

**M 52**

**Control Monitor**

**M 52 D**

**Operating Manual**

M 52

M 52 D



**Part Number:** 520766

**Version:** 02

**Date:** 23-Nov-2007

**Language:** English



## Introduction

Thank-you for purchasing a Klein + Hummel loudspeaker. The compact size, variety of input connections, power sources, and extensive mounting hardware range allow the M 52 and M 52 D loudspeakers to be used with any source equipment and in a wide variety of physical locations. The latest acoustical and electrical techniques and components have been used to ensure the most accurate sound reproduction possible. Klein + Hummel products are designed for longevity so we hope you enjoy many happy years of using this product.

Klein + Hummel's control monitors can be used on meter bridges, free-standing, mounted on to walls, or in a rack. They can be used in music, broadcast, and post production studios for tracking, mixing, and mastering. They can be used in stereo or multichannel systems, with or without subwoofers.

Before reading the rest of this operating manual, review the safety and warnings section towards the back of this book. Note that imperial dimensions are approximate.

## Package Contents

The shipping carton contains:

- This operating manual
- Product guarantee
- The loudspeaker
- Two mains power cables (Euro and USA)

Signal cables are not included. Accessories are listed at the end of this operating manual.

## Most Common Applications and Listening Distances

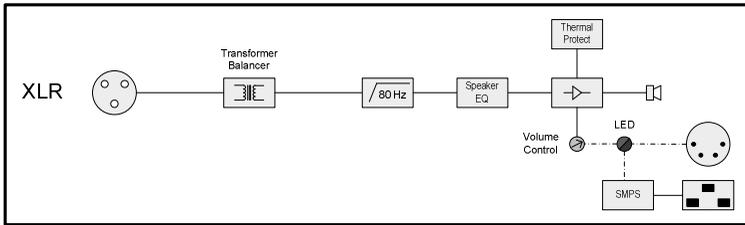
The minimum, recommended, and maximum listening distances for each product are shown below, together with their most common application:

Product	Most Common Application	Distances		
		Minimum	Recommended	Maximum
M 52	Near-field monitoring	0.5 m (2')	1.0 m (3')	3 m (9')
M 52 D	Near-field monitoring	0.5 m (2')	1.0 m (3')	3 m (9')

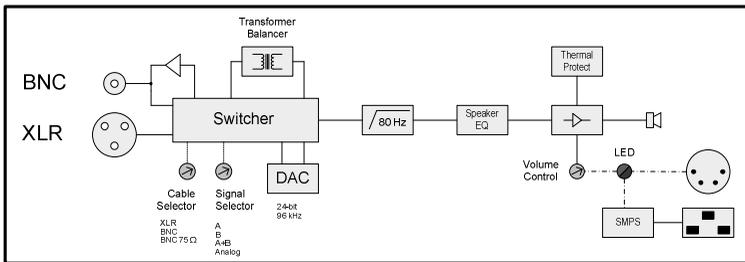
In multichannel systems, one should ideally use the same product for all main channels. However, as the rear channels often contain less bass and the signals are mixed at a lower level than the front channels, the rear loudspeakers can be smaller - see table below for details. The center loudspeaker should always be of the same type as the left and right loudspeaker. The subwoofer should be sufficient to keep up with the main loudspeakers - see subwoofer operating manual for details.

Front	Ideal Rears	Smaller Rears	Subwoofer(s)
M 52 (D)	M 52 (D)	-	Refer to subwoofer operating manuals
O 110 (D)	O 110 (D)	M 52 (D)	
O 300 (D)	O 300 (D)	M 52 (D), O 110 (D)	

## System Block Diagram



M52 block diagram



M52 D block diagram

## Electronics Panel Picture



M 52 electronics panel



M 52 D electronics panel

## Power Supply and Controls

The M 52 and M52 D have a switched-mode power supply, which can accept mains AC voltages of 85...240 V at 50...60 Hz. In addition, DC can be applied to the 4-pin "external power supply" connector (GND connects to pin 1, and 12...20 V connects to pin 4).

