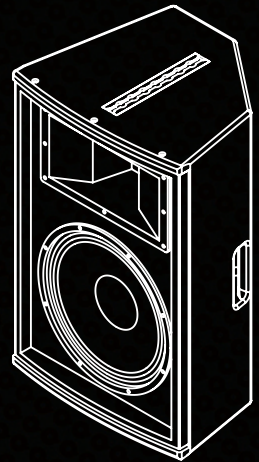


Qmotion

quest
engineering

User Manual

MODEL: QM 12MP



Qmotion

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Flying and installation of this speaker cabinet must be carried out by suitably qualified personnel following the locally authorised and approved safety standards.



Do not attempt to clean the painted enclosure with solvents or petrochemical based cleaners. Touching up scratched can be done with polyester paint.



Installation that allows direct precipitation is not advised and installation practise must prevent liquids from entering the box.



Do not stack the speaker cabinet in a manner that could cause injury should a cabinet become dislodged.



Do not place sources of heat on the speaker cabinet such as lighting equipment or smoke machines, and where possible please keep out of direct sunlight.

Attention

Before connecting or operating your new Quest Engineering speaker, please study the accompanying instruction manual paying particular attention to the operating precautions and wiring procedure. Quest Engineering will not assume responsibility for incorrect installation or operation of this product.

When your new boxes arrive...

You should visually inspect the outside of the shipping carton and make note of any damage on the shipping documentation. After unpacking, if you find concealed damage to the loudspeaker, save the packing materials for the carrier's inspection, notify the carrier and supplier immediately and file a shipping damage claim. Although Quest Engineering will help in any way possible, it is always the responsibility of the receiving party to file any shipping damage claim. The carrier will know how to prepare and file this claim.

Register Your Product

Thank you for choosing Quest. Please take the time to complete your product registration card which is included with the packaging.

Registering your Quest Engineering product will:

- CONFIRM YOUR WARRANTY
- REGISTER YOUR PRODUCT
- PROTECT YOUR NEW PRODUCT



General Description

The QM 12MP multi-purpose passive speaker system is designed for the live sound touring market. It is suited to high sound pressure level on stage fold-back and short throw front of house applications.

Built For Life On The Road.....

The QM series are designed for professional mobile live sound and fixed installations. Please read and become familiar with the following installation manual to get the best results from your Quest QM series speakers.

All Quest QM series speakers are designed and built tuff for the professional live sound industry. QM series speakers will stand up to a hard life of mobile sound beyond the limits of many of their competitors. However they will perform better if they are installed and operated within standard industry practice. Pay particular attention to the section on "Overhead installation and rigging" if you are flying the speakers.

Product Overview

The QM 12MP is a high to mid powered multi-purpose speaker primarily designed as a compact concert level fold-back monitor. It is has a provision for Aero-track (cargo-track) rigging for vertical or horizontal flown installation as well as a single 36mm speaker pole mount.

With the attachment of the appropriate aero-clip fittings, the QM 12MP can be installed into a wide variety of installation environments as a front-of-house speaker or flown fold-back monitor.

The High frequency driver in the QM 12MP consists of a high powered 3 inch diameter voice coil diaphragm driver mated to a 1.4 inch bi-radial horn flare. The woofer is a 12" mid-bass driver engineered to reproduce a defined midrange frequency response with flat bass response in a small enclosure.

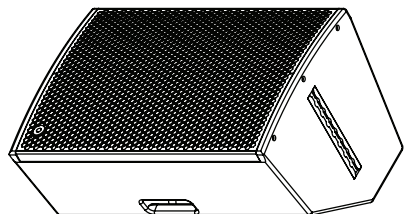
The QM 12MP is sold in left and right hand configurations (MPL and MPR) for ideal positioning to deliver maximum foldback

level before feedback. Monitor engineers will appreciate the convenient wedge profile angles and very flat frequency response. The QM 12MP needs only the minimum EQ adjustment with a standard vocal microphone to deliver very high sound pressure levels on just about any type of stage environment.

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Features

The QM 12MP has a number of features designed to increase performance and versatility for a professional mobile sound environment. A great deal of attention was paid to the details of the design to make the QM 12MP both sonically excellent and functionally suited to touring sound reinforcement and also A/V rental markets.

High Powered Purpose Designed Components

A very high powered three inch voice coil high frequency driver is mounted in an impact resistant frame support to the 1.5 inch high frequency bi-radial CD horn. The result is a very physically strong construction and high fidelity high frequency response **that needs almost no EQ correction to achieve high SPL fold-back.** This achievement is particularly impressive considering that no specialized system processor is needed to achieve high level vocal fold-back when a standard dynamic vocal microphone (commonly supplied by rental companies), is used.

