakers with identical drivers without a crossover, and check the system's overall phase response with a frequency analyzer and/or listening test.

NOTE: Since polarity reversal causes excessive driver excursion at high source levels, use moderate levels for these tests.

DRIVER POLARITY IN THE SAME LOUDSPEAKER

Use the following test procedure to verify polarity between drivers in the same loudspeaker:

1. Place a measurement microphone 3 ft from the front of the loudspeaker at the midway point between the 12" and 15" drivers.
2. Connect a signal source to the loudspeaker and note the frequency response.



ARRAY DESIGN

BACKGROUND

Creating an effective array with the MTS-4A requires a precise understanding of how to combine the coverage area and SPL of the individual speaker with those of adjacent speakers. Array design is a trade-off between increasing on-axis power and creating smooth transitions between the coverage areas of adjacent speakers.

As the splay angle (the angle between adjacent cabinet faces) decreases below the coverage angle of the individual speaker, the on-axis power increases, but the coverage overlap between adjacent speakers causes comb filtering and other frequency response variations.

The polarity is correct if the frequency response is smooth through each crossover region (40 Hz, 100 Hz, 1 kHz). Cancellation greater than 6 dB in any region indicates polarity reversal between the drivers on either side of that crossover point.

POLARITY BETWEEN ADJACENT LOUDSPEAKERS

Use the following test procedure to verify the polarity between two adjacent loudspeakers of the same type:

1. Position two loudspeakers adjacent to each other.
2. Place a measurement microphone 3 ft from the speakers on the axis between them.
3. Connect a signal source to one speaker and note the frequency response and overall level.
4. Apply the same signal to the second speaker with the first speaker still connected.

The polarity is correct if the frequency response remains constant with a significant increase in amplitude. Broadband cancellation (decreased overall level) indicates polarity reversal.

NOTE: Polarity tests among more than two speakers may damage the drivers in the cabinet with reversed polarity.

As the splay angle increases toward the coverage angle, the on-axis power decreases, but the variations in frequency response diminish. As the splay angle increases beyond the coverage angle, noticeable gaps begin to form in the array's coverage area.

NOTE: The trapezoidal shape of the MTS-4A does not represent the horizontal coverage area of the speaker. Tight-packing MTS-4As results in the minimum recommended splay angle (15°) for horizontal arrays.

ARRAY DESIGN FOR LOW FREQUENCIES

Since the MTS-4A contains sub and low frequency drivers, in addition to mid and high drivers, array design for the MTS-4A must incorporate the different array response of high and low frequencies. The beam width for a single speaker widens as the frequency decreases. Frequencies below 125 Hz are mostly omnidirectional while higher frequencies are more directional.

NOTE: *H* and *V* are abbreviations for horizontal and vertical.

The low frequencies of adjacent arrayed speakers exhibit on-axis addition and off-axis cancellation, resulting in a narrowing of coverage in the dimension in which they are arrayed. A H array of two MTS-4As narrows the H coverage without affecting the V coverage. A V array of two MTS-4As narrows the V, without affecting the H coverage. In both cases, there is 3 to 6 dB SPL of on-axis low frequency (LF) addition compared to a single MTS-4A. Due to the larger distance between LF drivers in V, compared to H arrays, the V coverage narrows at a faster rate than does the H coverage for H arrays, given the same array size and adjacent speaker placement.

Increasing the number of MTS-4As in the array increases the LF directional control. A properly designed V array steers low frequencies to include balconies and upper tiers, while a H array focuses low frequencies for longer throw distances without interacting with the walls.

LOADING

One of the most important factors governing LF response is speaker placement with respect to adjacent surfaces. The MTS-4A gains significant LF power by coupling with nearby floors and walls. Half-space loading describes a speaker coupling with one surface. Speakers placed on the floor benefit from half-space loading, while flown speakers in free-space

(without a nearby wall or ceiling) do not. In general, subwoofers in half-space generate twice the SPL (+6 dB) compared to the same number in free-space.