The loudspeaker is protected from accidental application of an incorrect polarity of the DC voltage. The mains input fuse is a slow blow 800 mA and is accessible from the outside (next to the main power On/Off switch). The external power supply input fuse is an SB 3150 mA and is located on the inside of the cabinet. To change this fuse:

- Turn off the loudspeaker and disconnect the mains power and signal cables.
- Open the cabinet (four screws on the edge of the back panel).
- Locate the fuse holder and change the fuse for a new one with the correct specification (slow blow 3150 mA).



- Close the back panel and reattach the mains power and signal cables.
- Power up the loudspeaker and check that the front panel light is correctly illuminated.

For mains AC power:

The **power On/Off** switch on the back panel turns the loudspeaker on and off. If the **volume control** on the front panel is rotated fully anti-clockwise the loudspeaker is placed into standby mode. If the back panel mains switch is on, standby is indicated by a red light on the front panel. Otherwise it is green (loudspeaker is ready to be used) or off (loudspeaker is switched off on back panel or no power applied to the external or mains connectors).

For the external power supply:

The 4-pin XLR input bypasses the main **power On/Off** switch. There is no standby mode when there is an external power supply. The LED lights green when the external power is applied.

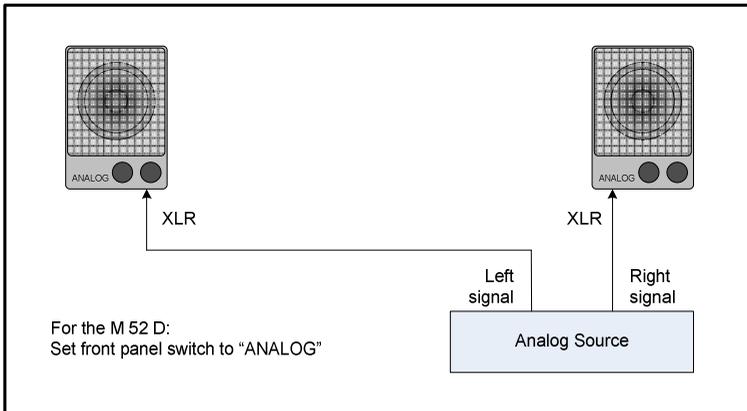
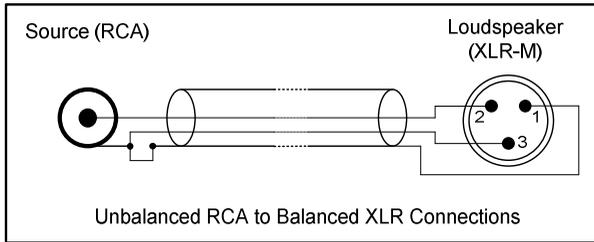
## Analog Input Stage

The **input stage** is a 10 k $\Omega$  transformer balanced type on a female XLR socket.

Pin	Signal
1	Audio Ground
2	Positive
3	Negative

If there is a humming or buzzing sound coming from the loudspeaker, first check it is not the loudspeaker by disconnection the input signal cables. If the noise goes away it is not the loudspeaker itself and so the noises must be coming from the cabling (mains power or signal) or the source. If unbalanced cables are being used, specially wired cables can increase the loudspeaker's immunity from these external noises – see picture below.

Disconnect the cable screen from the RCA sleeve if there are still humming or buzzing sounds.



For the M 52 D:  
Set front panel switch to "ANALOG"

### Digital Input Stage (M 52 D only)

In the M 52 D there is a **16...24-bit, 32...96 kHz digital input stage** that can accept AES3-2003 (commonly known as AES/EBU, AES3id-2001, and S/P-DIF (with a suitable connector converter) signals. De-emphasis is supported on 32, 44.1, 48, and 96 kHz sample rates. XLR and BNC connectors ensure good interconnectivity options. It is possible to have analog and digital signals connected, with the rear panel **cable selector switch** choosing which input connector is to be monitored. The table below shows what each switch position does:

Switch Position	Function
XLR	Analog or digital signal on XLR
BNC	Unterminated digital input on BNC
BNC 75 Ω	Terminated digital input on BNC
BNC	Same as "BNC" above

Uncompressed PCM AES3, AES3id, and S/P-DIF digital signals generally contain two audio channels (called "subframe A" and "subframe B") on one cable (single-wire mode). A clock input is not required because loudspeakers are not audio sources and the clock signal is locally regenerated from data contained in the bit stream. The four-way **signal selector switch** on the front panel allows selection of:

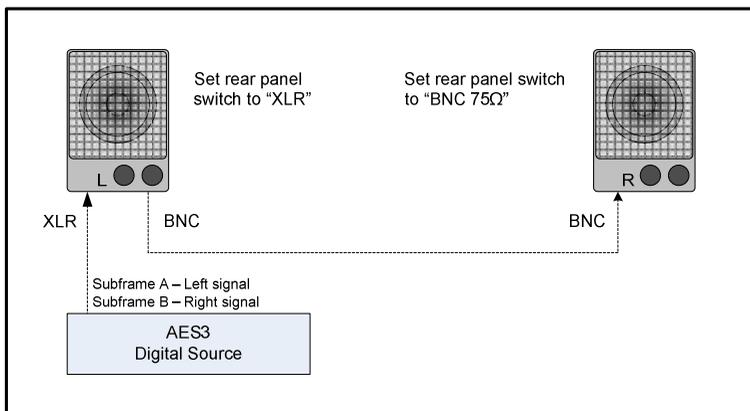
- "L" (digital subframe A)
- "L+R" (mono sum of subframe A and subframe B)
- "R" (digital subframe B)
- "ANALOG" (XLR input connector only). Note the signal selector switch on the back panel should be set to "BNC 75 Ω" when not using the digital input.



Always use good quality cables with the correct impedance to achieve these maximum cable lengths:

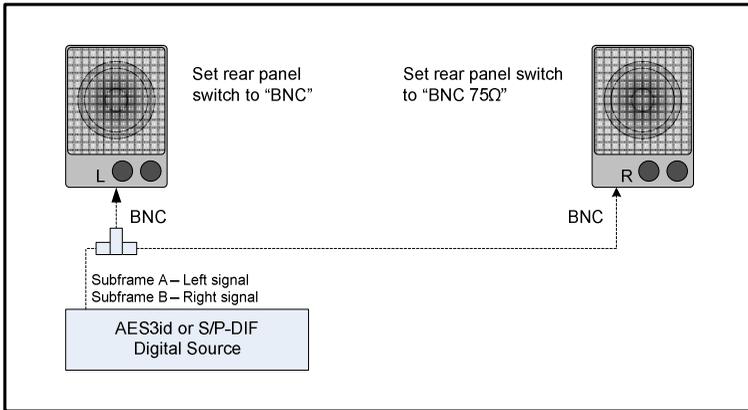
Format (Connector)	Impedance	Cable Length
S/P-DIF (RCA)	75 Ω	up to 10 m (30')
AES3 (XLR)	110 Ω	up to 100 m (300')
AES3id (BNC)	75 Ω	up to 1000 m (3000')

An AES3 signal (applied to the XLR connector) is point-to-point and may not be looped, so the BNC connector is used to connect additional monitors to the AES3 signal. The signal selector switch on the first loudspeaker should be set to the "XLR" setting. This outputs an AES3id signal from the BNC connector for connecting additional monitors to the original AES3 signal. The second loudspeaker should have its signal selector set to the "BNC 75 Ω" setting. See picture below:



**XLR digital input connections on the M 52 D**

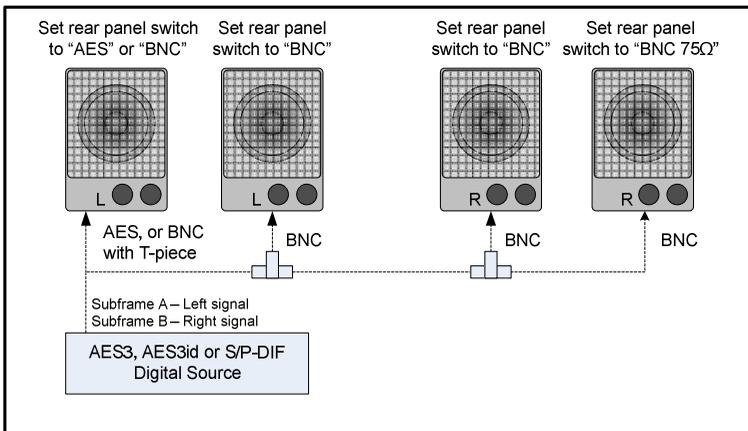
An AES3id or S/P-DIF signal (applied to the BNC connector) can be looped using a T-piece connector (not supplied) for connecting additional monitors to the input signal. The signal selector switch on the first loudspeaker should be set to the "BNC" setting. To terminate the cable correctly, the second loudspeaker should have its signal selector switch set to the "BNC 75 Ω" setting. An appropriate setting should be made on the front panel signal selector switch depending on the signal channel order and loudspeaker position. See picture below:



**BNC digital input connections on the M 52 D**

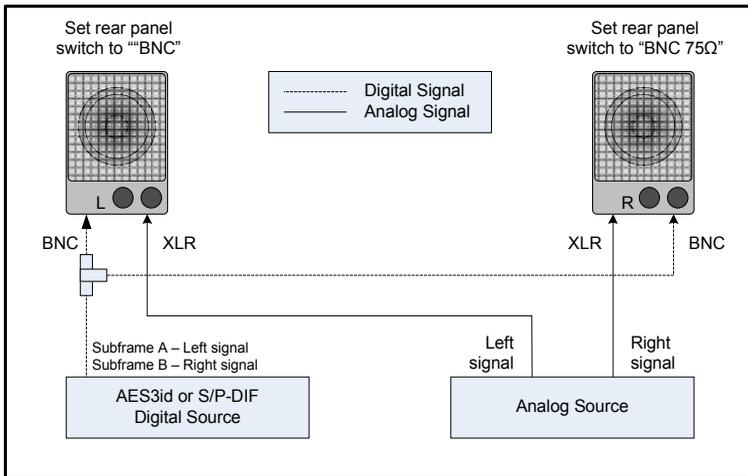
If there are multiple M 52 D monitors connected together using BNC T-piece connectors, the first one should be set to "AES" or "BNC" as appropriate. The rest should be set to "BNC", except the last one which should be set to "BNC 75Ω". Finally, an appropriate setting should be made on the front panel signal selector switch depending on the location of the loudspeaker.

Note that the BNC connector has no output driver. When using the AES3 input, the output level is derived passively from the AES3 signal's input level. This has a wide tolerance, therefore the length of the interconnection cable and number of loudspeakers will depend on the level of the source signal and quality of the interconnecting cables.



**Multiple M 52 D connections using BNC**

It is possible to have an analog XLR and a digital BNC cable simultaneously connected to the loudspeaker. The signal selector switch is used to monitor the required input.



**Simultaneous analog and digital connections on the M 52 D**

## Volume Control

A **volume control** on the front panel allows the loudspeaker to be matched to a wide range of equipment outputs whilst maintaining the desired acoustical output. This control is also used to match the output level of the loudspeaker that of other loudspeakers in the audio reproduction system. When the volume control is set to maximum, a +6 dBu (1.55 V) input signal gives 100 dB SPL output at 1 m. The maximum input level that the input stage can accept is +19 dBu (7 V). The maximum acoustical output of the loudspeaker is limited by the protection system. In general, larger loudspeakers can play louder and for longer periods than smaller loudspeakers. As with any other component in the audio chain, it is best to use the lowest gain for the application so as to minimize amplification of the preceding equipment's source noise. To check this, if the noise drops dramatically when the input cable is unplugged, the noise is coming from the source not the loudspeaker.

## Amplification and Driver

Amplifiers featuring low harmonic and intermodulation distortions, and low noise to ensure a clean audio reproduction. Although no damage will result, insufficient cooling will cause the amplifier protection to activate prematurely thereby limiting the system's maximum output level.

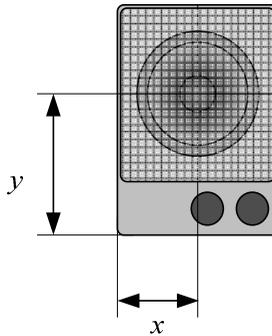
A long throw, efficient, low distortion driver ensures a clean sound quality even at high replay levels. The driver is loaded by the internal volume of the cabinet and is magnetically shielded for use near CRT screens or magnetic storage media. The system's SPL output and the cabinet volume can be seen in the specifications section.

## Cabinet

The aluminum cabinet is painted using the RAL color (7021). An appropriately colored pen can be used to touch up the paintwork if it is scratched during transport or use.