Functional Design

For maximum stage coverage effect, the QM 12MP is manufactured in left and right pairs. The recessed input panel is designed to remove the problem of "strain induced intermittent connections" that 90 degree plug panels can cause on speaker leads. Also the recessed connections remove potential damage to connectors being accidentally trampled on a dark stage. Mirrored patching inputs also mean short cable runs when paralleling speaker boxes and a tidier stage. Steel reinforced neoprene feet help the QM 12MP "stick" to a stage and solve the problem of fold-back wedges that "go walking" on a vibrating timber stages.

Multiple Installation Options

Added versatility is provided by the addition of aero-track rails on the QM 12MP to allow stage techs to fly the boxes from lighting

truss or to fly as short throw, wide dispersion front of house or delay speakers. Pole mount is also possible with integrated 36mm pole mount fitting.

Solid Build Construction

Built for a touring environment, the QM 12MP is well suited to all professional applications. The timber casing is reinforced birch ply with a heavy gauge power-coated steel grill. Like all QM series products, it is "built tough for a tough world".

QM 12MP Speakers As Fold-back Monitors

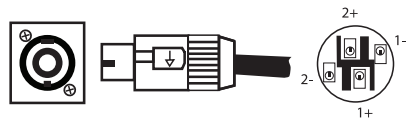
If you use the loudspeaker on the floor as a stage monitor, it is standard practice to use at least a 12 dB per octave HPF (High Pass Filter) set from 80 Hz to 95 Hz high pass. This will allow more power for useful monitor frequencies. Locating the wedge on the floor will give a natural boost to bass frequencies which can cause "muddiness" to the vocal frequencies. If using a pair of wedges for a single performer, locate the HF horns on the outside of the pair to minimize interference between the horns which can generate "HF hot spots".



Connections

Two Neutric Speakon model NL-4 connectors are mounted in a recessed panel on the rear surface of the box. This allows the speaker box to be set flat against a wall without physical interference to the speaker connector.

- The connector input is wired pin 1+ and pin 1-.
- Pin 2 is not connected.



Getting the Most from your Quest QM 12MP Speakers

It is true of all professional loudspeaker systems; the performance of the loudspeaker depends on an amplifier delivering an adequate supply of clean power. There are numerous opinions on the subject of appropriate power amplifier wattage for a given loudspeaker within the audio industry. There is no single answer to the question of what amplifier power you should use for a particular loudspeaker that covers all situations but there is a basic principle that if applied sensibly will generally deliver good results. These cover power ratings of speakers, amplifier power capability, and preventing loudspeaker damage.

Suitable Amplification

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Power In The Right Hands Can Save Your Speakers

If the loudspeakers are used for professional application with competent operators, the power principle is:

Where the full output capabilities of the loudspeakers will be needed to achieve maximum output levels, use amplifiers that can sustain twice the wattage listed in the loudspeaker specifications. A quality amplifier will provide a clean peak voltage capability

of 6 dB above the maximum RMS power of the speakers and even in the case of a lesser quality amplifier you will avoid "clipping" or distorted output from the amplifier under most circumstances.

The thermal limits of the speaker are unlikely to be exceeded with an undistorted signal. While principle is consistent with the Quest Engineering's testing regime, it does not completely guarantee trouble-free operation under all conditions.



WARNING

The power amplifier sizes recommended by the above principle capable of continuous output levels that can cause damage to or failure of the drivers. This is especially true when reproducing recorded music. Many recordings have very low peak to average ratios such that much higher continuous levels are possible before amplifier clipping.

Avoid Amplifier Clipping

Bearing in mind the above principle of amplifier power higher than speaker power, keep signal levels low enough so that neither the Clip nor Limit Active indicators are blinking frequently or are on continuously. If they are, turn down the input signal level to avoid overheating the amplifiers.

A low power amplifier that is clipping continuously will kill a speaker way faster than a high power amplifier with clean signal at twice or three times the speaker's rated capability.

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The Secret To Long Life

A competent audio system operator will operate the loudspeaker within its limits and capabilities.

Operation beyond the loudspeaker's capabilities usually includes, but is not limited to, one or more of the following conditions:

1. **Amplifier clipping**
2. **Peak voltage input in excess of twice the specified voltage limit**
3. **Noticeable distortion**
4. **Mechanical noise (such as a cone bottoming out)**
5. **A suitable means for determining these conditions is highly recommended.** At a minimum, the operator should have a meter display calibrated to indicate when the loudspeaker's maximum RMS voltage limits will be exceeded. This assumes amplifiers are not being driven into clipping at these limits.