NOTE: SPL values refer to an on-axis measurement position. The actual SPL addition and narrowing of coverage varies with frequency and depends on the physical displacement between cabinets, loading conditions, and room acoustics.

MTS-4A COVERAGE AND MAXIMUM SPL

A series of outdoor tests was conducted at Meyer Sound to determine the coverage angle and on-axis SPL for arrays with one and two horizontal rows of up to five speakers each, at numerous splay angles. The measurements were conducted at a distance of 8 m with half-space loading; on-axis SPL values were interpolated from 8 to 1 m. The coverage angle for the array is the result of averaging the -6 dB points from 125 Hz to 8 kHz.

The horizontal angles in the tables below represent the optimal narrow (15°), middle (30°), and wide (45°) orientations for the MTS-4A. The vertical splay angles represent the optimal narrow and wide configurations. 2@0° LT denotes long throw: the two horns are coupled directly together (top speaker upside down/bottom speaker upright) to form a single narrow horn.

The table on this page shows the SPL and coverage angles that result from grouping the MTS-4A in arrays of up to five units horizontally and two rows vertically. All splay angles refer to the angle between cabinet centers.

If this information does not address your application requirements, contact Meyer Sound to obtain additional information on array design.

MTS-4A Array Coverage and Maximum SPL

Number of Horizontal MTS-4As @ Angle	1			2 @ 15°			2 @ 30°			2 @ 45°			3 @ 15°			3 @ 30°			3 @ 45°		
	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL
	H	V		H	V		H	V		H	V		H	V		H	V		H	V	
Vertical Rows of MTS-4As @ Angle																					
1	70°	60°	140	50°	60°	146	60°	60°	145	100°	60°	142	80°	60°	149	120°	60°	147	150°	60°	145
2 @ 0° (LT)	70°	30°	146	50°	30°	152	60°	30°	151	100°	30°	148	80°	30°	155	120°	30°	153	150°	30°	151
2 @ 15°	70°	50°	145	50°	50°	151	60°	50°	150	100°	50°	147	80°	50°	154	120°	50°	152	150°	50°	150
2 @ 30°	70°	90°	143	50°	90°	149	60°	90°	148	100°	90°	145	80°	90°	152	120°	90°	150	150°	90°	148

Number of Horizontal MTS-4As @ Angle	4 @ 15°			4 @ 30°			4 @ 45°			5 @ 15°			5 @ 30°			5 @ 45°		
	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL	Coverage		Max Peak dB SPL
	H	V		H	V		H	V		H	V		H	V		H	V	
Vertical Rows of MTS-4As @ Angle																		
1	100°	60°	151	140°	60°	148	190°	60°	146	110°	60°	153	180°	60°	148	240°	60°	146
2 @ 0° (LT)	100°	30°	157	140°	30°	154	190°	30°	152	110°	30°	159	180°	30°	154	240°	30°	152
2 @ 15°	100°	50°	156	140°	50°	153	190°	50°	151	110°	50°	158	180°	50°	153	240°	50°	151
2 @ 30°	100°	90°	154	140°	90°	151	190°	90°	149	110°	90°	156	180°	90°	151	240°	90°	149