The acoustical axis is a line normal to the loudspeaker's front panel along which the microphone was placed when tuning the loudspeaker's crossover during design. Pointing the acoustical axis, in the horizontal and vertical planes, towards the listening position or centre of the listening area will give the best measured and perceived sound quality. The acoustical axis of Klein + Hummel's control monitors is located in the middle of the driver.

Product	x dimension	y dimension
M 52	6.0 cm ( $2\frac{3}{8}$ "	10.0 cm ( $3\frac{7}{8}$ "
M 52 D	6.0 cm ( $2\frac{3}{8}$ "	10.0 cm ( $3\frac{7}{8}$ "



**M 52 (D) Acoustical Axis**

## Acoustical Response

The M 52 and M 52 D have been designed to have a flat frequency response when used in their typical application, on a meter bridge or mounted in a rack, however they will still have a good response when used in other applications. If the sound quality is not acceptable, try moving the loudspeaker or nearby objects until it is. An acoustical measurement system can be used to help find the best location. In all cases, point the loudspeaker towards the listening position to achieve the best sound quality.

## System Protection

A high pass filter protects the amplifier and driver from high energy bass content that cannot be reproduced by the smaller driver. If deeper bass is required, use a larger loudspeaker, or add a subwoofer to handle the high-level low-frequency energy. The amplifier has built-in thermal protection. The protection systems cannot protect against sustained abuse of the loudspeaker.

## Mounting Options and Accessories

The  $\frac{3}{8}$ " thread on the base of the cabinet may be used for attaching the M 52 or M 52 D to a standard microphone stand. The M6 threads on either side of the cabinet can be used with the LH 11 table stand and MA 19 rack mount frame.

**FM 52 Fight case for a pair of M 52s or M 52 Ds.**

As the original packing is primarily designed to get the loudspeaker from the factory to the end user, it is highly recommended that a flight case is used if the loudspeaker is regularly moved between locations.

**LH 11 Mounting bracket**

Used to give vertically angle adjustment for the loudspeaker. Can be used on a meter bridge, microphone stand, or other flat surface such as a wall.

**MA 19 Rack mounting frame**

A 3U frame used to mount a pair of loudspeakers in to a 19" rack.

**LH 11 – Mounting bracket****MA 19 – Rack mounting frame**

Detailed mechanical drawings of these accessories can be found on line at [www.klein-hummel.com](http://www.klein-hummel.com). Accessories are fitted at the user's own risk and that safety and warning instructions should be observed.

**System Use**

Klein + Hummel loudspeakers should only be used indoors and in these ambient conditions:

- +10° C to +40° C (+50° F to +104° F), <90% relative humidity, non-condensing
- During transport or storage the ambient conditions can be:
- -25° C to +70° C (-13° F to 158° F), <90% relative humidity, non-condensing

Before connecting the mains power cable, ensure that the rear mains power and front panel switches are set to off and that the correct mains voltage (85 ... 240 V) or external voltage (12 ... 20 V) is available. Next connect the input signal cable (analogue, digital, or both as appropriate) and power up the loudspeaker. The front panel light should be glowing red or green depending on the position of the volume control. If the light is off, check the mains or external power supply. In the M 52 D, select the required signal on the front panel switch. Next raise the volume control until the desired audio level is achieved.

In a studio application, the loudspeakers should be placed according to the ITU-R BS.775-1 recommendations so there is consistency of reproduction when compared to other listening environments. For movie applications, ANSI/SMPTE 202M is the preferred standard for system setup. For home use, as materials are mixed in ITU style rooms, one should get as close as possible to this configuration to maximize replay authenticity.

For two-channel stereo,  $\pm 30^\circ$  should be used. There are currently no internationally agreed standards for 6.1 or 7.1 formats. However common practice is to use one or two loudspeakers in the centre back location of a 6.1 system. In a 7.1 system common practice is to place side loudspeakers at  $\pm 90^\circ$  and to push the surround loudspeakers back to  $\pm 150^\circ$ .