The QM 12MP is an 8 ohm enclosure and can be connected as multiple parallel connections to an amplifier channel that can operate into speaker impedances of 4 ohms, (see connections diagram).

A recommended power range per amplifier channel is 1,000 watts RMS into a 4Ω load. Higher power per channel is possible if the power is undistorted. An ideal partner for the QM 12MP is the Quest QA3004 amplifier. Setting the QA amplifier's high pass filter at 80Hz is recommended for clean high SPL vocal applications.

Magnetic Fields And A/V Equipment

Loudspeakers generate magnetic fields, unless specifically designed for audio-visual applications where drivers are magnetically shielded to limit the extent of the magnetic field. Therefore, place a loudspeaker at least 2ft (0.6 m) or more from any TV set or computer monitor. If it causes distortion or a change in the display color, move it further away. Do not place any audio, video, or computer magnetic media near the loudspeaker as the loudspeaker's magnetic field may damage the data.

Loudspeaker Wire Gauge

The proper conductor size (wire gauge) to use for the loudspeaker cable is primarily a function of the wire length. The general rule is that lower resistance, in relation to the loudspeaker's impedance, is better. To achieve this, use larger conductor sizes for longer lengths of cable and for lower impedance loudspeaker loads.

For wiring cables to fold-back monitors, 1.5mm 16 Gauge would be the minimum for short cable runs.

Standard AWG

14ga ... 0.6410" dia -> 1.63mm dia 10.44ohm/km
 16ga ... 0.0508" dia -> 1.29mm dia 13.17ohm/km
 18ga ... 0.0403" dia -> 1.02mm dia 20.94ohm/km

Euro Standard Wire -

1x1.00mm² -> 18 ga AWG
 1x1.50mm² -> 16 ga AWG
 1x2.50mm² -> 14 ga AWG
 1x4.00mm² -> 12 ga AWG



Speaker Placement for Maximum Stage Monitor Performance

The QM 12MP is primarily intended for use as a stage monitor in mirrored pairs or as single speaker boxes. They can also be employed as single or small array front of house boxes for short throw wide dispersion applications.

When two standard design fold-back monitors are placed in close proximity to each other and are reproducing the same signal, “interference effect” between the speaker transducers will contribute to uneven frequency response. This is called “comb filtering” and is impossible to correct with EQ alone. The QM 12MP is designed to minimize this potential problem.

Figure 1



Two conventional monitors with top mounted HF horns. Regardless of where they are located, the HF horns spill across each other and this causes “tangential interference” as the mid-high frequency waves intersect and create both peaks and cancellations which will radically change the frequency response in different areas of the sound field.

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This is the source “hot zones” found as you move a microphone in an arc in front of a pair of monitors.

The “mirror” design allows a monitor engineer to locate the HF horns at a greater distance apart and lower the level of interference between the boxes.

Figure 2



If more low frequency output is required, moving the boxes closer together will increase the total potential for more bass without causing excessive HF interference.

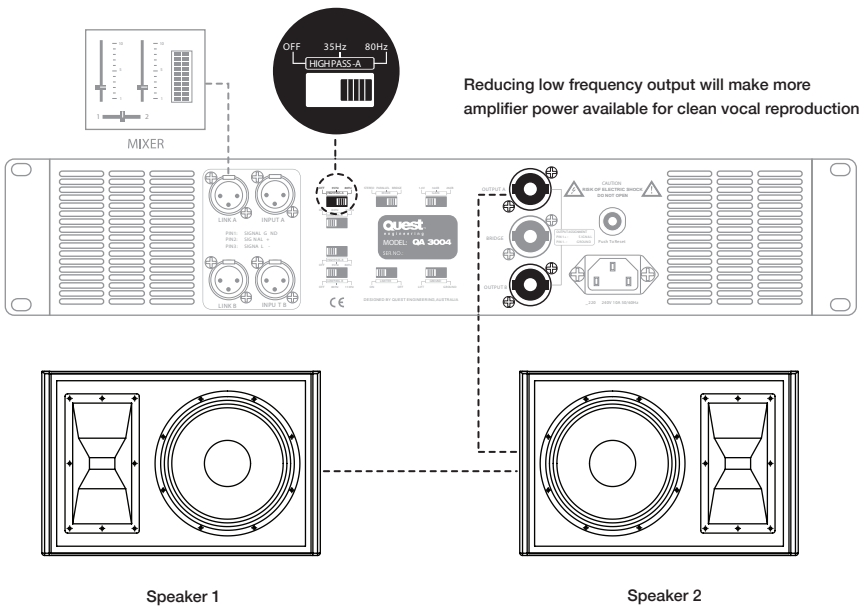
Technically, this box placement is called “coupling the bass drivers”. Placing two bass drivers next to each other has the potential of increasing the low frequency response by at least 3dB.