MTS-4A SPECIFICATIONS

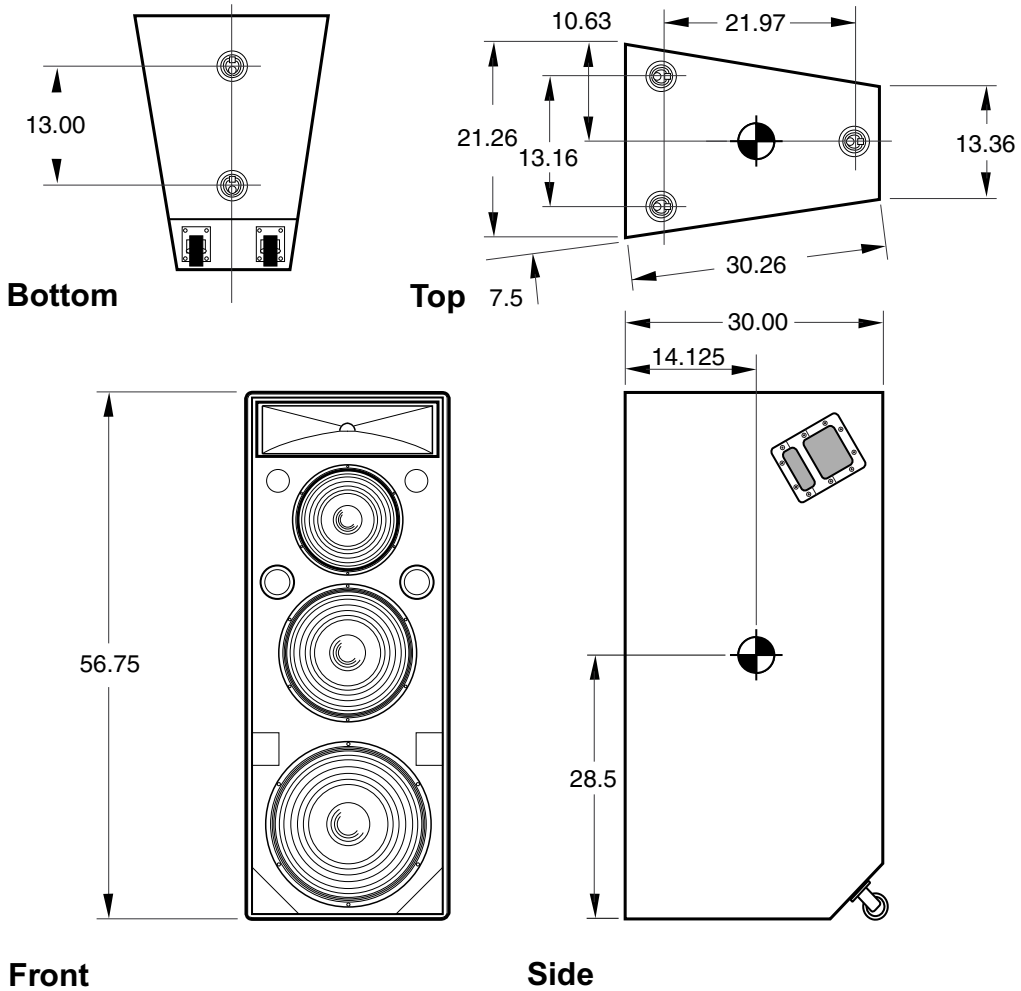
Acoustical¹ (each loudspeaker)	Operating Frequency Range² 26 Hz - 18 kHz ± 6 dB Free Field 32 Hz - 16 kHz ± 4 dB Half-Space 30 Hz - 16 kHz ± 4dB Phase Response ± 70° 90 Hz - 17.2 kHz Maximum Peak SPL³ 140 dB Signal to Noise Ratio >100 dB (A weighted noise floor to max SPL)
Coverage	-6 dB at 70° H x 60° V
Transducers	Sub Frequency 18-inch cone driver Low Frequency 15-inch cone driver Mid Frequency 12-inch cone driver High Frequency 2-inch throat (4-inch diaphragm) compression driver
Audio Input	Type 10k impedance, electronically balanced Connector XLR (A-3) male and female Nominal Input Level +4 dBu
Amplifiers	Type Complementary power MOSFET output stages (audio class AB/H) Burst capability 2480 watts (620 Wrms/channel x 4) THD, IM, TIM <.02 %
AC Power	Connector 250V NEMA L6-20P (twistlock) inlet or IEC 309 male inlet or Multipin VEAM option Automatic voltage selection 95-125 VAC and 208-235 VAC; 50 Hz / 60 Hz ⁴ Operational Voltage Range Turn on: 85 VAC; Turn off 134 VAC; 50/60 Hz Turn on: 165 VAC; Turn off 264 VAC; 50/60 Hz Max Continuous RMS Current (>10 sec) @115 V: 14 A @230 V: 7 A @100 V: 16 A Burst RMS Current (< 1 s) @115 V: 26 A @230 V: 13 A @100 V: 30 A Max Peak Current During Burst @115 V: 36 Apk @230 V: 18 Apk @100 V: 42 Apk Soft Start Turn-on Inrush current < 12A @ 115V
Physical	Dimensions Height: 56.75" (1441 mm); Width: 21.26" (539 mm); Depth: 30" (762 mm) Weight 280 lbs (127 kg) Enclosure Multi-ply hardwood Finish Black textured Protective Grill Perforated metal grill Rigging Aircraft pan fittings (3 on top, 2 on bottom). Working load for each fitting is 600 lbs, which is 1/5 the cabinet breaking strength (with straight tensile pull).

