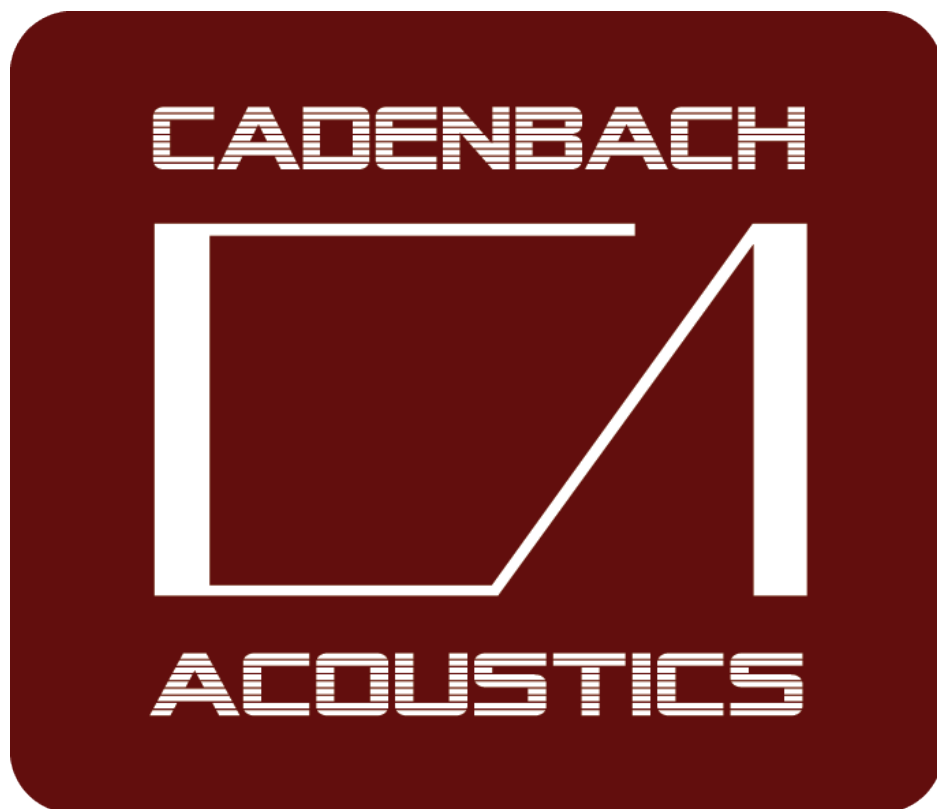


HARMONIA

Manual volume: E 0.1



YOU ART. WE SOUND.

HARMONIA 12 inch FIR point source loudspeaker



Safety precautions

Potential risk of personal injury

Never stand in the direct sound beam close to a loudspeakers driven at a high level. Professional loudspeaker systems can cause sound pressure levels that could harm human health. Noncritical sound levels at about 90 dB can cause hearing damage if people are exposed to it over a longer period.

In order to prevent accidents when deploying loudspeakers on the ground or when flown, please take note of the following:

- When setting up the loudspeakers or loudspeaker stands, make sure they are standing on a firm surface. If you place several systems on top of one another, use straps to secure them against movement.
- Only use accessories which have been tested and approved by Cadenbach Acoustics for assembly and mobile applications. Pay attention to the correct application and maximum load capacity of the accessories.
- Ensure that all additional hardware, fixings and fasteners used for installation or mobile use are of an appropriate size and load safety factor. Pay attention to the manufacturers instructions and to the relevant safety guidelines.
- Regularly check the loudspeaker housings and accessories for visible signs of wear and tear, and replace them when necessary.
- Regularly check all load bearing bolts in the mounting devices.

Potential risk of material damage

Loudspeakers produce a static magnetic field even if they are not connected or not in use. Therefore make sure when erecting and transporting loudspeakers that they are not near equipment and objects which may be impaired or damaged by an external magnetic field.

WARNINGS ON THE SPEAKERS BACK PLATE:

THIS EQUIPMENT CAN GENERATE EXTREME SOUND PRESSURE LEVELS THAT CAN LEAD TO PERMANENT HEARING DAMAGE.

THIS SURFACE MAY REACH HIGH TEMPERATURES WHILE IN USE.

TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

NO USER SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED PERSONNEL.

ONLY PERSONAL CERTIFIED TO BE TRAINED BY CADENBACH ACOUSTICS, HAVING PASSED S1 COURSE SHOULD SETUP THIS SYSTEM, OTHERWISE ANY WARRANTY IS VOID. SEE CORRESPONDING MANUAL.