Loudspeaker Name	ITU-R BS.775-1 Angle	ANSI/SMPTE 202M Angle
Left	-30°	-22.5°
Center	0°	0°
Right	30°	22.5°
Left Surround	-110°±10°	An array to the left
Right Surround	110°±10°	An array to the right

For the best stereo imaging the loudspeakers should be placed symmetrical in a symmetrical room where objects have been placed symmetrically. This ensures the same response from each loudspeaker at the listening position and thus good imaging. Sound reflected back to the listening position should also be minimized using surface angling or acoustical treatment. The acoustical axis point towards the listening position or centre of the listening area in both the horizontal and vertical planes.

If the loudspeaker is used free standing, use a strong microphone or good quality loudspeaker stand. For placement in a rack or on a meter bridge, suitable accessories (see Accessories and Options section) are recommended.

The loudspeakers should be placed on a circle to ensure equal time of arrival of the audio from all loudspeakers. Failing this, appropriate electronic time delays should be added to compensate for time of flight differences.

Next, trim the output level of each loudspeaker so that the SPL from each loudspeaker at the listening position is the same for the same input level.

Absolute acoustic level calibration is achieved using a sound level meter set to 'C'-weighting and a "slow" integration time. Play a broadband pink noise test signal set to -18 dBFS (Europe) or -20 dBFS (USA) on the console meters and measure the sound pressure level at the listening position. Then adjust each channel's level (can also be adjusted on all loudspeakers for a specific channel) until the desired level is achieved:

Application	SPL
Movie	85 dB(C)
Broadcast	79 dB(C)
Music	Engineer's preference

For information on setting up a subwoofer with these main loudspeakers, please refer to the operating manual supplied with the subwoofer.

## Technical Specifications

### Acoustics

Free field frequency response	90 Hz ... 20 kHz, $\pm 5$ dB
Self-generated noise	$\leq 20$ dB(A) at 10 cm
Max. SPL In half space at 3% THD	103.0 dB SPL
Averaged between	100 Hz and 6 kHz

### Electronics

Amplifier, cont.(peak) output power*	24 W (40 W)
Controller design	Analog, active
Protection circuitry	Amplifier thermal
Infrasonic filter frequency; slope	80 Hz; 12 dB/oct.

### Analog Input

Impedance, transformer balanced	XLR, 10 k $\Omega$
Input sensitivity	+6 dBu
Attenuator	0 ... $\infty$ dB
CMRR	>50 dB @ 15 kHz

### Digital Input/Output (M 52 D only)

	Optional
Format XLR (Format BNC)	AES/EBU (AES3id, S/P-DIF)
Impedance XLR, balanced	110 $\Omega$
Impedance BNC, unbalanced	75 $\Omega$
Input switching	Analog/Digital A, B, Mono
Digital converter: resolution, design	16 ... 24-bit DAC, $\Delta\Sigma$
sampling rate	32 ... 96 kHz

### Display and Mains Power

Indicators: On	Green
standby	Red
Mains power	85 ... 240 V AC
External power	12 ... 20 V DC
M 52 (D) Power consumption - Idle	5 VA, 90 mA (7 VA, 125 mA)
M 52 (D) Power consumption - Full output AC	50 VA, 1.7 A (50 VA, 1.8 A)

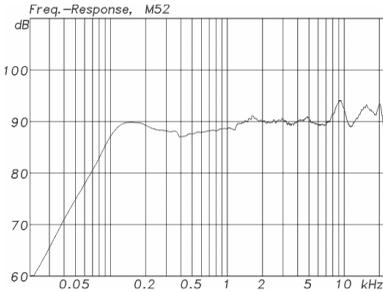
### Mechanics

Height x width x depth, mm	173 x 120 x 116 mm
inches	6 <sup>6</sup> / <sub>8</sub> " x 4 <sup>6</sup> / <sub>8</sub> " x 4 <sup>5</sup> / <sub>8</sub> "
Internal net volume	1.8 liters
M 52 Weight	1.7 kg (3.7 lbs)
M 52 D Weight	1.8 kg (4.0 lbs)
Drivers	Magnetically shielded
Woofer	3", 75 mm
Mounting points	3/8" threaded inserts on base M6 threaded inserts on sides
Cabinet surface finish	Painted
Color: standard	Anthracite (RAL 7021)
Baffle cover	Fixed metal grille