- | | |
|--------------|---|
| Notes | <ol style="list-style-type: none"> 1. Measurements are taken at 4 m on-axis, 1/3 octave, unless otherwise stated. 2. Response depends on loading conditions and room acoustics. 3. 1m, with pink noise or music, 1/2 space. 4. The unit is rated at 88-125V and 182-235V, 50/60 Hz, to satisfy EC standards |
|--------------|---|

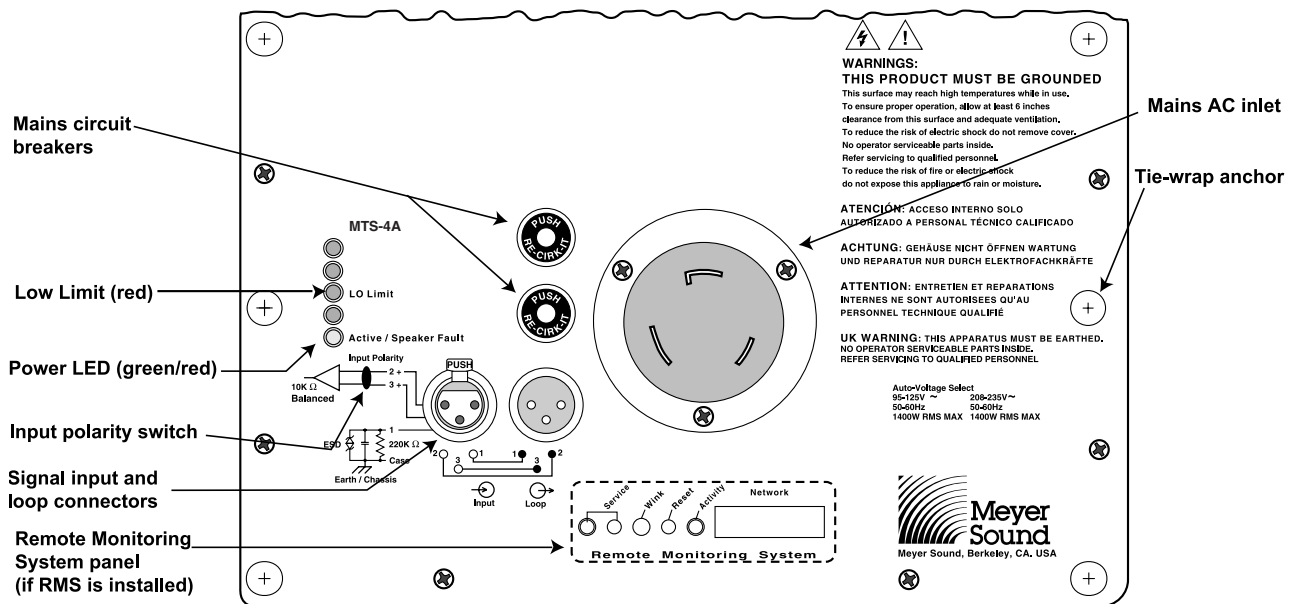
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MTS-4A DIMENSIONS

All units in inches



REAR PANEL DETAIL





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