MADE IN GERMANY / EU

HARMONIA 12 inch FIR point source loudspeaker

Product description



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Overview

HARMONIA is an extreme versatile point source loudspeaker with rotatable and interchangeable Horn in a multi-shape design with integrated standard truss mounting bar. It also provides quick lock pin side plates for easy and precise Cradle attachment and precise angling. Even full active equipped HARMONIA is still light weight and offers in all version more than 136 dB SPL at 1 meter. This enables the system to be used as main Loudspeaker system either as single speaker or in multiple horizontal and also vertical speaker array arrangement.

HARMONIA was designed for flexibility, whether using the speaker vertically or horizontally the Mid to High frequency 60° by 40° (90° x 50° when ordering HARMONIA9) CD horn delivers constant directivity and dispersion control and can be rotated into either the horizontal or vertical plane.

The construction of the 12 inch Low frequency neodymium cone with its 3 inch voice coil and Mid To High 1.5 inch exit driver section offers phase coherence between both chassis around crossover point of more than 5 octaves, creating a remarkable point source behaviour. The ring radiator design of the Mid to High compression driver has got a 1.75 inch voice coil delivering extra high excursion possibilities and radiates distortion free sound also above 16 kHz. TEUTATES is the dedicated low frequency extension, anyway all cadenbach acoustic sub woofers can be chosen to run with HARMONIA.

On order HARMONIA incorporates a very power full two channel frequency modulated floating modulator amplifier. Due to its advanced high efficiency power technology it runs at any moment at very low temperature and needs no fan cooling at all.

Operation

The frequency and phase response of HARMONIA is smooth at very low THD. HARMONIA can run full passive without the need of a controller and it can run in linear phase mode by using cadenbach acoustics **FIR filter** of the HEIMDALL D1 digital controller. Its rotatable and interchangeable horn offers full CD dispersion control in horizontal and vertical point source mode.

Applications

- Small concert halls, theatres and houses of worship, AV applications.
- Stage monitor, small to medium main system sound reinforcement.
- Side or front fill system, under balcony or distributed system.

Features

- Multi-shape design with high output level, with optional integrated amplifier
- Left and Right Horn one cabinet Monitor shape. Optimal integration with TEUTATES sub woofer.
- Very flexible CD coverage via rotatable, replaceable Horn and cadenbach acoustics FIR filters.
- Easy quick lock system and Truss bar integration for various fast flown configurations

HARMONIA 12 inch FIR point source loudspeaker



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Technical Specifications

Transducers

- Low frequency: **12 inches** (320 mm) Neodymium
- High frequency: **1.5 inches** (38 mm) Neodymium

Voice coil size and impedance

- Low frequency: **3 inches** (76 mm) Al, 8 ohms
- High frequency: **1.75 inches** (44.4 mm) Cu, 16 ohms

Diaphragm size

- High frequency: **1.75 inches** (44.4 mm) Polyester

Exit size

- High frequency: **1.5 inches** (38 mm) port

Nominal Impedance

- Low frequency: **8 ohms**
- High frequency: **16 ohms**
- Passive: **8 ohms**
Z = 8 ohms

Output at 1m

- **138.5 dB SPL** (3)
driven with PAX P16 137 dB
driven with internal amps 138 dB
- HARMONIA9: **137.5 dB SPL** (3)
driven with PAX P16 136 dB
driven with internal amps 137 dB

Sensitivity (SPL at 1m)

- Low frequency: **104 (300 Hz) dB / 130 dB**
cont. at 400 watts
- High frequency: **115 (1.5 kHz) dB / 134 dB**
cont. at 80 watts
- Passive: **103 (300 Hz) dB / 129 dB**
cont. at 400 watts

Power Handling

- Low frequency: **1500 watts peak**
400 watts AES
800 watts program
rec. amp power on 4 ohms
2800 watts
- High frequency: **450 watts peak**
80 watts AES
240 watts program
rec. amp power on 4 ohms
2800 watts
- Passive: **1500 watts peak**
400 watts AES
800 watts program
rec. amp power on 4 ohms
2800 watts