Figure 3



By moving the QM 12MP monitors, the frequency response of the monitor pair can be partially “flattened” and “hot zones” removed without losing gain with excessive EQ.

This is a common configuration for a guitar player/vocalist and leaves space for an effects board and boom microphone stand.



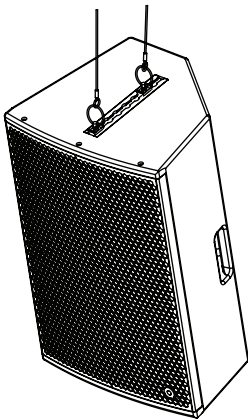
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QM 12MP as Front of House Speaker

The QM 12MP is also a very high fidelity front of house speaker system. It can be pole mounted on the 36mm top hat or flown with a double stud aero track clip connected to the cargo track on the speaker casing. For flying pairs of speaker boxes, it is suggested you read the section on "Arraying speakers" in the Quest Engineering instant roadie course at the end of this manual available on the Quest web site <http://www.questaudio.net/downloads.php>.

When Flying Speakers With Aero-Track and Accessories

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QM 12MP flying from a truss with aero-clips

Before suspending any speaker system always inspect all components (enclosure, rigging frames, eyebolts, track fittings, etc.) for cracks, deformations, corrosion, missing, loose or damaged parts that could reduce strength and safety of the array.

Do not suspend the speaker system until the correct preparation of the installation site has been taken to avoid health risks during and after the completion of the installation. A

licensed Professional Engineer must approve the placement and method of attachment to the structure prior to the installation of any overhead object.

HIGH TENSILE DOUBLE STUD AERO-CLIPS ARE ESSENTIAL IF BEING HUNG FROM A SINGLE CLIP! AND ARE RECOMMENDED FOR ALL INSTALLATION ENVIRONMENTS

Maintenance of Rigging

Suspension systems can degrade with time, exposure to atmospheric conditions and wear, they require regular inspection and routine maintenance to insure the speaker cluster and fittings are secure. The installation must be inspected for fatigue at least annually. The inspection must include a survey of all load bearing surfaces including those attached to the building for signs of deterioration or any other condition that may decrease the strength of the installation or loudspeaker enclosure.

Quest Engineering or its distributors are not responsible for the non legal application or misuse and abuse of its products by installers and product users.

Speaker Placement for Smooth Frequency Response

Where a loudspeaker is placed in a room has a great effect on its sonic performance. The size and material surfaces of the acoustic environment determine the type of reflections and reverberation characteristics and no amount of EQ or system processing can fix a poor acoustic environment.

However, you can improve your chances by following a few simple rules.

- 1. Make sure the HF horn of your speaker boxes is over the heads of your audience. People standing in front of the speaker boxes will absorb most of the high frequency energy and reduce the clarity of the system considerably.**
- 2. Try to angle your speaker system down into the crowd, not just over**

their heads. Sound bouncing off the back wall and roof will add to reflections and reverberation that will reduce your systems intelligibility. This particularly applies if clear spoken word is important.

3. If setting up your speakers as an array, (boxes placed next to each other to give more SPL or wider coverage),

Speaker Cables

Speaker cable needs to be as heavy gauge as conveniently possible for low-loss results. Light gauge cable (below 1.5mm) will create extra resistance and waste amplifier power. This particularly applies to long speaker runs. The amplifier's damping factor statistic ("punch" for the non technical) is greatly diminished, so keep your speaker cables short and as heavy gauge as practical.

Flying your system

Overhead Installation and Rigging

"Rigging" is used in this manual as a general term referring to fixed mounting or hanging suspension as well as the hardware used for such mounting and suspension. It also applies to temporary and permanent installation.

Mounting or rigging overhead suspension of any speaker box load can result in serious injury and equipment damage if not done correctly. Rigging and installation personnel must determine the mounting or suspension method that takes into consideration all loads that the speakers and rigging system will be subjected to. All such work must be done in accordance with and in compliance with all government, state, and local regulations governing such work.

NOTE: The user assumes all responsibility and liability for the proper design, installation and use of any rigging and mounting systems for Quest Engineering loudspeakers.

NOTE: Accessory items are available from Quest engineering and aftermarket suppliers to facilitate suspension, wall, ceiling, or other rigging. When using these items, review all

enclosed documentation and carefully follow all instructions and safety precautions.