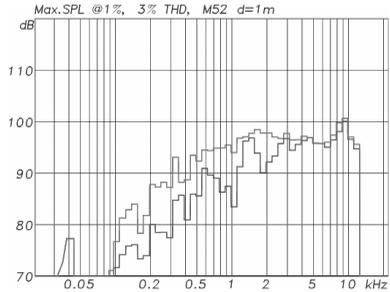
\*THD+N < 0.1 % with limiter deactivated

## Acoustical Measurements

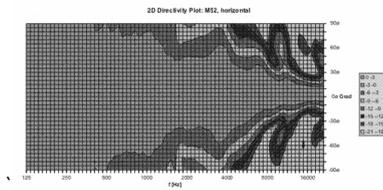
Below are acoustical measurements conducted in anechoic conditions at 1 m. Color versions of these graphs can be found on the appropriate product page of the klein-hummel.com web site.



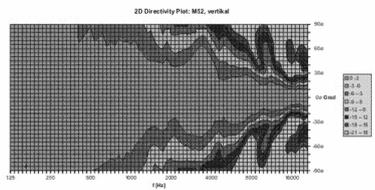
**M 52 (D) free-field response**



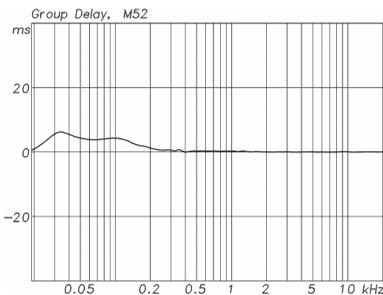
**M 52 (D) Maximum SPL output at 3% THD**



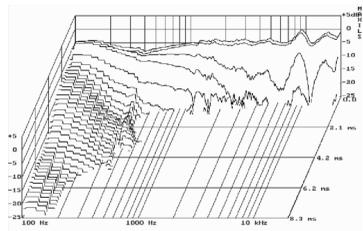
**M 52 (D) horizontal directivity plot**



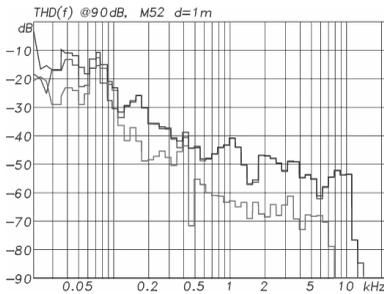
**M 52 (D) vertical directivity plot**



**M 52 (D) group delay**



**M 52 (D) cumulate spectral decay**



**M 52 (D) distortion at 90 dB SPL**

## Safety and Warnings

In addition to specific warnings throughout this document, please observe these additional general instructions.



This symbol means that a high voltage is to be found nearby. Take appropriate precautions to avoid electric shocks.



This symbol means that hot parts of the product may be found nearby. Take appropriate precautions to avoid burns.

### General

- Keep these instructions in a safe place for future reference.
- Failure to follow the safety and warning instructions contained in this document voids the warranty.
- This product should be used for the intention for which it was designed and as described in this document.

### Environment

- Ensure that the room in which you use this product is wired in accordance with the local electrical code and checked by a qualified inspector.
- A correctly earthed mains power connection should always be used.
- If access to the interior electronics is required, disconnect it from the mains power and allow electrical energy storage devices, such as capacitors and transformers, to discharge.
- Other electronic products may generate sufficient heat to require ventilation.
- Do not block or cover heatsinks, fans, or vents.
- Unless otherwise stated, this product is designed to be used indoors only.
- Do not expose this product to water, any other liquids, moisture, or naked flames.
- Do not install this product into hot, humid, or excessively dusty locations, or into direct sunlight.
- Avoid installing this product into locations where it will experience externally generated vibrations or heat (e.g. radiators).
- If the product is moved from a cold environment into a warm one (such as from a vehicle into a building), it is possible that condensation will form. Please allow the product sufficient time for acclimatization to room temperature before using.
- Wherever an amplifier is located, a free flow of air should be maintained by leaving a gap of at least 5 cm (2") around it. A flush mounted cabinet with the electronics panel still installed should be well-ventilated to avoid heat build-up and possible risk of fire.