Crossover type and frequency

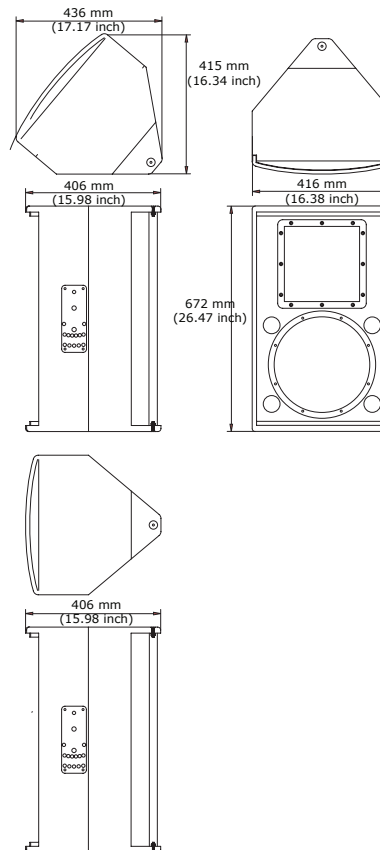
- Filter type active: **FIR zero phase**
Low to Mid High: **1.1 - 1.6 kHz**
- Filter type passive: **None** / FIR zero phase
Low to Mid High: **1.5 kHz**
- Sub to Low: **70 Hz - 130 Hz**

Frequency and Phase response

- Usable frequency range: **52 Hz - 22 kHz** (1)
- Free field frequency response: 75 Hz - 19.5 kHz
(-5 dB) linearity (+/- 0.5 dB)
passive no filter(+/- 2.5 dB)
- Phase response: **0° +/- 2°**
from 280 Hz to 21.5 kHz
passive: 180° to - 180° from 77 Hz to 17.5 kHz

Size and weight

- Height: **26.47 inches** (672 mm)
- Width: **16.38 inches** (416 mm)
- Depth: **15.98 inches** (406 mm)
- Weight:
52.91 lbs (24 kg) passive model
57.32 lbs (26 kg) active model



Coverage

- Horizontal coverage:
55° - 65° rotatable
HARMONIA9: 85° - 95° rotatable
- Vertical coverage:
40° rotatable
HARMONIA9: 50° rotatable

Speakers per PAX P16 channel

- For passive model:
2 / 3 (2) parallel via link

Connection

- For passive model:
2 x NL4 (1+/- passive, 2+/- link)

(1) Full-range mode, providing 115 dB @ 52 Hz

(2) possible only with short length cables.

(3) SPL max peak, test signal: pink noise with crest factor 6 dB.

HARMONIA 12 inch FIR point source loudspeaker



Data

Technical Specifications

Internal Amp module

- Type of output stage: free floating modulator FM out put power stage
- Total output Power and Volts: into 8 ohms
Music: **2 x 2800 watts** at **150 V_{pk}**
RMS: **2 x 1400 watts** at **106 V**
- Low frequency:
2800 watts peak / 1400 watts rms
- High frequency:
1400 watts peak / 700 watts rms

Audio specifications

- IM: **0,05%** (SMPTE)
- DIM: **0,005%** (DIM 100)
- THD: **0,02%** (+N 20 Hz - 20 kHz)

Audio input Connection

- XLR 5 pin, (with internal Controller XLR 3 pin) female in and male link out
5pin: 1g, 2 LF+, 3 LF-, 4 HF+, 5 HF-,
3pin: 1g, 2 +, 3 -

Audio input Impedance

- 20 kOhms symmetric (between + and -),
- 10 kOhms non symmetric (- grounded).

Ac Power connection

- Powercon 25 A blue in and white link (max 12,6 A link)