Purchaser & Installer Responsibility

It is the responsibility of the purchaser and end-user of Quest Engineering products to:

1. Read the product instructions and labels and follow them.
2. Inspect the product immediately upon receipt as well as before and after each use.
3. Receive training in the proper installation and use of the equipment. Proper training includes safety procedures, limitations of the equipment, inspection of the equipment, and risk management. If you are not competent in the use of a product, do not use it.
4. Determine if the product is suitable for its intended use and that it meets all applicable
5. Standards and regulations.
6. Use adequate back-up rigging safety systems.

Rigging and Safety

Whether mobile sound or fixed installation, for best and safest results your speakers need to be installed and positioned correctly. Just placing a mid-high on a sub bass and pointing it at the crowd will not be a good show if it vibrates off and falls onto a member of the audience. The same goes for hanging a box from a lighting bar with non rated hardware and relying on luck for it to stay there.

So if you are going to use the Quest speakers for anything other than a fold-back monitor....

Read the rigging part of this manual and follow the instructions. There are many books on the subject of overhead rigging and it is recommended that any installer is educated on this subject to a level of thorough knowledge especially in the area of load limits and weight ratings.



DANGER

If there is any question about the integrity or capability of any installation component to perform its intended function when used to suspend or mount a loudspeaker, immediately remove it from service for repair or replacement.



WARNING

Do not under any circumstances use a loudspeaker's handles to support the weight of the loudspeaker except for their intended use: hand carrying. The handles are not rated to support the load of the loudspeaker for temporary or permanent installation.

Note: If you are not sure of the safety of your loudspeaker rigging, consult a licensed, qualified professional engineer or professional rigger. All rigging work must be done in accordance with and in compliance with all applicable regulations governing such work.

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The Basics Of Safe Rigging

Rigging a loudspeaker array requires determining accurately:

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

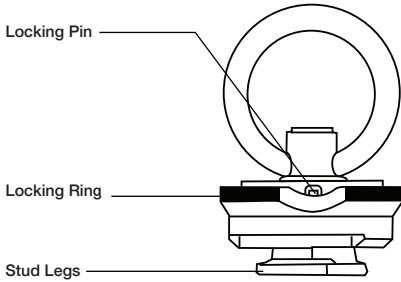
The Design Factor for all working load limits is a minimum of 8:1. In other words, the rigging for a 100 KG speaker must be able to carry 800Kg.

Routine Inspections

Thoroughly inspect all rigging hardware and components used to support the loudspeaker. Do this on a regular periodic basis, whether components are integral with or external to the loudspeaker or whether factory or user-supplied. The interval between inspections and scope of the inspections will depend on the installation and the conditions of use. The rigging inspection interval must not exceed 1 year.

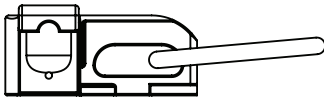
Look for loose fasteners, cracked or corroded fittings, frayed wires and signs of strain or wear on anything that could detach from the speaker box or associated fittings.

Using The Aero-Track



Pictured are the Aero-clip fittings that attach to the Aero-track anchor rails on the QM 12MP speakers.

Double stud Aero-clip



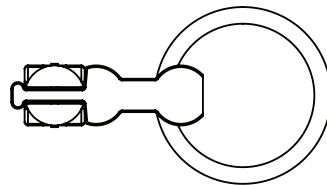
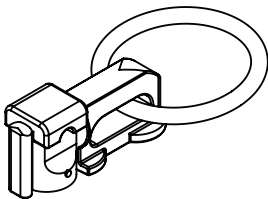
WARNING

It is important to install the correct aero-clip for the type of box or array configuration to minimize stress on the clips.

- A single stud clip is intended for a vertical hang.
- If a sideways load is intended as in a horizontal hang, use a purpose designed double stud aero-clip.

IMPORTANT

Do not double hang the speaker boxes in a vertical array. The lower anchor point is intended for horizontal installation or for tilt angling the speaker, not carrying the load of multiple speakers.



Specifications

Power Handling (Nominal)	500W RMS
Frequency Response +/- 3dB	65 - 19 KHz
Maximum SPL @1m	128dB
Impedance	8 ohms
Connections	Speakon NL4 x 2 In/out
Wiring	Pin1+ Pin -
Woofers	1 x Quest 12" High Powered Mid-bass Woofer
Tweeter	1 x Quest 3" Voice Coil 1.4" Exit HF Transducer
Horn Flare	CD Horn
Directivity (FOH mode)	90 x 60
Dimensions WxHxD mm	390X 340 x 600
Weight	23kg

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