### Use

- The equipment should be mounted by a suitably qualified professional in accordance with local, national, and international regulations and standards.
- Falling equipment can damage itself, people, and other objects, so do not place this unit on any unstable platform, cart, trolley, stand, table, or mounting hardware.
- Do not use accessories and options with this product that are not approved by Klein + Hummel.
- Mounting hardware must be attached to the appropriate hardware and attachment points rated and intended for such use.
- Ensure that the operating voltage of this product matches that of the local mains voltage.
- Use the power cable that came with this product as this has been manufactured to international safety standards. If it has been damaged obtain a similarly certified and specified mains power cable.
- This product should be unplugged from the mains power and the signal sources if it is not to be used for an extended period of time, or during lightning storms.

- The power switch on this product should be set to off before applying mains power via the mains power cable.
- Some parts of this product, particularly power amplifier components, can become hot to the touch. Do not touch these parts until they have cooled down.
- Never touch the loudspeaker's drivers.
- Loudspeakers are often capable of producing a sound pressure level in excess of 85 dB. This may cause permanent hearing damage so user caution is recommended. Noise exposure is a function of SPL and time, so observe local regulations when listening at high levels for a long time. Hearing protection may be required.

#### Servicing

- Repairs, maintenance, or other servicing of this product when its interior compartment is exposed should only be performed by Klein + Hummel authorized service engineers familiar with the equipment and risks involved in handling electronics.
- Servicing may be required in the event of exposure to unfavorable environmental conditions, such as liquids, excessive heat, or a lightning strike.
- Amplifier outputs may carry high voltages so take appropriate precautions, for example, connect the cables before powering up.
- When replacing a fuse, ensure that a brand new fuse is used. It must be exactly the same type, value, and voltage as the original, as stated in the product's technical specifications or on the circuit board.

## Maintenance and Servicing

- There are no user serviceable parts inside the standard version of this product. Repairs should only be undertaken by Klein + Hummel certified service engineer.
- Options and accessories are fitted at the user's own risk.
- Products may be cleaned using a non-abrasive cloth lightly dampened with water. Disconnect the mains power cable when cleaning to avoid risk of electric shock. Do not use alcohol-based cleaners.
- The electronics should only be opened by non-"Klein + Hummel certified service engineer" for the installation of user installable options as described in the product's operating manual. The mains power cable should be disconnected whenever the electronics panel is opened.
- If the main fuse blows, the product should be checked by a Klein + Hummel certified service engineer.

## Guarantee

This product comes with a guarantee, a copy of which is enclosed with this product.

## Recycling

Attention to product quality in the design phase ensures, firstly, that products have a long life and that, secondly, all parts of a product may be reused or recycled at the end of that life. An extensive product servicing network ensures that products can be repaired in the event of the premature failure of a part, or as a way to prolong the life of a product that would otherwise be considered a candidate for landfill. Eventually there comes a time when a product is considered beyond repair (for economic reasons or lack of parts), so the parts must be disposed of in a suitable manner. The disposal should conform to local environmental regulations and be conducted in an authorized recycling facility.

Loudspeakers and electronic products consist of some or all of these components:

Item	Material	Recycling Instructions
Loudspeaker Cabinets	Wood (MDF), steel, aluminum, polyurethane or a combination	Separate materials then recycle
Drivers	Aluminum, copper, paper and plastics	Separate materials then recycle
Damping Materials	Sheep wool	Compost
Electronics Panel	Aluminum	Remove electronics and recycle
Electronics	Various	Recycle in an approved recycling facility
Remote Electronics Kits	Steel and some electronics	Separate materials then recycle
Cables and Connectors	Metals and/or plastic	Reuse or recycle
Packing Material	Cardboard, wood and/or plastics	Separate materials then recycle
User Manuals and Sales Literature	Paper and cardboard	Recycle

## EC Declaration of Conformity

This equipment is in compliance with the essential requirements and other relevant provisions of Directives 89/336/EC and 73/23/EC. The declaration is available on the internet site at [www.klein-hummel.com](http://www.klein-hummel.com). Before putting the device into operation, please observe any respective country-specific regulations.

## **For loudspeakers fitted with digital inputs: Compliance to FCC Rules**

This device complies with part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions:

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

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

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

This class B digital apparatus complies with the Canadian ICES-003

Changes or modifications to this equipment not expressly approved by Klein + Hummel may void the FCC authorization to operate this equipment.







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Klein + Hummel reserve the right to change product specifications without notice.  
Exceptions and omissions excluded.

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