Ac Power specifications

- 180 - 265 V AC 50 Hz / 2200 VA

Mechanical specifications

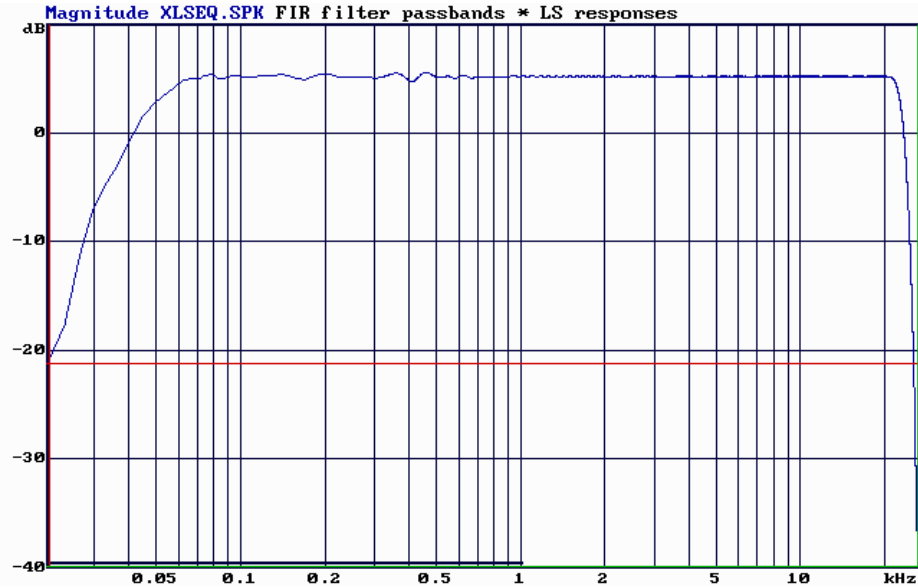
- Mounting: **2 Aluminum side plates** with 4 point quick lock
- Working load: 144 x Speaker-weight
- Construction: **15 - 27 mm Plywood** steal grill with foam, aluminum angle adjustment plates all powder coated, 50 mm truss bar, inside acoustic carpet, foam and glue damping.
Internal amp module mounted on 7 mm aluminum back plate with total passive fan free cooling.
- Flying frame: Quick lock U-type Cradle CSR-12U

HARMONIA 12 inch FIR point source loudspeaker

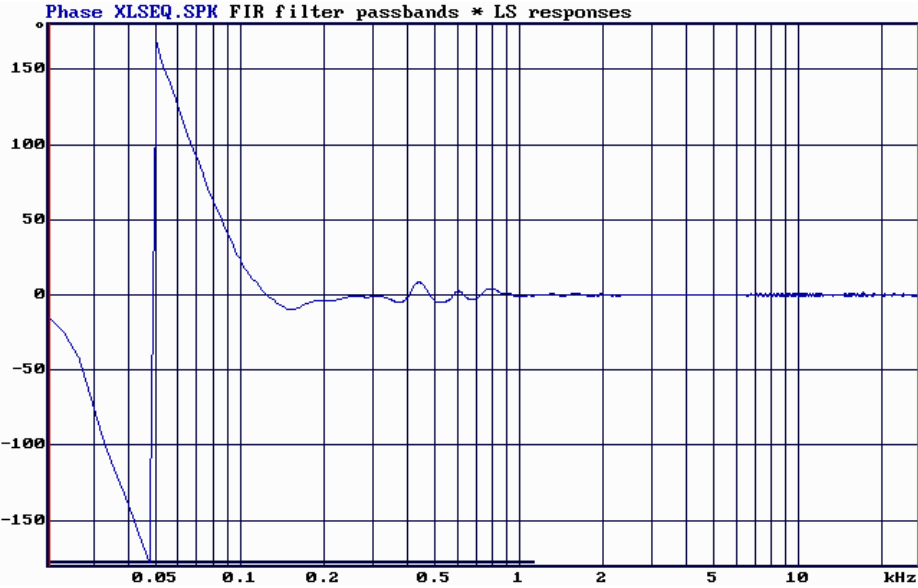


Data

Measurements



Frequency response with FIR Filter of HARMONIA



Phase response FIR linear phase Filter of HARMONIA

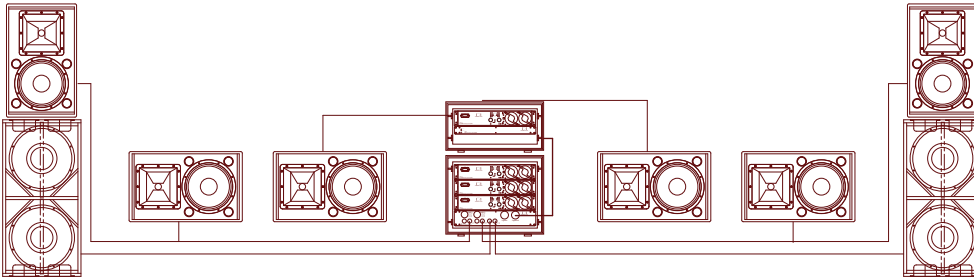
HARMONIA 12 inch FIR point source loudspeaker



Systems

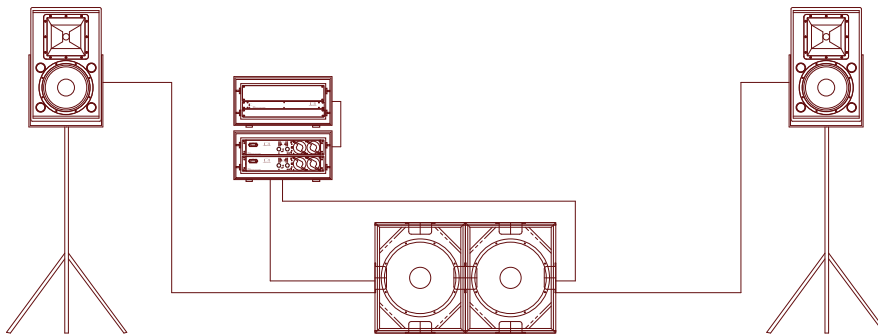
System setups: HARMONIA-S1

System for Monitor and Main or side, drum, stage fill system use, with 6 x HARMONIA-12UP with 2 x TAMARIS subwoofer, 1 x System ampcase with each 3 x PAX P16 and a 4u case with 1 x HEIMDALL D1 FIR Controller and 1 x PAX P16. Same Amping can double the speakers to run.



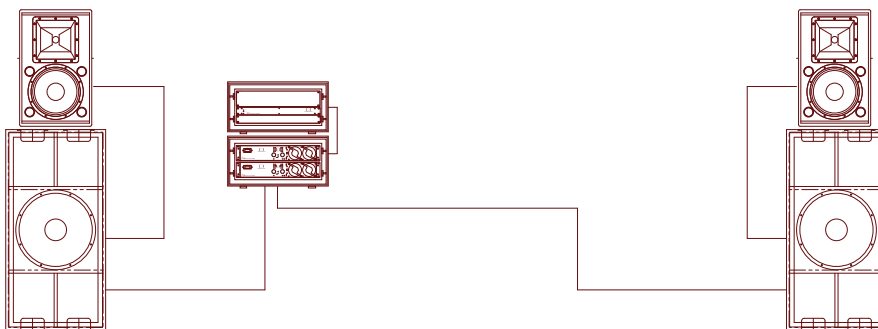
System setups: HARMONIA-S2

Typical starter system using 2 x HARMONIA-12UP passive per side with 2 x TEUTAES sub on the ground with 2 x PAX-P16 Amp + 1 x HEIMDALL D05 FIR Controller. Same Amping can double the speakers to run.



System setups: HARMONIA-S3

Typical starter system using 2 x HARMONIA-12UP passive per side with 2 x HORUS sub on the ground with 2 x PAX-P16 Amp + 1 x HEIMDALL D05 FIR Controller, same Amping can double the speakers to run.



HARMONIA 12 inch FIR point source loudspeaker

Save operating



Protecting your speaker

HARMONIA speakers may be used in combination with Cadenbach Acoustics PAX Amplifiers and Cadenbach Acoustics HEIMDALL controller.

In general, audio signals must not be over driven. This may be caused by mixing consoles, equalizers, effect equipment, etc. and should be indicated on this equipment. When a power amplifier is over-loaded at the output (clipping), then the amplifier activates a clipping warning signal. In any case, the signal must be reduced as soon as it sounds unnaturally distorted.

Damage caused by overloading the speakers or using the speakers without Cadenbach Acoustics PAX and HEIMDALL we do not assume warranty and excludes liability for possible consequential damage.

Permanent high-level signals with high frequency and continuous noise from feedback or permanently distorted high-level signals or noises, which occur when the amplifier is on while equipment is being connected, disconnected or switched on could damage the loudspeakers.

Do not install loudspeakers at places where they are permanently exposed to direct sunlight, high moisture, direct rain or strong vibrations and dust.

HARMONIA 12 inch FIR point source loudspeaker

Manufacturer's Declarations



YOU ART. WE SOUND.



EU conformity of loudspeakers (CE symbol)

This declaration applies to:

Cadenbach Acoustics loudspeaker, HARMONIA-12U
Cadenbach Acoustics loudspeaker, HARMONIA-12UP
Cadenbach Acoustics loudspeaker, HARMONIA9-12U
Cadenbach Acoustics loudspeaker, HARMONIA9-12UP

All production versions of these types are included, provided they correspond to the original technical version and have not been subject to any later design or electro-mechanical modifications.

We herewith declare that said products are in conformity with the provisions of the respective EC directives including all applicable amendments.

A detailed declaration is available on request and can be ordered from Cadenbach Acoustics.

WEEE Declaration (Disposal)

Electrical and electronic equipment must be disposed of separately from normal waste at the end of its operational lifetime.

Please dispose of this product according to the respective national regulations or contractual agreements. If there are any further questions concerning the disposal of this product, please contact Cadenbach Acoustics.

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